

COMBAT SUPPORT AND COMBAT SERVICE SUPPORT

Under the **Program Executive Office for Combat Support & Combat Service Support (PEO CS&CSS)**, project managers, together with their reporting product managers and product directors, are responsible for Army systems and some joint service programs across all phases of their life cycle.

Program phases fall into the areas of: pre-systems acquisition (concept refinement or technology development), generally consisting of research and develop-

ment programs and prior to a Milestone B; systems acquisition (between Milestone B and full materiel release); systems after full materiel release (in production and fielding phases); and two types of sustainment (operations and support): systems that have completed fielding, are no longer in production and are managed directly by the project manager and systems that have completed fielding, are no longer in production and are managed by an Army Materiel Command commodity command, but for which the PM is the life-cycle manager.

PEO CS&CSS Project Managers include: Project Manager Force Projection, Project Manager Joint Combat Support Systems, Project Manager Tactical Vehicles and Project Manager Mine Resistant Ambush Protected Vehicles. A representative sampling of their programs follows.

Project Manager Force Projection

The **Project Manager Force Projection (PM FP)** encompasses Product Director for Army Watercraft Systems (PD AWS), Product Manager Bridging, Product Manager Combat Engineer/Material Handling Equipment (PM CE/MHE), Product Manager Force Sustainment Systems (PM FSS), and Product Manager Petroleum and Water Systems (PM PAWS).

With an understated motto of "Sail



Logistics support vessel (LSV)

Army," the **Product Director for Army Watercraft Systems (PD AWS)** is working to provide "a flexible and responsive fleet, projecting and sustaining America's forces through the 21st century." PD AWS is responsible for the engineering, production, fielding, initial logistics support and modernization/modification of the Army's fleet of watercraft and associated support equipment, all of which enable the warfighter to rapidly project and sustain the nation's armed forces.

The **Logistics Support Vessel (LSV)** provides worldwide transportation of

combat vehicles and sustainment cargo. The 313-foot LSV class vessel, designed to carry more than 2,000 tons of deck cargo, has a beam of 60 feet and a molded depth of 19 feet. It provides intratheater movement to remote underdeveloped coastlines and inland waterways. The LSV is the primary joint logistics over-the-shore (JLOTS) vessel. It also assists in unit deployment and relocation. The LSV fleet will begin a service life extension program this year, which will include changes to command, control, communication, computers, intelligence, surveillance and reconnaissance

(C⁴ISR) and integrated bridge systems, hull and engineering systems, and force protection upgrades as well as improvements to crew messing and living spaces and deck equipment.

The **Landing Craft Utility (LCU) 2000** provides worldwide transport of combat vehicles and sustainment cargo. It also supports intratheater and tactical resupply. The LCU 2000 has a length of 174 feet, beam of 42 feet and loaded draft of 9 feet. The LCU 2000 can carry 350 tons of deck cargo. The LCU 2000 fleet is nearing completion of a C⁴ISR upgrade, which provides state-of-the-art communication equipment, navigational equipment and safety of life-at-sea electronics.

The **Large Tug (LT) 128'** is used for transocean/coastal towing operations and for assisting with the docking/undocking of large ships. The LT 128' is outfitted to provide salvage, rescue and firefighting assistance to other vessels and shore installations on a limited basis. The LT 128' fleet recently completed an extensive modification program, which included lowering the pilothouse and upgrading the fuel tank systems and bow fendering.

The **900 Class Small Tug** mission is moving logistical supplies and equipment in harbor and inland waterways. The small tug also provides the capability to assist larger tugs in docking and undocking all types of ships and watercraft and can be used in routine harbor utility work.

The **Landing Craft Mechanized (LCM8)**, used in utility work, features a specialized Mod 2 program. This provides additional capabilities of command and control, personnel transfer and light salvage.

The **Modular Causeway System (MCS)** provides a means to move cargo from ship to shore across unimproved beaches in areas of the world where fixed port facilities are unavailable, denied or otherwise unacceptable. The sections are made from modular, ISO-compatible modules. The four systems are configured from basic modules in various configurations: roll-on/roll-off discharge facility; causeway ferry; floating causeway (FC); and warping tug.

