Modernize the Force

Modernization provides materiel solutions to improve capabilities that enhance the Army's ability to conduct successful early-entry, full spectrum operations world-wide. Modernization provides the capabilities required to transform to a force that meets the demands of persistent conflict in the 21st Century. We have updated key weapons and equipment since the early days of the current fight and have been steadily working to improve our speed and efficiency in this area. Our improvements are driven by Combatant Commander's assessments, mission requirements and our commitment to Soldier protection.

The Army must continue to prepare its Soldiers to succeed in the current conflict. The best equipment must be supplied adequately and on time. The Army must also continue to provide the technological edge over any future enemy that we face under any conditions. In the near term, the Army is committed to providing Soldiers with overmatch capability to defeat current and future adversaries. The Army faces several challenges in modernizing and equipping the Current Force. High-demand, low-density items such as up-armored tactical wheeled vehicles, Counter-Improvised Explosive Device and route-clearing vehicles are not available in adequate numbers to equip all non-deployed units. The result is that units returning from war require rotational equipment sets to support training. These shortfalls impact the Army's capacity to sustain operations. The Army is mitigating shortfalls in capacity by implementing Army Force Generation and investing in the stocks necessary to equip the force within ARFORGEN.

However, the Army must also continue to invest in capability by supporting upgrades to current modular formations and by introducing emerging technologies to the force.

Program Budget Review 09-13

Program Budget Review 09-13 in conjunction with proposed supplemental funding supports the upgrade of the Current Force to include

- Accomplishing two variants of Tanks and Bradley's by fiscal year 2013

- Displacing M113A2s and ambulances, with Strykers by fiscal year 2014

- Accelerating the Network (Warfighter Information Network – Tactical)

- Accomplishing Distributed Common Ground System – Army Version 3 by fiscal year 2010

- Accomplishing Pure Fleet Patriot by fiscal year 2011

- Maintaining Aviation Modernization (Joint Cargo Aircraft)

- Replacing Fox with Nuclear, Biological, and Chemical Reconnaissance Vehicle by fiscal year 2014

- Replacing all M35 Trucks by fiscal year 2010

- Beginning Program Improvement for Paladin (automotive/power train)

- Supporting Growth and Rebalance -- Grow the Army equipping

Core Materiel Programs Modernization

In the coming years the Nation will invest considerable resources to upgrade the Active and Reserve Component to include the Abrams and Bradley fleets as well as the tactical wheeled vehicles fleet. Aging ambulances; M113 command vehicles; and Nuclear, Biological and Chemical vehicles will be displaced throughout the force by Stryker variants. The plan accelerates aviation modernization efforts, restructures and standardizes attack/lift formations across the force, and upgrades an additional 96 Apache Attack helicopters in the Reserve and National Guard. Lastly, the Army will pure fleet the Patriot missile force transforming 1980s technology to more lethal missile defense systems. All of these efforts contribute to ensuring that our Army is relevant in the 21st Century. A modernization overview of the Army's Core Material Programs is organized in the following Appendixes:

Appendix 1: Combat Platforms – Maneuver

Appendix 2: Soldier as a System

Appendix 3: Aviation Systems

Appendix 4: Air and Missile Defense

Appendix 5: Fire Support

Appendix 6: Chemical, Biological, Radiological and Nuclear Defense

Appendix 7: Battle Command

Appendix 8: Battlespace Awareness

Appendix 9: Engineer Equipment

Appendix 10: Tactical Wheeled Vehicles

Appendix 11: Combat Service Support

Appendix 12: Army Watercraft

Appendix 13: Focused Logistics

Appendix 1: Combat Platforms–Maneuver

Discussion of Core Combat Platforms Materiel Programs

Abrams Tank

Modernization of the Abrams tank centers around getting the entire force equipped with two variants of the M1 main battle tank by 2013. The two variants, M1A2 SEP V2, and the M1A1 AIM SA provide the lethality and survivability necessary for the Abrams tank to be a viable part of the Army's inventory well into the future. The 120-millimeter main gun, a powerful 1,500-horsepower turbine engine, and special armor combine to make the Abrams tank especially effective against heavy armor forces on future battlefields.

The M1A1 tank modernization program includes increased armor protection, suspension improvements and a protection system against chemical attacks. An advanced computer system with embedded diagnostics, a second-generation thermal sensor and the capability to designate targets from increased distances can be incorporated into existing Abrams tanks. M1A2 tank modernization provides for the following:

- Commander's independent thermal viewer

- Independent commander's weapons station

- Navigation equipment

- Embedded diagnostic systems

- Improved fire control systems

The M1A2 System Enhancement Program adds second generation thermal sensors and a thermal management system. This program also includes upgrades to processors, with additional memory to allow the M1A2 to use the Army's Common Command and Control Software – enabling rapid transfer of data that provides additional situation awareness.

Abrams modernization is also responsible for an overall engine rebuild program, better management of spare parts and a database of all parts to ensure that a complete package of parts in available for any rebuild project or new production.

Program Status

The following units have fielded M1A2 SEP tanks:

- The Army Evaluation Task Force

- The 3rd Armored Cavalry Regiment

- The 1st Cavalry Division

- The 4th Infantry Division

By March 2009, 1st Brigade, 1st Armored Division projects fielding of M1A2 SEP tanks, to be shortly followed by remainder of the Brigade Combat Teams in 1st Armored Division. In FY09, 3rd Infantry Division begins fielding M1A1 Tanks with 2nd generation Forward Looking Infrared Radar.

The Army National Guard has added M1A1 Tanks to two of its Heavy Brigade Combat Teams. In August of FY08, the National Guard's 278th Brigade is projected to field M1A1 Tanks with 2nd generation Forward Looking Infrared Radar. All of these variants of the Abrams Tanks improve lethality, survivability and situational awareness.

Bradley Fighting Vehicle

Bradley Fighting Vehicle recapitalization rebuilds and upgrades Bradleys to the most modernized M2/M3A3 CM/ED configurations. The A3 version adds the following:

- Two second-generation Forward Looking Infrared Radar–one in the commander's independent viewer and one in the improved Bradley acquisition sight

- A position/navigation system

- Core electronic architecture

- Digital command and control

These upgrades improve crew ability to navigate, pinpoint and identify friendly and enemy positions, and engage two targets nearly simultaneously in both

day and night conditions. The digital command and control provides near real-time data links between Bradley Fighting Vehicles and headquarters.

Program Status

The following units have fielded M2/M3A3 Bradleys:

- The Army Evaluation Task Force

- The 3rd Armored Cavalry Regiment

- The 1st Cavalry Division

- The 4th Infantry Division

By August 2008, 4th Brigade, 1st Armored Division projects fielding of rebuilt (recapitalized) M2A3 Bradleys, followed by remaining Heavy Brigade Combat Teams in 1st Armored Division. By December 2011, 3rd Infantry Division is scheduled to complete fielding. The Army is currently fielding Bradley ODS-E vehicles to engineer companies in Heavy Brigade Combat Teams.

By FY13 National Guard Heavy Brigade Combat Teams begin fielding upgraded M2A2 Bradley Fighting Vehicles with second generation Forward Looking Infrared Radar.

Stryker Brigade Combat Teams and Stryker Armored Vehicle Modernization

The SBCT is inherently a precision unit. The force design of the SBCT provides the Army with dominant maneuver and precision engagement capabilities found in the modular brigade-centric force. Specifically the RSTA squadron, equipped with unmanned aerial vehicles and ground-based HUMINT specialists, provide the commander with unequalled situational understanding. The networked C2 architecture allows the commander to provide the same picture to lower echelons and major combat platforms, such as the Stryker vehicle, thereby establishing a real-time friendly force operational picture for the unit. The SBCT also features organic, ground-based sniper teams—the essence of precision strike and a critical combat requirement.

The SBCT's force application capability is truly global. C-130 transportable, the unit can deploy rapidly to austere environments, thereby overcoming enemy area-denial and anti-access efforts and can quickly mount offensive operations with minimal reception, staging and integration. Although it excels in the midpoint of the operational spectrum, it can fight effectively as a fully committed unit in major engagement and battles with augmentation (such as attack aviation and rocket artillery). With its superior tactical mobility and excellent battlefield situational awareness, the SBCT can also execute difficult security missions such as guard, cover, screen, counter reconnaissance and rear-area combat operations. The superior off-road maneuverability of the Stryker vehicle, combined with its dismounted infantry assault capability featuring robust anti-tank weaponry, ensures the SBCT can very effectively engage and destroy enemy armor in close, complex and urban terrain.

The Army is currently benefiting from the capability of the SBCT in operational missions in Iraq. The unit

is maximizing the capabilities of this transformational organization in combat operations. Examples are increased speed and survivability provided by the Stryker family of vehicles in the brigade; near-seamless situational awareness down to the combat vehicle crew level allowing quick execution of changing missions; high rate of reliability of the Stryker vehicles; and high confidence in the vehicle and its capabilities by the Soldiers in the brigade.

Stryker Family of Armored Vehicles

The Stryker Family of Armored Vehicles is the centerpiece combat and combat support platform for the SBCTs. Ten configurations of the Stryker will be fielded: the Infantry Carrier Vehicle, Reconnaissance Vehicle, Commander Vehicle, Mortar Carrier, Fire Support Vehicle, Anti-tank Guided Missile Vehicle, Engineer Squad Vehicle, Medical Evacuation Vehicle, Nuclear, Biological and Chemical Reconnaissance Vehicle and the Mobile Gun System. Stryker capabilities include:

- Strategically responsive and deployable on the complete U.S. Air Force family of transport aircraft, C-130 and larger

- Roll-on/roll-off combat capable with minimum preparation

- Superior situational awareness with inter-netted/ networked communications

- Survivability enhanced by all-around 14.5-millimeter armor piercing and 152-millimeter artillery airburst protection (add-on armor provides protection against RPG anti-tank weapons)

- Accurate target acquisition with LRAS3 mission package

- Accurate target engagement with Remote Weapon Station (MK19 grenade launcher and M2 .50 caliber machine gun)

- Decisive offensive action with dismounted ICV

- Bunker-busting capability with 105-millimeter cannon for roles in immediate fire support of dismounted infantry operations and with TOW missile bunker-buster munitions

- Responsive indirect fires with 120-millimeter mounted mortar

- Anti-tank capability with TOW 2B and Javelin-equipped dismounted infantry (ICV)

- Mobility enhanced by mine plow, roller and detector

- Integrated NBC sensor capability

Stryker provides a unique family-of-systems approach that maximizes commonality and integrated capabilities while filling an immediate capabilities gap in the Current Force. Stryker Brigade Combat Teams utilize the unit set fielding approach, which provides a new equipment training package for both operations and maintainers. The Stryker Brigade Combat Team is an infantry-centric, full spectrum combat force that provides division, corps, or Joint task force commanders a unique capability across the spectrum of conflict. The SBCT balances lethality, mobility and survivability against the requirements for rapid strategic deployability. Inherently, the SBCT is a precision unit that can operate in various types of battlespace, to include, some of the most austere locations in the world because of its deployability capabilities.

The force design of the SBCT provides the Army with dominant maneuver and precision engagement capabilities not found in any other Army brigade-sized unit. The RSTA squadron, equipped with unmanned

aerial systems and ground-based HUMINT specialists, provide the commander with unrivalled situational understanding. The networked command and control architecture allows the commander to provide the same picture to lower echelons and combat platforms, such as the Stryker family of vehicles, thereby establishing a near, real-time friendly force operational picture for the unit. The SBCT also features organic, ground-based sniper teams and robust Stryker Mobile Gun Systems equipped with enhanced optics and firepower—the essence of precision strike and decisive operations meeting critical combat requirements.

Program Status

Planned procurement is for 3,324 vehicles consisting of ten variants. This will equip seven brigade-size units including maintenance floats, a strategic pool of ready-to-fight systems, Institutional Training Base, Test Articles, an Equipping Force Pool managed by the Army Materiel Command, other operational requirements and NBCRVs to fill non-SBCT armored CBRN requirements The Stryker program has obtained a FRP decision on eight of the ten configuration variants. The Army has funded, and the Secretary of Defense has authorized, procurement and fielding of seven SBCTs to fulfill the defense strategy and National security requirements.

Stryker-Nuclear, Biological and Chemical Reconnaissance Vehicle

The Stryker-NBCRV incorporates integrated chemical and biological point detectors that allow on-the-move standoff biological and chemical agent detection. The Chemical Biological Mass Spectrometer improves the detection and identification of liquid chemical agents, while Joint Biological Point Detection System provides a first-time biological agent detection capability to the reconnaissance platform. The sensor suite automatically integrates contamination information with data from onboard navigation and meteorological systems and rapidly transmits contamination hazard and non-contaminated area intelligence to the appropriate operations center. Integration of the common CBRN technical architecture allows for expansion/upgrading of the onboard computers at minimal cost, as well as the command and control of CBRN-sensing UAVs and unmanned ground vehicles in the Future Combat Systems.

Program Status

Stryker-NBCRV Milestone C was reached in fourth quarter, FY04, allowing the start of LRIP for 17 NBCRVs. An Extended LRIP was authorized for 95 additional NBCRVs in first quarter FY08. The FRP decision is now scheduled for FY10. The Stryker-NBCRV begin fielding in FY06, will field to HBCTs in late FY10; and planned fielding to chemical companies is thereafter.

Stryker-Mobile Gun System

The Stryker MGS provides rapid direct supporting fires to assaulting infantry in order to destroy or suppress hardened enemy bunkers, machine gun positions, create breach points in up to double reinforced concrete walls and sniper positions in urban, restricted and open rolling terrain. Its primary weapon system is the M68A1E8, 105-millimeter cannon with an 18-round auto-loader capacity. Additionally it has a coaxial mounted 7.62 millimeter machine gun and a pintal mounted .50 caliber machine gun for the vehicle commander. The main gun is capable of firing current 105-millimeter munitions which include: canister, SABOT, HEAT and HEP rounds.

Program Status

MGS Milestone C was reached in first quarter, FY 04, allowing the start LRIP of 72 MGS Strykers. SBCT 4 fielded 27 MGS in FY 07 and is currently conducting combat operations with the MGS. SBCT 3 and 5 have been fielded with 9 MGS each in third quarter, FY 07. On 22 Dec 07 the DAE authorized the procurement of the long-lead items required to support the FY-08 production quantity of MGS's. The MS III Full Rate Production DAB decision is currently for second quarter, FY 08, for the remaining 199 MGS.

Appendix 2: The Soldier as a System

Discussion of Core Soldier as a System Materiel Programs

Ground Soldier Ensemble

Ground Soldier Ensemble (GSE) integrates multiple components and leverages emerging technologies to provide overmatching operational capabilities to ground combat Soldiers and small units. The GSE gives infantry Soldiers additional capability above the core Soldier system, specifically oriented to network integration of the individual Soldier, protection, mobility, sustainability, reliability and embedded training. GSE capabilities, based on the predecessor Land Warrior System, are intended to meet the needs of all Soldiers who conduct ground combat and provide the dismounted Soldier component of the Future Combat Systems and of the Brigade Combat Teams. GSE increases capabilities of individual Soldiers to conduct offensive and defensive operations by incorporating the following:

- Network-centric enabled operations at the small unit level

- User defined operating picture

- Improved force protection against threats

- Access to weapons, sensors and external assets formerly available only to higher level units

- Embedded training to enable the Soldier to meet the growth in demand for future skills
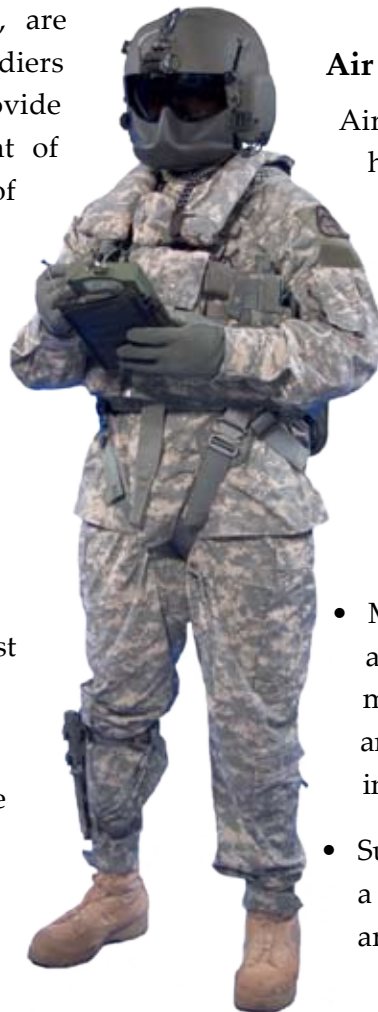
and proficiency levels

- Affordable, supportable, adaptable and highly mobile logistics concept

The GSE is required to be modular to fit within the SaaS architecture, permit tailoring for mission requirements, allow tailoring of the combat load and to streamline maintenance.

Program Status

GSE fielding is scheduled to the Army Evaluation Task Force in FY10 and planned to achieve First Unit Equipped in FY12. GSE fielding will be aligned with FCS Spin-out #2 BCTs starting in FY13. GSE is scheduling a milestone B decision in third quarter FY08.

Air Warrior

Air Warrior (AW) is a Soldier system for helicopter crewmen that provides a new generation of integrated, mission-tailorable, life support equipment, body armor, chemical and biological protection equipment with reduced weight/bulk. It is designed to improve aircrew endurance and performance. AW significantly improves flight time in Mission Oriented Protective Posture from 1.6 to 5.3 hours. Components include:

- Microclimate cooling system that includes a microclimate cooling garment and a small microclimate cooling unit that chills water and pumps it through small tubes embedded in the garment

- Survival equipment subsystem that includes a survival gear carrier, soft and hard body armor, thigh holster and survival knife

- Interim Modular Integrated Helmet Display System with laser eye-protection and a night-vision device mount

- Over-water survival subsystem that includes a personal flotation device, survival egress air (breathing oxygen) and an inflatable raft that is integrated into the ensemble and worn by the crew member

- Nuclear, biological and chemical protection with modified chemical protective undergarment, M-45 or M-48 protective mask with blower unit, gloves and over boots

- Aviation clothing items that include modified aircrew battle dress uniform and the Aircrew Cold Weather Garment System

Future AW system spiral development improvements focus enhanced components reflecting emerging technologies defined in AW Blocks II and III. Air warrior transitions to Air Soldier under the SaaS concept once the Air Soldier CDD is validated by HQDA in FY08/09.

Block II developmental and production efforts are underway and will add an encrypted Aircraft Wireless Intercom System and the Electronic Data Manager (EDM). AWIS will enhance crew member performance by providing the capability for wireless communications within the aircrew and with ground crew or ramp support personnel such as in a tactical forward area rearm and refueling point. The EDM, in the form of a digital kneeboard, provides a capability to the aircrew to generate, store, display and distribute digital information and will interface with Blue Force Tracking systems.

Block III efforts will increase performance and capabilities by adding a fully compliant MIHDS helmet. The MIHDS helmet will provide, as a baseline, the same safety performance characteristics as the HGU-56/P helmet. The MIHDS will be tailorable and compatible with the Apache helmet-configuration and head tracking technologies and will also provide an improved day/night helmet-mounted display symbology for those aircraft that currently lack this feature. These helmet-mounted displays will be compatible with aircrew prescription spectacles, CB protection, oxygen masks, laser eye protection and nuclear flash protection technologies. CB protection will be donned in-flight without removing the helmet.

Program Status

Air Warrior currently is being fielded to the force. Approximately 76 percent of AW Block I equipment and 27 percent of the EDMs have been fielded. The encrypted AWIS is still in development and testing.

Mounted Soldier System

Mounted Soldier System (MSS) will provide combat vehicle crewmembers and platform commanders with increased mission effectiveness in the areas of command and control, situational awareness, communications, force protection, survivability, mobility and sustainability. MSS provides dismounted and mounted combat crews uninterrupted viewing of their

immediate surroundings while remaining connected to onboard platform C4ISR capabilities, providing crews with continuous SA and communications with both mounted and dismounted Soldiers.

MSS also will provide maximum individual protection from Chemical/Biological contamination without reducing individual dexterity, tactility, agility and mobility. The MSS includes a Combat Vehicle Crewman helmet head-mounted display, and improved audio headset and microphone; body gear subsystem, providing cordless communications; crew member over garments; gloves; footwear; ballistic protection; CB protective mask and over garments; ballistic eye protection; and on-the-move hydration; as well as a Vehicle Interface Kit subsystem with components that mount to the vehicle. The MSS equips all Combat Vehicle Crewman and selected Maneuver Support and Maneuver Sustainment Soldiers who perform mounted missions.

Program Status

MSS achieved Milestone B on 17 October 2007. MSS program funding will be initiated in FY09 for System Development and Demonstration. This funding will enable the development of MSS in support of an initial fielding to 13 HBCTs (two heavy divisions) and seven SBCTs.

Combat Identification

Combat Identification measures enhance Soldier protection and overall combat effectiveness by minimizing fratricide incidents. As a result of lessons learned in OEF and OIF, the Army has fielded thousands of the Joint CID Marking System kits to its forces. The JCIMS kit consists of thermal and infrared marking devices that enable forces equipped with FLIR and night-vision sensors to identify friendly forces based on unique signatures of the JCIMS

devices. Combined with the increasing density of GPS systems, BFT systems, FBCB2 and Second Generation FLIR technology, these devices on the battlefield have significantly reduced fratricide incidents through improved ability to locate and identify friendly forces.

An interactive vehicle recognition training device called Recognition of Combat Vehicles is being issued to Soldiers at every level and can be easily downloaded because it comes on a computer disc. Army Combat Training Centers have put in place measures to assess CID and SA during unit rotations and an aggressive program for capturing, reconciling and leveraging lessons learned from OIF, OEF and CTCs. CID is a major focus area at the Center for Army Lessons Learned.

Program Status

In March 2006, the Army and Marine Corps Board, co-chaired by Army G-8 and the U.S. Marine Corps Assistant Deputy Commandant, Programs & Resources, conducted a review of CID efforts in the Army and Marine Corps and directed the following: implement a Joint acquisition strategy for a Millimeter Wave cooperative target identification capability; implement a Joint acquisition strategy for Radio Based Combat Identification capability align with AMCB/JFCOM A-G CID study banded investment recommendation of 4 Jan 06; fully embed and institutionalize Millimeter Wave and RBCI in services' training strategy and programs; coordinate Joint acquisition strategy within POM 08-13; provide appropriate guidance to service authorities and program managers to implement Joint acquisition strategy for Millimeter Wave and RBCI; approve the recommended follow-on actions for other assessed technologies. OSD Program Decision Memorandum II added funds within existing resources for BTID development and maintain option for POM FY10 MS B

for the program of record if full funding requirements are satisfied in POM FY 10 and required resolution of Joint and Coalition Cooperative Target ID-Ground capability strategy at Army/Marine Corps Board with report to DAWG by May 1, 2008; include recommended POM FY 10 funding.

Thermal Weapon Sights

Thermal Weapon Sights are a family of low-cost, lightweight, man-portable IR imaging devices used for surveillance and fire control of individual and crew served weapons during daylight and darkness, adverse weather and dirty battlefield scenarios. They can also penetrate light foliage, smoke, dust and camouflage. Un-cooled microbolometer technology has evolved to enable the development of advanced TWS II systems. TWS II systems offer increased performance in a smaller, lighter package and employ the use of standard commercial batteries.

Program Status

The TWS program is in fielding/sustainment, having fielded more than 39,000 light, medium and heavy systems. Fielding will continue to FY13 to meet the Acquisition Objective. The Future Weapon Sight is in early development, intended to further improve situational awareness, interoperability and operational flexibility. LRIP is expected to start in FY12, with full rate production in FY13 and beyond.

Enhanced Night Vision Goggles

The next generation of night-vision goggles for the Soldier is the Enhanced Night Vision Goggles. It combines both an un-cooled thermal and an image-intensification capability into a single integrated device. ENVG improves Soldier situational awareness by providing the capability to rapidly detect and recognize man-sized targets, while simultaneously maintaining the ability to see detail and to use rifle-mounted aiming lights. The ENVG provides Soldiers the ability to engage and execute close combat in all levels of light, to include the zero-illumination conditions found in caves and underground environments, adverse weather conditions and under battlefield obscurant conditions. This is a system component of the Soldier Warrior programs.

Program Status

The ENVG completed Operational Testing in June 2007. The first Unit was equipped in February 2008.

M-4 Carbine

The M-4 is the Soldier's weapon of choice in Iraq and Afghanistan. It has been a combat proven weapon since its introduction into the force in 1991. The M-4

Carbine is the primary individual combat rifle for the Army's BCTs and ARSOF Soldiers. Lessons learned have shown that the M-4's combination of light weight, maneuverability and lethality are clearly preferred by Soldiers and units in the field. It is also easily maintained.

The Army began combat operations in 2001 with a mix of M16A2s, M16A4s and some M-4 Carbines. All M-4s initially issued did not include the full suite of enhancements now available, but all are now included with current M-4 fielding (Adapter rails, collapsible butt stock, 3-point sling, back-up iron sight, close combat optic and seven new magazines). This gives the M-4 the most current technology available of any mass produced rifle/carbine in general use today by any Army and allows for the weapon to be further enhanced with technology improvements.

Program Status

The M-4 is currently in production and fielding.

M110 7.62 millimeter Semi-Automatic Sniper System

The selected replacement for the M24 Sniper Weapons System, the M110 7.62 millimeter Semi-Automatic Sniper System is effective against personnel and light materiel targets. Capable of rapid fire/rapid reload, this suppressed sniper rifle exceeds the rate-of-fire and lethality of the M24 Sniper Weapon System. SASS is lighter than the M24 and its anti-personnel ranges are equal to or greater than M24. SASS includes an enhanced sniper spotting scope, a detachable suppressor, a carrying case and other support equipment.

Program Status

The M110 currently is in production and fielding to Army units preparing to deploy to the current Theater of Operations. The current production rate is 75 weapons systems per month.

XM 150 Rifle Combat Optic

The XM 150 Rifle Combat Optic will improve the capability to recognize and engage targets from zero to 600 meters with the M-4 carbine, M16 Rifle and the M249 SAW. The optic will allow Soldiers to rapidly transition between long- and close-quarter engagements without degrading the ability to conduct reflexive fire techniques. The optic can be used to scan an area for acquiring and engaging targets. When a target is acquired, the ranging reticle within the optic can be used to obtain an accurate range to the target. An appropriate aiming point on the reticle can then be selected to accurately engage the target.

Program Status

The Rifle Combat Optic has an approved CPD. The sight is currently being fielded via RFI to units directly involved in the GWOT. Approximately 33,000 RCOs are in use in Iraq and Afghanistan at this time. Type Classification is currently scheduled for March 2008 with the first Unit being equipped in 4th Qtr FY08.

Land Warrior/ Mounted Warrior

Land Warrior, the precursor to what will be the Ground Soldier System, provides small unit leaders with Battle Command and situation awareness capabilities that have proven to be combat multipliers in tactical operations. The Battle Command and situational awareness information shared and displayed

among leaders enable greater mobility, speed of execution, flexibility, momentum, coordination and synchronization between mounted and dismounted maneuver elements. The visualization of the fight, enabled by Battle Command and situational awareness information, enhances the ability to mass combat power at the right place and time to kill or capture enemy forces, minimize friendly casualties and successfully execute tactical missions, thereby enhancing the small units' lethality and survivability in combat.

Leaders at each level are very positive about the Land Warrior and Mounted Warrior capabilities. For example the digital icon provides an excellent visual reference capability and has proven to be a very useful tactical command and control measure for small units. The ability for small unit leaders to communicate, the situational awareness capabilities in Land Warrior, coupled with the GPS navigation capability have greatly enhanced small unit combat operations.

Appendix 3: Aviation Systems

Discussion of Core Aviation Materiel Programs

AH-64 Apache Attack Helicopter

The AH-64 Apache is the Army's heavy attack helicopter assigned to armed reconnaissance battalions and regimental aviation squadrons in both the Active and Reserve Components. Apache is a two-pilot, twin-engine attack helicopter designed to meet the current mission requirements for reconnaissance and attack worldwide, day or night, under obscured battlefield and adverse weather conditions. The upgraded AH-64D Longbow began fielding in 1998. The AH-64D upgrades, among other improvements, adds a millimeter wave Fire Control Radar, Radar Frequency Interferometer, fire-and-forget radar-guided missile and cockpit management and digitization enhancements. The combination of FCR, RFI, and the advanced navigation and avionics suite provides increased SA, lethality, and survivability.

The Apache-focused recapitalization program integrates a number of related initiatives to produce and retrofit aircraft across the Apache fleet to meet objectives of the Army's recapitalization policy and to address lessons learned from recent combat operations and deployments. This program applies reliability and safety modifications, increases aircraft life by addressing high-maintenance demand/operating and support cost drivers and incorporating a second-generation forward-looking infrared with the Modernized Target Acquisition Designation Sight/Pilot Night Vision Sensor.

The program goals are to reduce the overall average airframe age of the fleet to the half-life metric of 10 years by 2010, increase the unscheduled mean time between removal rate by 20 percent for selected recapitalized components, and maximize the return on recapped components by 20 percent.

Program Status

Remanufacture of 621 AH-64As to the AH-64D Longbow configuration will be complete in FY10. In January 2007, the first of 120 AH-64A model Apaches was inducted for conversions to D model Longbow configuration. This will continue through FY10. Deliveries will begin in FY08 and end in FY11. The Army has been funded for 32 additional War Replacement Aircraft with three deliveries in FY08, 11 in FY09 and 18 in FY10.

ARH-70A Arapaho Armed Reconnaissance Helicopter

The mission of ARH-70A helicopter is to provide a robust reconnaissance and security capability for the Joint combined arms air-ground maneuver team. The ARH program was established to correct OH-58D capability gaps for use in reconnaissance. As a result of Aviation Focus Group analysis, in February 2004, the Army Chief of Staff identified the need for 368 ARH aircraft to replace the existing OH-58D fleet. The requirement has since grown to 512 aircraft. The

increase to 512 aircraft is due to the conversion of four AH-64A National Guard Apache battalions to the ARH-70A.

Program Status

ARH's first flight occurred on 20 July 2006. A Limited User's Test was conducted in November 2007 with a subsequent LUT expected in February 2009 following its Milestone C decision in June 2008. A Full Rate Production decision review is expected in 1st quarter FY11 with the First Unit Equipped in 4th quarter FY11.

The Lakota is a light, commercially procured helicopter designed to perform a variety of missions—from Joint to non-governmental to homeland security and Force medical evacuation operations. It is the newest aircraft in the Army's inventory. The UH-72A fleet is composed of 18 aircraft as of 21 December 2007. The Army intends to procure and field 322 Lakotas from FY06-15; estimated cost of the LUH program is $5 billion. LUH is designed to transport two crew and six Soldiers. Additional configurations include two NATO litters with patients and one medical attendant. The aircraft has a hoist for use in emergency evacuations. The ARNG will be the primary user of the LUH, conducting missions in support of homeland security such as civil search and rescue, medical evacuation, and counter-drug operations.