The **Barge Derrick (BD) Crane 115 Ton** is used primarily in discharging heavy loads beyond the capacity of the ship's gear and assisting in salvage operations. The crane provides the lift and reach needed to discharge the heaviest of the projected Army cargo—the M1A2 main battle tank—

from the centerline of the large, medium speed roll-on/roll-off (LMSR) ships.

Future Army Watercraft Systems

The future Army watercraft programs include the joint high speed vessel, harbor-master command-and-control center and vessel-to-shore bridging.

The **Joint High Speed Vessel (JHSV)** is a key element for transforming the Army's watercraft capabilities. The JHSV is the Army's next-generation self-deploying watercraft. It brings an entirely new capability set to the force by filling critical capabilities gaps in rapid, tactical response and operational maneuver ability of expeditionary and modular forces. The JHSV is an interoperable platform that can work in tandem with the Navy and Marine Corps in any waterborne theater to deploy equipment, cargo and troops. The JHSV enables units to maneuver into the battlespace with little to no reception, staging, onward movement and integration in the forward area; it can also provide follow-on sustainment through minor and degraded ports. Leveraging technologies developed within the commercial sector and DoD, the JHSV will be faster, more capable and more survivable than current-generation watercraft. The first JHSV is currently under construction with delivery planned for December 2011, after which the vessel will undergo post-delivery test and trials for approximately 10 months. The Army plans to procure five JHSVs.

The **Harbormaster Command and Control Center (HCCC)** will provide 24-hour real-time vessel tracking, in-transit visibility, movement tracking, full joint interoperability, secure and nonsecure communications, and real-time meteorological and bathymetric data. It will be fully digitized.

The **Vessel-to-Shore Bridging (VSB)** capabilities are key enablers for the JHSV and current fleet vessels in meeting assured access requirements. In addition, VSB will

meet future force lift and access requirements by filling a capability gap to resupply deployed future brigade combat team (BCT) and joint forces rapidly. Future force operational concepts dictate that these platforms need a bridging technology that enables them to access any entry point, even bare-beach environments. The new VSB technology will enhance watercraft's ability to conduct self-supporting operations in an austere operational environment. Investing in VSB will enhance fort-to-port sustainment for the future force.

Product Manager Bridging

Product Manager Bridging interfaces with other defense organizations on a range of existing and emerging bridging systems including the Armored Vehicle Launched Bridge (AVLB), Improved Ribbon Bridge (IRB), Standard Ribbon Bridge (SRB), Bridge Erection Boat (BEB), Common Bridge Transporter (CBT), Rapidly Emplaced Bridge System (REBS), Dry Support Bridge (DSB) system, M3 Medium Girder Bridge (MGB), Joint Assault Bridge (JAB), Assault Breacher Vehicle (ABV), Improved Boat Cradle (IBC), Bridge Adapter Pallet (BAP) and Line of Communication Bridge (LOCB). The Dry Support Bridge system and the Improved Ribbon Bridge provide representative examples.

The **Dry Support Bridge (DSB)** provides the Army with assault and support bridging for gaps of up to 40 meters. The DSB replaces the outdated, manpower- and time-intensive medium girder bridge (MGB) with a mechanical system capable of emplacing a 40-meter bridge with 14 soldiers in 90 minutes or less. In addition, the DSB will improve current bridge load-carrying capacity, moving it up to military load classification (MLC) 96 for wheeled traffic, such as an M1 tank uploaded on a heavy equipment transporter. The DSB is designed for transportation as a palletized load by the CBT, palletized load system



Joint high speed vessel (JHSV)

(PLS) trailers or by service support units equipped with PLS trucks.

The **Improved Ribbon Bridge (IRB)**, which was fielded beginning in 2004, improves mobility by providing a continuous roadway or raft capable of crossing MLC 96 (wheeled)/80 (tracked) vehicles over nonfordable wet gaps.