Program Status

On 13 February 2006, OSD delegated the LUH Program to the Army as an Acquisition Category (ACAT) 1C (COTS). UH-72A LUH FUE completed in May 2007. The UH-72A LUH program received Full-Rate Production decision in August 2007.

UH-60 Black Hawk Helicopter

With its 28 configurations and mission equipment package variants, the UH-60 Black Hawk is the Army's Current and Future Force utility and MEDEVAC helicopter. The UH-60 Fleet is composed of 1,669 aircraft. There are 949 UH-60A models, which began production in 1977; 671 UH-60L models, which began production in 1989; and 26 UH-60M models, which began production in 2005. The Black Hawk can transport 11 fully equipped combat troops, plus an external load up to 9,000 pounds, depending on the model. The UH-60 provides rapid and agile maneuver capability through air assault, general support, airborne C2 and MEDEVAC, providing commanders the ability to initiate, conduct and sustain combat operations by providing internal and external lift of troops, weapon systems, supplies and equipment. In the airborne C2 role it provides full Joint and combined interoperability with other C4ISR elements. The Army will procure the UH-60M/HH-60M to extend fleet capabilities thru 2025, incorporate Global Air Traffic Management requirements and extend aircraft life.

Program Status

The UH-60M and HH-60M programs received full-rate production decision in June 2007. FUE for UH-60M is FY08. The accelerated development of new technologies has resulted in an upgrade program for the UH-60M that will include fly-by-wire Common Avionics Architecture System, Composite Tail cone and Drive shafts and Full-Authority Digital Engine Control. In-process review cut-in decision for these upgrades will occur in late-FY08.

CH-47 Chinook Helicopter

The CH-47 Chinook is a twin-turbine, tandem-rotor, heavy-lift transport helicopter with a useful load of up to 25,000 pounds. Secondary missions include MEDEVAC, aircraft recovery, parachute drops, disaster relief and search and rescue operations. These aircraft are the Army's only heavy-lift aircraft and are fielded to heavy helicopter companies and Special Operations Aviation Regiment.

Key modifications integrate a new-machined airframe, an upgraded T55-GA-714A engine to restore performance capability, Common Avionics Architecture System, Air Warrior, Common Missile Warning System, enhanced air transportability, Digital

Automatic Flight Control System and an Extended Range Fuel System II for self-deployment missions. The CH-47F recapitalization program provides a more reliable, less costly way to operate aircraft compatible with Joint digital connectivity requirements in the Future Force with an extended life of approximately 20 years. The CH-47F is expected to remain the Army's heavy-lift helicopter until at least 2020-2025, ultimately to be replaced by the Joint Heavy Lift Aircraft.
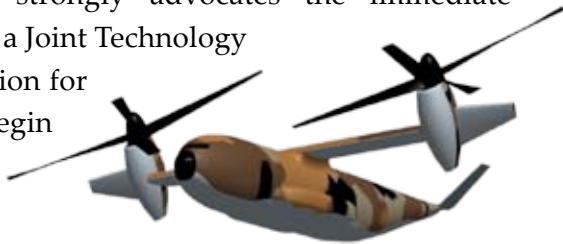
Program Status

A total of 452 CH-47F model aircraft are planned for delivery to the Army over the next 12 years. Of these, 120 will be new builds and the remaining 352 "remanufactured" aircraft. The remanufactured aircraft have 97 items that are recapitalized from retired CH-47Ds. With the exception of these items, all other components, including airframes, wiring bundles and hydraulic systems on the remanufactured CH-47Fs are new. FUE was completed on 20 July 2007. Subsequent CH-47F units will be fielded at a rate of two units per year.

Joint Heavy Lift

The Joint Heavy Lift (JHL) is intended to be the Department of the Army's next-generation heavy lift rotorcraft to support the Army's Mounted Vertical Maneuver concept. The JHL program calls for an aircraft that can transport up to 29 tons—the currently anticipated weight of a vehicle in the FCS—to a radius of about 500 nautical miles at speeds greater than 250 knots. The need for a JHL solution has been recognized by the Services and documented in the form of a draft JHL Initial Capabilities Document (ICD). However the Army and Air Force are still discussing the final version of the ICD. In FY 05, the Army, in cooperation with its Joint Service and NASA partners, announced the award of five 18 month agreements/contracts for the Concept Design and Analysis (CDA) of a Vertical Takeoff and Landing (VTOL) Joint Heavy Lift (JHL) rotorcraft. In May 07, JHL program officials unveiled a sketch of a "High Efficiency Tilt Rotor" (HETR) that reduced industry offerings from five to three. The Army strongly advocates the immediate initiation of a Joint Technology Demonstration for JHL to begin in FY 08.

Program Status.

The FY08 Army budget request included $6 million in FY07 and $3.065 million in FY08 for RDT&E to complete the final Concept Refinement Design Review; complete a preliminary Joint Concepts Analysis of Alternatives; and develop a draft Capabilities Document. The FY08 request also terminates the Future Transport Rotorcraft Program shown in the FY07 request. An Initial Capabilities Document Adjudication Conference was held 4 Dec 07. Currently, the Army and Air Force are working through differences in their positions.

Fixed-Wing Aircraft

The fixed-wing modernization strategy addresses an aging fleet of 292 aircraft of 21 different models by procuring an Aerial Common Sensor, Joint Cargo Aircraft and a Future Utility Aircraft. Decisions on the movement, retirement and reorganization of the fixed-wing fleet will be based on the fixed-wing *Operational and Organizational Plan*. The approved fixed-wing O&O Plan addresses Table of Distribution and Allowances to Modified Table of Organization and Equipment reorganization; composition of the fixed-wing fleet; and required capabilities for fixed-wing aircraft in the Future Force.

Program Status

The Army will retain the approved fixed-wing force structure, given recent agreements with the U.S. Air Force on the Joint Cargo Aircraft, and in anticipation of the outcome of the Program Decision Memorandum II OSA Study, the PDM III FCA/LCA Study, PDM IV Non-Standard Airlift Study and the USAF Intra-theater Airlift Force Mix Analysis. Army senior leadership will review and adjust the final transformation of the fixed-wing fleet at the conclusion of these studies.

Hellfire Family of Missiles

Hellfire air-to-ground missiles destroy armored and high-value point targets. Semi-active laser HF tracks laser energy delivered by ground or airborne designators, while Longbow HF uses internal millimeter wave radar frequency for autonomous guidance. AH-64 Apache, ARH, ER/MP and OH-58D Kiowa Warrior use HF as their primary air-to-ground weapon. Joint Air-to-Ground Missile is programmed to be the follow-on to Hellfire. JAGM provides a multi-mode seeker coupled with a multi-purpose warhead that provides increased range over Hellfire.

Program Status

The P+ Hellfire missile is scheduled for production in sufficient quantities to support the fielding of the ER/MP UAV from FY09-13. Additional procurements will be addressed in the FY09-13 POM. JAGM is programmed for use on Army Aviation helicopters and UAS, and select USMC and USN helicopters and fixed wing aircraft. Initial fielding is programmed for FY11.

Unmanned Aircraft Systems

In Operations Enduring Freedom and Iraqi Freedom, Unmanned Aircraft Systems such as Raven, Shadow 200, Hunter and Improved GNAT are providing a new dimension to maneuver forces. Raven enhances small-unit reconnaissance, surveillance, and target acquisition, and is used for training by deploying units. The Army's first Tactical Unmanned Aircraft System to go FRP is the Shadow 200, fielded to military intelligence companies in maneuver brigades. Planned system improvements include engine and airframe upgrades, refined target location error, Tactical Common Data Link and addition of a laser designation into the payload gimble.

Hunter is fielded in the aerial exploitation battalions of the Intelligence and Security Command Theater Military Intelligence Brigades. Hunter is a RSTA/ISR and battle-damage assessment asset providing ground forces with near real-time imagery via electro-optical/infrared intelligence at ranges up to 200 kilometers. Used extensively as an ISR platform, Hunter UAS has been upgraded to employ Viper Strike munitions; its capability will be sustained until the ER/MP UAS is fielded at the division level as a RSTA/ISR, target attack and command, control, communications and intelligence system.

The Future Combat Systems include two separate and distinct efforts. The Class I UAS provides the ground Soldier with Reconnaissance and Surveillance and Target acquisition. The Class I UAS uses autonomous flight and navigation, but it will interact with the Network and Soldier to dynamically update routes and target information. It provides dedicated reconnaissance support and early warning from the lowest echelon to the Brigade Combat Team in environments not suited for larger assets. The Class I UAS provides a dedicated UAV capability at platoon level, hover & stare capability enabling observation of urban infrastructure, Electro-Optical/Infrared/Laser Designation/Laser Range Finder Sensor capability and a heavy fuel engine propulsion system. The CL

IV will be multifunction aerial systems capable of providing reconnaissance, security/early warning, long endurance persistent stare, target acquisition and designation, wide area surveillance and have the capability to team (with Level IV Control) with air-ground forces throughout the FCS BCT. The aerial systems will provide information from operating altitude and standoff range both day/night and adverse weather. The aerial systems should be capable of acting as a communication relay, detect Chemical, Biological, Radiological, Nuclear materials or high-yield explosive devices and perform meteorological survey for the FCS BCT throughout their area of influence.

Extended Range/Multi-Purpose Unmanned Aircraft System (ER/MP)

Extended Range/Multi-Purpose is an unmanned aircraft system to conduct continuous operations against moving and stationary targets. The ER/MP system is composed of 12 multi-role air vehicles (six with SATCOM), five ground control stations, two portable ground control stations, five TCDLs ground data terminals, two TCDL portable ground data terminals, one SATCOM system, four automatic takeoff and landing systems, 12 electro-optic/infrared and 12 synthetic aperture radars/moving target indicators.

ER/MP UAS provides division-level and above commanders dedicated mission-configured UAS support to battlefield surveillance brigades and fires brigades, and tactical commanders a real-time responsive capability to conduct an array of missions to include reconnaissance, surveillance and target acquisition, C2, communications relay, signals intelligence and BDA capability. ER/MP equates to a company-size organization and is planned to be fielded as a separate company organic to the combat aviation brigade.

Program Status

FUE for ER/MP is planned for FY09 with IOC planned for FY10. Ten companies plus a training base asset are planned.

Small Unmanned Aircraft System (SUAS)

Small Unmanned Aircraft System is man portable and consists of five basic components: ground control station, remote video terminal, air vehicle (three per system), payload and field repair kit. SUAS provides company- to brigade-level commanders a greater ability to shape over-the-hill operations with dedicated unmanned aerial vehicles.

With a wingspan of 4.5 ft. and a weight of 4.2 lbs, the hand-launched battery-powered AV provides aerial observation, day or night, at line-of-sight ranges up to 10 kilometers and delivers color or infrared imagery in real time to the GCS and RVT. Flight duration of 90 minutes is possible with organic rechargeable lithium batteries. Assembly, preflight and launch are accomplished in less than five minutes. Hand-launch and auto-land recovery are made in a small area without a prepared site or auxiliary equipment. Both one-man and two-man operations are possible.

Program Status

On October 5th, 2006, the Milestone Decision Authority authorized the SUAS program to enter FRP and exercise options in the SUAS contract for FY07 and beyond to procure the quantity of systems identified in the SUAS Acquisition Plan.

Other Aviation Initiatives

Aircraft Survivability Equipment (ASE)

The suite of Integrated Infrared Countermeasures will provide an enhanced IR countermeasure capability for aviation, rotary and fixed wing platforms. A

component of the SIIRCM is the Common Missile Warning System, with an Improved Countermeasure Munitions Dispenser system with advanced flare countermeasure munitions. The CMWS/ICMD recently has been installed on all deployed rotary wing and limited types of fixed wing aircraft platforms. Efforts now will be directed to installing A/B kits on unit aircraft prior to scheduled deployment with follow on rotations and on aircraft undergoing recapitalization.

In June 2006, the Army validated requirements that endorse placing ASE system A-kits on all Army aircraft platforms while providing system B-kits for all tactical aircraft. Additional procurement for the current aircraft fleet will be considered in the FY10/15 program planning process. The Army plans to add a Hostile Fire Detection capability to the Aviation fleet.

Aviation Electronics

Aviation Electronics programs ensure aviation platforms meet combined arms and Joint requirements for C2, mission planning, communications, navigation (to include worldwide civil airspace) surveillance and information interchange and interoperability. Major avionics initiatives include the future fielding of the JTRS in modernized aviation platforms. Delays in JTRS have necessitated the procurement of an interim radio suite known as Alternate Communications, which provides significant increases in capabilities to include data exchange and SATCOM. Other advancements in avionics include migration of the Aviation Mission Planning Systems to a Joint Mission Planning System, which will provide significant increases in mission-planning capabilities including an enhanced mission-rehearsal capability; upgrades to the Improved Data Modem as the centerpiece to digitization; GPS equipment for improved navigation accuracy; GATM equipment mandated when flying in civil airspace; and development of the Joint Precision Approach and Landing Systems, which provides a Joint common instrument approach system for fixed base, tactical field sites and shipboard procedures.

Air Traffic Services / Airspace Command and Control (ATS/AC2)

ATS provide the full range of air traffic services supporting disaster relief, peace-keeping missions, homeland security and military operations from contingency operations through major combat operations. ATS remains the Army's core enabler for Joint, Interagency and Multi-national airspace command and control, ensuring synchronized access into diverse and the increasingly congested airspace systems. ATS modernization fields smaller, lighter, more efficient, more robust, digitally connected terminal and en route communications, tracking and precision navigation systems for tactical and fixed-base operations. Major programs include the Tactical Airspace Integration System, the Air Traffic Navigation, Integration, and Coordination System, Mobile Tower System, and JPALS; plus a variety of fixed equipment at locations throughout CONUS, Korea, Europe, the Balkans, Honduras, Iraq, and Kuwait.

Aviation Ground Support Equipment (AGSE)

The goal of AGSE modernization is to reduce logistical support requirements by pursuing common ground-support equipment that is mission configurable, enabling flexible capabilities while improving aircraft operational readiness. Initiatives focus on improved automation, modularity, sustainability and integration of seamless logistics management through automation systems; and replacement of aging ground support equipment. Specific improvements include a new towing tractor, a life extension program for the Aviation Ground Power unit and recognition that AGSE is fielded based on G-3 GWOT priorities.

Aircraft Component Improvement Program (ACIP)

ACIP sustains engineering efforts to investigate, identify, and address user identified safety and reliability related deficiencies. ACIP inserts emerging technology, extends service life, drives down O&S costs and improves readiness by keeping components operationally ready longer. ACIP also reduces Safety Risk Assessments thereby improving aircraft safety; reduces maintenance, inspections and spare parts procurement.

Training Aids, Devices, Simulators and Simulations (TADSS)

Aviation TADSS will leverage technology to provide effective and affordable combined arms/Joint training and mission planning and rehearsal simulators that are current with the aircraft/systems they replicate. Major initiatives include simulator concurrency, fidelity and combined arms tactical and mission rehearsal simulators/simulations that network virtual, constructive and live simulation systems.

Appendix 4: Air and Missile Defense

Discussion of Core Air and Missile Defense Materiel Programs

Patriot/Medium Extended Air Defense System Combined Aggregate Program

Patriot is an echelon-above-corps AMD system that can simultaneously engage and destroy multiple air and missile threats at varying ranges and altitudes. It is the world's only battle-proven theater AMD system and will be a key AMD element for the next two decades, providing Combatant Commanders with modular, scalable, mission-tailored capabilities to dominate, enable and exploit the third-dimension battle-space and contribute to operational force protection in support of the Joint team.

The Patriot recapitalization program improves operational capability by bringing existing Patriot assets to a "like-new" state; thereby achieving OSD's Set the Force objectives and enabling the Army to meet future Combatant Commander requirements. The recapitalization program is planned and fully funded in fiscal years 2007 and 2008, and funding shortfalls for fiscal years 2009-13 are being addressed by Headquarters, Department of the Army.

MEADS will provide Joint and coalition forces critical asset and defended area protection against multiple and simultaneous attacks by short to medium range ballistic missiles, cruise missiles, unmanned aerial vehicles and tactical air-to-surface missiles. MEADS will have a netted and distributed architecture with modular components to increase survivability and flexibility of employment in a number of operational configurations. MEADS implements the plug and fight capability to support flexible interoperability in support of AMD Task Force requirements. It comprises a Battle Manager capable of integrating into Army and Joint SoS Battle Command architectures using Link-16 and wide-band networking capabilities to provide maximum protection of supported forces by engaging at longer ranges with distributed system operations and BLOS engagements.

Program Status

COCOMs require 15 battalions of PAC-3 capability to meet current threat. The PAC-3 Pure Fleet and Grow the Army initiatives are intended to result in 15 Patriot PAC-3 tactical battalions. These initiatives are synchronized with the separately funded Patriot Recapitalization Program. PAC-3 Pure Fleet was fully funded in the FY07 Omnibus Reprogramming ($212 million) and the FY08 Budget ($208 million). The first pure fleet battalion fields early FY09 and remaining two pure fleet battalions field in FY10.

Patriot GTA was intended to add 2 additional PAC-3 Battalions in FY11 via a split FY08 and FY09 funding strategy. However, Congress funded the Patriot GTA FY08 request at only $147.5 million, half of the FY08 GTA request of $294.5 million. As a result of the FY08 GTA funding decrement, the FY09 cost to complete GTA will grow to approximately $500 million (planned

$309 million plus $187 million - $147 million cut plus at least $40 million for lost efficiencies) thus delaying by a year the fielding of the 15th battalion until FY12.

Terminal High Altitude Area Defense (THAAD)

Terminal High Altitude Area Defense is a mobile, ground-based missile defense system designed to protect forward-deployed military forces, population centers and high value civilian assets from short-, medium and intermediate-range ballistic missiles. As an element of the Missile Defense Agency's terminal defense segment, THAAD will provide the opportunity to intercept and destroy enemy ballistic missiles, both outside and inside the earth's atmosphere, that were not destroyed earlier by another anti-missile system. That is, THAAD protects against missiles which were not destroyed in the boost phase or midcourse phases of flight by other Ballistic Missile Defense System elements, such as Aegis or the Ground-Based Midcourse Defense System Interceptor.

A THAAD unit consists of a command and control/battle management element, truck-mounted missile launchers, missile interceptors encased in canisters and mounted on the trucks, an X-band radar and ground support equipment. The THAAD missile interceptor is comprised of a single-stage booster and a kinetic kill vehicle, which destroys enemy warheads through hit-to-kill collisions. The THAAD radar is a solid-state, phased-array, X-band radar that performs search, track, target discrimination and other fire control functions. The THAAD radar also sends updated target information to the kill vehicle while in flight.

Program Status

The Missile Defense Agency is developing THAAD in incremental, capabilities-based blocks. Having achieved seven successful flight tests which began in FY06 as part of an extensive test and evaluation program the capability continues to be demonstrated. The THAAD acquisition strategy will rely on test program results to make future acquisition decisions. Although currently funded by the Missile Defense Agency, the THAAD program will produce and deliver a weapon system manned and operated by the Army. Four THAAD units are planned for fielding beginning in FY09 and concluding in FY13.

Surface-Launched Advanced Medium-Range Air-to-Air Missile (SLAMRAAM)

Surface-Launched Advanced Medium-Range Air-to-Air Missile is the Army's only medium range weapon system designed to protect designated critical assets and maneuver forces from the emerging, stressing cruise missile and UAV threat. SLAMRAAM is a key component of the AMD Composite Battalion and will complement the PAC-3 and MEADS systems in cruise missile and other air-breather defense missions. Without SLAMRAAM, the Army and Joint force will not have a dedicated, lethal capability against stressing cruise missiles, UAVs and other air-breather threats. SLAMRAAM is a lightweight, day-or-night, and adverse-weather, NLOS weapon system with engagement capabilities in excess of 18

kilometers. The system is comprised of: a HMMWV-mounted launcher with common Joint launch rails, launcher electronics, onboard C4 components and four to six AIM-120 Advanced Medium-Range Air-to-Air Missiles; an Integrated Fire Control Shelter to command and control its sensor and launchers; and the Sentinel Enhanced Target Range Acquisition Classification radar to provide surveillance and fire control data. The system will also be capable of receiving data from other Joint and Army external sensors when available. SLAMRAAM is critical to the successful development and fielding of the IAMD SoS.

Program Status

The SLAMRAAM entered the SDD phase in Sep 03. It is funded to meet a Milestone C decision in FY10 and to field to the first unit equipped of a battery in FY11. FUE will equal IOC.

Ground-Based Midcourse Defense (GMD)

Ground-Based Midcourse Defense is a fixed site, land-based system designed to provide protection to the United States against an intercontinental ballistic missile attack. The capability is limited in scope to providing an effective defense against accidental, unauthorized, or authorized limited launch of ballistic missiles. The GMD uses a System of Systems approach. Its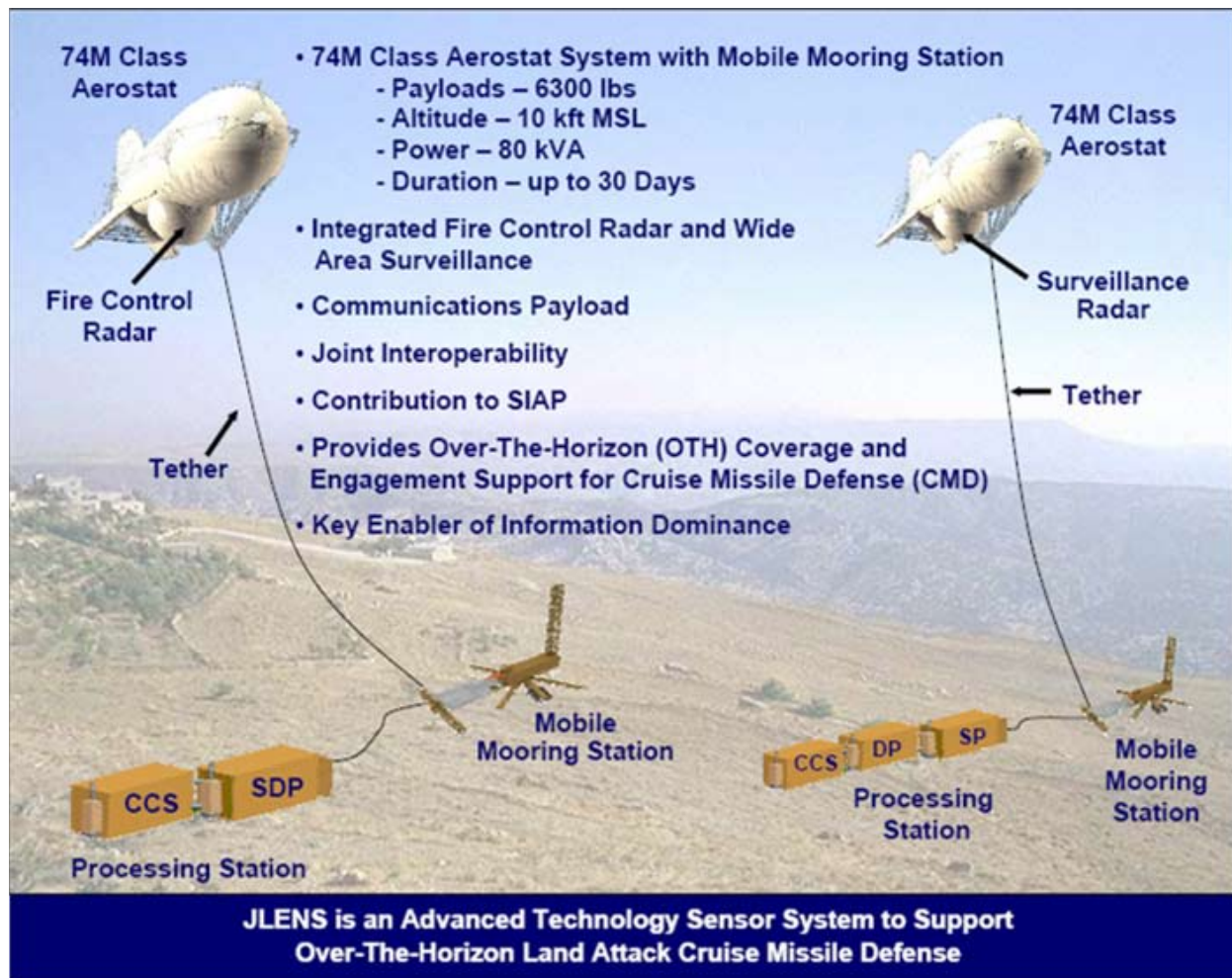 architecture is comprised of the following components: the GMD Communications Network, the GMD Fire Control, In-Flight Interceptor Communications devices, the Ground-Based Interceptors and a series of new and existing radars which not only detect and track targets but also guide the interceptor to an incoming missile. The GMD SoS radars include several Upgraded Early Warning Radars, the AN/TPY-2 (Forward Based) Radar, the Aegis Ballistic Missile Defense Radar and the Sea Based X-Band Radar. The GMD SoS also receives target data from the Space-Based Infrared System and its Defense Support Program predecessor.

Program Status

The GMD, as an element of the MDA's broader Ballistic Missile Defense System, is a capabilities-based developmental acquisition program utilizing a block approach. That is, capabilities are fielded as they are developed. The system is in a constant state of evolution. The Army has served as lead Service for the GMD, minus acquisition since 1999 and today has focused its efforts on providing installation support, facilities, resources, force protection and operational personnel in support of the deployed capability which also serves as a developmental test bed. Currently, the GMD meets the National Command Authority's directive of providing a fielded limited operational capability against ballistic missile threats. System improvements are ongoing, and the scope of

74M Class Aerostat

Fire Control Radar

Tether

- 74M Class Aerostat System with Mobile Mooring Station
  - Payloads – 6300 lbs
  - Altitude – 10 kft MSL
  - Power – 80 kVA
  - Duration – up to 30 Days
- Integrated Fire Control Radar and Wide Area Surveillance
- Communications Payload
- Joint Interoperability
- Contribution to SIAP
- Provides Over-The-Horizon (OTH) Coverage and Engagement Support for Cruise Missile Defense (CMD)
- Key Enabler of Information Dominance

74M Class Aerostat

Surveillance Radar

Tether

Mobile Mooring Station

CCS | SDP

Processing Station

CCS | DP | SP

Processing Station

Mobile Mooring Station

JLENS is an Advanced Technology Sensor System to Support Over-The-Horizon Land Attack Cruise Missile Defense

defense may be expanded to include protection of friends and allies against long-range ballistic missile attack.

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

Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System is the only persistent, elevated, wide area surveillance and fire control sensor system currently under development for the Department of Defense. It is a critical component of both the Army AMD Future Force and the Joint force CMD kill chain. Without JLENS, the Army and Joint force will not have an elevated sensor capable of providing persistent surveillance cuing and fire control quality

data to ground-based shooters in order to protect the force against stressing cruise missiles at extended ranges.

JLENS uses advanced sensor and networking technologies to provide 360-degree Wide Area Surveillance and Fire Control capability against the emerging, stressing land attack cruise missile threat as well as other air-breathing threats to include UAVs, UCAVs and rotary and fixed wing platforms. It will also provide surface moving target data and TBM boost launch warning to the Joint force and can also serve as a long-endurance communications relay. JLENS enables Joint and Army Integrated Air Missile Defense to conduct beyond LOS and

NLOS engagements against aerial targets out to each respective interceptor's maximum effective kinematic range. JLENS directly supports all facets of Joint theater AMD active air defense and contributes to offensive counter air/attack operations and C4I through multi-link dynamic data distribution. This system supports the JTAMD mission set execution by providing surveillance and supporting integrated fire control, and aerial CID activities. JLENS is a major contributor to the JTAMD Capstone Requirements Document objectives of SIAP and CID, providing precision tracking and measurement information. As a key element of the SIAP, JLENS correlates organic tracks/measurements with Identification Friend or Foe and Precise Participant Location Identification Data. The correlated data is then placed on the external networks. JLENS can stay aloft for up to 30 days, providing 24-hour battlespace coverage over extended areas. JLENS is an Army-led, Joint interest program.
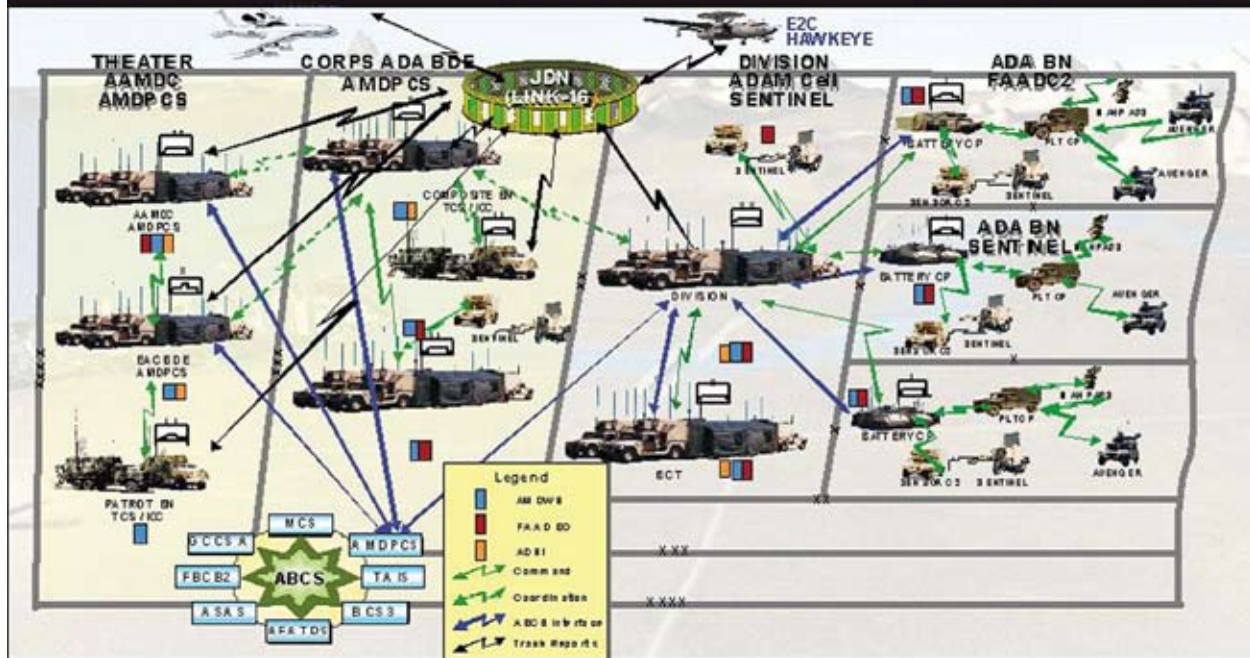
Program Status

JLENS is being developed, demonstrated ,and procured using an evolutionary acquisition strategy consisting of spirals and increments that lead to the fulfillment of ORD requirements. Block I consists of two spirals, with Spiral 2 meeting Block I requirements. Each spiral is being constructed to support air directed surface-to-air missile engagements, SIAP and CID capabilities. Block II will provide increased fire control and wide area surveillance capability with each sensor hosted on a non-tethered platform. Block III provides an increased system capability with sensors hosted on a single non-tethered platform for high mobility. JLENS Block 1 successfully completed its Milestone B in FY05 and is currently in SDD. It is an ACAT 1D program with a FUE of one battery in FY11 with IOC in FY13. Milestone C decision is scheduled for FY 11.