The **Product Manager Combat Engineer/Material Handling Equipment (PM CE/MHE)** coordinates and supports a wide range of compaction equipment, quarry and asphalt equipment, rough terrain container handlers, cranes, dozers, excavators, forklifts, graders and scrapers, loaders and airborne/air assault equipment. Program examples include new systems like the high-mobility engineer excavator, engineer mission module-water distributor, paving machine, backhoe loaders, hydraulic excavators, light and heavy dozers, light and heavy loaders, heavy grader, asphalt mixing plants and skid steer loaders. These programs support the current engineer forces within Stryker, Heavy and Infantry BCTs, ESC, vertical, horizontal, asphalt, concrete, bridge, quarry and route-clearance units. PM CE/MHE also supports transportation, quartermaster, medical, aviation, and military police units.

The **High-Mobility Engineer Excavator (HMEE-I)** is a nondevelopmental, military-unique vehicle that will be fielded to the Army's brigade combat teams and other selected engineer units, replacing the Small Emplacement Excavator (SEE), whose life cycle ended in FY 2005. The high mobility of the HMEE-I provides an earthmoving machine capable of maintaining pace with the Army's current and future combat systems. The HMEE-I is a diesel-engine-driven, self-propelled, four-wheel-drive vehicle with a hydraulically operated front-mounted loader bucket and a hydraulically operated rear-mounted backhoe bucket. The HMEE-I has a 1.5-cubic yard front-loader bucket, a 0.28-cubic yard backhoe bucket, a 14-foot digging depth, and a climate-controlled cab. The HMEE-I was designed to maintain pace with maneuver units and has a top speed of 60 mph.

Another recently emerging activity with a broad range of engineering applications involves the development of **Engineer Mission Modules**. Permanently mounted on standard logistics flatracks, the modules are loaded via truck load-handling equipment, which allows drivers to configure their systems for a specific mission. By using fewer trucks and more modules, the concept provides a cost-effective means of modernizing the fleet of engineer construction equipment. PLS flatrack configurations in production include the M5 bituminous distributor, which has a capacity of 2,800 gallons; the M6 concrete mobile mixer, which has a capacity of 5 cubic yards when used on the PLS truck or trailer and 8 cubic yards when



M9 armored combat earthmover (ACE)

used on the ground as a batch plant; and the M6 dump body, which has a capacity of 12 to 14 cubic yards. Currently under development are the XM9 2,000-gallon water distributor for use with the Heavy Expanded Mobility Tactical Truck-Load Handling System (HEMTT-LHS) and the XM10 3,000-gallon water distributor for use with the PLS truck. Other modules being considered include a fuel module, a well-drilling system and a chemical decontamination unit.

The product office also has responsibility for the **M9 Armored Combat Earthmover (ACE)**, a highly mobile armored vehicle capable of performing mobility, countermobility and survivability tasks in support of light, medium or heavy forces on the integrated battlefield. First fielded in 1986, this multipurpose engineer vehicle provides the operator with armor protection for operation in the forward portion of the combat area. By raising the dozer blade and using its scraper blade, the M9 ACE can fill itself with ballast to improve dozing efficiency.

Product Manager Force Sustainment Systems

The **Product Manager Force Sustainment Systems (PM FSS)** has life-cycle

management responsibility for cargo aerial delivery equipment, field feeding and field services systems, force provider base camp, and shelter systems consisting of shelters, heaters and camouflage netting.

The **Joint Precision Air Drop System (JPADS)** is a family of systems—Joint Precision Air Drop System 2,400 pounds (JPADS 2K) has recently been type classified and is presently being fielded to authorized units. It allows conventional military aircraft to accurately drop sensors, munitions, and/or a huge range of supplies onto the battlefield while minimizing the risk to aircraft and the possibility of enemy detection of aircraft drop zones. The systems use gliding parachute decelerators, GPS-based guidance, navigation and control, weather data assimilation and an airdrop mission planning tool to deliver cargo with near pinpoint accuracy. The first combat JPADS cargo airdrop took place at the end of August 2006. The Joint Precision Air Drop System 10,000 pounds (JPADS 10K) is currently in development and testing.