Sentinel Enhanced Target and Classification System

The Sentinel radar employs a modern phased array antenna that automatically detects, tracks, classifies and identifies CMs, UAVs, helicopters and fixed-wing aircraft to cue Maneuver Air and Missile Defense weapons systems. The Sentinel is comprised of a radar-based sensor system with its HMMWV prime mover, power, IFF and command and control interfaces. The antenna/transceiver group has an advanced 3rd dimensional battlefield air defense radar housed aboard a light tactical trailer chassis. Targets can be hovering or fast moving, from nap of the earth to the maximum engagement altitude of MAMD weapon systems. The radar operates in the X-band, transmitting 1,100 pencil beams per rotation. It rotates at 30 rpm. Sentinel, with ETRAC, improves operations in a Joint environment to detect smaller cross section targets and is critical for airspace SA / SU, deconfliction and advanced threat early warning. ETRAC upgrades add 20 rpm rotation and staring capability to enhance the detection and tracking of CMs. The instrumented range and altitude are 40 kilometers and four kilometers, respectively. The Sentinel utilizes the SINCGARS and EPLRS radios to provide a track file of more than 60 targets. Sensor data is passed through the FAAD-C2 system to ADA weapon systems. Sentinels will be organic to the multi-functional ADA battalions, providing 360-

Forward Area Air Defense–Command and Control

degree surveillance to counter CMs, UAVs and other ABTs, enabling Avenger today and SLAMRAAM in the future to defeat those threats.

Program Status

The program completed its primary Sentinel procurement in FY01 and is currently undergoing preplanned product improvement to improve surveillance and tracking capabilities. Additional upgrades and system modifications are currently scheduled through FY19 for many AC and RC units to improve target identification, increase Joint combat ID capabilities and reduce the potential for fratricide. ETRAC modifications will be applied to 76 radars by FY13. The ETRAC modifications consist of two upgrades: Phase 1A improves the radar detection range against low-observable and stealthy targets; Phase 1B improves the radar classification of low-observable and stealthy targets at extended

ranges. The Phase 1B capability for target airframe classification will support the Joint identification and target classification function that allows maneuver weapons to operate at maximum effectiveness. Although modularity decisions removed Sentinels from the corps, division, and brigades, strong consideration is being made to reintegrate Sentinel in the division headquarters. The Sentinel radar is the ground maneuver commander's sensor designed to provide Joint low altitude air coverage and is critical for airspace deconfliction and advanced early warning.

Forward Area Air Defense–Command and Control (FAAD-C2)

The Forward Area Air Defense–Command and Control system digitally processes and disseminates real-time target cueing and tracking information, the common tactical air picture, and command, control and intelligence information to ADA battalions Avenger

weapon systems and Counter Rocket Artillery and Mortar (CRAM). The FAAD-C2 system enables Engagement Operations (EO) through the integration with the Multifunctional Information Distribution System, the Joint Tactical Terminal, Single Channel Ground and Airborne Radio System, Enhanced Position Location Reporting System, Global Positioning System, the Airborne Warning and Control Systems, the Sentinel radar and the ABCS architecture. The FAAD-C2 primary system is an EO workshop (WS). The EO WS is used to process and exchange Sentinel air track data between the air battle management operations center and Sentinel radars in the sensor network, external track sources via a JDN and intra-AMD EO/FO data. The EO WS digitally processes, develops and disseminates a real-time air picture to the ADSI. The EO WS processes airspace control measures, rules of engagement and air defense warnings. The EO WS can provide third-dimensional situational awareness to ADA Battalions Avenger weapon systems and CRAM if assigned / attached to the division / sector to provide low altitude air defense / CRAM.

Program Status

FAAD-C2 is an ACAT II program with an Aug 95 approved ORD. The FY10-15 program plan funds FAAD-C2 Common Hardware Systems upgrades to the ARNG ADA Battalions Avenger weapon systems. FAAD-C2 program funding will provide FAAD-C2 EO WS in 92 ADAM Cells.

Air And Missile Defense Planning And Control System (AMDPCS)

The Air and Missile Defense Planning and Control System integrates Air and Missile Defense operations for Army Air and Missile Defense Command Headquarters, Air Defense Artillery Brigade Headquarter, Air Defense Airspace Management Cells, and Joint command and control elements. As a part of the ADA Transformation Plan, the ADA force is modernizing its C2 by standardizing AMDPCS configurations at the AAMDCs and ADA Brigades. The AMDPCS-AAMDC and ADA Brigade systems will comprise of a set of modular, re-configurable and standardized automated data processing equipment packaged in the ADAM system, AN/TSQ-253 and the Command Post Platform, AN/TSQ-232.

The AMDPCS-A system will be employed at the AAMDC Headquarters in the following Command Post configurations: TAC includes one each ADAM system, AN/TSQ-253; MAIN includes one each AN/TSQ-252 shelter, one each CPP shelter; and the REAR includes one each AN/TSQ-252 shelter, one each CPP shelter. The AMDPCS-B system will be employed at the ADA Brigade Headquarters in the following Command Post configurations: Jump TOC includes one each ADAM system, AN/TSQ-253; and the MAIN includes one each AN/TSQ-252 shelter, one each CPP shelter. Working in concert with the Army's transformation to the Battle Command as a Weapon System concept, the AAMDC and ADA Brigade incorporates two of the BCAWS enablers–ADAM system and the CPP shelter, thereby creating the initial plugs necessary to receive Army's modernization to the Functional Support Brigades.
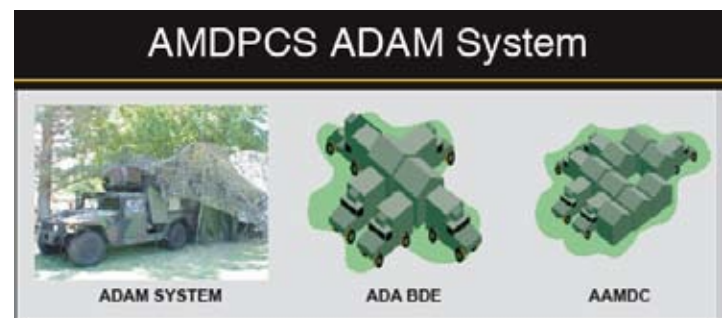
The AMDPCS ADAM System

AMPDPCS ADAM provides the Maneuver Commander with a modular, scalable cell, consisting of air defense and aviation personnel/equipment,

capable of providing airspace management, air defense and airspace planning and coordination utilizing third dimensional situational awareness/situational understanding obtained from organic sensors or the Joint Data Network. The ADAM system is organic in the corps and division, maneuver BCTs, CABs and multi-functional support brigades. Additionally, the ADAM system will now be organic to the AAMDC and ADA functional Support Brigades equipped with AMDPCS and FAAD-C2 systems manned by air defense personnel. AMDPCS component includes an AMDWS and an ADSI workstation. The FAAD-C2 component includes an Engagement Operations Work Shop with an intelligence processor. Additionally, the ADAM system is equipped with the TAIS AWS, and at the SBCTs-it includes an Aviation Mission Planning WS, both WSs manned by Aviation personnel.

Program Status

Current funding will procure 160 ADAM Cells; upgrade one AAMDC, eight ADA Brigades to meet the Army Modular Force MTOE authorizations. To date, the Army has fielded 76 ADAM Cells and will field an additional 84 in fiscal years 2010-13.

Joint Tactical Ground Station Multi-Mission Mobile Processor (JTAGS M3P)

The Multi-Mission Mobile Processor is a P3I of the current, operationally proven Joint Tactical Ground System. M3P's will be acquired as part of the mobile ground segment for the Space-Based Infrared System; the successor to the Defense Support Program. M3P is a transportable missile warning and communications system that will receive and process direct down linked raw data from DSP satellites and the follow-on SBIRS sensors. The three forward deployed systems support simultaneous operations in multiple theaters and provide the theater Combatant Commander with in-theater tactical ballistic missile warning, alerting and cueing data. In addition, the M3P with the SBIRS sensors will provide battlespace characterization data for situational awareness. M3P will provide warning and situational awareness data down to the tactical command level. An M3P detachment's equipment will include a 42-foot van, two 100-KW generators, three 5-ton cargo trucks, one 5-ton tractor, three tri-band antennas and one HMMWV.

Program Status

The Army plans to replace the five fielded JTAGS with the M3P systems, of which three are permanently forward deployed, beginning in fiscal years 2012-13. The Joint Requirement Oversight Council approved Operational Requirements Document calls for a total of seven M3P systems. The transition to M3P is expected to occur as the SBIRS Geosynchronous satellites are launched and assume operational capability. The current M3P baseline program has not been approved on the SBIRS program. While the Air Force is reassessing the need for mobile systems in their strategic warning mission, the Army plans to move forward with the acquisition of theater-only M3Ps. In fiscal year 2013, M3P is anticipated to begin incorporation of data from the technologies developed by the Missile Defense Agency and their development efforts with the Space Tracking and Surveillance System. MDA is currently conducting technology demonstrations that will lead to a Low Earth Orbit constellation in support of theater tactical missile warning.

Joint Tactical Ground Station (JTAGS)

Joint Tactical Ground Station is DoD's transportable in theater, direct downlink missile warning and com-

munications system. JTAGS receives and processes space based infrared sensor data and then disseminates threat missile data to forward units via multiple theater communication networks, enhancing theater missions for missile warning, missile defense and situational awareness. JTAGS receives data from Geosynchronous Earth Orbit Defense Support Program Infrared satellite sensors. JTAGS' forward deployed systems provide continuous and simultaneous operations in multiple theaters, providing Combatant Commanders assured warning for deployed forces and allies.

Program Status

JTAGS is undergoing a phased P3I program to align with advancing communication networks and theater missile warning architectures and sensors. JTAGS ongoing phase I P3I fiscal year 2008-09 enhances the system with numerous communications upgrades and adapts to receive an additional space based data source from the Space Based Infrared Systems Highly Elliptical Orbit sensor. JTAGS P3I Phase II (fiscal years 2010-12) includes interfacing with SBIRS GEO satellites along with dismounting from the JTAGS shelter, the use of commercial antennas and evolving to a net centric architecture for message dissemination.

Army Integrated Air and Missile Defense Battle Management Command, Control, Communications, Computers and Intelligence

The proliferation of increasingly sophisticated ballistic missile, cruise missile and unmanned aerial vehicle threats force the development of air and missile defense capabilities that are able to defend against the full spectrum of threats. The Army continues working to increase interoperability and integration among the various current and future Army AMD weapon, sensor and communications platforms to achieve significant increases in operational effectiveness and efficiency. The development and fielding of common

AIAMD BMC4I assets will allow the employment of scalable, modular "plug and play'' AMD capabilities against the full spectrum of threats throughout the battlespace to support the Army and Joint Current and Future Force.

Program Status

Development of a common AIAMD BMC4I is being undertaken in three major increments. The first increment, which is close to completion, is primarily DOTMLPF focused with minimal materiel development or fielding. The second increment will use a variety of hardware and software solutions to enable an Army integrated net-centric common AMD Battle Command and integrated fire control capability. The third increment aims at realizing the full capabilities of an Army common IAMD BMC4I, including 360 degree extended range active protection against TBM threats while positioning the Army to become fully integrated with FCS. The effort is on track for a MS B decision in FY07 and a MS C decision in FY10.

Counter-Rocket, Artillery and Mortar (C-RAM)

During 2007, mortar and rocket attacks in Iraq and Afghanistan have forced American and Allied forces to reassess their abilities to counter these indirect fire threats. The Counter-Rocket, Artillery and Mortar effort is a holistic, multi-Service approach for providing integrated, modular and scalable capability to counter rocket, artillery and mortar attacks against friendly forces. The C-RAM initiative is built upon seven functional areas: Shape, Sense, Warn, Intercept, Respond, Protect and C4 to provide the Current Force with present, near-term and future early warning, intercept, and rapid response protection against rockets, artillery and mortars. It highlights the operational concept shift from a "system-centric" focus to a network-centric component "plug and fight" architecture capable of operating within the Army and
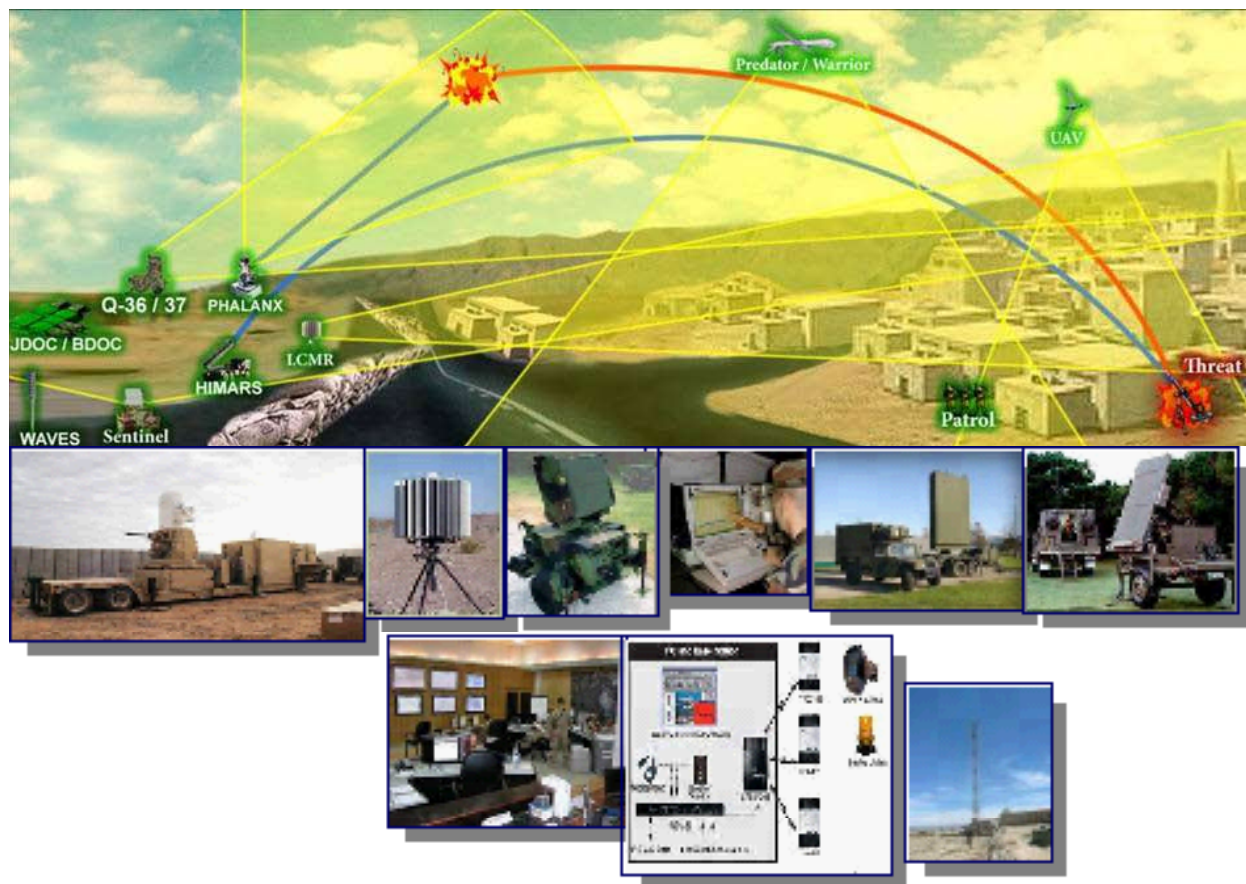
Joint digital architectures. Several agencies within the Army are an integral part of the Joint C-RAM solution including the TRADOC Futures Center, Fires Center of Excellence, Air and Missile Defense Battle Lab, other TRADOC schools, and the Maneuver Support Center, the Counterstrike Task Force, the Engineer Research and Development Center, the Rapid Equipping Force and various material developers.

Program Status

The current operational need to protect friendly forces from indirect fire attacks in support of the global war on terrorism serves as a catalyst for continued interest in C-RAM development. Already, the Army has deployed 16 integrated Shape, Sense, Warn and Respond capabilities utilizing a variety of systems including the Land-based Phalanx Weapon System, Forward Area Air Defense-Command and Control,

Lightweight Counter Mortar Radar, Firefinder Radar, Sentinel Radar, Wireless Audio Visual Emergency System, Rapid Aerostat Initial Deployment, and Air and Missile Defense Workstation and Artillery Tactical Data System. Deployment of more robust Shape, Sense, Warn, Intercept and Respond capability to support the ongoing war on terrorism is planned. HQDA and TRADOC are working to determine what the C-RAM capability requirements are for the Future Force and how best to bring these capabilities to the Army and Joint force. Future capabilities being explored include improved kinetic energy and potentially directed energy solutions to support the improved intercept functions and integration of base defense security through integrated sensor suites, information sharing and improved Battle Command to support the Sense, Warn, Shape, Respond and C4 functions.

Appendix 5: Fires Support Modernization

Discussion of Core Fire Support Materiel Programs

High Mobility Artillery Rocket System (HIMARS)

The M142 High Mobility Artillery Rocket System provides Joint early entry forces, SOF and BCTs with an indirect fire launch platform that provides extremely lethal, responsive, continuous and all-weather, precision medium to long-range rocket and missile fires to a depth of 300 kilometers. Highly tactically deployable, the HIMARS launchers have been very successfully employed in both OIF and OEF, providing exceedingly accurate and devastating fires. HIMARS units are organic to modular fires brigades that provide integral fire support for BCTs. HIMARS fills the gap in range between direct-fire systems, short-range artillery systems and longer range air systems. Mounted on a Family of Medium Tactical Vehicles chassis, the HIMARS is C-130 transportable and provides full Multiple Launch Rocket System family of munitions capability, yet requires 70 percent fewer airlift resources to transport than the current M270 A1 MLRS launchers. When firing GMLRS-Unitary precision rockets, HIMARS can support to a range of 70 kilometers with low-collateral damage enabling danger-close fires in support of friendly troops in contact, as well as engaging high valued point targets in open, urban and complex environments. When employing ATACMS Unitary, HIMARS can extend low-collateral lethal precision attack to 300 kilometers.

Program Status

HIMARS is in Full Rate Production with three battalions fielded to date. HIMARS is fielded to both Active and Army National Guard units replacing select M270 and towed M198 cannon battalions.

Lightweight Laser Designator Range Finder (LLDR)

The Lightweight Laser Designator Range Finder is a man-portable, thirty-five pound, long-range fire support targeting sensor that significantly improves the commander's ability to shape the battlefield through use of indirect and precision fires. LLDR can accurately locate, identify, range, self-locate, determine azimuth, vertical angle and designate hard or soft, stationary or moving targets. LLDR replaces the Ground/Vehicular Laser Locator Designator and associated first generation night sight with a state-of-the-art lightweight targeting system. The LLDR provides Light, Interim and Heavy Forces with ability

to locate, identify and designate during day and night to provide combat overmatch in symmetrical and asymmetrical environments

Program Status

The Lightweight Laser Designator Rangefinder began low-rate initial production and fielding in 2003. LLDR production is now at 28 systems per month, with maximum capacity of 40/month being reached by 2nd Quarter FY 2009. LLDR AAO is 3,113 systems and will complete Army wide fieldings in 2013. To date, the Army has fielded 305 systems.

Meteorological Measuring Set-Profiler

Profiler, AN/TMQ-52 provides a modernized, real time meteorological capability for a wide range of deep fire weapons and munitions over 60 kilometer battlespace with potential to extend coverage to 500 kilometers of battlespace. Profiler replaces the Army's Meteorological Measuring Set, AN/TMQ-41 currently nearing obsolescence. Profiler gives the artillery the capability of applying MET data from the firing platform to the target area; target area MET is critical in the selection of the proper munition and for calculating the aim point for "smart munitions".

Program Status

Full rate production and fielding to modular BCTs initiated in FY06 and will continue through FY08.

M777A2 Lightweight 155-Millimeter Howitzer

The Army has a requirement for an advanced, towed, lightweight 155-millimeter howitzer, with self-locating and aiming capability, that meets increased operational thresholds for mobility, survivability, deployability and sustainability. A Joint USMC/Army program, the M777A2 will provide accurate, reliable, responsive, on-demand, 24-hour, all-weather and all-terrain close support fires to maneuver forces.

Program Status

A four-year production contract was awarded 22 March 2005. Full Material Release for the M777A1 version was achieved in January 2007, and fielding to Army and USMC artillery units is currently underway. The first Army unit fielded was 2-11 FA. Development of upgraded software which integrates the Excalibur precision guided munition capability was completed with Full Material Release of the Excalibur capable M777A2 in June 2007. The M777A1 version fielded to 2-11 FA have been upgraded, and the first Army unit to be fielded the M777A2 version was 3-321 FA, 18th Fires Battalion. Additional software upgrades are being developed to give the M777A2 more capabilities, and will be incorporated into future fieldings.

M119A2 Lightweight 105-Millimeter Towed Howitzer

The M119A2 has been in service since 1989, and is used by the Army's light forces to fulfill direct support artillery mission within those units. Decisions to pursue modularity and convert the ARNG to a pure fleet of M119A2s have roughly doubled the Authorized Acquisition Objective for M119A2s to 814 systems. This requirement has driven the need

to reenter production and produce 400 additional M119A2s.

Program Status

Funding to restart the M119A2 program and initiate production was received in the FY05 and FY06 Supplementals. A make/buy decision was made to produce the howitzers at Rock Island Arsenal. Using fiscal years 2005 and 2006. Supplemental funding, long-lead materials have been placed on order and manufacturing activities to produce the initial year's order quantity of 35 weapons have begun. The first delivery of a complete new production M119A2 was completed in April 2007. After production testing is complete, materiel release is expected by the end of third quarter FY08 with fieldings commencing in third quarter FY08.

M109A6, PALADIN

The M109A6 155-millimeter howitzer was fielded in 1993. It is the most technological advanced self-propelled cannon system in the Army. The Paladin has state of the art components to achieve dramatic improvements in survivability in shoot and scoot tactics; improved ballistic and NBC protection. It is capable of firing within 45 seconds from a complete stop with on-board communications, remote travel lock, and automated cannon slew capability. Paladin achieves accurate fires from its on-board position navigator and technical fire control system. It has an extended range of 30 kilometers with HE, rocket assisted projectile and also fires the Excalibur precision-guided munitions with Portable Excalibur Fire Control System.

Program Status

Paladin Integrated Management program will rebuild platforms, apply current Modification Work Order's, and deliver a ready, relevant, and sustainable platform. The objective of the Paladin PIM program is to modernize and sustain the Paladin fleet to fight side-by-side with NLOS-C in the HBCT formations well into the 21st Century.

M1200 Armored Knight Fire Support Vehicle

The M1200 Armored Knight provides precision strike capability by locating and designating targets for both ground and air-delivered laser-guided ordnance and conventional munitions. It replaces the M707 Knight and M981 Fire Support Team Vehicles used by Combat Observation Lasing Teams in both Heavy and Infantry BCTs. Prior to 2005, Knight was delivered on unarmored HMMWV M1025 chassis configured with the Fire Support Sensor System. Up-armored HMMWVs with Knight MEP are approximately one ton over gross vehicle weight, and unable to accommodate user requirements for additional survivability, mobility, space and power. FY07 procures Armored Knight vehicles configured with the Armored Security Vehicle M1117 chassis. This will enable Armored Knight to meet Army's modularity requirements with FS3 objective sensor,

improved survivability, mobility, mission payload, gross vehicle weight, and growth potential not attainable with HMMWV.

Armored Knight operates as an integral part of the brigade reconnaissance element, providing COLT and fire support mission planning and execution. Specifically, Armored Knight provides fire support planning, direction, control, target designation and night observation in a highly maneuverable platform, and acquires, processes and transmits target information directly into the AFATDS fire support network. It has the ability to self-locate, determine range, azimuth and vertical angle to target, target destination and night observation. This capability provides terminal guidance for any munitions requiring reflected laser energy.

Armored Knight's secondary mission is gathering intelligence through AOR surveillance and reconnaissance. Armored Knight utilizes an M1117 ASV hull and provides full 360-degree, continuous armored cupola coverage and the fully integrated Knight Mission Equipment Package common with the M7 BFIST/M707 Knight and Stryker FSV.

Program Status

The M1200 Armored Knight, began fielding with an urgent material release in 2007. Current FY07 funding supports procurement of 107 M1200 Armored Knights to be delivered beginning March 2008. The program is currently funded to meet a modularity end-state of 342 systems.

Lightweight Counter Mortar Radar (LCMR)

The Lightweight Counter Mortar Radar, AN/TPQ-48 is a developmental, lightweight, man-portable weapons location sensor that provides continuous 360-degree accurate mortar location up to a range of 5 kilometers. LCMR was originally developed for the U.S. Special Operations Command in response to 1999 MNS described by the 75th Ranger Regiment for automatic location of indirect fire weapons, with emphasis on mortars. The MNS also identified the requirement for a sensor with 360 degrees of azimuth coverage that was small and light enough to be inserted with airborne troops and transported on the ground by two persons. Enhancements in the AN/TPQ-48 were implemented to refine the design and to address feedback received from users during both testing and operational use in OIF/OEF. A developmental effort for the AN/TPQ-48 system and delivery of 13 prototypes has been initiated to provide improved operational and physical functionality over the existing LCMR and radar systems, to have increased accuracy and

range, to be highly mobile and two-man transportable, have improved emplacement capabilities and be a ruggedized battlefield radar system.

Program Status

LCMR AN/TPQ-48 (Version 2) continues to be fielded to the Army, USMC, C-RAM and various Foreign Military Sales coalition countries. A long-term contract for LCMR Version 3, with extended range and target detection capability, is under development and is projected to begin fielding in FY2010.

Enhanced AN/TPQ-36

The Enhanced AN/TPQ-36 radar is a replacement for the aging AN/TPQ 36 and AN/TPQ-37 counter fire radar systems. The EQ-36 is a system technology upgrade that provides a 360-degree capability with improved range and accuracy in a clutter environment.

Program Status

The EQ-36 will be produced in two increments based on two tiers of technical threshold requirements. Increment I requirements will incorporate 360-degree coverage, improved 90-degree range and accuracy, single C-130 sortie capability and AFATDS interoperability. Increment II will incorporate improved 90- and 360-degree range and accuracy

capabilities. Enhancements include increased performance in high-clutter, improved accuracy from .65 percent of range to .30 percent of range, and improved range from 14.5 kilometers to 32 kilometers for cannon and 24 kilometers to 50 kilometers for rockets. Crew size will be reduced from six to four for Q-36, and from 12 to four for Q-37. Programmed funding fully funds RDTE for increments I and II, provides for five radar systems for integration and testing, and procures 204 production systems at the most economical production rate.

Appendix 6: Chemical, Biological, Radiological, Nuclear (CBRN) Defense

Discussion of Core CBRN Defense Materiel Programs

M31A1/M31E2 Biological Integrated Detection System (BIDS)

M31A1/M31E2 Biological Integrated Detection System is a shelter-mounted system on a dedicated vehicle, and equipped with a biological detection suite employing complementary technologies to detect large-area biological attacks. The M31E2 BIDS is capable of detecting all types of biological agents in less than 10 minutes, and identifying any 10 agents simultaneously in less than 30 minutes.

Program Status

The M31A1 and M31E2 versions of the BIDS are currently fielded. All new activating units will receive the M31E2 version.

STRYKER-Nuclear, Biological and Chemical Reconnaissance Vehicle (NBCRV)

The STRYKER-Nuclear, Biological and Chemical Reconnaissance Vehicle incorporates integrated chemical and biological point detectors that allow on-the-move standoff biological and chemical agent detection. The Chemical Biological Mass Spectrometer improves the detection and identification of liquid chemical agents, while Joint Biological Point Detection System provides a first-time biological agent detection capability to the reconnaissance platform. The sensor suite automatically integrates contamination information with data from onboard navigation and meteorological systems and rapidly transmits contamination hazard and non-contaminated area intelligence to the appropriate operations center. Integration of the common CBRN technical architecture allows for expansion/upgrading of the onboard computers at minimal cost, as well as the command and control of CBRN-sensing UAVs and unmanned ground vehicles in the Future Force.

Program Status

Stryker-NBCRV Milestone C was reached in fourth quarter, FY04, allowing the start of LRIP for 21 NBCRVs. An Extended LRIP was authorized for 95 additional NBCRVs in the first quarter FY 08. The FRP decision is scheduled for FY10. The Stryker-NBCRV began fielding in FY06, will field to HBCTs in FY10 and fielding is planned for chemical companies thereafter.

Monitoring and Survey Hazardous Response (MSHR) CBRN Set, Kit and Outfits

The Monitoring and Survey Hazardous Response CBRN Set, Kit and Outfits is a developmental system containing CBRN sensors specifically designed for dismounted use during the assessment of sensitive sites that are inaccessible by mounted CBRN reconnaissance vehicles. The MSHR CBRN provides the warfighter with handheld chemical, biological, radiological and nuclear sensors and individual protective equipment incorporated on a specialized

HMMWV trailer that can be used to assess hazardous materials incorporated into weapons or that are produced by industry.

Program Status

The MSHR CBRN is expected to begin fielding by FY11. It will be issued to CBRN recon platoons assigned to IBCTs, heavy chemical companies, Special Forces chemical response decon units, and potentially to hazardous response decon platoons.

M56 Wheeled Smoke System

 The M56 Wheeled Smoke System, COYOTE provides large-area, multi-spectral screening for maneuver and support forces from the M1113 HMMWV, and can generate large-area obscurants throughout the battlespace to counter enemy reconnaissance, surveillance and target acquisition systems. Missions include providing static and mobile visual, IR screening in the form of a haze, blanket and curtain. Major components include a turbine smoke-generating system. It has the capability of providing continuous visual smoke for up to 90 minutes and 30 minutes of IR screening smoke. A proposed P3I can add a 30-minute millimeter wave obscuring capability to defeat enemy radar RSTA/ISR devices

and weapon systems. A two-person crew operates the M56 and has the capability to counter the threat arising from the wide proliferation of advanced visual and IR sensors.

Program Status

Fielding of the M56 is complete. Limited production of six M56E1 systems is expected NLT FY08. The PM is currently exploring options to improve system survivability. The Army Acquisition Objective of 265 has been met.

M7 Vehicle Obscuration Smoke Systems

M7 Vehicle Obscuration Smoke Systems provide an immediate smoke screen that can obscure threat surveillance, target acquisitions, and weapon guidance systems in the visual through infrared spectrum. The system provides approximately 20-120 seconds of obscuration, which enables the vehicle to maneuver out of the immediate threat area. The M7 Light Vehicle Obscuration Smoke System provides this capability for up-armored HMMWVs. The M7 system utilizes 66-millimeter grenades and a launcher configuration of four tubes. Multiple launcher systems are utilized to provide all-around screening capability.

Program Status

The M7 program is currently funded.

Chemical Biological Protective Shelter System (CBPSS)

The Chemical Biological Protective Shelter System is a self contained highly mobile, rapidly deployable chemically protected shelter system designed

for emergency medical use in the forward battle areas. The shelter consists of an air beam-supported soft shelter offering 300 square feet of working space, power systems and environmental control equipment. The foldable shelter, power system and environmental control equipment is housed on a lightweight multipurpose shelter, mounted on an expanded capacity vehicle with a modified 1-1/4-ton, high-mobility trailer which has a permanently mounted tactical quiet generator set.

Program Status

CBPSS program currently is reviewing design options to convert the existing CBPSS from an un-armored HMMWV to an up-armored Medium Tactical Vehicle platform. CBPSS fieldings will continue through FY13.

Chemically Protected Deployable Medical System (CP DEPMEDS)

The Chemically Protected Deployable Medical System is a containerized collective protection system that provides U.S. Army Deployable Medical System Combat Support Hospitals the capability to sustain medical operations in a CBRN environment for 72 hours. The system consists of modular M28 chemical/biological protective liner sections, 200 hermetically sealed filter canisters, recirculation filters, pressurized protective entrances, additional power generation, a CBRN-protected water system, low-pressure alarms, and CBRN protected latrine facilities for patients and staff.

Program Status

CP DEPMEDS AAO specifies 23 systems. The Joint Operational Requirements Document was updated in October 2003 to reflect the Medical Reengineering Initiative configuration, which allows for smaller, split-base hospital operations and can deploy incrementally to protect a 44-bed early entry hospital, an 84-bed hospital company, a 164-bed increment, or a full-up 248 bed CSH.

Joint Chemical Agent Detector (JCAD)

Joint Chemical Agent Detector will be a combined portable monitoring and small point chemical agent detector for individual Soldier applications. This handheld, pocket-sized detector will be designed to automatically detect, identify and quantify chemical agents. The primary function of the JCAD is as a chemical weapon agent point detector that can be used to detect, identify, quantify, and warn personnel of the presence of vapor chemical agents. Follow-on increment will also detect specified toxic industrial chemicals.

Program Status

Testing of a candidate system is underway at Edgewood Chemical Biological Center. Increment I fielding is scheduled for third quarter, FY08.

Increment II is scheduled for FY10.

Joint Chemical, Biological, and Radiological Agent Water Monitor (JCBRAWM)

Joint Chemical, Biological, and Radiological Agent Water Monitor will provide the warfighter the capability to detect, identify and quantify the presence of CBR contamination in water. The ICD describes the need for monitoring to protect the warfighter from drinking or using contaminated water. The JCBRAWM will detect and identify CBR agents during three water-monitoring missions: source site selection, treatment verification and quality assurance of stored and distributed water.

Program Status

The system is pre-milestone B and will potentially be fielded as incremental capabilities for each separate threat.

Joint Warning and Reporting Network (JWARN)

Joint Warning and Reporting Network provides standard integration and analysis of NBC detection information with command, control, communications, computers, information and intelligence on the battlefield. JWARN automates the NBC warning and reporting processes now performed manually throughout the Services. It will provide additional data processing, production of plans and reports and access to specific NBC information to improve the efficiency of NBC personnel. JWARN will be integrated on MCS and GCCS-A in the near term and FBCB2 in the out years.

Program Status

JWARN will be distributed as a module of the MCS (software block 9/11) and GCCS-A systems. IOC will be achieved when JWARN is fielded to initial units and training bases, unit personnel are trained, training base is established and a maintenance system is in place.

Joint Effects Model (JEM)

Joint Effects Model will provide commanders with advanced modeling and simulation capability to forecast and display the effects of CBRN events, including toxic industrial hazardous, based on inputs from JWARN-networked sensors, intelligence and other units. JEM supports force protection and operational deployment planning by providing critical CBRN/TIH planning and defensive information.

Program Status

JEM Increment-I is currently in the SDD acquisition phase and will be included as a module of the MCS (software block 9-11).

Joint Service Transportation Decontamination System (JSTDS)

This mobile system provides the capability to conduct operational and thorough decontamination of medium-to-large mobile or fixed equipment, aircraft, facilities, shelters, surface areas and terrain. The small-scale Joint Service Transportation Decontamination System replaces the M17 LDS and M12A1s in non-chemical units. The large-scale system will be integrated into or mounted on a dedicated vehicle/system. The large-scale system replaces the M12A1 in chemical units. Specifically, this will be a cross-spectrum system designed to support Current and Future Forces, or homeland security operations. It will be capable of decontaminating fixed sites, terrain, large aircraft and seaports of debarkation and aerial

ports of debarkation.

Program Status

JSTDS-SS IOC is scheduled for FY10. FOC is scheduled for FY12. IOC of 350 JSTDS-LS is scheduled for FY13. FOC is scheduled for FY15.

Joint Service Personnel/Skin Decontamination System (JSPDS)

Joint Service Personnel/Skin Decontamination System replaces the M291 SDK and will decontaminate the skin, individual equipment and individual weapons. IOC is scheduled for FY10 and will be achieved when JSPDS is fielded to forward-deployed units, rapid deployment units, unit personnel are trained; a training base is established; and a maintenance system is in place.

Program Status

IOC is scheduled for FY10. FOC is scheduled for FY13 and will be achieved when the JSPDS AAO is reached and all authorizations are filled. Total number of systems is 2,285,451.

Joint Platform Interior Decontamination System (JPID)

Joint Platform Interior Decontamination System will consist of a decontaminant and an applicator for use primarily in immediate and operational decontamination operations. The target items for decontamination will be small non-sensitive equipment and key areas on large non-sensitive equipment. The JPID will decontaminate threat agents to lower levels than current portable systems used for these operations.

Program Status

The IOC for this system is projected in FY10, with FOC planned for FY13.

Joint Service Sensitive Equipment Decontamination System (JSPDS)

Joint Service Sensitive Equipment Decontamination System provides a first-ever capability to decontaminate chemical and biological warfare agents and toxins from sensitive electronic, avionics, and electro-optic equipment. Its use will be compatible with and not degrade sensitive materials or equipment. It will be operator safe and offer protection from off–gassing and direct liquid exposure during decontamination.

Program Status

IOC for this system is projected in FY10, with FOC planned for FY13.

Joint Service General Purpose Mask

The XM50 and XM51 are two new protective masks that make up the Joint Service General Purpose Mask lightweight mask system. The XM50 mask replaces the existing M-40 individual mask, and the XM51 replaces the M-42 crew member mask. Each mask consists of a face-blank assembly, front module cover, mesh-type head harness assembly, self-sealing valve, inlet/outlet valve, internal and external drink tubes, carrier, waterproof bag, canteen cap, dust cover, laser outsert, primary filters, operator cards and accessories as required. The masks allow intelligible voice transmissions.

Program Status

FRP memo was signed in September 2007. Fielding is scheduled to continue beyond FY15. The program is funded for the Total Service Requirement of the Army, Air Force, Marine Corps and Navy.

Joint Biological Agent Identification and Diagnostics System (JBAIDS)

The Joint Biological Agent Identification and Diagnostics System program is DoD's initial effort to develop and field a common medical test equipment platform amongst all the Services. JBAIDS is an evolutionary, three-block, reusable, portable and modifiable biological agent identification and diagnostic system capable of simultaneous reliable identification of multiple biological agents of operational concern and other pathogens of clinical significance. JBAIDS Block I tests a variety of environmental samples and clinical specimens for non-diagnostic purposes, and performs confirmatory testing of samples collected by existing and future biological detection systems. Block II focuses on the militarization and hardening of critical toxin identification technologies based on a COTS/NDI candidate system. JBAIDS Block III is planned to be a handheld, FDA-approved device capable of providing the full range of biological agent identification and diagnostics.

Program Status

Block II development is scheduled for FY08.

Appendix 7: Battle Command

Discussion of Core Battle Command Materiel Programs

Global Command and Control System – Army /Net-Enabled Command Capability (GCCS)

Global Command and Control System–Army is the Army's strategic, theater and tactical command and control system providing seamless operational information and data from the strategic GCCS-Joint to Army theater elements and below. The system provides an interface between Joint/Combined Forces (Joint GCCS) and Tactical Army Battle Command Systems (ABCS). GCCS-A is an integral component of the GCCS-FoS program and provides a robust and seamless command and control capability to senior military leaders and decision makers.

Net-Enabled Command Capability replaces GCCS-A and is the DoD's principal command and control capability that will be accessible in a net-centric environment and focused on providing the commander with the data and information needed to make timely, effective and informed decisions. The NECC draws from the C2 community to evolve current and provide new C2 capabilities into a fully integrated, interoperable, collaborative Joint solution. Warfighters can rapidly adapt to changing mission needs by defining and tailoring their information environment and drawing on capabilities that enable the efficient, timely and effective command of forces and control of engagements.

Program Status

NECC program has not yet received MS B approval. An APB will be established to document this program when approved. Army funding addressed in this WSR for NECC is a part of the Joint NECC program and will be covered in the NECC APB.

Battle Command Common Services (BCCS)

Battle Command Common Services (BCCS) is a suite of standardized and configured servers that provide a tactical infrastructure of server and service capabilities that extends the NECC and NCES environment to tactical echelons from battalion to Army Service Component Command. This infrastructure enables Army Battle Command System interoperability and data management, supports modularity and provides for enterprise services. Enterprise services consist of commercial products that are integrated and standardized to provide the current tactical infrastructure and will migrate to become the key component of the Net Centric Environment. These services include Windows Service Configuration and user management (Active Directory, Domain Name Service and Windows Server), e-mail (Microsoft Exchange), Web Portal (Microsoft SharePoint) for Knowledge Management, security and virus protection, backup, failover and restoration services. Battle Command system interoperability is enabled currently with a Publish and Subscribe Service that is evolving to a Data Dissemination Service compliant with the NECC and NCES environment. PASS and DDS are used by multiple Army systems and support data exchanges and dissemination throughout the unit. BCCS also supports ongoing Joint convergence efforts with the Marine Corps by providing a data exchange gateway that allows the direct exchange of COP data between Joint Services.

Mounted Battle Command on the Move (MBCOTM)

The Mounted Battle Command on the Move system is a set of Command, Control, Communications, and Computers mission equipment integrated into a Bradley (ODS, M2A3, M3A3), Stryker Commander's Vehicle and the future light tactical vehicle for use by Commanders and selected Battle Staff personnel.

The focus of MBCOTM is to facilitate commander execution-centric operations versus command post-centric operations. MBCOTM provides for Battle Command by providing a commander situational awareness in the form of a digital common operating picture, enabling a commander to maintain situational understanding while moving and physically separated from fixed command posts. MBCOTM will be able to host Army Future Combat Systems Battle Command Technology as it is developed and will provide the integration necessary to enable Battle Command for Tactical Command and Control On The Move.

Program Status

Updated CPD JROC approved, followed by MS-C/LRIP ADM in 2QFY07. FUE is scheduled for 1/2QFY09.

Maneuver Control System (MCS)

Maneuver Control System is the mission critical command & control system that allows Commanders and their staffs to visualize the battlespace and synchronize the elements of combat power for successful execution of combat operations. The MCS provides a software capability that has transformed the way the maneuver commander, from battalion task force through corps, collaboratively creates and manages critical information to include location of friendly units, enemy units, targets, plans and orders, as well as operational graphics. MCS is used to improve

and shorten the decision making process, enhance planning operations, and supervise the execution of operations. MCS provides tools and displays that collect and process information from various sources as desired by the tactical commander and various battle staff users.

MCS is the heart of the Army's Battle Command System, the "system of systems" for Battle Command. Using formats and templates that are familiar to users, the MCS system can quickly develop and distribute battle plans and orders. Its automated features provide commanders the capability they need to conduct multi-node collaborative planning sessions to execute the battle plan, and coordinate forces for precision engagement.

MCS as part of ABCS, is the Combined Arms Commander's tool for visualization of the battlefield.

In this capacity, MCS receives critical Battle Command information and data from each ABCS Battle Field Functional Area and displays that information on the COP display as required by commanders and their staffs. MCS also provides critical COP information to each BFA as required for execution of their functional area. These information and data exchanges are completed directly via military messaging, data exchanges, email, hosting client applications, or indirectly using the ABCS Publish and Subscribe Service capability and web-based services.

MCS also provides the enterprise services necessary to support Battle Command functions and for the system to operate across the battlespace and seamlessly integrate with ABCS, other battle command enablers, Net Centric Enterprise Services and the Global Information Grid. MCS will use resident enterprise services to integrate information within the battlespace and through NCES, bring information from beyond the battlespace to the commander on the ground.

Program Status

MCS 6.4 Milestone III (FRP)–29 June 2005. MCS capabilities are being transitioned as services and will become part of the Joint Convergence effort. Command Post of the Future capabilities will also be added to MCS as a technical insertion.

Command Post of the Future (CPOF)

The Command Post of the Future is the commander's executive level decision support system, providing situational awareness and collaborative tools for tactical decision making, planning, rehearsal and execution management from Army Service Component Command to battalion level. CPOF supports visualization, information analysis, and collaboration in a single, integrated environment. Through the technological insertion of CPOF into the MCS program, commanders and key staff have an executive level decision support capability with enhanced real-time collaborative tools. These capabilities provide critical contributions to the commander's warfighting capabilities by enhancing his/her situational awareness and supporting an execution-focused Battle Command process.

CPOF operators interactively collaborate, sharing thoughts, workspace and plans to analyze information, and evaluate courses of action with real-time feedback for an immediate and comprehensive view of the battlefield. CPOF creates a commander-centric software environment that can be tailored to fit specific visualizations. This custom view supports distributed and collaborative operations that allow the commander to command anywhere on the battlefield. CPOF is designed to enable deep cohesion of thought processes between the commander and his staff. Users are able to selectively and dynamically generate and transmit their evolving analysis, plans and execution. CPOF is a comprehensible collaborative environment from the moment the system is turned on. Users just need drag and drop a visualization product into the "shared products" region, and it is instantly shared with all registered users.

Program Status

CPOF, MCS 6.4 and BCCS fielding is in accordance with G3 priorities to deployed and deploying operational units in theater (Army Battle Command System (ABCS) 6.4 Unit Set Fielding).

Standardized Integrated Command Post System (SICPS)

Standardized Integrated Command Post System is primarily a non-developmental effort that consists of the integration of approved and fielded C2 and other C4ISR systems technology into platforms supporting the operational needs of battalion through echelon above corps command posts. SICPS consists of various systems, specifically the SICPS Command Post Platform, which includes: Command Post Communications System, an intercom, the Command Center System and the Trailer Mounted Support System. SICPS provides:

- Standardized CP Infrastructure allows commanders and staffs to digitally plan, prepare and execute operations

- Systematic integration of Army tactical communications systems, Battle Command systems, and supporting systems into standard

platforms

- Standardized / modular / reconfigurable platforms, enabling multiple Battle Command applications over both classified and Sensitive but Unclassified LANs

- Supports NET-Centric CP operations on-the-move and at the long and quick halt

- C-130 transportability

- Real-time Situational Awareness and Common Operational Picture in Command Information Center with CCS

- TMSS (comprised of tents, environmental conditioning, and infrastructure) to support collaborative staff operations

Program Status

SICPS is an ACAT II program, currently in Low Rate Initial Production. SICPS fieldings continuing IAW Unit Set Fielding schedule. Implementation of VCSA Command Post standardization directives is on-going.

Force XXI Battle Command Brigade and Below (FBCB2)

Force XXI Battle Command Brigade and Below is a Joint interoperable, digital, Battle Command information system for brigade level and below. FBCB2 is designed to provide mounted and dismounted combat elements with near real-time, integrated SA and C2 functionality. FBCB2 enhances the ability of tactical commanders to better synchronize their forces, achieve agility and gain a sense of the

battlespace through improved SA and better combat awareness reporting while on the move. FBCB2 is a key component of ABCS.

FBCB2 operates over both terrestrial communications networks and SATCOM networks. The system consists of a ruggedized computer with a touch screen and keyboard in which the Soldier sees either a digital map or satellite imagery overlaid with icons representing the vehicle's location, other FBCB2 Blue Force Tracking (BFT) vehicles, known enemy units and objects such as minefields and bridges. FBCB2/BFT was expeditiously fielded in reduced quantities to every Army Command, Army Service Component Command, and Direct Reporting Unit, as well as the USMC and United Kingdom forces participating in OEF and OIF. In theater BFT has been fielded on 50 percent of all Up-Armored HMWVVs, and 100 percent of ASVs. The Army is currently fielding BFT on 100 percent of its MRAPs. Completion of fieldings for the Modular Force is scheduled for FY10.

Program Status

FBCB2 is currently funded to continue improvements in the Network Operations Center re-architecture, synchronization of software releases, satellite architecture and waveform redesign to reduce latency caused by increased system demands, Type 1 encryption, beacon capability development, logistics product development and Internet Protocol v6 development.

ISYSCON V4 Tactical Internet Management System (TIMS)

The ISYSCON (V) 4/Tactical Internet Management System is a software system that resides on the FBCB2 system located in the S6/G6 sections of the digitized force architecture. The ISYSCON (V)4/TIMS uses FBCB2 software as a foundation and adds developmental and commercial off-the-shelf software to plan, configure, initialize and monitor the Tactical Internet. The ISYSCON (V) 4/TIMS enhances the FBCB2 system management capability, and provides the Signal Officer, G6/S6, with a network management tool that allows him/her to plan, disseminate, configure, initialize, monitor and troubleshoot the Tactical Internet as well as the Tactical Operation Center and Command Post Local Area Networks.

Program Status

The program is currently providing ABCS and network system management hardware/software tools to deploying forces in accordance with the *Army Campaign Plan*.

COBRA-Based Blue Force Tracking Systems and Supporting Architecture

The MTX is the current DoD BFT system that leverages existing National Space Infrastructure/National Technical Means (NTM).These devices give commanders the ability to track and receive position location information (PLI) and short brevity codes, in near real-time, from friendly forces requiring a extremely secure, low probability of intercept/low probability of detection (LPI/LPD) C2 link. These systems substantially enhance security and reliability through the use of LPI/LPD COBRA (collection of broadcasts from remote assets) waveforms, encryption certified by the National Security Agency and military GPS. SMDC/ARSTRAT's BFT Mission Management Center (MMC) supports MTX use of the existing COBRA architecture by coordinating with National system managers and warfighting units to help collect, process and disseminate warfighter BFT data.

Due to the security advantages, SOF used the COBRA-

based BFT systems during OEF and OIF while Coalition Forces Land Component Command main formations used FBCB2. Post-OIF I, has developed a capability to successfully integrate disparate BFT systems used by different units and Services into the COCOM's TOP COP, deliver these devices' PLI data via the Integrated Broadcast Service and maintain special mission "discrete" BFT data feeds to those users requiring significant security. These BFT systems, the MMC and the NTM architecture give operational-level commanders a substantially enhanced COP to date by increasing their situational awareness.

Program Status

Approximately 6,000 MTX systems have been produced and fielded to USSOCOM components (e.g., every USAF Special Operations airframe and deployed ground team in support of OEF/OIF has an MTX), Other Government Agencies (OGAs), and all other services who have a specialized requirement for secure/LPI/LPD BFT support. The MTX and the MMC were developed and fielded as a result of supplemental appropriations and budget additions, but have since been accepted as critical and indispensable support systems to the GWOT. The NRO has also invested heavily in upgrading and expanding the COBRA support architecture to make it mission ready for DoD and OGA requirements.

Single Channel Ground and Airborne Radio System (SINCGARS)

Single Channel Ground and Airborne Radio System provides commanders with a highly reliable, secure, easily maintained combat net radio that has both voice and data handling capability in support of C2 operations. SINCGARS, with the Internet controller, provides the communications link for the digitized force. The Advanced System Improvement Program

models are of a reduced size and weight, providing further enhancements to operational capability in the Tactical Internet environment.

Program Status

SINCGARS continues to be the workhorse in the Army. FM Combat Net Radio in OIF/OEF is being fielded to Active, ARNG and Reserve forces in current operations as well as supporting Army transformation.

Global Positioning System (GPS)

Global Positioning System is a space-based radio POS/NAV system that provides extremely accurate, continuous, all-weather, common-grid, worldwide navigation and three-dimensional positioning, velocity and timing information to land, sea, air and space users. These components are the space, ground control and user equipment segments.

Program Status

The Defense Advanced GPS Receiver (DAGR) began replacing the current Precision Lightweight GPS Receiver in 1QFY05. The DAGR includes the Selective Availability Anti-Spoofing Module and other significant improvements including size, weight and battery requirements. The PLGR will be cascaded from units fielding the DAGR to fill authorized requirements in other units. The DAGR is projected to be replaced starting in FY13 by an improved Military (M)-Code capable handheld GPS device when the associated M-Code satellite constellation and ground control stations have reached FOC.

Bridge-to-the-Future Networks (BFN)

Bridge-to-the-Future Networks is the Army's bridging strategy to deliver increasing net-centric capabilities into the Current Force today, and will be followed by the initial transition to the Warfighter

Information Network–Tactical capability. Capability enhancements within the Army's BFN strategy are increased voice, data and video services that are Joint network ready and supports the Army's modular designs. The BFN provides the Current Force with a state-of-the-art COTS communications backbone network (high-speed and high-capacity) that will enable them to exchange information (voice, data, and video) throughout the tactical corps and into the sustaining base.

The objective of the BFN is to incrementally insert increased capability, COTS solutions to the Army's Current Force to satisfy existing capability gaps. BFN capability increments build off the recapitalization of the current Multi Subscriber Equipment (MSE) and Tri-Services Tactical Communications (TRI-TAC) systems. The Army's BFN CPD fuses the Army's Joint Network Node, connect the Logistician–CSS, and intelligence Trojan Spirit initiatives into a single strategy to deliver increased capabilities to the warfighter today. The BFN capability increments build off of the existing *Area Common User System Modernization Plan* and recapitalization of the current MSE and TRI-TAC systems.

Warfighter Information Network–Tactical (WIN-T)

Warfighter Information Network–Tactical is designed to provide the backbone of the tactical network, continuous and full communications-on-the-move (users and network infrastructure) capability at all echelons, Joint and coalition voice and data services to all command posts, a flexible and dynamic task reorganization capability, and a more survivable and less complex network. WIN-T's single integrated network will provide multi-level classified Joint and coalition voice and data services to all command posts. Conceptually, this is intended to eliminate the need for stovepipe (CSS-VSAT, Trojan Spirit) communications systems. As an integral component of the FCS network, WIN-T is a critical element in the Army's transition to robust network based operations. WIN-T provides the key capability for on-the-move communications through a three-tiered architecture (ground, airborne and space) that enables continuous network connectivity. The ground layer will equip Soldiers, sensors, platforms, command posts, and access nodes (signal shelters) with integrated transmission (radio) systems, switching, and routing capabilities that will serve as WIN-T points of presence. The airborne layer will serve as an access node and relay by positioning transmission, switching and routing capabilities onto airborne platforms. The space layer will serve as an access node and relay by leveraging the transmission, switching and routing capabilities provided on the satellite.

Program Status

The Army has restructured the WIN-T Program to absorb the former Joint Network Node Network program. The restructured WIN-T program will consist of four Increments:

- Increment 1: Networking at-the-Halt

- Increment 1a: Extended Networking at-the-Halt - the former JNN program with Ka military

satellite communications capability

- Increment 1b: Enhanced Networking at-the-Halt - the former JNN Program with Net Centric Waveform and Colorless Core Capability

- Increment 2: Initial Networking on-the-Move

- Research, Development, Test & Engineering for Soldier Network Extensions and High-capacity Network Radios, Tactical Communications Nodes, Points of Presence and other associated Configuration Items

- Procurement of limited numbers of SNEs, HNRs, TCNs, POPs and other associated CIs

- Increment 3: Full Networking on-the-Move

- Full mobility to include Future Combat Systems support

- Increment 4: Protected Satellite Communications (SATCOM) on-the-Move

- Enhanced capability for protected SATCOM through tech insertions from High Capacity Communication Capability

The Army has combined the former JNN program's funding and WIN-T funding into a single funding profile that clearly identifies funding for each increment. The Army will procure Increment 1 equipment to complete fielding to about 199 Army units; and will procure Increment 2 equipment for about 37 Army units, based on affordability through fiscal year 2013.
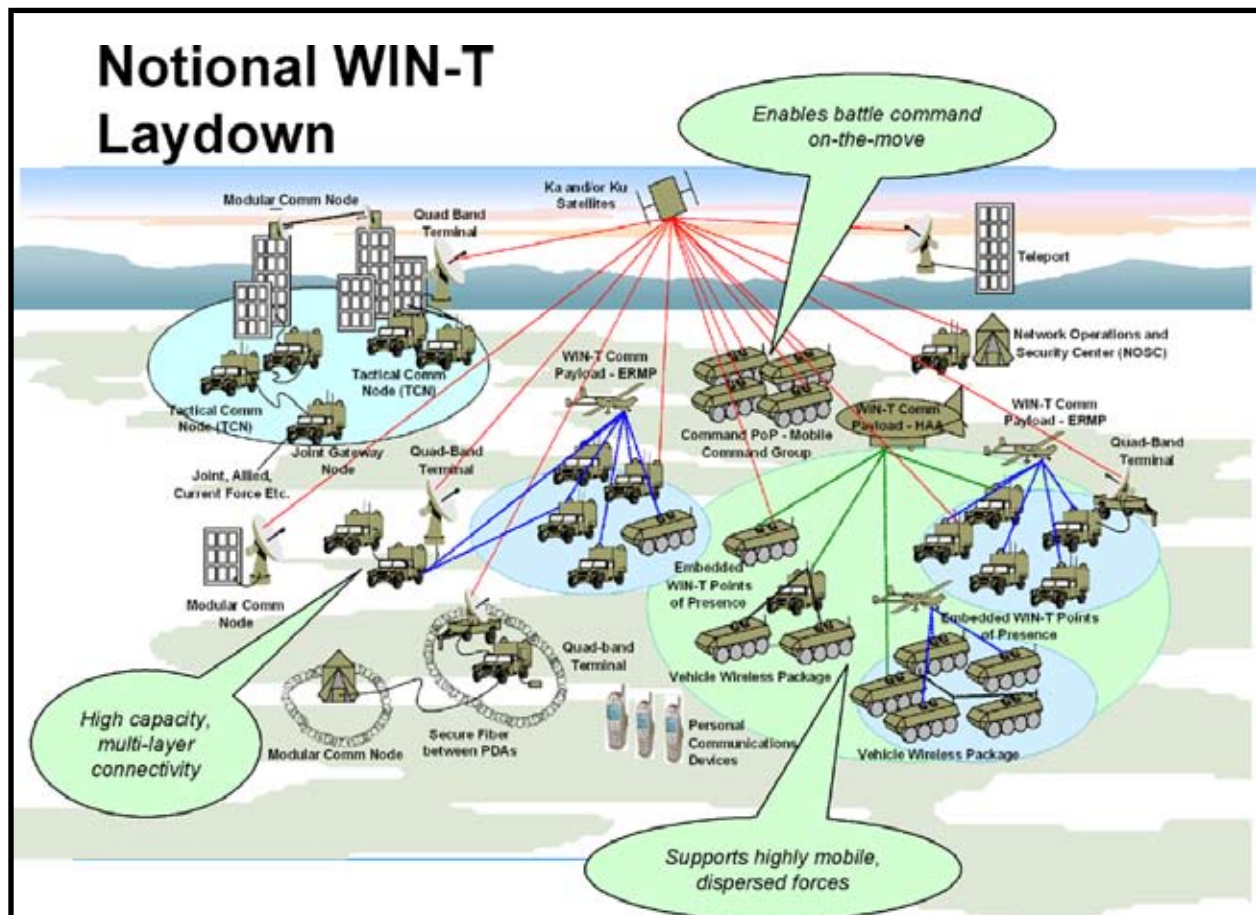
In FY 2008, the Army will provide Increments 3 and 4 content description, cost, schedule and affordability details. Also in FY08, the Army will finalize its plan on realigning the former JNN program assets (if needed, depending on whether FY08 supplemental funding is provided), from maneuver brigade combat teams to those sustainment, engineer and battlefield surveillance brigade units, which require only communications at-the-halt capability.

The Joint Requirements Oversight Council approved WIN-T Capability Development Document will be used as the foundational requirement document for the restructured WIN-T program and its increments. The JROC validated the former JNN program Annex of the Bridge to Future Networks CPD, which will provide the capabilities for WIN-T Increment 1a. The Army will develop a CPD for Increment 1b and any additional increments of the restructured WIN-T program. The PM will establish a formal agreement with the FCS program office to establish final performance requirements by WIN-T Increment 3 Preliminary Design Review that includes Size, Weight and Power-Cooling (SWaP-C) specifications for CIs to be provided to FCS, based on balanced trade. Increment 1 of the restructured WIN-T program is post-MS C and is authorized the procurement of Low Rate Initial Production units to meet operational requirements of the Army. Increment 2 is now a post-MS B procurement. Increment 3 is post-MS B, but the APB will be broken out from the existing

APB. PM WIN-T PM has awarded the Increment 3 SDD Phase 3 contract and to begin work on Increment 2.

Joint Tactical Radio System (JTRS)

Joint Tactical Radio System is a family (ground, airborne, and maritime domains) of common software-defined radios that provide seamless network connectivity throughout the battlefield in support of Joint Vision 2020 objectives. JTRS is the military's affordable, mobile, high-capacity, lightweight, multi-band radio system providing simultaneous voice, data and video communications. JTRS will be a key component of the Tactical Internet and GIG using a family of network waveform applications. The Army is the executive agent for the JTRS program requirements, and the Navy is the executive agent for JTRS acquisition. The Army is responsible for two (Ground Mobile Radio (GMR) and Handheld, Manpack, Small Form Fit (HMS) of the four primary product lines (GMR, JEM, HMS, and AMF). GMR is developing the ground vehicular radio, AMF is developing an airborne radio for Army rotary wing aviation platforms, and HMS is developing the handheld, manpack and small form fit radios. In order to support the Spin-out of FCS capabilities into the Current Force that begins in 2010, an initial "slice" of the GMR capabilities will be included in the early Spin-out fielding. As the JTRS program continues through its development milestones, the capability within the FCS network will be enhanced.