The **Low Cost Aerial Delivery System (LCADS)** is another family of aerial delivery products that are on the opposite end of the technology spectrum compared to



Low cost aerial delivery system (LCADS)

JPADS. By means of simplified designs and use of commercially available low-cost materials, PM FSS has fielded an array of expendable parachutes and containers. These parachute and container assemblies are a cost-effective means of either battlefield resupply or providing humanitarian aid. Purpose-built for one-time use, these items are uniquely suited for employment in the combat environment where the recovery of aerial delivery equipment is either impractical or puts soldiers at risk. At 50 percent less cost than legacy aerial delivery equipment, LCADS provides tangible dollar savings. In addition, because LCADS parachutes come prepacked from the manufacturer, there is no need for skilled parachute riggers to maintain and prepare this equipment. This reduces parachute rigger manpower requirements, resulting in a smaller logistics footprint in the theater of operations.

In the field feeding area, the **Multi-Temperature Refrigerated Container System (MTRCS)** will provide the capability to transport and store refrigerated and frozen products in a single container. The MTRCS will be used by quartermaster subsistence platoons at corps level and brigade combat teams to support ration distribution and storage. The MTRCS consists of an insulated 8-foot by 8-foot by 20-foot ISO container with an engine-driven refrigeration unit that will allow operation on the move. Two compartments inside the container are separated by a moveable partition, allowing the container to be tailored to the specific load. The result is more efficient space utilization and reduced transportation requirements. The MTRCS is constructed to interface directly with the HEMTT-LHS for transport.

For the field services area, the **Mobile Integrated Remains Collection System (MIRCS)** will transform mortuary affairs operations by providing a system that is responsive, deployable, agile, versatile and sustainable. The MIRCS provides a mobile facility for the initial processing and storage of human remains on the battlefield. It is a self-contained, expandable, ISO compatible shelter with a receiving/processing area, administrative area, refrigerated storage for 16 remains, and storage for operational supplies. It has an onboard power generator and freshwater and wastewater storage areas and includes all components necessary to deploy, move and operate in support of the full spectrum of military and peacetime disaster support operations. The MIRCS is constructed to interface directly with the HEMTT-LHS for transport.



Force Provider-Expeditionary

In response to the needs of the warfighter and combatant commanders, the Force Provider base camp system, initially developed as a deployable rest and recreation system, has been repurposed into an expeditionary base camp for sustainment of the soldier on the front lines, becoming affectionately known as the Army's "home away from home." The expeditionary configuration features a 600-person module in component sets that can be divided into four equal company-size submodules. It incorporates the use of an air-beam supported Tent, Extendable, Modular Personnel (TEMPER) shelter, and TRICON-based hygiene, laundry and feeding systems. The four equal submodules enable the commander to deploy 150 personnel to four separate locations without sacrificing any capability. This gives the commander great flexibility in deciding where to base combat power. The air-beam TEMPER shelters make setting up the billeting and administration tents a snap, reducing the time it takes to establish an entire 600-person camp from weeks to just a few days. The tent's air beams are inflated with an air compressor, similar to filling an automobile tire with air; it takes less than 30 minutes to set up each tent.

With the flooring and liner already integrated into the tent, the only thing left to do is hang lighting on prepositioned straps, and the shelters are ready for move-in. The TRICON systems are shipped in their transportation configuration of 8 feet by 8 feet by 6.5 feet and are easily and quickly expanded into their operational footprint of a standard 20-foot ISO container. These key features have the ability to air transport all necessary equipment for a complete 150-person camp in a single C-17 aircraft, and, after reaching its final destination, the submodule can be fully operational in less than four hours with a trained crew of eight personnel, providing quality latrine, shower, laundry, billeting and feeding facilities for the warfighter.

The **Product Manager Petroleum and Water Systems (PAWS)** is responsible for a

range of petroleum laboratories, petroleum storage and distribution systems, water purification and treatment systems, and water storage and distribution systems.

The **Petroleum Quality Analysis System-Enhanced (PQAS-E)** is a fully-integrated fuel laboratory installed in an environmentally controlled ISO shelter, mounted on a XCK2000E1 trailer with support equipment, supplies and a tent. The PQAS-E is a complete petroleum laboratory capable of B-2 level testing on kerosene-based and diesel fuels. System software provides an information database/expert system for the technician to consult in interpreting test results and in making recommendations for the disposition of fuels. Data acquisition equipment includes a modem that allows the PQAS-E to quickly transmit test results to the requiring customers. The tent structure serves as a customer service area where samples can be received, logged and stored prior to processing.

The **Modular Fuel System (MFS)** is a part of the family of mission modules developed specifically for use with the Palletized Load System (PLS) and the Heavy Expanded Mobility Tactical Truck (HEMTT)-Load Handling System (LHS). The MFS capitalizes on PLS/LHS enhanced mobility, speed of download and multicommodity capabilities. By replacing fuel storage bags on the ground (FSSPs) with tank-racks in selected division-and-below areas, bulk fuel storage becomes more relevant because of increased mobility, modularity and flexibility. The MFS is a rapidly deployable and recoverable fuel storage/distribution system able to receive, store and issue fuels on the battlefield. The system has a 35,000-gallon capacity and is transported by PLS/HEMTT-LHS and PLS trailers. The system can be manifolded and placed into operation in one hour or less using four trained 92F personnel. It can also be disassembled and packed for transport in one hour or less. The MFS system is composed of 14 baffled 2,500-gallon Tank Rack Modules (TRMs) and two 600-gallon-per-minute Pump Rack Modules (PRMs). Each TRM has onboard

storage compartments for hoses, nozzles, fire extinguishers and grounding rods. Each PRM has a diesel-engine-driven centrifugal pump, filter separator, sufficient hoses, refueling nozzles, valves, fittings and an auxiliary pump for gravity discharge operations, and fittings to establish eight retail and/or bulk dispensing points (total of 16 points per system). The system can also be fitted with a fuel additive injector. The MFS is ISO certified for transport through regular commercial shipping, and the TRM will have the capability of low velocity airdrop (LVAD). The Army does not have any legacy storage/distribution system that can compare to the increased mobility, capability, compatibility, maintainability, sustainability and performance of the MFS.

The **Advanced Aviation Forward Area Refueling System (AAFARS)** 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 berm, nozzles and fuel test kit. The AAFARS replaces the Forward Area Refueling Equipment (FARE) on a one-for-two basis. The AAFARS is an operationally responsive advancement in rapid delivery of fuel to aviation units. The AAFARS is capable of deploying and initiating operations in 20 minutes or less using

a four-person team. The AAFARS provides the advantages of rapid deployment and agility as it is internally transportable by one UH-60 aircraft and can be air-emplaced. The AAFARS enables forces to rapidly refuel in forward areas, allowing them to remain in the area longer to destroy, dislocate, and disintegrate the enemy and make the transition to the next engagement. Used by aviation brigades, the AAFARS supports a variety of missions when the ability to supply fuel by ground transport is not possible or when the urgency of the situation requires the rapid establishment of forward refueling capabilities.

The **Assault Hoseline System (AHS)** is a mobile, cross-country, bulk fuel distribution system consisting of a diesel engine, a 350-gallon-per-minute (GPM) pressure-regulated pump and 14,000 feet of 4-inch collapsible hose. The system includes a mechanical system for rapid deployment and recovery of the hose. The AHS has the capability to traverse all types of terrain and can be deployed over obstacles 200 feet in length. The AHS replaces the hose-line outfit on a one-for-one basis. Its rapid hose emplacement and retrieval capability enables force sustainment units to establish refueling positions quickly throughout the battlespace in support of theater and division units.

The **Fuel System Supply Point (FSSP)** consists of fabric storage tanks of various sizes, pumps, filter separators, fittings and hoses. The systems are containerized in ISO-compatible modules. The FSSP is the primary system for receiving, storing and issuing fuel within a theater of operation. The system configuration can be tailored to situational requirements. The FSSP has the flexibility to provide storage and delivery of fuel for a few thousand to hundreds of thousands of gallons. It is capable of rapid emplacement and recovery and can be transported to the operational site by a wide variety of transportation assets.