Program Status

The JTRS Joint Program Executive Office has restructured its program to ensure the GMR, HMS and AMF product managers deliver Increment 1 capability. Both GMR and HMS are in the SDD phase. Increment 1 Low Rate Initial Production (LRIP) for GMR is anticipated to begin in 2QFY11 and LRIP for the various HMS products ranges from 4QFY10 to 2QFY11. AMF is in the Pre-SDD phase and LRIP for the rotary wing radio is projected to begin in 4QFY11.

Joint Network Management Systems (JNMS)

Joint Network Management Systems provides a common, automated tool for network planning and management that will support the Combatant Commanders and their deployments. It consists of primarily commercial off-the-shelf software modules/capabilities to accomplish its mission. JNMS includes the following capabilities:

- High level planning, to include creation/editing and/or loading of data bases; definition of network sites and units; assignment of responsibilities and schedules; and generation and distribution of planning data (Commander's Evaluation Request, Annex K to the Operations Plan, Joint Communications-Electronics Operating Instruction, Communications Service Requests.

- Detailed planning and engineering, activation and modification, to include planning and engineering for circuit switches, Asynchronous Transfer Mode, Defense Message System, commercial and military satellite communications systems, data networks, message switches, transmission systems, and single channel networks, generation and distribution of planning and engineering data,

and link and network activation and gateways between networks.

- Monitoring, to include collection of data from equipment and networks, data analysis, display, data base updates and generation and distribution of reports.

- Control and reconfiguration, to include network device configuration, processing of incoming data, generation and evaluation of alternative responses and implementation of appropriate responses.

- Spectrum planning and management, to include information management, spectrum engineering; allotment/assignment of frequencies, de-confliction, electromagnetic compatibility and electromagnetic interference analysis.

- Security, to include formulating network security requirements, physical security, user security, information assurance and Communications Security/Electronic Protection.

Program Status

JNMS ORD Rev 3 Approved 12 Jun 06. Fielding ongoing for–11 full JNMS systems (planning & JNN based management/Help Desk) with 27 additional JNMS Network Planning Systems to be fielding to Signal Brigades, Corps, Echelons Above Corps Signal and SOF Commands.

CRYPTOGRAPHIC MODERNIZATION PROGRAM

Cryptographic security is an integral part of LandWarNet, the Army's portion of the GIG. It is necessary to provide the high assurance and robust technology required to protect and secure our National Security Information and National Security Systems from Nation States intent on gaining access to

critical command and control systems. Cryptographic Modernization is a DoD initiative. The National Security Agency and Services have a collaborative partnership that plans for the incremental replacement of an aging cryptographic equipment inventory that is rapidly approaching functional obsolescence. The current inventory of cryptographic devices is not net-centric (GIG Compliant), no longer in production and whose components are no longer logistically or economically supportable. Cryptographic Modernization provides highly assured, technologically advanced, robust cryptographic solutions that are adaptive to evolving network architectures. The improved capabilities may be in the form of improved algorithms, expanded functionality, or the integration of new and emerging technologies. Cryptographic Modernization is inextricably linked to NSA's migration from Electronic Key Management Systems to Key Management Infrastructure which will facilitate over the network keying and downloadable and reprogrammable algorithms. The overarching efforts of CryptoMod are to provide cryptographic solutions that support the following tenants:

- Programmable/Downloadable Algorithms

- Embeddable Solutions (Whenever Possible)

- Scalable Components (Software Upgradeable)

- EKMS/KMI Compliant (Over-the-Network Keying)

- Network-Ready (Network Awareness, Plug and Play)

- Joint Interoperability

Program Status

Currently the program is procuring and fielding the latest, available technologically advanced network security devices to support warfighter demands for more bandwidth capable solutions to support information sharing, video and the extension of SIPRnet connectivity down to battalion and company levels. Devices such as the KIV-7M/KIV-19Ms, the INEs, the voice over IP secure phone and KSV-21 STE card will be integrated into the Current Force via technology refresh initiatives. The KSV 21 is an NSA directed replacement initiatives for the KOV 14 STE card currently in used. The KIV-7M is a converged technology solution that combines the dual functionality of the link encryptor family and a trunk encryptor family in the same form factor. The KIV 7M will be integrated into the Joint Network Node (JNN), HUB sites (collocated with Teleport reach back), the Single Shelter Switch and other new and modernizing Army programs beginning in FY08. The KMI Capabilities Increment (CI) 2 contract was awarded on 31 July 2007. The newer INEs incorporate High Assurance Internet Protocol Interoperability Standards (HAIPIS) scalability and both Suite A and B algorithms. The suite B solutions support allied and coalition interoperability. The secure IP phones will support the migration to everything over IP.

Appendix 8: Battlespace Awareness Modernization

Discussion of Core Battlespace Awareness Materiel Programs

Space Support Enhancement Toolset (SSET)

The Space Support Enhancement Toolset is a COTS/GOTS prototype capability supporting Army Space Support Teams and Space Support Elements in current theater of operations. It provides ARSST and SSE specialized tools and software to maintain situational awareness of all space assets, monitor satellite status, and produce specialized products from space-based assets, as well as providing the capability to maintain continuous communications with National and Joint space organizations in CONUS. SSET is a mission-essential item of equipment for both ARSST, augmenting corps, and JTF headquarters and other Services and Joint, Interagency and Multinational headquarters as military and strategic situations call for; and SSE, organic to modular division, corps, and select Army headquarters. It provides capabilities needed by ARSSTs and SSEs to conduct space operations planning, integration and coordination and the production of enhanced space products.

Originally SSET was developed through the efforts of the Space and Missile Defense Battle Lab. The SSET has been combat-tested in OEF and OIF, where space-based products provided by SSET-equipped teams provided enhance C2 and situational awareness for land force commanders. The complete SSET consists of a communications suite, four workstations and ancillary equipment housed in a V5 rigid-walled shelter, mounted on an M1113 HMMWV. Modular Force designs incorporate a four-person SSE at division level, a five-person SSE at corps level and a six-person SSE at army level, each equipped with an appropriate version of SSET.

Program Status

SSET is an emerging requirement funded in fiscal years 2008-13 program funding. The Army Acquisition Executive assigned SSET system life-cycle management responsibilities to the Program Executive Office Intelligence, Electronic Warfare and Sensors (PEO-IEWS). Consequently, the PEO-IEWS directed that responsible program offices and the TRADOC Capabilities Manager to: determine ARSST and SSE capability, functionality and communications requirements to support OIF/OEF; whether those requirements can only be provided by Space Operations System boxes; the SSET capability current fielded in OIF and any shortfalls; identify any unique SSET capabilities that could be incorporated into the Distributed Common Ground System–Army CDD; and assess the cost and schedule impacts to incorporate these unique SSET capabilities into the DCGS-A program.

Distributed Common Ground System-Army (DCGS-A)

Distributed Common Ground System-Army is the Army's contribution to the DoD DCGS program. Its core functions are ISR integration, fusion of sensor information and direction and distribution of sensor information. DCGS-A will draw information from a wide variety of automated and manual sources, space platforms, unattended air and ground vehicles, existing and new ISR capabilities and an assortment of databases. The system enhances the capabilities of Current and Future Force commanders to execute Battle Command, synchronize fires and effects, rapidly shift battle focus, achieve situational awareness and protect the force. It does so by providing tactical and operational commanders access to advanced ISR capabilities and allows them to synchronize ISR collection, exploitation, processing and distribution of information, while operating in a multi-level security network. DCGS-A provides access to National, theater

and Joint Services intelligence databases. DCGS-A is a complementary system to FCS and will affect all levels of the Army by providing fixed systems at theater MI brigades, mobile systems at battalion to Army Service Component command levels, and embedded software to provide ISR data and access to ISR systems to Soldiers operating non-ISR, non-intelligence systems.

Program Status

The Army is leveraging its successful integration of Joint Intelligence Operations Capability-Iraq into the DCGS-A program to accelerate the introduction of advanced DCGS-A capabilities to the Current Force. The Multi-National Corps-Iraq has requested that Army employ DCGS-A (V)3 software in-theater. In response, in 2QFY08, Army will begin upgrading DCGS-A Theater Provided Equipment in Iraq with DCGS-A(V)3. Simultaneously, Army will begin increasing the capability of the All Source Analysis System systems in next deploying OIF and OEF units with DCGS-A(V)3 software. By the end of FY10, Army intends to have a DCGS-A base capability in all Active, National Guard, and Army Reserve units. Advanced software, DCGS-A Software Baseline 1.0 will undergo an operational evaluation in 2QFY09 with the Army's Software Block 2+. The Army will incorporate DSB 1.0 into existing Program of Record systems, ASAS, Tactical Exploitation System-Forward, Common Ground System and Digital Topographic Support System to "Spin-out" advanced DCGS-A capabilities to the Current Force in FY10. DCGS-A will undergo a Limited Users Test in 2QFY10 with DSB 2.0 and fully up-armored platforms. This will lead to a Low Rate Initial procurement decision in 4QFY10 and an Initial Operational Test and Evaluation in 3QFY12. Army anticipates beginning Full Rate Production in FY13. Army intends to continue DCGS-A development, primarily software development, through the 10-15 POM. These efforts will meet objective requirements

and keep DCGS-A relevant as advanced sensors and other advanced technologies are introduced through the next decade.

Block II Analysis & Control Element

ASAS Light

ACT Enclave

Communications Control Set

All Source Analysis System (ASAS)

The All Source Analysis System is the Army's primary intelligence fusion program. ASAS automates the planning and management of intelligence, counterintelligence and electronic warfare operations; intelligence collection management; the processing and analysis of intelligence and combat information; and the dissemination of intelligence and combat information products to tactical and operational commanders.

ASAS provides an automated interface to the Army Battle Command System and the Joint Global Command and Control System. These interfaces provide battlefield commanders with enhanced situational awareness and timely intelligence on enemy force deployments, capabilities and potential courses of action, as part of the COP. In turn, the Army intelligence community receives current information on blue force locations, activities and plans.

An ASAS system is authorized in all combat and combat support units and designated combat service support units at all Army echelons from battalion to

field Army. Because of its ubiquitous presence and the fact that substantial ASAS software capabilities were incorporated into DCGS-A(V)3, Army decided to upgrade the ASAS Family of Systems with DCGS-A(V)3 software to accelerate the introduction of DCGS-A capabilities into the Current Force. The initial DCGS-A Enabled ASAS systems were fielded in 4QFY07 and Army intends to equip all units deploying in FY08 with DCGS-A Enabled ASAS. By the end of FY10, all authorized Active, National Guard and Army Reserve units will be equipped with DCGS-A Enabled ASAS systems. This will provide the Current Force a base DCGS-A capability that will be the foundation of transforming the Intelligence, Surveillance and Reconnaissance capabilities of the Current Force into Future Force capabilities.

Program Status

ASAS Block II is in FRP. In Oct 07, the Project Director for Intelligence Fusion in the ASAS program office came under the operational control of PM DCGS-A. All ASAS systems produced in FY08 and FY09 will meet DCGS-A specifications and be fielded as integral components of the Army's initial DCGS-A capability. The program to upgrade currently fielded ASAS equipment to this configuration began in1QFY08. By end of FY09, ASAS will be totally merged into the DCGS-A program and will cease to exist as a separate entity.

Grenadier Brat (GB) and Mini-transmitter (MTX) Blue Force Tracking (BFT) Systems and Supporting Architecture

GB and the MTX are two separate and distinct current DoD BFT systems that leverage and take advantage of the existing National space infrastructure National Technical Means. These devices give commanders the ability to track and receive position location information of dismounted teams and vehicles equipped with the devices. The systems are monitored and disseminated by the Mission Management Center, which supports GB/MTX use of the existing COBRA architecture by coordinating with National system managers and warfighting units to help collect, process and disseminate operational BFT data. These BFT systems, the MMC and the NTM architecture give operational-level commanders a COP which substantially increases their situational awareness.

Program Status

GB was acquired as a Warfighter Rapid Acquisition Program and currently 500 systems are fielded with U.S. Army Special Operations Command, U.S. Central Command and U.S. Army South. No further systems will be procured and the program will be de-fielded by first quarter, FY08 due to architecture updates. There are approximately 5,500 MTX systems produced and fielded to all services, USSOCOM components and other Government agencies that have a specialized requirement for secure/LPI/LPD BFT support and will continue to be available as a lightweight man portable BFT device.

Aerial Common Sensor (ACS)

Aerial Common Sensor is an Airborne Reconnaissance, Surveillance and Target Acquisition/Intelligence, Surveillance, and Reconnaissance capability directly supporting Battlespace Awareness for tactical commanders. Specifically, ACS will provide real-time, persistent, precision, networked, wide-area, high-capacity, multi-sensor, intelligence collection capability throughout the Joint operating environment. ACS will quickly produce actionable intelligence that provides commanders and Soldiers critical shared situational understanding delivered with the speed, accuracy, and timeliness necessary to conduct successful and when necessary, lethal Joint operations. ACS will support

focused Intelligence Preparation of the Battlespace, Indications and Warnings, precision targeting, battle damage assessment, situational development, Battle Command and Force Protection. Each of these will be synchronized with operations in order to develop and maintain situational awareness and reduce clutter in the maneuver environment. ACS will be a manned, high performance fixed-wing aircraft capable of rapid worldwide deployment carrying multiple sensor payloads and intelligence processing, appropriate air/ground/satellite data links and air crew. The RSTA/ISR payload will consist of a suite of modular, scaleable signal intelligence and imagery intelligence sensors and processors that can operate alone or simultaneously in combination with each other.

The intelligence processing suite onboard ACS and in the ground station, provided by the Distributed Common Ground System-Army, will integrate the products from all ACS Sensor payloads as well as the sensor feeds from other Joint force sensors, including manned/unmanned teaming with Army Unmanned Aircraft Systems, to provide a correlated near-real-time picture of the tactical operational environment with the greatest degree of granularity possible. Onboard communications will consist of a robust set of line-of-sight and satellite communications datalinks that will enable direct linkage to Brigade Combat Teams, Manned-Unmanned teaming with Army UAS, wideband/worldwide connectivity to DCGS-A, the Global Information Grid, and interoperability with other Army, Joint and National RSTA/ISR assets. ACS will be a critical and integral component of the Future Force.

Program Status

The ACS Program is in pre-Milestone B status. The Army is currently on track for a MS B decision during 2QFY09 and System Development and Demonstration contract award in 3QFY09.

Tactical Exploitation System (TES)

The Tactical Exploitation System Family of Systems is the Army's Tactical Exploitation of National Capabilities system that tasks directly, receives through direct downlinks or relays, processes, exploits and disseminates electronic intelligence, communications intelligence externals, Imagery and MTI data from satellites, USAF (U-2, Global Hawk, Predator & JSTARS), Navy (P-3, Maritime Global Hawk & SHARP) aircraft/sensors and from direct downlinks and other fixed and mobile ground stations. TES is embedded in the corps and division force structures is providing vital space-based and airborne imagery, signals intelligence, blue force tracking and communications reach to and from deployed units for OIF. The TES family of systems is a key part of the emerging DCGS architecture with TES variants in Army, USN, USMC, limited USAF units and selected National and Joint agencies/headquarters. TES software and middleware are the basis for DCGS-A fixed systems.

The TES program combines the intelligence functions of four previously stovepiped ISR collection systems into an integrated downsized, open, scalable, modular and network-centric architecture with all elements fully transportable by C-130 aircraft. TES generates timely information, intelligence, and precision targeting data. TES also is capable of limited MASINT processing and analysis. TES receives space-based blue force tracking data and provides it to the GCCS–Army. TES has a direct digital/network interface with the AFATDS, Automated Deep Operations Coordination System and the Joint Intelligence Operations capability in Iraq/Afghanistan. TES performs preprocessor, processor, analytical functions for the ASAS, Common Ground Station, JIOC-I/A and Digital Topographic Support System.

Program Status

TES-Main and TES-Forward systems have been fielded to III, V, XVIII Airborne corps and 513th MI Brigade. As the Army transforms to its new structure, the TES-Main will support the theater as a component of the Theater Intelligence Brigade and the TES-Forward will be organic in both the Corps and selected TIBs. The first TES Main moved to a TIB from XVIII Airborne Corps in FY06 as the corps started its transformation to a Modular Configuration. Division-TES have been fielded to all Active divisions. The TES-Forward (minus) was fielded to the 501st MI Brigade and to I Corps in FY06. Thirteen of 21 TES-Lite systems were fielded to I Corps, SOF units, Korea, and selected TIBs in FY06. An additional eight will be fielded to XVIII Airborne and III Corps, SOF units and selected ARNG units on a rotating bases to support OIF/OEF deployments in FY07.

The JIOC I has been fielded to Multinational Forces-Iraq command center. The TES Remote Interface System that provides expanded direct database access between TES/DTES and ASAS has been fielded to XVIII Airborne Corps, along with III Corps, V Corps, 4th ID and as stay-behind equipment in support of Multinational Corps-Iraq. A number of TES systems continue to be deployed in OEF and OIF and judged in after-action reviews as being very supportive of high OPTEMPO, ISR, and dynamic targeting demands. TES systems have remained the primary source of theater and National near real-time imagery and SIGINT data for MNC-I and divisions. TES systems will be in the force structure until the objective DCGS-A system is fully fielded, sometime after 2012. Significant TES components will be re-designated as DCGS-A components over the next three to four years.

Trojan Special Purpose Integrated Remote Intelligence Terminal (SPIRIT)

Trojan SPIRIT provides assured Top Secret/Special Compartmented Information satellite communications to deployed warfighters from brigade to EAC. It provides critical intelligence reach to strategic, operational and tactical Army and Joint formations. Trojan SPIRIT was born as a quick-reaction capability during Operations Desert Shield/Storm, as commanders needed a way to receive time-sensitive TS and Secret imagery and intelligence data at high data rates. From those beginnings, the system became a program of record in 1993, designated the Trojan SPIRIT II, with initial fieldings to separate brigade/ACR, division, corps, and EAC units. Trojan SPIRIT II fielding ended in 1998, but the advent of the Stryker brigade brought the system back to life with a new variant, the Trojan SPIRIT Lightweight Integrated Telecommunications Equipment. There are three versions of the Trojan SPIRIT LITE: a transit case version, in use by SOF, and HMMWV-mounted wheeled versions used at the BCT through EAC levels. All feature a 2.4 meter satellite dish that provides up to T-1 (1.544 mbps) bandwidth throughput using the C or Ku frequency bands. Each Stryker brigade receives two V2 and

one V3 Trojan SPIRIT LITE. Under the Modular Force design, each BCT receives one V3 system, a significant increase in Trojan SPIRIT density across the force. The Modular Divisional Headquarters retains the two Trojan SPIRIT II systems formerly in the division MI battalion, with fielding of a third system in FY08-10 to provide TS/SCI bandwidth for the Tactical Command Post. As part of Grow the Army, each Battlefield Surveillance Brigade Headquarters will also receive a Trojan SPIRIT LITE V3.

Program Status

Trojan SPIRIT is an interim solution for assured TS/SCI satellite communications until the fielding of WIN-T. The program is beyond Milestone III. LITE V2 production ceased after fielding of Stryker Brigade 7. LITE V3 and V1 production and fielding will continue through FY12 as the Army resources all Modular Force brigades and ARNG division headquarters with the system and as Army Special Forces Groups increase in size.

PROPHET

Prophet provides an all-weather, 24/7 near-real-time view of the BCT/ACR/SBCT/BfSB AOR through the use of SIGINT sensors, to include the capability to detect, identify and electronically attack selected enemy emitters. It is the BCT Commander's only organic, ground SIGINT capability allowing him to visually depict and understand his Battlespace, now and in the future. The Prophet program has migrated from a block acquisition strategy to a spiral acquisition strategy. Prophet Electronic Attack Spiral 1 provides a modern EA capability that assists the Brigade and Division Commander in overwhelming the enemy, shaping the Battlespace, and protecting friendly operations. Prophet Electronic Support Spiral 1 provides the brigade with the improved ISR

capabilities across a broader range of missions. The spiral enhancements capitalize on Commercial off-the-Shelf/Government off-the-Shelf solutions and Technology Insertion capabilities. Prophet can operate on-the-move, mounted on a HMMWV, or stationary in a mounted or dismounted configuration.
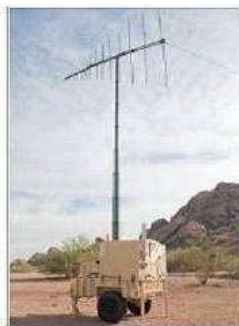

Prophet Block I

Prophet Spiral 1 ES

Control w/Prophet T-Lite

Prophet Spiral I Electronic Attack (EA)

Prophet Spiral II ES and EA

Program Status

The Prophet ES Spiral 1 system will begin fielding in FY08. The Prophet EA Spiral 1 Initial Operational Test and Evaluation will be conducted in 4QFY08 with fielding beginning in FY09.

Tactical Unmanned Aircraft Vehicle (TUAV) Shadow 200

The RQ-7A Shadow 200 TUAV provides the maneuver commander with a near real-time, highly accurate, sustainable capability for over-the-horizon RSTA/ISR and BDA. Each Shadow 200 TUAV system consists of four Shadow 200 aircraft, two HMMWV mounted GCS, one portable GCS and four remote video terminals that can provide near real-time video to commanders on the ground. The Shadow

200 TUAV has an onboard electro-optical/IR sensor payload. Future planned improvements include a Laser Designator, Tactical Common Data Link for secure, jam-resistant data forwarding, and an upgrade of the engine to gain reliability improvements. The threshold range is 50 kilometers with an objective range of 200 kilometers and an on-station endurance of four hours. The threshold payload is 60 pounds with an objective capacity of 100 pounds. OPTEMPO requires a threshold of 12 hours per 24-hour period and an objective of 18 hours per 24-hour period.

Program Status

FUE was 1/4 ID in May 2002 and IOC was achieved in October 2002. The TUAV program was revalidated by JROC in 2004. Production and fielding continues to meet the HQDA approved procurement objective of 115 systems.

Counterintelligence Human Intelligence Automated Reporting and Collection System (CHARCS)

During January 2007 the PEO IEW&S chartered a Counterintelligence Human Intelligence Automated Reporting and Collection Systems Product Director to manage the future development process for Human Intelligence team member, Counterintelligence investigator, interrogation collection and reporting systems and tools. The PD CHARCS provides focused development support for the collection and reporting elements of the CI and HUMINT architecture.

Specifically, the PD CHARCS has development responsibilities for the collection and reporting components; source and mission management; DOCEX and language translation; biometrics; interrogation management tools, media forensics and counter human deception detection devices and was the initial developer of the Tactical HUMINT Team Kitbag that is in wide use throughout OIF and OEF. Additionally, CHARCS systems support both Army Special Operations Command and INSCOM with CHARCS system variants tailored for their specific mission requirements. Due to an evolving threat, new systems and upgrades are required to maintain relevancy. The latest increment is referred to as CREW 2.1.

Two systems, the AN/PYQ-8 Individual Tactical Reporting Tool and AN/PYQ-3 CI/HUMINT Automated Tool Set are the centerpieces of CHARCS collection and reporting capability and have been fielded to CI and HUMINT intelligence units worldwide. CREW production has been completed. Production of CREW 2.1 is ongoing and theater fielding began March 2008.

Program Status

CHARCS Increment 1 is Type Classified Standard and has Full Material Release. Components are currently being fielded to the Reserve Component and to deploying units. Full fielding is expected in 2011. The CHARCS Increment 2 Capability Development Document, which is presently in Army staffing, provides the requirements foundation for the next generation of collection and reporting systems and tools. CHARCS is the next evolution for CI and HUMINT collection and reporting addressing the lessons learned from the over 2,000 ITRT and CHATS fielded through FY06 to Army units in support of GWOT. New software and hardware components being designed under CHARCS FY07 through FY10 will aggressively leverage the open architecture framework defined by DCGS-A and

provide flexible, modularized human intelligence collection and reporting solutions. Enhancements will provide smaller, lighter and mobile modularized collection and reporting tools with simplified software baselines and improved communications capability.

Sequoyah Foreign Language Translation System

Military, contract and host nation linguists provide a critical capability that is unavailable in sufficient numbers to satisfy the language translation needs of the Services, Joint and National agencies. The Sequoyah Foreign Language Translation System addresses this capability gap by enabling non-linguists with two-way automated speech and text cross-lingual communication capabilities on demand. S-FLTS will provide commanders an organic capability to rapidly perform two-way speech and text cross-lingual operations at all echelons and in all environments where linguist support is minimal or unavailable. S-FLTS interoperable design will enable it to be embedded on diverse platforms throughout the Joint community which includes, but is not limited to, the BCS, GSS, FCS and the DCGS. S-FLTS capabilities will be available via a browser, and as downloadable modules for systems that are not always linked to the network.

Program Status

The Army has been designated as the lead Service for S-FLTS with JROC interest designation. Joint Forces Command, in response to an Urgent Need Statements provided by the Multi-National Security Transition Command-Iraq, 25th Infantry Division, USCENTCOM, USPACOM and USSOCOM is providing the initial speech to speech capability by leveraging DARPA's tactical translation program. DARPA's Global Autonomous Language Exploitation program is being leveraged to provide the Text to Text capabilities. S-FLTS Capability Development Document has been approved by the Army Requirements Oversight Council and funding programmed in FY09-13. FY08 funding is being reprogrammed to S-FLTS to initiate documentation preparation to support a 1QFY09 Milestone B Review.

Counter Radio Controlled Improvised Explosive Device Electronic Warfare Increment 2 (CREW-2)

The original Counter Radio Controlled Improvised Explosive Device Electronic Warfare Increment 2 was a response to Operational Needs Statements for a capability to prevent and defeat Radio Controlled Improvised Explosive Device detonation ambushes that are a pervasive threat throughout Operations Iraqi Freedom and Enduring Freedom theaters of operation. CREW is a family of radio frequency jammers that target cell phones, beepers, garage door openers and like systems. It provides frequency coverage against many known RCIED threats, increased protection range, ease of programmability, reduced size/weight and power required, and a built in capacity for future growth, CREW-2 is providing significant support to forces who must deal with counterinsurgents.

Program Status

CREW transitioned to a Program of Record. CREW-2 CPD was AROC/JROC approved on 12 March 2007.

Biometrics Automated Toolset (BAT)

Biometrics Automated Toolset is a multi-modal biometric collection system originally designed for the Counterintelligence/ Human Intelligence community to collect, store, match and share Red Force and grey Force biometric data in current theaters of operation. Red Force biometric and identity information is a critical type of associated intelligence data used to identify detainees, enemy

combatants, enemy prisoners of war, or persons of interest. Grey Force biometric and identity information is essential because it facilitates the vetting of locally employed persons on U. S. Military bases across the world and can be used to control access to those bases. BAT provides biometric and identity identification, tracking, dissemination and situational awareness capability which can enhance the CI/HUMINT, Military Police and Military/ Civilian Intelligence community's ability to monitor, assess, and react to the unique threat environments that are being encountered throughout the world, now and in the future.

Program Status

Initially an Advanced Concept Technology Demonstration, BAT was approved for Program of Record status in Nov 2006. The BAT CPD is under review by TRADOC. Hundreds of BAT systems have been issued to deployed units to support current operations.

Appendix 9: Core Engineer Materiel Programs

Discussion of Core Battlespace Awareness Materiel Programs

Family of Dozers

The Army is replacing its 30 year old D7 dozer fleet with a new model that will have the ability to add on armor as required, and be joystick controlled. A new D5 dozer will be placed in the Engineer Support Companies which will give them more capability to perform their mission.

Program Status

Program strategy is to procure all Dozers by FY15. Capability Production Document approved in FY06.

Family of Loaders

The new procurement of Skid Steer loaders, Backhoe loaders and type I HMEEs are embedded into the SBCT, IBCT, HBCT and will be an added capability to these units. This gives the Army the capability to repair and expand operating capacities of Ports of Embarkation, Intermediate Staging Bases/Forward Operating Bases, Ports of Debarkation, entry points and opening of temporary lines of communication.

Program Status

Procurement begins in FY08. Capability Production Document approved in FY06.

Family of Graders

The Army is replacing its 25 year-old fleet of Graders with a new model that will be capable of adding on armor as required. The Heavy Road Grader is a diesel engine, pneumatic tired, 6x4 front steer with articulated frame steer type. The Grader provides capability for grading, shaping, bank sloping, ditching, scarifying and general construction and maintenance of roads/airfields and other horizontal construction projects.

Program Status

Begin fielding graders FY10, planned completion of fielding FY15. All CPDs are approved.

Family of Scrapers

The Army is upgrading its scraper fleet which will make them add-on armor capable. The scraper is a self-propelled open bowl, pneumatic, two-axle, single diesel engine driven, articulated frame steer vehicle. Its capacity is 14 cubic yards assisted by a pusher tractor during loading, but can self-load. The scraper provides a self-loading, hauling and dumping capability to perform efficient earth-moving tasks in support of earthmoving projects. It can excavate 56-72 cubic yards per lift.

Program Status

All CPDs are approved and fielding of the loader will completed by FY10.

Improved Ribbon Bridge (IRB)

The Improved Ribbon Bridge, fielded to multi-role bridge companies, provides a dependable

roadway or raft capable of crossing assault vehicles or tactical vehicles over non-fordable wet gaps. This system is capable of a military load classification of 100 wheeled and MLC 80 tracked. The bridge sections are transported by Common Bridge Transporters (CBT), which are modified HEMTT LHS providing enhanced, multipurpose transportation capabilities. Each MRBC will be capable of emplacing 210 meters of bridging. The system is external airlift transportable by CH-47 and CH-53 helicopters. The bridge bays are air transportable, partially disassembled, in C-130s. The IRB has enhanced capabilities of operation in swifter water speeds up to 10.3 feet per second and over 2.1 meter banks. It provides a 4.5 meter-wide roadway, improved hydrostatic capabilities and various other design improvements.

Program Status

This multi-year contract started in FY00, will field 23 MRBCs with the IRB. Eleven units are fielded to date, with the remaining units to be fielded by FY11.

Dry Support Bridge (DSB)

Dry Support Bridge is a modular bridge assigned to the MRBC that can span a 40 meter gap and can be emplaced in 90 minutes by eight Soldiers. One bridge set provides either a 40 meter or two 20 meter bridges. The bridge will cross MLC 96W/70T traffic and will allow crossing of a heavy-equipment transporter carrying a combat-loaded M1 tank. DSB consists of a launcher permanently mounted on a Palletized load System (PLS), three CBTs and four PLS trailers that carry the modular components as palletized loads. A bridge set consists of six M1077 flat-rack loads of bridge components, one M1077 flat-rack load of launch beams and a launcher vehicle. To transport and launch one complete DSB system requires the launcher, three CBTs and four PLS trailers.

Program Status

A multi-year production APO of 92 systems. Fielding initiated FY03 with final fielding programmed to be completed FY11.

Rapidly Emplaced Bridge System (REBS)

REBS is a wheeled, vehicle-launched, bridge system providing a four-meter roadway width, MLC 30 tracked (T) and wheeled (W) normal and MLC 40(T) (W) gap crossing capability up to 13 meters. Transported on a CBT, each SBCT will have four REBS. This system is transportable by C-130 aircraft. The assembled bridge is externally sling-lift-transportable by CH-47 and CH-53 helicopters. Two Soldiers can deploy the REBS in the daytime, within 10 minutes, with little or no site preparation.

Program Status.

7 SBCTS fielded in FY07.

Assured Mobility Capabilities

The Engineer Future Force will be organized, manned, equipped and trained to be more strategically responsive, deployable, agile, versatile, lethal, survivable and sustainable across the full spectrum of military operations. Future Engineer Force structure will be comprised of modular, scalable, and flexible organizations for prompt and sustained land

operations capable of quickly transitioning between changes in task, purpose and directions.

Assured mobility capabilities support force application by maneuver forces as well as focused logistics by sustainment forces. Current operations in OEF and OIF highlight the enduring importance of systems that provide ground forces the capability of detecting, defeating and emplacing minefields and other obstacle effects, allowing unparalleled freedom of maneuver and force sustainment. This capability is critical to gaining the positional advantage needed to retain the initiative and enhance Joint precision fires as well as ensuring sustainment force movement remains effective across the distributed battlefield environment.

Ground Stand-off Minefield Detection System (GSTAMIDS)

Ground Stand-off Minefield Detection System is a time-phased developmental program designed to provide the warfighter a capability to execute on-route countermine missions for the FCS. GSTAMIDS will be employed on an overpass-capable countermine Multifunctional Utility/Logistics and Equipment Vehicle (MULE) variant UGV. The system will employ future improvements that will automatically detect, mark and neutralize all metallic and nonmetallic Anti-Tank mines.

Program Status

GSTAMIDS is currently in SDD and preparing for fourth quarter, FY08 Preliminary Design Review. GSTAMIDS is planning for a Milestone C and production in FY12.

Airborne Surveillance, Target Acquisition, and Minefield Detection System (ASTAMIDS)

Airborne Surveillance, Target Acquisition, and Minefield Detection System is an FCS Tier 1 Complementary Program. ASTAMIDS is an FCS Class IV Fire Scout UAV sensor payload that provides near-real time detection of surface and recently buried minefields and obstacles in day and night conditions. Minefield and Obstacle information is used to update the COP/SA of the unit. ASTAMIDS also performs an FCS BCT Class IV Fire Scout UAV RSTA/ISR and Laser Designation mission and function in addition to its countermine mission.

Program Status

ASTAMIDS is in the SDD phase of acquisition. The program completed its Preliminary Design Review during April-May 2006. Contractor Functional and Qualification Testing is planned throughout FY07. An MS C/LRIP decision is planned during second quarter, FY09.

Route Clearance Vehicles

Route Clearance Vehicles consist of a family of mine-protected vehicles employed by Combat Engineers in route clearance operations. The three vehicles include the Buffalo Mine Protected Clearance Vehicle (MPCV), the Interim Vehicle Mounted Mine Detector (IVMMD), and the Medium Mine Protected

Vehicle (MMPV). The systems are employed within a route clearance team with 1-2 MMPVs serving as a command and control vehicle and providing local security to the team. The IVMMD is then employed to detect the mine or IED hazards so that the MPCV can investigate suspicious items with its articulated arm. All three vehicles provide the crew protection from explosive blasts and small-arms fire, and each is designed for rapid repair after an explosive incident. All three vehicles are NDIs that have proven effective in war time operations.

Program Status.

The Route Clearance Vehicles have been fielded in support of OEF and OIF. The MPCV and MMPV have AROC approved CPD and the IVMMD CPD is pending approval. MS C is expected in FY07 pending funding and completion of full material release actions.

Appendix 10: Tactical Wheeled Vehicles Modernization

Discussion of Core Tactical Wheeled Vehicles Materiel Programs

Family of Medium Tactical Vehicles (FMTV)

The Family of Medium Tactical Vehicles is built around a common chassis and drive train, featuring over 80 percent commonality of parts and components between models and weight classes. Operating worldwide in all weather and terrain conditions, the FMTV provides unit mobility, re-supply and transportation at all organizational levels. It serves as the weapon systems platform for HIMARS and the support vehicle for Patriot. FMTV enhances crew survivability through use of hardened cabs, three-point seat belts, central tire inflation and machine gun ring-mount capability. It provides enhanced tactical mobility and is strategically deployable in C-5, C-17 and C-130 aircraft. FMTV reduces the Army's logistics footprint by providing commonality of parts and components, reducing maintenance downtime, and lowering operation and support costs that older trucks require.

Program Status

FMTV is in full production with over 28,000 trucks and 6,100 trailers fielded to date. A competitive requirements contract will be awarded starting in FY09. The new contract will include the 10-ton Dump Truck. The FMTV-Load Handling System is currently being fielded, initially to medical units. The Expansible Van started fielding to all units in early FY08. Current fielding supports modular transformation and modernization of infantry, heavy, Stryker, sustainment and fires brigade teams.

High-Mobility Multipurpose Wheeled Vehicle (HMMWV)

High Mobility Multipurpose Wheeled Vehicle is a light, highly mobile, diesel-powered, four-wheel-drive vehicle with common chassis. Using common components and kits, it can be configured as a troop, armament, TOW, shelter carrier or ambulance. It is a multi-Service program that also provides vehicles that satisfy USMC, USN, USAF and foreign military sales requirements. When armor is added, the M1151A1 has up-armored HMMWV-like protection with a greater payload and incorporates operational lessons learned from OEF and OIF. An enhanced troop, cargo, shelter carrier M1152A1 entered production in February 2006. The useful life of existing HMMWVs is being extended through an ongoing recapitalization program.

Program Status

There are 21,000 Up-Armored HMMWVs (UAHs) currently in U.S. Central Command's area of

responsibility AOR supporting Operational Force protection requirements. Near-term production of HMMWVs will support theater requirements as well as system interchange requirements for platforms such as Trojan SPIRIT, Tactical Operations Centers, Secure Mobile Anti-Jam Reliable Tactical Terminal and Tactical Unmanned Aerial Vehicle. Over 23,000 recapitalized HMMWVs are in the fielding process in CONUS, including modularly converted units and SBCTs. Continued HMMWV deliveries will support modularizing units in the near future.

Heavy Expanded Mobility Tactical Truck (HEMTT)

The Heavy Expanded Mobility Tactical Truck Family of Vehicles provides all-weather, rapidly deployable transport capabilities for re-supply of combat vehicles and weapon systems. There are six primary variants of the HEMTT series trucks: M977/M985 cargo truck with Material Handling Crane, M978 2,500-gal fuel tanker, M984 wrecker, M983 light equipment transport and the M1120 HEMTT-Load Handling System. A self-recovery winch is also available on certain models. HEMTT-LHS provides the Soldier with an efficient and economical forward area distribution system. The HEMTT A4 Product Improvement Program/Long-Term Armor Strategy will be in full production starting June 2008 and will have a modern power train consisting of a 550 hp C-15 engine which offers 55 horse power more than the HEMTT A2, air-ride suspension, updated electrical system, anti-lock brakes traction control, common cab with the Palletized Load System, integrated mounting for GPK and machine gun mount and A kit and B kit armor. HEMTT series trucks were built for cross-country missions carrying payloads up to 11 tons, and are designated an FCS-complementary system and a key enabler to achieving a distribution-based logistics system.

Program Status

The M978 Tanker, M983 LET, M984 Wrecker and M1120 LHS Truck are currently in production. The FY07-13 fielding schedule includes COMPO 1 SBCTs 4-7, 1/1 AD HBCT, 2/1 AD HBCT, modular infantry and heavy BCTs, 43 SUS BDE, 507TH SUS BDE and fires brigades and OIF combat-loss replacements. COMPO 2 371/67/38/40/369 sustainment brigades as well as COMPO 3 requirements include vehicles for 162/474/164 sustainment brigades, 263 AAMDC and 16/35 engineer brigades.

Palletized Load System (PLS)

Palletized Load System is a 16.5 ton payload prime mover with an onboard load handling system and removable flat racks. The vehicle can also be equipped with Materiel Handling Equipment and winch. Its mission is to rapidly move combat configured loads of all classes of supply, either containerized or non-containerized. The system also includes a PLS trailer, a PLS Container Handling Unit for transporting 20' ISO containers, an M3 Container roll-in/Out Platform, and M1 Flatracks.

Program Status

The PLS Block 1 Product Improvement Program will be in full production in 2009 and will include a modern power train (CAT C-15 600 hp Engine, Allison 4500SP Transmission, larger cooling system, 2004 EPA Compliant), independent front suspension, updated electrical system, ABS & traction control,

climate control and a common cab w/HEMTT A4 & LTAS compliant. The M3 CROP is currently in production, whereas the M1077 and M1 flatracks are no longer in production. Note, the M1077 flatracks are incorporated into the Forward Repair System and the M1 flatracks are used in support of engineer systems. FY07-13 fielding schedule includes AC and USAR engineer mission modules, APS and OIF combat-loss replacements. Funding supports ARNG requirements for the 371/38/67/40 369/162/474 Sustainment Brigades.

M1070 Heavy Equipment Transport (HET) with M1000 70 Ton Trailer

The M1070 Heavy Equipment Transport System consists of the M1070 Truck Tractor and the M1000 Heavy Equipment Transporter Semi-trailer. The HET transports payloads up to 70 tons–primarily Abrams tanks. The M1070 also transports fighting and recovery vehicles, self-propelled howitzers and construction equipment. It operates on highways worldwide, secondary and cross-country roads. The HET has a number of features that significantly improve the mobility and overall performance of the system in a tactical environment. The M1070 tractor has front- and rear-axle steering, a central tire-inflation system and cab space for six personnel to accommodate the two HET operators and four tank

crewmen. The M1000 semi-trailer has automatically steerable axels and a load-leveling hydraulic suspension. The 25-ton loading winches are fitted as standard together with an auxiliary winch to handle cables and for general utility purposes. Despite its bulk the M1070 heavy equipment transporter can be airlifted.

Program Status

The M1070 HET is a powerful tractor truck with an 8 x 8 drive configuration and advanced features such as an electronic engine control system to ensure maximum efficiency at all times, and an 'air ride' rear suspension to ensure all axles remain in contact with the ground at all times while smoothing out the worst round-terrain shocks to the chassis frame. To assist traction further, across rough terrain, another standard feature is a central tire inflation system.

The HET's payload is 140,000 pounds and has a 500-horsepower Detroit Diesel and a 5-speed automatic transmission. The HET can travel up to 40-45 mph on highway (25-30 mph with 70 ton payload) and has a range of 300 miles. The HET can be transported using the C-5A and C-17 Cargo Aircraft.

The M1070 HET is currently not in production; however, Project Manager, Heavy Tactical Vehicle is currently working on a new HET Truck & Trailer with production starting in 4QTR FY09/FY10.

M915 Family of Vehicles

The M915 Family of Vehicles refers to three variants that share body components, drive train design and logistics support. Each of the three serves a unique tactical mission. All three are manufactured under a FY00 Requirements-Type contract with Freightliner LLC that has been extended into an eighth year. The three models are the M915A3 6X4 Line Haul Tractor, M916A3 6X6 Light Equipment Transporter, and the

M917A2 6X6 20-ton Dump Truck. The M915 primary wartime mission is to provide a means for high-speed line haul transport of all classes of supply from port to division. It is found in Medium Truck Transportation Companies throughout the Active and Reserve Components.

With its 2-inch kingpin compatible 5th wheel it is the prime mover for the M872 Series 34-ton flatbed and M1062 7500-Gallon Tanker. It is also interoperable with other existing semitrailers that includes the M871 Series 22.5-ton flatbed, M900 Series 5000-Gallon Tanker, M127A1 and M129-Series Van semitrailers. The M916A3 LET and M917 Dump Truck share a chassis and drive train. The M916A3 is a tractor equipped with a 3.5-inch kingpin compatible 5th wheel and a 56,000 pound hydraulic rear winch. It is the prime mover for the M870-Series 40-ton low bed semitrailer used by Engineer units. The M917A2 20 ton Dump Truck is also found in Engineer units and supports construction and quarry missions.

Program Status

The M915A3 and M916A3 will continue to be in full production in 2008. M915A3 production will support an approved ONS from the MNF-I Theater Transportation Mission. Prior to overseas transport these trucks will receive add-on-armor kits installed by depot teams. Scheduled 2008 M916A3 production was funded by 2007 Main Supplemental. These trucks will be used to support AC/RC shortages that exist due to left-behind equipment, a growing Army Acquisition Objective and washout of over-aged M916s and M920s. ARNG NGREA funds received to date will acquire additional M916A3 and M917A2s. Awarding new delivery orders are pending approval of a second Family of Vehicles contract extension. The extension will also include FY08 PA funded M916A3s. The M917A2 has not had a budget line since 2003. The only M917A2s ordered since that time has been through receipt of National Guard and Reserve Equipment Appropriation funds.

Numerous product improvements have been incorporated in the M915A3s on the current contract in response to the changing mission threat resulting from the GWOT. The location of U.S. forces in combat zones, with the associated increase in their mission readiness has caused these forces to adopt an OPTEMPO far in excess of normal peacetime requirements. As a result they are experiencing battle damage and accelerated wear and tear. To address these issues additional design improvements have been proposed that would improve survivability, safety, reliability and add new capabilities.

Tactical Wheeled Vehicle (TWV) Force Protection

The Army has continued its aggressive approach to upgrading tactical wheeled vehicle protection as an important part of the Army's responsibility to sustain the Joint force with equipment able to survive on the modern battlefield. The highest priority is to provide such protection to our forces involved in ongoing operations in Iraq and Afghanistan. At the same time,

the Army has developed and is implementing a long-term armoring strategy that will integrate effective armoring and other protection initiatives that will enable TWV to better survive on future battlefields. Currently, the Army has two distinct levels of armor protection on TWVs. The first, "level I", refers to fully integrated armor installed during production and retrofit. The second, "level II", includes officially approved and centrally manufactured add-on armor kits that can be installed on vehicles anywhere. Concurrently, the Army is assessing and testing other technological improvements to ensure that all TWVs involved in operational missions are equipped with the best protection available.

Armoring of the TWV fleet has been an enormous effort for the Army since late 2003. This endeavor was challenging because it required the design, testing, production, and installation of armor components on TWVs that were never designed to accept armor. In spite of the challenge, the Army met theater requirements for AoA kits by September 2006, with over 26,000 TWVs outfitted. However, AoA kits were never envisioned as long-term armor solutions for TWVs. The Army's long-term armoring strategy for TWV consists of a combination of an "A cab" and "B" armor kit. The "A cab", manufactured into the vehicle, provides the framework upon which the armor "B kit" is mounted. The B kit can be installed or removed to meet mission requirements. The Army will begin fielding medium and heavy "A cab/ B kit" vehicles in FY 08. In addition to protecting TWVs with AoA kits, the Army is also providing enhancements to the factory-installed armor on the M1151 up-armored HMMWVs. Started in early 2006, these fragmentation protection kits add armor to protect such areas as the door edge, rocker panel, front wheel wells and doors.

Armored TWVs remain a critical component of the Army leadership's highest priority, protecting our Nation's military force.

In addition to the essential materiel solutions to these operational requirements today, the Army is also fully involved in pursuing non-materiel measures that can directly improve the sustainment and protection of the Joint force. These steps include the work of the Joint Improvised Explosive Device Defeat Task Force, which is working across the interagency and international spectrum on materiel and non-materiel solutions to defeat this threat. Tangible results include effective countermeasures, fielding systems that increase detection and enhance detonation, and training solutions that increase awareness and incorporate lessons learned. In the end, this is and will remain the highest-priority task for the Army and one that is fully integrated into equipping and operational requirements and responses.

Armored Security Vehicle (ASV)

The Armored Security Vehicle is an armored all-wheel drive vehicle with 360 degree armor protection against armor-piercing, high-explosive fragmentation, and anti-tank mines under the wheels and under the hull. The ASV has a

crew of three plus one passenger; vehicle intercom system with combat vehicle crewman helmets. The armament suite consists of a MK19 grenade machine gun and M-48MG. It has the collective NBC protection system as well as a digitization package which includes FBCB2, Blue Force Tracking, and SINCGARS. The ASV provides essential protection to Combat Support units in highly exposed threat environments. Increased lethality is provided via both point/area weapons (M-48/MK19) in the same turret. The ability to reload under armor adds to crew survivability. The ASV survivability and lethality increase the military police capability to conduct operations throughout the spectrum of conflict to include convoy escort; area and route reconnaissance and surveillance; counter-incursion reaction force roles; and security of critical assets, key personnel and lines of communication. Vehicle capabilities have been so successfully demonstrated that it has been diverted to CCP use.

Program Status

Currently, 2,776 ASVs, the Army Acquisition Objective, are funded and theater requirements have been met. Fielding of ASVs to CONUS based units began in August 2007 and is scheduled to continue through FY 22.

Mine Resistant Ambush Protected Vehicles (MRAP)

The Army, Air Force, Navy, Special Operations Forces, and USMC are procuring Mine Resistant Ambush Protected vehicles to fill requirements from theater for better armor protected vehicles. The MRAP family of vehicles will provide operating forces multiple, mission-role platforms capable of defeating and mitigating the effects of IEDs and other casualty-producing threats currently seen in theater. Due to the potential increase in vehicle size and weight which may be necessary to defeat these threats, the

MRAP vehicles may not be capable of executing all the mission requirements currently executed by up-armored HMMWVs. As such, it is the Army's intent to replace some; but not all, up armored HMMWV's in theater. There are three categories of MRAP: CAT 1 comprises Mine Resistant Utility Vehicle/Urban Combat Operations, and can accommodate six or more personnel. CAT 2 comprises Multi-Mission (convoy escort, troop transport, ambulance, EOD, combat engineer) and can accommodate ten or more personnel. CAT 3 comprises Mine/IED Clearance Operations (Buffalo) and can accommodate six or more personnel.

Program Status

This is a Joint Services acquisition with the Navy as the Executive Agent. A Joint Marine Corps/Army request for proposal was issued 9 November 2006 for up to 4,060 MRAP vehicles with awards granted 26 January 2007. Since then, accelerated testing of candidate vehicles was conducted at Aberdeen Test Center, and the Army placed production orders on 5 variants of MRAPs. Fielding to Army units in theater began in November 2007. Theater Combatant Commanders will provide an Operational Assessment in February 2008 This assessment will define the final number of MRAP vehicles required.

In addition to the essential materiel solutions to these operational requirements today, the Army is also fully involved in pursuing non-materiel measures that can directly improve the sustainment and protection of the Joint force. These steps include the work of the JIEDD TF, which is working across the interagency and international spectrum on materiel and non-materiel solutions to defeat this threat. Tangible results include effective countermeasures, fielding systems that increase detection and enhance detonation, and training solutions that increase awareness and incorporate lessons learned. In the end, this is and will remain a high-priority task for the Army and one that is fully integrated into equipping and operational requirements and responses.

Appendix 11: Combat Service Support

Discussion of Core Combat Support Materiel Programs

Joint Precision Airdrop Systems (JPADS)

The Joint Precision Airdrop System is a high altitude capable, autonomously operated airdrop capability with significantly increased accuracy to a ground location. The system consists of a family of differently sized, high glide canopies, allowing airdrop of various weight categories. Currently a 2,000 pound and a 10,000 pound program are being pursued. A lower weight category is desired by USMC and SOF, and an Army Technology Objective has also demonstrated a 30,000 pound capability. JPADS is not totally wind dependent and is releasable from altitudes up to approximately 25,000 feet Mean Sea Level. Based on winds and release altitude, 25 kilometer standoff distances are also possible. On aircraft Mission Planning capability, an Autonomous Guidance Unit (AGU) and space-based GPS technology provides for aerial navigation and maneuverability of the Air Vehicle throughout descent; steering into the wind as necessary, and permitting highly accurate ground touchdown locations. JPADS is a critical logistics transformation enabler that facilitates dedicated aerial sustainment, helps achieve full distribution-based logistics, and serves as a force protection measure for delivery aircraft, ground recipients and the IED threat to ground transportation.

Program Status

The 2,000 pound program is preparing for Developmental Test and is fully funded to meet Army Acquisition Objectives. Rapid Fielding Initiatives have placed prototype capability in the AOR. As possible, Urgent Materiel Release will be examined to satisfy COCOM requirements. The 10,000 pound variant was the subject of ACTD. ACTD was successfully transitioned to program in Nov 07, and will commence in progression to the 2,000 pound program. The 10,000 pound program is also funded. The 30,000 pound variant is an ATO, and currently unfunded. Requirements for this weight capability are being examined.

M100A1 Advanced Aviation Forward Area Refueling System (AAFARS)

M100A1 Advanced Aviation Forward Area Refueling System is a modular, four-point refueling system. The principal components are engine, pump, filter and control modules, along with hoses, nozzles, couplings, defueling pump, fuel blivets, fire-suppression equipment, fuel spill containment berms, nozzles and fuel test kit. AAFARS is transported inter-theater in three specialized shipping containers.

Program Status

There have been 244 systems fielded. Current production and fielding schedules is four per month thru August 2009.

Petroleum Quality Analysis System (PQAS)

Petroleum Quality Analysis System is a complete petroleum quality surveillance laboratory capable of conducting B-level testing in accordance with MIL-STD-3004 on kerosene-based, e.g., jet propellants and diesel military mobility fuels.

Program Status

PQAS is being redesigned to meet the Full Armor solution with system integration of the HMMWV Shelter Based Laboratory, FUE FY09, into the FMTV International Standardization Organization Shelter Based Laboratory. The selected for use in the new design is the Standard Automotive Tool Set shelter used by PM-SKOT.

Tactical Electric Power (TEP)

Tactical Electric Power are all-mobile, diesel-fueled, electric power generating sources, 840KW and smaller, which are skid mounted, trailer mounted, or man portable. TEPs are capable of independently producing electric power when operating on diesel, JP-8, or other fuel sources. Included are follow-on power sources such as fuel cells, hybrid electric systems, renewable energy systems, alternative energy systems, and thermoelectric devices. These mobile, tactical generators provide quality power to operate DoD systems away from a fixed power grid and are found in nearly every organization in the Army. They directly support all field electrical systems such as C4ISR, medical, maintenance, fire direction and controls, target acquisition, life support, sustainment and illumination.

Program Status

TEP Tactical Quiet Generators are currently in production and being fielded. The next generation of TEP generators, the Advanced Medium Mobile Power Sources (5-60K), reached MS B in November 2003 and begins production in FY10. To date, 75 percent of the older MILSTD generators have been replaced by TQGs and 15,000 remain to be replaced by TQGs and AMMPS. Current FY08 fielding strategy is to support procurement to fill critical shortages for deploying units. Funding supports procurement and fielding of over 30,000 AMMPS generators and Power Distribution Illumination Systems Electrical. Funding will modernize 30 percent of all Army Component's power generation requirements.

Standard Automotive Tool Set (SATS)

The Standard Automotive Tool Set system is a base tool set of the most frequently required automotive maintenance tools that can be augmented by modular packages that are tailored to suit unit mission requirements and organizational design. SATS eliminates obsolete tools, eliminates unneeded redundancy and inefficient in tool proliferation, increases tool quality, improves transportability and improves tool accountability. The most significant advantage gained through use of SATS is its minimization of the logistics footprint. This is achieved through standardization and modernization, which eliminates the need for four 5-ton cargo trucks and accompanying trailers.

SATS is a modular, flexible, standardized automotive

maintenance shop system that will replace the most numerous types of field level shop sets. SATS enables a modular, expeditionary, campaign-quality force and supports the Army transformation to a two-level maintenance system. The SATS consists of a transportable, International Standardization Organization 8x8x20 container with an integrated government-furnished, electric power generator and Environmental Control Unit. The container includes secure storage space for a complete base set of COTS and government-furnished industrial-quality tools and equipment needed to perform field-level maintenance of military vehicles and ground-support equipment.

Program Status

SATS is in full production with over 175 sets fielded to date. SATS is programmed for fielding FY08-13 with 126 deliveries in FY08, 139 in FY09, 144 in FY10, 117 in FY11, 41 in FY12 and 56 in FY13.

Containerized Kitchen (CK)

Containerized Kitchen integrates standard and commercial kitchen equipment into an expandable 8x8x20 foot ISO container. CK has onboard refrigeration and uses the improved modern burner unit. It has a running water system and the interior is environmentally controlled. CK can feed three meals a day to 800 Soldiers. Its efficiencies over the Mobile Kitchen Trailers include overall decreased footprint and manpower requirements.

Program Status

More than 300 CK systems have been produced and fielded and have been in continuous production since FY02. Production continues at the rate of four per month from FY07 through FY13.

Camel Unit Water Pod System

The Camel system consists of an 800-900 gallon storage capacity tank, heater/chiller unit, government-furnished M1095 medium tactical vehicle trailer, and contractor developed components mounted to or carried by the trailer. Under the SBCT concept, Camel will provide a maneuver company operating in a temperate environment two or more days of supply of water at a minimum sustaining consumption rate. It will have provisions for at least six retail dispensing points, and be fully capable of stand-alone operation. Camel will be capable of transporting both full and partial loads of water by C-130 and larger aircraft, external-lift helicopter, and low-velocity, air-droppable means. Camel replaces the M107, M149 and M1112 series water trailers.

Program Status

Four prototypes have been procured with Product Qualification Testing began early 2007, contract award FY08 and the first unit equipped FY09.

Load Handling System Compatible Water Tank Rack System

Hippo consists of a 2,000 gallon, ISO-framed, potable water tank rack. Hippo has an organic

125-GPM water pump, filling stand, 70 foot hose reel for both bulk suction and discharge and retail distribution. Hippo will enhance water distribution by providing one system that enables both hard wall bulk water transportation and unit retail water support. It will allow for water transport directly from water purification points to supported maneuver elements and can be used as a water distribution point.

Program Status

Hippo will replace the Semi-trailer Mounted Fabric Tank and the majority of the Forward Area Water Point Supply System. Fielding of the Hippo began in first quarter, FY07.

1,500-GPH Tactical Water Purification System

The Tactical Water Purification System supports Army's mission to provide life and mission sustaining water to front line and remote units in tactical environments. It is capable of supplying 1,500 GPH of potable water for division and brigade ground units within remote areas. In addition, it provides quality water support to civilian agencies or host nations for disaster relief, humanitarian efforts and peace keeping missions.

Program Status

The Army requirement is for 221 systems. All units should be fully fielded by FY09.

Container/Material Handling Equipment (C/MHE)

The Container/Material Handling Equipment includes all container and material handling equipment required to support the deployment of unit equipment and the distribution of sustainment items. The primary tactical C/MHE includes the Rough Terrain Container Handler and the All-Terrain Lifter Army System. The RTCH is the primary capability for handling 20 and 40 foot-long containers weighing up to 53,000 pounds. RTCH is deployable by air, operates on all types of terrain and is capable of stacking containers up to three high. ATLAS has a 10,000 pound capacity and is capable of handling fully loaded 463L Air Force pallets, has a variable reach boom for removing items from 20-foot containers and is capable of deploying by air.

Program Status

The RTCH program was terminated in FY04 with 346 of the 627 systems fielded. Production for Army requirements will restart again in FY08 and continue through FY12, and reach approximately 85 percent of the AAO. The initial contract production for ATLAS I ended in FY05 with 1,809 of 2,500 systems fielded. Funding currently is provided through FY10 that will procure additional systems to reach the entire AAO.

Next Generation Automatic Test System (NGATS)

The Next Generation Automatic Test System is a highly mobile, rapidly deployable, general-purpose, reconfigurable automatic test system which directly supports testing and screening of

Army weapon systems to maintain their readiness to shoot, move, and communicate. This system will utilize spiral development leveraging the Joint ARGCS ACTD to provide capabilities to incrementally replace DSESTS, the Army standard IFTE BSTF(V)3, and the electro-optical testing capabilities of the BSTF (V)5. NGATS will be a reconfigurable ATS housed in an ISO Shelter and be transported by a HEMTT LHS. NGATS will be 100% compatible for use with all Test Program Sets currently employed by Army off-platform automatic test equipment. It will have full sustainment level diagnostic maintenance capability on the full spectrum of current and future Army weapon systems. A key feature of NGATS is that it will use Joint service developed test technologies and move DoD closer to its stated goal of a common ATS architecture capable of cross-service weapons system testing.

Program Status

NGATS is currently in the RDT&E phase. Two prototypes have been built. Distribution will be in accordance with current Army doctrine to support the Modular Force. Full Rate Production is currently scheduled to begin FY10.

Maintenance Support Device (MSD) Version 2

As the replacement for the Soldier Portable, On-System Repair Tool and Maintenance Support Device is a lightweight, rugged, compact, man-portable, general-purpose automatic tester used to verify the operational status of systems, both electronic and automotive, and to isolate faulty components for immediate replacement. MSD is also used as a software uploader/verifier to restore or provide new software to weapon systems, and supports testing requirements of current and FCS. The MSD is in wide use throughout the Army's ground combat and CSS vehicle, as well as aviation fleets.

Program Status

MSD is currently being fielded. A recent change in the basis of issue will provide the MSD to field-level maintainers at a ratio of 1:3 per maintainer occupational skill. MSD AAO is 35,000, of which 50 percent have been fielded/modernized with MSD/MSD-V2. No projected buy-out of MSD as it is a recurring modernization effort driven by the development of new weapons technology. Current platform runs on Windows XP based software maintaining operability with new FMTV production vehicles and Paladin upgrades. Expired MSD/SPORT platforms run on older versions of Microsoft Windows and are not compatible with new FMTV production vehicles and Paladin upgrades. Approximately 6,000 MSD-V2 Kits have been produced and fielded.

General Purpose Electronic Test Equipment (GPETE)

General Purpose Electronic Test Equipment products are COTS/NDI consisting of lightweight, man-portable, general-purpose, electronic test equipment used to test, maintain, and calibrate Army current and future

systems. Examples include the oscilloscope, spectrum analyzer, data communication analyzer, frequency counter, multi-meter, signal generator, radio test sets and radar test sets. GPETE modernization efforts continue to improve Army weapon system readiness, minimize GPETE proliferation and obsolescence, and reduce operations and support costs.

Program Status

Current GPETE modernization efforts include the AN/PRM-35 Radio Test Set, AN/GRM-123 Radio Test Set, SG-1364/U Signal Generator and Function Generator. There are 36 other GPETE candidates for the Test Equipment Modernization program. These candidates will be sequentially modernized by priority as documented in the Army G-3 approved GPETE Identification and Replacement Prioritization List.

Man-Transportable Robotic System (MTRS)

Man-Transportable Robotic System provides a two-person, portable, lightweight robotic system. Current operations have shown a need for smaller, portable robotic systems. Lack of this capability requires EOD and Combat Engineer Soldiers to physically approach explosive devices and manually perform reconnaissance and render safe procedures in confined and open spaces. Requirements for additional MTRS were initiated and validated in response to the increased number and sophistication of potential threats.

Program Status

The new MTRS AAO of 461 incorporates additional requirements resulting from lessons learned in OIF and OEF. These requirements are included in the program plan through FY10 and are currently undergoing reform based on 06 approved FDU.

Forward Repair System (FRS)

Forward Repair System is a high-mobility maintenance system designed to support forces in the battle area. FRS includes a crane and maintenance enclosure mounted on a component flat-rack. The crane has a 5.5-ton lift capacity with a 14 foot radius capable of removing and replacing major components, including full-up power packs of all models of military vehicles. The maintenance enclosure includes a 35KW generator; air compressor; welding equipment including arc; and industrial-quality air and electrical power tools ranging from 3/8- to 1-in drive with associated tool cabinets.

Program Status

FRS is currently in full production and fielding. Projected procurement/fielding of AAO by FY12 to include GTA.

Appendix 12: Army Watercraft

Discussion of Core Army Watercraft Materiel Programs

Joint High Speed Vessel (JHSV)

The Joint High Speed Vessel is the Army's next generation self-deploying watercraft. JHSV will maximize intra-theater lift from an offshore or out of sector staging base, or within littoral waters to provide warfighters the capability to maneuver combat ready forces into forward areas. It can also provide follow-on sustainment through minor and degraded ports. Leveraging technology as it is developed, the JHSV will be faster, more capable and have greater survivability than current generation watercraft.

Program Status

Since JHSV is a documented program of record with an approved ICD and Capability Development Document, the CBA validates the JCIDS actions already under way. The Army is procuring five JHSVs.

Harbormaster Command and Control Center (HCCC)

Harbormaster Command and Control Center is the mission critical materiel system required by Harbormaster Detachments. HCCC provides command and control tools, sensors, technical connectivity, and physical configuration to properly manage Army watercraft assets to ensure that watercraft-delivered sustainment is responsive to warfighter requirements. HCCC will have interoperable C4ISR systems and be able to send and receive information classified up to SECRET.

Program Status

Currently under development, the HCCC is a documented Acquisition Category III program of record with an approved CDD and a funding line in the current POM. CASCOM and TCM-Trans are currently working closely with the Program Manager –Tactical Operations Centers to finalize the Capability Production Document, and support production of the prototype system in FY08. The current plan is to complete integration and field the eight operational systems and training packages.

Vessel-to-Shore Bridging

The Vessel-to-Shore Bridging capabilities encompass lightweight floating bridging that can be carried on current and future watercraft with little space and weight requirement. Easily and quickly employed to allow vessels access to austere and bare-beach littoral access points they could otherwise not reach, VSB provides a causeway-like platform for the offload of wheeled and tracked vehicles, as well as containerized cargo. Existing systems–the Army's Modular Causeway System and the Improved Navy Lighter System–can only be delivered by major shipping, thereby negating the speed advantage of future vessels like the JHSV, and require a large investment in time and manpower, thus defeating the goal to reduce or eliminate logistics footprint.

Program Status

VSB capabilities are still under development however, feasibility and military utility is scheduled for demonstration in 2008 by one of the key elements of the

Joint Enable Theater Access–Sea Ports of Debarkation Advanced Concept Technology Demonstration. CASCOM is currently completing work on an Initial Capabilities Document that will define required VSB capabilities, support analysis of alternative approaches, and development of materiel systems. The strategy is to continue to pursue development of capabilities and document VSB requirements IAW JCIDS with the goal of fielding a system by 2011.

Logistic Support Vessel (LSV)

The Logistic Support Vessel is a world-wide deployable vessel that provides transport of combat vehicles and sustainment cargo in the theater zone. It provides intra-theater line haul of large quantities of cargo and equipment. Tactical resupply missions can be performed to remote underdeveloped coastlines and inland waterways. It is also ideally suited for the discharge or back load of sealift, including Roll-on/Roll-off (RO/RO) vessels, such as a large medium-speed RO/RO. Because of its shallow draft, the LSV can carry cargo from deep-draft ships to shore ports or areas too shallow for larger ships. The LSV is ideally suited to execute cargo operations along coastal LOCs.

Program Status

The Army will continue to require the capability provided by the LSV, a fielded acquisition category 3 program. It is the Army's workhorse with regard to moving large amounts of sustainment cargo and equipment within a theater of operations. The current platforms, however, are aging and the first vessel in class will reach the end of its projected life cycle–the economic useful life in 2013. The initial LSV modernization plan will be implemented to upgrade critical systems to extend the LSV's service life and provide the minimum capabilities needed to 2024. The LSV's lack of speed will remain an issue, but the planned upgrades will allow the fleet to maintain its "amber" capability level.

Landing Craft Utility

The Landing Craft Utility-2000 provides transport of combat vehicles and sustainment cargo. It provides intra-theater movement of cargo and equipment. Tactical resupply missions can be performed to remote, underdeveloped coastlines and inland waterways. This includes missions in LOTS operations in remote areas with austere shore facilities or unimproved beaches. It is also ideally suited for the discharge or back load of sealift, including RO/RO vessels such as an LMSR.

Program Status

The LCU-2000 is a fielded Acquisition Category III program. Lift capability provided by the current

platform will continue to be required for the foreseeable future. It is the medium sized vessel used to move containers and outsized cargo. Immediate modernization of the on-board C4I suite will extend the utility of the current vessels for a number of years. A service life extension program must be developed and implemented within the next three-five years to ensure this capability is available through year 2024.

Landing Craft Mechanized

The Landing craft Mechanized transports cargo, troops, and vehicles from ship to shore or in retrograde movements. It is also utilized in lighterage and utility work in harbors. It is designed for use in rough or exposed waters and is capable of operating through breakers and grounding on a beach. The bow ramp permits RO/RO operations with wheeled and tracked vehicles. Its small size facilitates its use in confined areas.

Program Status

A fully-fielded Acquisition Category III program, the design of the current platform is 70 years old and the platforms themselves are approaching 40 years of age. Extending the service life of this platform for a third time would not be prudent given the cost. This coupled with the platforms lack of speed and utility for current and emerging missions lead to the need for a new platform.

Large Tug, LT-800 Series

The 128-foot Series 800 Large Tug is used for ocean and coastal towing operations. It has a secondary mission of accomplishing general-purpose harbor duties, such as positioning floating cranes. The LT can perform fire-fighting duties, a significant capability, particularly where ammunition ships are deployed.

Program Status

LT-800 is an Acquisition Category III program that is currently being modified to eliminate its fielded stability problems. All modifications are scheduled to be completed by the end of fiscal year 2008. Although the LT 800 will be retained for the foreseeable future, preliminary work should be performed to position a replacement if resources become available.

Small Tug

The Series-900 Small Tug can move cargo barges and lighters of various types within a harbor, port, or LOTS anchorage. It can also assist larger tugs with utility work, such as docking and undocking of ships of all sizes, movement of floating cranes, and line-handling duties.

Program Status

The ST900 is an Acquisition Category III program designed and built to replace the 65 foot small tug as well as move ammunition LASH barges. Due to this change, these vessels are currently being utilized in port support roles.

Barge Derrick, 115-Ton

The Barge Derrick can load and discharge heavy lift cargo that is beyond the capacity of ships' gear. It provides the lift and reach needed to discharge the heaviest of projected Army cargo from LMSRs, as well as commercial container ships, to accomplish strategic deployment. It is capable of lifting a 75-ton main battle tank from the centerline of a non-self-sustaining ship.

Program Status

This platform, an Acquisition Category III program, was designed and built to provide the capability to lift an M1A2 main battle tank from the centerline of the Fast Sealift Ship. Because the M1 MBT will be in the inventory for the foreseeable future, the uniqueness of this capability, the uncertainty of commercial availability and it is prudent to retain these platforms.

Modular Causeway System (MCS)

The Modular Causeway System is made up of four primary modular components that are used to create four systems: the Floating Causeway, the Causeway Ferry, the RO/RO discharge facility and the Modular Warping Tug. MCS is designed to provide the ability to establish logistics sites from remote and austere bare beach environments.

Program Status

The MCS is an Army Acquisition Category III program. Currently, the Army and Navy each employ a different, Service-specific system for providing causeway capabilities to support JLOTS operations: the Army's MCS and the Navy's Improved Naval Lighterage System. The two systems are not interoperable, thus the Army and Navy are currently maintaining two distinct systems.

Containerized Maintenance Facility (CMF)

The Containerized Maintenance Facility is a combination of tactical rigid wall shelters and a standard ISO container grouped together into a system that, when completely fielded, will be the principal support maintenance for Army watercraft deployed worldwide in improved and unimproved ports. The CMF has its own power generation/distribution system and is capable of using local commercial power sources when available.

Program Status

The CMF, an Army Acquisition Category III program, was developed in 1997 as the principal item of equipment found in the Floating Craft Maintenance Company, and two were fielded in 2007 to the two companies currently in the force structure. Two are currently programmed for procurement for pre-positioned assets in fiscal years 2010-2011. As part of the concept to move watercraft maintenance toward two-level maintenance, consideration must be given to the utility of the current CMF.

Appendix 13: Additional Modernization Initiatives in Focused Logistics

Logistics Modernization: (Near term)

The Army leadership prioritizes adaptable and responsive near and longer-term technology options that enable the Modular Force Logistics Concept, the longer-term concepts for the Future Modular Force, and ensure that our logistics capabilities are as rapid, precise and agile as the warfighters we support. For logistics, these options are focused on enhancing strategic response, reducing the demand for consumables such as fuel and water, production of consumables closer to the point of use, precision airdrop, prognostics and diagnostics for operational availability and condition-based maintenance, tactical wheeled vehicle fleet modernization, intermodal distribution systems, robotics and decision support tools that provide predictive, anticipatory and effects-based approaches to logistics. Concepts and enabling technologies are applied against the framework of bandwidth, computing power, sensors and data integration that supports the acceleration of the logistics decision cycle and its synchronization, from strategic

to operational to tactical levels, with the operational tempo of the warfighter.

An Army Watercraft fleet has been identified to provide lift assets to an expeditionary focused force to meet deployment goals, provide for assured access, decrease predictability and dwell time and quickly deliver combat sets inter theater and intra theater in order to build and sustain combat power.

To sustain warfighters, logisticians must be able to anticipate and confirm operational requirements and then provide the right capabilities at the optimum place and time. The approved Modular Force Logistics Concept relies on synergies achieved by fielding not only materiel and technology solutions, but also organizational, leadership and education, doctrinal and policy changes. The FCS BCT will further enhance logistics capabilities by fully integrating Logistics C2 within the FCS Battle Command Network, and by designing systems with dramatically improved reliability, availability and maintainability. This operational transformation, combined with our institutional business process transformation and enhanced by technology insertion is the basis of the Army's logistics transformation, with the ultimate

measure of effectiveness being the outcome we are expected to deliver–enhanced and sustained logistics readiness. Select enabling modernization capabilities to achieve these requirements are identified below:

Unity of Effort Modernization

Global Combat Support System-Army. Battle Command Sustainment Support System and Medical Communications for Combat Casualty Care System.

Domain-Wide Visibility Modernization

Movement Tracking System, Property Book Unit Supply Enhanced and the Standard Army Maintenance System.

Rapid and Precise Response Modernization

Joint High Speed Vessel and Joint Precision Airdrop Systems, Family of Medium Tactical Vehicles, High Mobility Multipurpose Wheeled Vehicle, Joint Light Tactical Vehicle and Heavy Expanded Mobility Tactical Truck.

Command and Control

Command and control describes mission planning and execution, and includes: Army Battle Command System, Common Operational Picture, Joint C2, communications and computer environment, information collection, Army Battle Command System, Maneuver Control System, Logistics Decision Support System, Logistics Data Management System and Platform Soldiers Mission Readiness System.

Net-Centric

Net-centric capabilities help provide universal access to all relevant authorities, assets and capabilities, enabling commanders to effectively coordinate battlefield effects and maintain full spectrum dominance and decision superiority. Net-centric capabilities include integrated information systems and supporting information infrastructure. Combat Service Support Satellite Communications Global Positioning System, War fighter Information Network-Tactical, Joint Network Node, and Joint Network Management System.

Army Logistics Information Technology Modernization

Army Logistics Information Technology is the critical enabler for managing the Army's complex logistics processes. In FY 08, the Logistics Domain will support the Current Force with our current IT structure, while modernizing for the future. Army logistics is transitioning from numerous independent IT systems to an end-to-end, web-based enterprise environment that will link to the platform based tools in the BCTs that are equipped with the FCS capabilities. The core building block of this plan is the Single Army Logistics Enterprise which will provide information superiority through real-time visibility of personnel, equipment and supplies anywhere in the distribution pipeline and within the battlespace. To guide the development and synchronization these programs, the Logistics Domain will use the Army Integrated Logistics Architecture to support the SALE effort.

In addition, the Common Logistics Operating Environment will be employed by the Army to

capture, store, retrieve and utilize logistics data from battlefield operating systems. It will integrate logistics and command and control information systems that automatically produce, consume and propagate logistics-focused near-real-time data—from "the foxhole to the factory."

Army Logistics Domain Information Technology Transformation

The Army Logistics Domain Vision is a digital environment that builds, sustains, and generates warfighting capability through a fully integrated logistics enterprise based on collaborative planning, knowledge management and best business practices. The Army is enabling this vision through the development of the Single Army Logistics Enterprise and the alignment of Army distribution architectures with Joint distribution processes.

Logistics Domain Transition Strategy

Army logistics is transitioning from numerous independent and standalone IT systems to an integrated end-to-end system operating in a net-centric environment. Today the Army is developing a comprehensive view of all logistics IT systems and applications as it centralizes existing and future requirements across the Logistics, and other Army Domains. The end state will be a results-oriented logistics capability in support of the Warfighter. To achieve this end state Army Logistics Domain strategy is to:

- Continue to meet Warfighter requirements with current IT systems

- Bridge to enhanced, near term capabilities as necessary

- Deliberately move to a Single Army Logistics Enterprise, taking advantage of modernized enterprise resource planning capabilities

Support Current IT Systems

Today's current logistics IT systems were acceptable in the 1980's; but are limited at best in keeping pace with today's new, immediate and critical warfighting requirements such as near real time property accountability, total asset visibility and in-transit visibility. Data integration requirements of Army Force Generation, integration of logistics command and control into Battle Command, and increasing information assurance requirements also seriously limit the ability of our current IT. Within the limits of current IT systems, Standard Army Management Information Systems have been refreshed to meet these changing requirements and deliver maximum capabilities. Existing IT systems are identified as either permanent or migrating investments as functionalities are systematically absorbed, replaced or remain consistent with the Army Logistics Vision. Critical modifications to existing logistics IT systems are only made on a case-by-case basis with impact to the warfighter, cost and performance as the basis for these decisions.

Bridge to Enhanced Near Term Capabilities

The process of transitioning to future IT systems requires the implementation of a bridging strategy that overcomes limitations in our current IT and meets new wartime requirements. Bridging also gives the Army an opportunity to consolidate/retire systems, which provides the opportunity to reduce the complexity of data migration to the modernized systems. Enhancements to bridging systems will be controlled via logistics governance processes, well documented, scrutinized in budgets and tracked with appropriate metrics for performance to meet stringent guidelines of Army leaders and the Planning, Programming, Budgeting and Execution process. Bridging systems cannot significantly expand the scope or burden the current Army logistics IT systems

Army Logistics Automation Transition Plan
Path to One Single Army Logistics Enterprise (SALE) as of 26 Jul 07
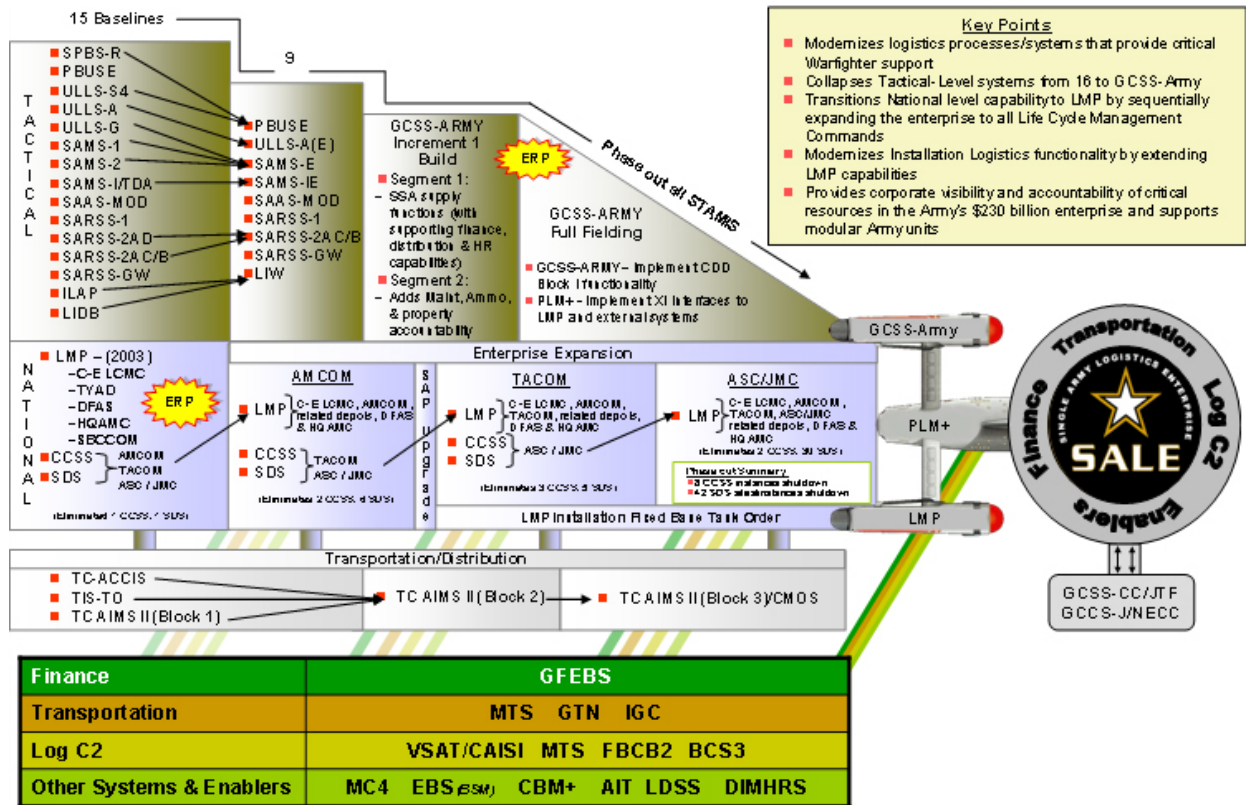
targeted in our plans. They must provide a substantial near term benefit in support of current operations and establish migration plans for consolidation under the SALE.

Deliberately Move to the SALE–Modernized ERP Capabilities

SALE is the core building block of this plan that will provide information superiority through real-time visibility of personnel, equipment and supplies anywhere in the distribution pipeline and within the battlespace. The SALE will deliver standard enterprise capabilities, assure minimal interfaces and data reconciliation, and provide commanders access to authoritative data. These capabilities will satisfy Joint strategic objectives, meet Department of Defense enterprise transition compliance standards and comply with the Business Enterprise Architecture. The SALE end state will be an integrated enterprise solution that enables materiel readiness, provides asset management and accountability, architecture, acquisition compliancy and financial transparency from factory to foxhole.

The transformation of Army Logistics IT Domain systems is a collaborative effort that will, when completed, move and translate data into meaningful information from multiple sources including individual vehicle platforms to the tactical and national levels. Architecture efforts must be defined and integrated end-to-end in order to establish the required global visibility both

Graphic for Logistics Modernization, Near-Term, page 90, near Language that talks about "logistics Decision making)

within the Logistics Domain and within the larger Army and Joint environments. To guide this effort, the Logistics Domain has identified the Army Integrated Logistics Architecture as the Army G-4's overarching logistics architecture. The AILA informs, guides, and supports decisions for the SALE and assists the Army logistics community in achieving integration and interoperability in the Business Mission Area and Warfighter Mission Area. The AILA assists the SALE effort by identifying architectures and users of logistics information that is necessary in this effort to eliminate redundant and stovepipe IT investments.

MANAGING THE TRANSITION

As the Current Force transitions to the Future Combat System, logistics IT systems must be developed to support interoperable forces and move critical sustainment information between logisticians and commanders. The Army G-4 will establish a Logistics Process Integration Laboratory federated with the Central Test Support Facility so that all Logistics Domain capabilities are integrated and tested with the CTSF in accordance with the integrated architecture. The Logistics Innovation Agency's Logistics Process Center will be used to model, test, and simulate modernization proposals across the logistics enterprise for all classes of supplies and logistics functions. It will also assess research and development initiatives to achieve real world, integrated solutions for implementation and integrate data exchanged across the logistics enterprise to achieve interoperability

among the generations of forces from the Current Force to the Future Force.

Strategic Objective 1

Support today's logistics information technology requirements in support of Combatant Commanders and Joint operations

Logistics information systems play a key enabling role to ensure the Combatant Commander's forces are successful. The increasing demand placed on these systems requires that they be maintained and improved to provide uninterrupted support while new systems are developed and fielded. To be successful, the Army strategy must meet today's operational requirements, while bridging the gap to tomorrow's Future Force and requirements.

The Army's bridging strategy will continue to enhance current logistics support while allowing the Army time to acquire resources. This will allow the transition to a modernized, enterprise wide management capability, described as the SALE. To support this strategy, the Army will:

- Complete PBUSE fielding

- Continue to field SAMS-E

- Continue to field ULLS-A

- Field FCS BCT with integrated logistics

We will continue to improve our tactical and strategic logistics communications capability by continuing to field Combat Service Support Satellite Communications Automated Information System Interface/Very Small Aperture Terminal capabilities. Command and control of logistics is essential to the warfighting. Further improvements must be made to enable today's Joint warfighters to track and redirect units, equipment, and supplies, to

include ammunition, while in route efficiently, and provide the ability to deliver tailored logistics and sustainment packages directly to the warfighter.

To support the way ahead and today's field operations the Army will:

- Continue fielding BCS3 and integrate LOG C2 into the larger Army effort

- Continue fielding the TC-AIMS II Blocks II and begin fielding Block III

- Continue to develop the Business Intelligence tool using the Logistics Integrated Warehouse data as the initial roll out of the Product Lifecycle Management and Master Data Management capabilities of the SALE

- Field the Standard Army Ammunition System, Ammunition Transfer Handling Point

Strategic Objective 2

Provide progressive logistics automation capabilities, business processes, and practices necessary for continuous Army Transformation

The Army's logistics IT transition efforts are enabling best business practices and processes while providing the necessary capabilities to logisticians and warfighters. The Army must develop and share logistics data and requirements across the full spectrum of logistics organizations from the tactical to the National level, across Active and Reserve Components, inside the Army to include Defense Logistics Agency, United States Transportation Command and other Domains and components. The Army Logistics Domain is planning and synchronizing emerging requirements, which will result in an Enterprise solution.

A transformed logistics capability is needed to provide

sustained competitive advantage for the Army, the other Services, Defense Agencies and its allies in current and future operations. To support the way ahead the Army will:

- Continue to reduce redundant and stovepipe IT investments

- Enforce the Logistics Domain IT governance process

- Build and use the AILA to inform, guide, and support decisions made in the implementation of the SALE The Army must continue working cross-domain integration issues to achieve a more fully integrated ERP environment

- Business Mission Area. To support the way ahead the Army will collaborate with the Joint community to identify capability gaps and redundancies

To achieve the SALE end state, the Army must define, plan, and field capabilities that integrate logistics processes from "factory to foxhole". This will allow the Army to efficiently and effectively manage its full inventory of assets, provide critical information to commanders in the operational environment and enable the Reset of returning forces. For continuous logistics transformation, the Army will:

- Continue to field LMP (to include Army Installations)

- Plan for and field GCSS-Army (F/T)

- Plan for and field GCSS-Army (PLM+)

- Define and develop an integrated Industrial Base Modernization Solution that consolidates all industrial base IT initiatives

Logistics automation modernization is essential for both operational and business transformation of

the Army. Current logistics systems are not able to effectively or efficiently sustain the Army of the future. Modernization is not an option but a necessity.

Logistics Modernization: (Mid to Long Term)

The future operating environment will likely present logisticians with the most complex set of challenges yet faced by any force. Army logistics modernization is guided by the requirement to build capabilities that meet the challenges inherent in persistent conflict. These capabilities must support a Joint full spectrum capable land force and will be achieved through the upgrade and modernization of existing systems as well as the insertion of new technologies that improve strategic force projection, intra theater operational maneuver and logistics, force protection, modular, scalable and tailorable logistics command and control.

Our focus is on 360-degree readiness, completing the transformation effort, and funding and fielding logistics automation. Building and sustaining combat power is paramount to the Army's success. Our success in future campaigns relies on a Joint-capable, expeditionary logistics community that maintains domain-wide visibility over requirements, resources, and priorities; anticipates and delivers capability with speed and precision to meet operational needs of the Joint force commander; and acts with unity of effort to plan and execute logistics across the Joint operations area. The transformation of logistics automation, current and Future Force, will be synchronized and balanced with the interdependent Department of Defense Logistics Enterprise, and the emerging Army Modular Force structure designed to improve operational readiness, agile sustained capability, efficiency and effectiveness.

Within the tactical BCTs, the integration of logistics into the overall Battle Command suite will be accomplished using FCS capabilities. Not only will this ensure that the commanders consider logistics capabilities and constraints in their mission planning, but that the enterprise logistics environment will directly support BCT mission operations. Combined with the improved diagnostic and prognostic capabilities made available through the FCS logistics automation products, the tactical user logistics requirements will be more accurately generated and automatically linked to the logistics enterprise environment through the GCSS-A.

Logistics automation assures sustainment is delivered with the speed and precision necessary to meet the needs of the Joint force commander via a well defined enterprise architecture that synergizes global assets and unity of effort throughout the planning and execution phases of logistics support across the interdependent logistics spectrum. The objective is to assure expeditionary and campaign quality logistics by maintaining a 360 degree view of equipment readiness, improving and implementing the logistics concepts of support while continuing the execution and implementation of an aggressive Joint-capable logistics strategy that assures domain-wide visibility of requirements, priorities and resources.

Science and Technology

Future logistics concepts and enabling technologies will support the achievement of operational effects through adaptive planning and execution monitoring, a robust end-to-end information grid and infrastructure and 100 per cent visibility that assures readiness and reduces mission risk. The focused application of technology solutions will reduce demands on manpower, improve the efficiency and effectiveness of logistics support and improve reliability, maintainability, sustainability and operational readiness. Concepts and enabling technologies will be applied against the framework of bandwidth, computing power, sensors and data integration that supports the acceleration of

the logistics decision cycle and its synchronization, from strategic to operational to tactical levels, with the operational tempo of the warfighter. New approaches to logistics will enable the Joint capable concept of support and encompass capabilities spanning command and control, organizations, doctrine, tactics, techniques and procedures, with the ultimate measure of effectiveness being the outcome we are expected to deliver – enhanced and sustained logistics readiness.

The Army, as a component of Joint forces, will accomplish operational and tactical missions at higher tempos while distributed across much larger operational areas. With each insertion of the FCS capabilities and tools into the Current Force BCTs, logistics Command and Control will become an integral element of the Battle Command suite ensuring that commanders will be informed of logistics capabilities and constraints when formulating and executing tactical plans. Existing, or projected, Logistics command and control systems necessary to enable the Army as the theater's sustainment provider, must be built to support this tempo, force distribution and notion of interdependence. Characteristics should include improved information processing, automated updating and distribution, filtering, fusion, decision-making and course of action development across functions and levels that help ensure that the volume of information does not overwhelm commanders and staffs. It should also accelerate the logistics military decision making process provide for COA development under rapidly changing conditions, and more effectively link logistics actions to commanders' intent.

A future logistics C2 strategy must be centered upon achieving a life-cycle driven end-to-end logistics enterprise that supports the application of integrated capabilities across the full spectrum of military operations. These capabilities will be characterized by comprehensive physical and virtual connections, enabling collaboration and ability to share information across the Joint force unhindered by distance, terrain, weather or hostile activity. It must meet the Army's objectives in its strategy for Unified Battle Command and must provide logistics C2 that is integrated into a single Battle Command network such as that being developed by the FCS. Logistics C2 will be applied within the operational environment regardless of echelon, and incorporate key elements of battlespace awareness, command and control and net-centric operation Joint functional areas. It will be developed with a capability to counter threat capabilities through a combination of redundant, multi-layered systems that eliminate single points of failure. Self-healing qualities will automatically adjust and reconfigure the network, reroute information flows and execute immediate action measures to thwart enemy actions. Defenses against computer network attack, deception, electronic intrusion and monitoring and effects of electromagnetic pulse will be embedded to support operational and tactical maneuver.

These capabilities will be enabled by radically advanced data collection, transmission, pattern development, analysis and discovery of links and relationships normally hidden in vast quantities of data scattered throughout multiple global data bases. Logistics C2 will be integrated, tailored, mobile and networked to connect to any other element across the self-forming, global networking grid. This network dynamically adjusts to support the commanders' intent, mission, and op tempo, systemically pre-disposed for the swift fight.

Common Logistics Operating Environment (CLOE)

Common Logistics Operating Environment is the *Army Campaign Plan* initiative to synchronize logistics concepts, organizational approaches, information and a new generation of technologies into a single

operational and technical architecture for Current and Future Force structures. The ultimate goal is to enable warfighters and logisticians at all levels to have total situational awareness within a Common Operating Picture for all aspects of logistics, from factory to foxhole. At the same time, warfighters and logisticians will have a single set of interfaces to "business" processes such as calls for support, requisitioning an item from supply, in-transit visibility and domain wide total asset visibility that supports unity of effort and enables rapid, precise response across a wide range of military operations.

At the National level, CLOE enabled data flows will enable fleet trending and analysis, reliability growth, adjustments to maintenance programs and true prognostic capabilities that will leverage information resources to provide substantially better and more cost-effective logistics support. The data will also support configuration management and failure analysis, as well as adjustments to stock levels and consumable requirements. Additionally, CLOE enabled capabilities will assist Performance Based Logistics by providing contractors the information necessary to optimize system readiness.

The integration of logistics services into the FCS Battle Command Network will achieve this for the FCS BCT. The FCS program has three Logistics software services:

- Platform Soldier Mission Readiness System

- The Logistics Decision Support System

- The Logistics Data Management Service.

PS-MRS provides the platform centric portion of the embedded diagnostic and prognostic system. PS-MRS also determines the current and predicted platform readiness, functional capabilities, re-supply needs, and maintenance requirements. LDSS supports the overall

sustainment concept for the FCS Equipped BCT by providing logistics operation planning and execution. LDMS provides the Product Support Integrators the status and location of national level assets of FCS spares and repair parts. LDMS enables the collection, reporting and collaboration of logistics data on customer demands received from the DOD, STAMIS and ERPs.

CLOE is an ambitious collaborative initiative to synchronize multiple programs so that emerging logistics transformation concepts and processes work seamlessly, end-to-end. The technologies that comprise the common logistics operating environment mark a step change in sustainment processes. These enablers have the potential to substantially improve agility and effectiveness and provide major increases in the commander's situational awareness and unit combat power. Using tests, demonstrations, simulations, user assessments and proofs of enablers, CLOE has provided the data needed to design a robust logistics operating environment. CLOE will also validate the integrated logistics architecture; demonstrate the capabilities required to implement the operating environment across the logistics domain and to identify the resources, schedule drivers, and integration needed for Army-wide implementation.

Army Integrated Logistics Architecture (AILA)

In order to establish the required global visibility of logistics information within the Logistics Domain and within the larger Army and Joint environments, an end-to-end architecture must be defined and integrated. The AILA is the Army's designated overarching logistics architecture and provides the means to move and translate data into meaningful information from multiple sources. The AILA spans from the tactical through strategic echelons and supports a Joint integrated environment.

The AILA informs, guides and supports decisions for the Single Army Logistics Enterprise and assists the Army logistics community in achieving integration and interoperability in the Logistics and Warfighter domains. The AILA is compliant with the Department of Defense Architecture Framework and focuses on current and future concepts, their associated concepts of operations, Service Concepts, Army doctrine and transformation of the Total Force. The AILA supports Army modularity and provides the framework for implementing net-centric warfare principles in the logistics domain. The AILA has been developed in a collaborative effort and continues to evolve. The Army has integrated logistics architecture to establish operational framework and baseline technical standards to enable an end-to-end, common logistics information enterprise. The AILA is the TRADOC-approved logistics architecture for the Current Modular Force and will be updated with the CMF model library.

This effort continues to perform research and analysis of evolving Army/Joint operating, functional and integrating concepts and doctrine to collect, organize, correlate and store source data required to meet the purpose and objectives of the architecture. In doing so, this effort is producing the Army's Common Logistics Operating Environment to provide an Army/Joint methodology that defines the Focused Logistics Vision and synchronizes individual embedded diagnostic and prognostics efforts into a common architecture. This architecture effort synchronizes programs and enables them to work within a common framework to clearly defined logistics processes and share awareness across the logistics domain for both logistics managers and operational commanders. The AILA provides the Army with the capability to link the platform, the lowest level of the Army's logistics network, with the enterprise necessary to provide net-centric logistics, and more importantly the larger migration to DOD's future Net-Enabled Command Capability, the next generation command and control system, Net-Enabled Battle Command and the Army's component of NECC.

Army-USMC Logistics Interoperability

The Army and USMC logistics communities are collaborating on logistics interoperability issues. A multi-phased plan to promote Joint Logistics Interoperability commenced in August 2006. A demonstration planned for first quarter 2009 will serve as a test bed for emerging technologies and programs to advance Joint logistics automation, integration, interoperability and build a foundation for Army and Marine interoperability that enables web-based inter-service support in Joint tactical operations. The demonstration will produce a number of products including Interface Design Documents, Service-Oriented Architecture enabling software and an Implementation Plan that will be provided to Combat Developers, Program Managers and other organizations to serve as a guide for implement tactical logistics interoperability.

Adaptive Logistics (AL)

The Adaptive Logistics initiative demonstrates the use of intelligent agent technology and cognitive decision support tools to improve situational understanding by monitoring and synthesizing large volumes of data from disparate sources and rapidly providing courses of action to facilitate decision-making. Intelligent agents have the capability to change the way logisticians do business.

The objectives of Adaptive Logistics (AL) are:

- Achieve asset and event visibility throughout the enterprise from the point of need to the strategic base

- Achieve data standardization by leveraging Common Logistics Operating Environment standards

- Employ Non-Standard Equipment or high technology developmental products to bind logistic decisions with operations plans/ execution and achieve Joint collaboration and command and control.

Intelligent agents have the capability to mine and fuse data from disparate sources within minutes, creating an initial analysis of the data to provide courses of action to facilitate decision-making. AL lays the foundation for an effects-based, and ultimately a "predict and pre-empt," environment where Army and Joint data are fused to provide a complete picture to all personnel in the operating environment. This capability has the potential to better synchronize logistics support within the larger military decision support process, enable logisticians and customers to see operational requirements in real-time, and sustain the Joint force commander at the point of need.

The chart on the following page illustrates how intelligent agent technology can be used at a Theater Sustainment Command to create a dynamic Theater Distribution Network to support action officer/decision makers with actionable information and Courses of Action relating to theater distribution planning, execution and monitoring.

Condition-Based Maintenance Plus (CBM+)

CBM is a DoD mandated proactive equipment maintenance capability that is enabled by a Common Logistics Operating Environment and uses system health indications to predict functional failure ahead of the event and take appropriate action. "CBM+" consists of a set of rigorously defined maintenance tasks derived from Reliability Centered Maintenance analysis. The tasks can be scheduled in response to accumulation of specified calendar time intervals or operating hours or mileage, or they can be dynamically scheduled, based on the detection of a specified deterioration or operating condition. The goal of CBM+ is to improve the availability of weapons systems throughout their life cycle and reduce cost.

Essentially, CBM+ enables a substantial reduction in equipment downtime, while also providing a dynamic new visibility of equipment health status to operating units. CBM+ will improve maintenance productivity, reduce the deployed footprint required to provide maintenance services to combat units, and provide visibility of equipment status needed to implement anticipatory logistics concepts. The Combined Arms Support Command has inserted CBM+ language into the TRADOC Writers Guide IAW DoD policy. This will ensure Future Combat Systems are CBM+ capable. The challenge the Army faces today with CBM+ is the simultaneous application of CBM+ capabilities to Current Force platforms and enterprise infrastructure and systems.

Program Managers are incrementally applying CBM+ capabilities to limited numbers of existing platforms. The Army Materiel Command's Logistics Support Activity is establishing the Army CBM+ data ontology, Combined Arms Support Command is preparing CBM+ documentation, and the ODCS, G-4's Logistics Innovation Agency is developing the CBM+ Implementation Plan. The immediate challenge is that the Army must resource multiple CBM+ efforts simultaneously to achieve an enterprise wide capability. The fundamental building blocks in the development of CBM+ capability are: collection of data on the platform, movement of data off the platform,

storing the data in a data warehouse, analyzing the data, and acting on the data. Given these expansive areas of interest the Army must develop a comprehensive resource strategy across Program Manager lines, life-cycle managers and data storage activities to achieve the desired end state. The CBM+ implementation strategy requires a comprehensive synchronization of multiple system and platform programs to reach a threshold objective capability within the current FYDP2010-2015. Basic planning will be complete within the next two years, to align ongoing investment programs and to support complementary resource requests in the POM2012-2017 exercise. The objective CBM+ capability will be realized with a fully integrated and interoperable force consisting of Current Force and Future Combat Systems capabilities.

Low-Cost/Low-Altitude Aerial Delivery (LCLA)

Low Cost/Low Altitude is an effective and efficient enabler for aerial delivery of small quantities of supplies at altitudes up to 500 feet above ground level,

Intelligent Agent Technology Used at a Theater Sustainment Command
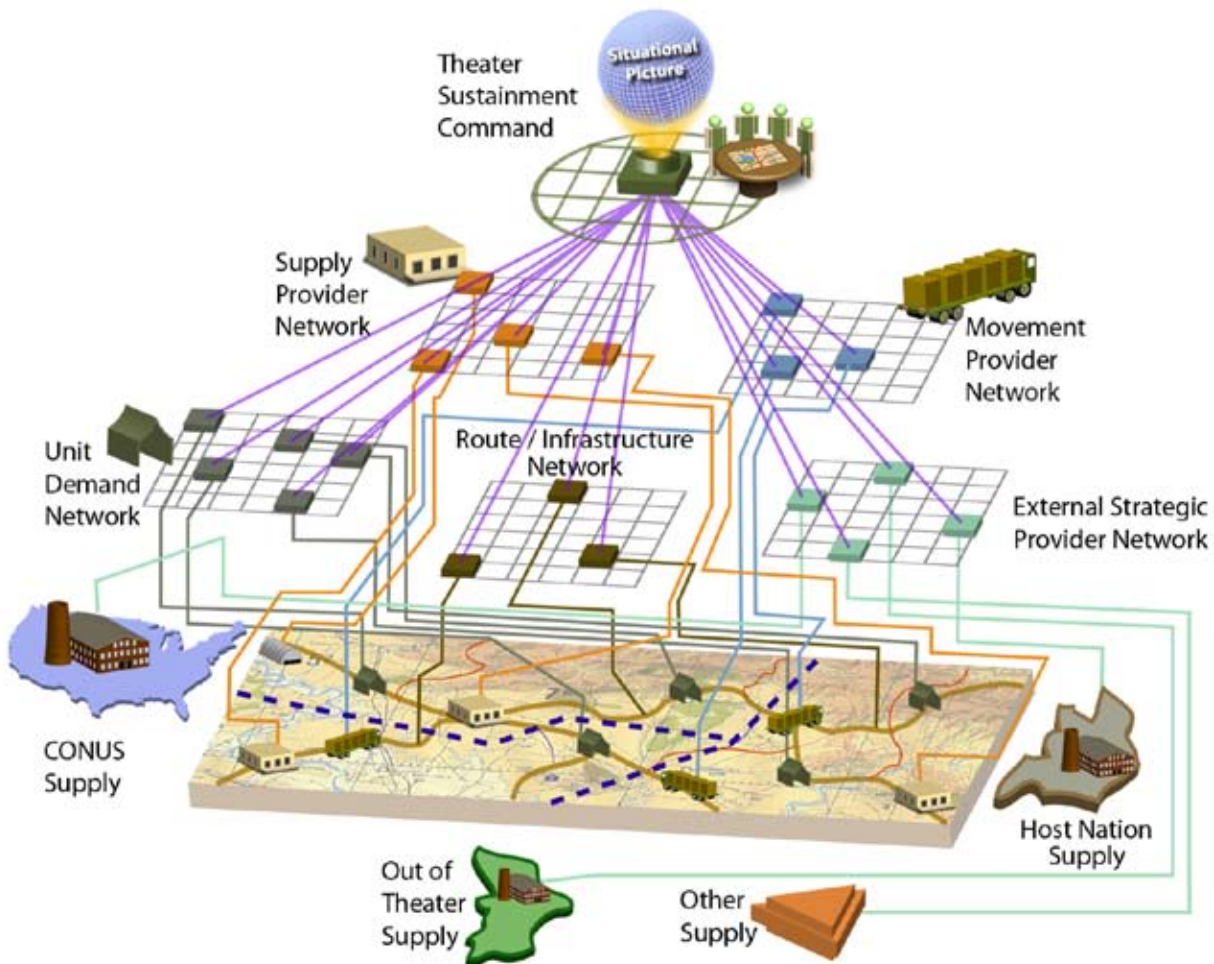
to units operating in remote, austere and hard-to-reach locations with very limited or no materiel handling equipment and no viable airstrips. LCLA consists of a family of five parachute systems, which support various weight ranges up to 300 pounds. A subsystem of LCLA currently in development is the Free-drop Packaging Concept Project. The objective of the FPCP is a low-cost package (less than $100), containing 50 to 350 pounds, that can be dropped from an aircraft moving at 65 to 130 knots from an altitude of 50 to 100 feet AGL.
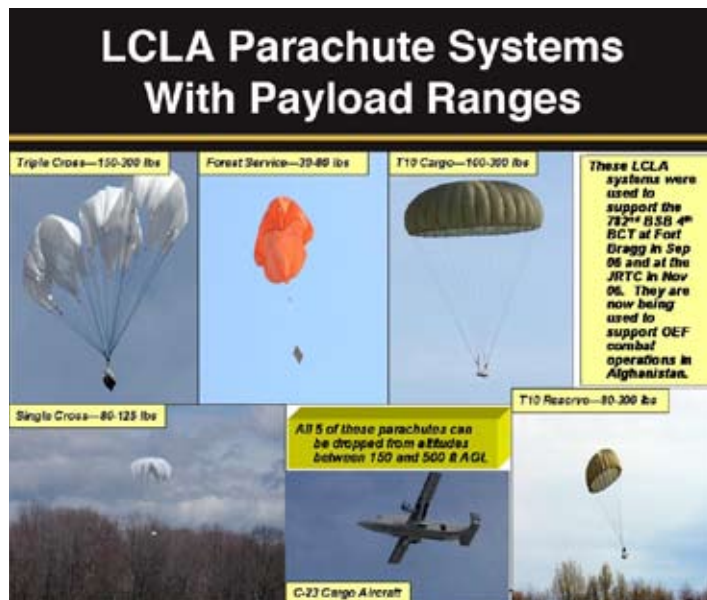
Other objectives include 100% survivability of supplies and recovery and distribution of supplies by two Soldiers without materiel handling equipment in less than two minutes per package. The free-drop method of re-supply requires an innovative packaging concept where supplies are free-dropped without any decelerator material from a very low altitude and land at the desired location without any damage and in a condition that facilitates recovery and distribution. LCLA and FPCP are two of several key Integrated Logistics Aerial Re-supply Delivery Systems that the Army and Joint communities are developing in

synchronization with surface distribution operations to provide the Combatant Commander with alternative capabilities required to meet operational missions. For LCLA, PM FSS is in the process of implementing Indefinite Delivery/Indefinite Quantity contracts for the manufacture of LCLA parachutes to meet the growing demand from theater.

As of February 2008, forces have conducted over 1600 LCLA airdrops, accounting for over 1.5 million pounds of supplies in support of Operation Enduring Freedom operations and mission requirements. Based on the successful results of FPCP Event 1, further testing will be conducted through May, 2008, ranging from static to aircraft airdrops. A final assessment is expected in March, 2009. LCLA and the FPCP substantially contribute to the agility, effectiveness, efficiency and interoperability of the Joint distribution system. LCLA and FPCP have applicability to Army Special Operations Forces, Airborne Forces, Stryker and Infantry Brigade Combat Teams. Both initiatives support the DCS, G-4's campaign objective of enhanced logistics readiness through the identification, demonstration and transition of technology options that support both the Current Force and the longer-term Future Modular Force.

Micro Electrical Mechanical System (MEMS)

Micro Electrical Mechanical Systems are technologies that combine modern electronics with mechanical systems on a small scale to sense, control and act on changing events. MEMS sensors trigger proactive alerts for items that exceed temperature, humidity, vibration, shock and light thresholds. When integrated with active RFID technology, they track and monitor shelf-life and environmental factors affecting assets. MEMS RFID devices improve the ability to preserve materiel in storage and in-transit, for readiness and timeliness of Soldier support.

To demonstrate MEMS RFID capability, the U.S. Army Logistics Innovation Agency led two sensor pilot demonstrations targeting high pay-off areas. First, long-term storage condition monitoring of assets in Deployable Medical Systems at Sierra Army Depot, CA, in collaboration with Headquarters, Army Materiel Command, U.S. Army Tank-Automotive and Armaments Command, and U.S. Army Medical Materiel Agency; and second, in-transit nodal condition monitoring of medical sets, kits and outfits shipped from the U.S. Army Medical Materiel Center–Europe to customer destinations in the United States Central Command area of operations. This demonstration was conducted in partnership with Product Manager Joint–Automatic Identification Technology. The demonstrations validated that sensor technology is well-suited for long-term storage and in-transit visibility condition monitoring. The sensor data were more accurate and actionable than data from indicators currently in use today for long-term storage. Alerts received via Radio Frequency In-Transit Visibility or e-mail, while assets were in-transit, provided actionable information about the materiel before it was received downrange.

PM J-AIT is working to fully integrate MEMS RFID technology into RF-ITV. The medical community is exploring further uses of sensors and associated alert capabilities for monitoring medical chemical defense materiel, and is collaborating with PM J-AIT, the Office of the Army Deputy Chief of Staff, G-4, USCENTCOM and other stakeholders to identify requirements for fielding, sustainment and user training. HQ AMC is working with PM J-AIT to implement sensor security tags in all DEPMEDS at SIAD. Although the demonstrations focused on specific medical assets as high-payoff applications, MEMS RFID benefits extend to all classes of supply and logistics processes, across all Services.

It is clear that these capabilities are particularly appropriate for shelf life or life-limited assets such as medical and food assets; but the applications are many and varied, and each application must be evaluated based on individual merit. Key considerations include examination of business rules, with corresponding changes to and integration of supporting automated information systems, establishment of policies and standards, and training in the schoolhouses. As sensor, RFID and satellite-based location and tracking systems become more interoperable, these networks will help improve the quality, integrity and safety of products in storage and while moving through the supply chain, with improved knowledge for life-cycle tracking.

Next Generation Wireless Communications (NGWC) for Logistics Applications

NGWC is a NS-E technology integration effort focused on developing and integrating technologies to significantly enhance visibility of Army and DoD assets in both time and space. NGWC encompasses a suite of mesh network-enabled, information assurance compliant, sensor devices that will collect vital logistics visibility data and route that visibility data to the Radio Frequency In-Transit Visibility server via interfaces with existing backhaul communications capabilities already in existence throughout the distribution pipeline. The NGWC effort is characterized as follows:

- Requirements based developmental effort

- Open architecture, standards-based methodology

- Leverages ad hoc mobile mesh network technology as the framework communications architecture

- NS-E sensor-enabled (based on customer requirements)

- DoD Information Assurance compliant

- Mesh functionality designed to support logistics business processes

- Asset visibility in transit, storage and processing

- Logistics operational resource visibility

Under NGWC, the Army will demonstrate the initial functioning spiral of mesh network technology in late summer of 2008. Additional spirals of mesh network technology will focus on mesh design to support specific logistics business processes. The Army is collaborating with the United States Transportation Command and the United States Joint Forces Command to ensure service and joint requirements are addressed in the overall NGWC asset visibility solution.

Robotics

Robotics technologies are man-made devices that are capable of sensing and interacting with the environment. The technology is capable of performing functions that are normally performed by human operators. Robotic systems are made up of mechanical components, computers, sensors and other specialized devices. Current robotics applications, with some exceptions, are geared towards performing repetitive, dangerous, or difficult work that humans cannot perform well or would not want to perform.

Applications within the Army, with some exceptions can be sorted into two broad categories: Unmanned Ground Vehicles and Unmanned Aircraft Systems. Based on current and planned unmanned robotics capabilities, the U.S. Army Logistics Innovation Agency developed a Robotics Assessment (August, 2006) that identifies expected robotics capabilities and frames them against potential logistics policy and doctrinal implications. With rapid improvements in robotic technologies, new opportunities are emerging in the application of robotic systems to provide improved logistics support, especially in higher risk operations.

In support of robotics logistics systems development, LIA recently conducted initial analysis that outlines near term, high pay-off logistics applications of robotics technologies (November, 2007). This analysis lays the groundwork for further experimentation with robotics capabilities to improve logistics speed and minimize exposure to dangerous operations.

Focused Logistics Modernization

The following Programs and initiatives are the prime modernization efforts of Focused Logistics–not in priority order:

Science and Technology Capabilities Gap Filler

Convoy Active Safety Technologies (CAST) supports requirements to improve Soldier protection and increase the ability to sustain the force by increasing distribution capability. CAST is a low cost, Leader/ Follower capability for the Current Force tactical wheeled vehicle fleet and uses Future Force autonomous navigation technologies with a Current Force vehicle application. The system demonstrates potential to improve driver safety by increasing situational awareness, reducing collisions and fatigue, as well as improve convoy integrity. Additionally, the system benefits the ability to sustain the force by increasing distribution throughput. This program supports Army Gaps and Shortfalls outlined in the Current Gap Assessment VI, Capability Needs Assessment 10-15, and FY09 Technology Shortfalls Analysis as well as USMC gaps.

Focused Logistics: Wearable Energetically Autonomous Robotics- Personal Combat Vehicle (WEAR-PCV)

Logistics Variant, formerly known as Exoskeleton, is a robotic augmentation for an individual Soldier that increases Soldier strength and endurance. With the ability to be worn and used in all Soldier work environments, the logistics variant WEAR-PCV is an

agile, dexterous, compact and self-powered physical enhancement with potential to significantly reduce workload and fatigue for Soldiers performing logistics repetitive, heavy lifting / moving tasks. This system supports developmental efforts towards a Combat Infantry variant requirement outlined in the Ground Soldier System Capability Development Document. Additionally, the WEAR-PCV could fill low-weight Materiel Handling Equipment shortfalls as well as supports gaps outlined in the current gap

Assessment VI, Capability Needs Assessment 10-15.

Streamlining and improving the turn-around of the BOIP process from product development approval from the PM/PdM to the field. Could this process be automated to make initial allocations and the process for revision quicker and less involved as the Army transforms and modernizes?

Force Provider

Force Provider is known as the Army's premier deployable base camp capability. Although initially intended to support Reception, Staging and Onward Integration as well as Rest and Recuperation missions, over time it has evolved to being used to support disaster relief, Forward Operating Bases and even relocated with Provisional Reconstruction Teams. In order to meet these missions, the latest configuration Force Provider Expeditionary remains a 600 person module, but is packaged into four 150 person capability increments. By reconfiguring the modules with air-beam tents and Triple Container based kitchens, laundries, showers, and latrines, a single 150 person increment can deploy on one C-17 and can be operational in less than six hours.

The Army is developing, with input from the other Services, a Joint Capability Production Document which incorporates both the core and additional add-on capabilities that the warfighter has requested for Force Provider / base camp support. One of the capabilities that will significantly reduce bulk water resupply requirements is a Shower Water Reuse system, which leverages the Army's Tactical Water Purification System technology.

Other add-on capabilities include water bottling, ice production, a Modular Ballistic Protection System for tents, patient care containers and a capability to reduce the vast quantity of solid waste that must be backhauled for disposal. Although these capabilities increase the procurement cost of a module, they quickly pay for themselves by keeping trucks off the road. The Army medical community has provided significant input to the CPD as they intend to leverage many of the Force Provider Expeditionary subsystems for their Combat Support Hospitals. Force Provider Expeditionary and its subsystems are on the way to becoming the Joint solution to support the deployed warfighter.

Field Feeding

The Army is about to begin fielding the Assault Kitchen, which provides a heat-on-the-move capability to prepare the Unitized Group Ration Heat & Serve and, with the retention of selected items from the Kitchen Company Level Field Feeding, provides units the capability to prepare the UGR-A when appropriate. Through an engineering change to the current Containerized Kitchen, we will provide the cook with thermostatic control of the kitchen appliances and improved work environment, while still retaining the 10KW Tactical Quiet Generator. The recently completed Army Food Program Capabilities Based Assessment identified the need for a full service kitchen to replace the Mobile Kitchen Trailer which has been in the field since 1975. That effort will be the Battlefield Kitchen

and is anticipated to be made available to the field in the 2015 time period after the CK completes fielding. Until then, the Army will continue to reset MKTs as they will continue to be in use for at least another 20 years.

In order to meet the directives of "no stocks on the ground" and Brigade Combat Teams must be three days self sustaining and in conjunction with the implementation of the Configured Loads concept; the Army developed and will soon field the Multi-Temperature Refrigerated Container System. The MTRCS will be fielded to field feeding sections across the force as one per CK/MKT and to subsistence platoons which will enable the movement of frozen and refrigerated items in the same container. The complete MTRCS configuration includes a HEMTT-LHS, PLS Trailer, a Flatrack and the MTRCS refrigerated container, thus providing the ability to support up to 800 personnel with operational rations for three days.

Aerial Delivery Goals and Direction

Current cargo airdrop equipment is vintage 1940's technology which was designed for delivery from aircraft three times removed from the inventory and from altitudes inconsiderate of current threat capabilities. We must modernize ADE to retain and revive the uniqueness of the airdrop method, to make airdrop relevant to current and Future Modular Force operations, and to have it perform as a viable supply and re-supply method based on theater needs and mission requirements. The goal is to provide a "mix" of airdrop options or a menu of alternative materiel systems to provide the right capability to accomplish the mission. These capabilities include necessary high tech solutions such as the Joint Precision Air Drop System, as well as low tech solutions like the Low Cost Low Altitude Airdrop System. These systems provide: flexibility

in type of aerial delivery platforms, increased air carrier survivability via altitude/horizontal offset, improved ground accuracy which increases load survivability and provides lower cost alternatives that meet performance requirements while moving toward "throwaway" status or a reduced need to be recovered.

Current sling-load operations and equipment are outdated. Materiel solutions to satisfy gaps here include slings and netting that are stronger, lighter, non-abrasive and less expensive. A nondestructive test capability for these items is necessary; as is the capability for better weighing prepared loads for "handoff" to the aircrews. An automatic/automated capability is being explored that removes ground personnel from the task of having to physically ground the aircraft and then affix the prime sling leg upon the aircraft hook which allows an automatic "hook-up" to loads. Historically, rotorcrafts conduct air-land operations via internal cargo transport and sling-load operations. However, rotorcraft is a viable airdrop platform, to include free drop platforms and should be used in this manner to further reduce blade time. This will also increase air carrier survivability and provide greater flexibility as an aerial delivery platform.

In a broader sense, our goal is to increase the use of aerial delivery platforms as a routine transportation mode for distributing and sustaining troops on the ground. As a result of enemy tactics, techniques and procedures we are left reliant upon a fragile, resource intensive, frequently unreliable and unresponsive Ground Line of Communication. The driving mission for all of us is to sustain the force, wherever they may be located, in a responsive manner. When critical, there is a great difference in customer wait times of hours as opposed to days. The customer is not interested in the transportation mode used or the price paid to

transport the supply requirements; they want their items at the right time, in the right place in usable condition.

Water Distribution Modernization

The delivery of potable water on the battlefield accounts for a significant portion of the distribution footprint. This large footprint translates into increased risk for Soldiers and civilians involved in delivering and protecting those delivering this commodity. One of our goals is to significantly reduce the distribution requirements for potable water by purifying/generating and packaging as far forward as possible. Two efforts that support the reduction of the distribution footprint for potable drinking water are in development:

The Expeditionary Water Packaging System (EWPS)

The Expeditionary Water Packaging System is a complete water packaging system that consists of a blow molding machine,; work station, plastic pre-forms stock bin, conveyor system, two ultraviolet sanitizing units, bottle capping machine, bottle labeler, 6 KW air conditioning unit, diesel engine driven generator, banding machine, and shrink wrap machine. The system allows the bottling of ROWPU purified water within or near the battle space of consuming organizations eliminating the need to transport bottled water from regionally available sources or CONUS.

The Gator, Self Filling Camel (GSFC)

The Gator Self Filling Camel uses water from air technology to generate water at or near the point of consumption. This technology uses a series of proprietary processes to extract and treat water from atmospheric air and dispense pure water on demand. It will operate over a wide range of climatic conditions and provide drinking water in a variety of tactical situations.

Test Measurement & Diagnostic Equipment (TMDE)

Modernization General Purpose Electronic Test Equipment: GPETE, formally known as the Army's Test Equipment Modernization Program, was chartered in 1983 with goals of: improving the materiel readiness of weapon systems; reducing TMDE proliferation; as well as obsolescence and support costs. GPETE is a funded program which utilizes commercial off-the-shelf test equipment acquisition to streamline the normal life cycle process. The Program Director for TMDE acquires TMDE identified by the GPETE Joint Working Group which annually convenes to select and prioritize GPETE requirements. The Department of the Army G-3 is responsible for approving the GPETE Prioritization List.

The benefits of the GPETE Program are: it continues to provide support of weapon systems requiring TMDE, it further reduces the TMDE redundancy and obsolescence in the field, allows for maintenance personnel to have the most current TMDE to perform alignment, calibration or repair tasks and it reduces support cost with limited models of TMDE in the field.

Container/Material Handling Equipment (C/MHE)

Container/Material Handling Equipment modernization is occurring through the following three programs:

a. CASCOM requested HQDA approval to transition from the Army's over-age 4,000 pound, rough terrain forklift fleet and adopt the USMC 5,000 pound Light Capability Rough Terrain forklift. In addition to a Joint Army/USMC 5K forklift, enhancements

include: increased lift capacity, an extendable boom to assist installing Armor Kits on all vehicles, and a fork mounted pintle attachment to position trailers.

b. CASCOM's approved ORD for the 10,000 pound All-Terrain Lifter Army System has six TACOM contract prototypes at Aberdeen Test Center under-going production Validation Testing for a projected FUE in 2Q FY08. ATLAS II enhancements include: increased reliability, lifetime lubricated axles, EPA approved tier II engine, Add-on armor for operator protection and Interactive Electronic Technical Manuals to compress diagnostic and repair times.

c. CASCOM's on-going materiel handling Capabilities Based Assessment contract will research the Army's future concept needs for all TOE forklift, container handlers and cranes (2015–2025). Deliverables by 1 Oct 08 include four JCIDS documents TRADOC ARCIC will use to grant permission to write new CDD/CPD's incorporating technology for modernizing future forklifts and container handlers.

Test Measurement & Diagnostic Equipment

Modernization Next Generation Automatic Test System: The NGATS is the Army's latest Automatic Test System within the Integrated Family of Test Equipment. It will serve as the Army's designated off-system diagnostic set providing a balance of support for both aviation and ground platforms which includes Abrams, Bradley, MLRS and Kiowa Warrior. NGATS is designed to replace existing off-system testers currently fielded and experiencing obsolescence. It has also been identified as the Army's ATS for the Joint Agile Rapid Global Combat Support Advance Concept Technology Demonstration.

The benefit for modernizing IFTE with NGATS is that it complies with the Joint/Department of Defense/NxTest open architecture enabling all services to leverage off each other's diagnostic systems. In addition, NGATS is designed for continued modernization utilizing commercial industry technological standards. NGATS will be C-130 air transportable and self contained allowing for versatility with mission requirements. Potentially, NGATS could perform diagnostics on multi service platforms.

Advanced Bomb Suit

The Advanced Bomb Suit continues to be updated to increase survivability while maintaining mobility. The second generation EOD 9 helmet provides better ventilation, external lighting and better blast protection than earlier models. As of 2007 all CENTCOM EOD units were issued the latest version of helmet. In response to an Operational Needs Statement, the Army is developing a night vision visor system to allow EOD Soldiers to operate at night without white lights, making themselves less vulnerable to sniper attacks.