The **Tactical Water Purification System (TWPS)** is a complete water purification system that consists of feed water pump, hoses, reverse-osmosis water purification unit (ROWPU) elements, pre-filter, high-pressure pump, 60-kilowatt tactical quiet generator, 15,000-gallon water storage and distribution system, and control panel. It purifies up to 1,500 gallons per hour from freshwater sources and 1,200 gallons per hour from any other water source, including 60,000 total dissolved solids saltwater and nuclear, biological, chemical (NBC)-contaminated sources. It is mounted on an ISO-configured flatrack to be LHS-PLS compatible and is transported to a water source, then unloaded for operation. It can be loaded into a C-130 fixed-wing aircraft

for delivery to small airports or landing strips. The system supplies potable water in supporting division and brigade units during ground, amphibious, airmobile and airborne operations. The TWPS can provide water for civilian agencies during disaster relief, humanitarian and peace-keeping missions.

The **Lightweight Water Purifier (LWP)** is a complete water purification system that consists of feed water pump, hoses, ROWPU elements, pre-filter, high-pressure pump, 3-kilowatt tactical quiet generator, 1,000-gallon water storage and distribution system, and control panel. It purifies up to 125 gallons per hour from a freshwater source and 75 gallons per hour from salt-water and NBC-contaminated sources. It will be mounted on skids that can be lifted by four people and will normally be transported in a two-soldier cargo Humvee. The LWP can be transported by UH-60 helicopter or C-130 fixed-wing aircraft. The LWP provides potable water for a wide range of military operations and is deployed with small units, special operations forces and for use in temporary medical facilities.

The **Forward Area Water Point Supply System (FAWPSS)** is a portable, self-contained, potable water storage and distribution system. Its 3,000-gallon capacity can support personnel in forward areas of the battlefield, in arid regions, or other environments where potable water is needed.

The **Load Handling System Compatible, Water Tank Rack (Hippo)** represents the latest technology in bulk water distribution systems. The system is a mobile hardwall system providing potable water to theater and brigade units. The Hippo consists of a 2,000-gallon water tank rack with pump, filling stand, and a 70-foot hose reel with bulk suction and discharge hoses. It is fully functional mounted or dismounted and is transportable when full, partially full or empty. The Hippo prevents water from freezing at minus 25 degrees Fahrenheit and is compatible with the HEMTT-LHS and the PLS truck and trailer. The Hippo replaces the Semi-trailer Mounted Fabric Tank (SMFT). It provides the Army with the capability to receive, store and distribute potable water for cooking, drinking, showers and cleaning purposes.

The **Unit Water Pod System (Camel)** system will consist of an 800- to 900-gallon storage capacity tank, heater unit, government-furnished M1095 medium tactical vehicle (MTV) trailer, and contractor-developed components mounted to or carried



by the trailer. Under the Stryker brigade combat team (SBCT) concept, the Camel will provide a maneuvering company operating in a temperate environment more than two days of supply of water at a minimum sustaining consumption rate. The Camel is the unit's primary water distribution system and will be used by units at all echelons throughout the battlefield, replacing the M107, M149 and M1112 series 400-gallon water trailers (Water Buffalo).

Project Manager Tactical Vehicles

Offices within the **Project Manager Tactical Vehicles (PM TV)** include: Product Manager Light Tactical Vehicles (PM LTV), Product Manager Medium Tactical Vehicles (PM MTV), Product Manager Heavy Tactical Vehicles (PM HTV) and Product Manager Armored Security Vehicle (PM ASV).

The **Product Manager Light Tactical Vehicles (PM LTV)** is responsible for the Army's **High Mobility, Multipurpose Wheeled Vehicle (Humvee)** family of vehicles and **Light Tactical Trailers (LTT)**.

The versatile **Humvee** is the Army's most ubiquitous vehicle, providing a common, light tactical wheeled capability. The Humvee is the Army's (and other services') primary light wheeled vehicle for combat, combat support and combat service support missions. Humvees of all variants (but mostly up-armored versions) are currently deployed in support of operations in Iraq and Afghanistan.

The Humvee family of vehicles consists of multiple configurations built on a common chassis to support weapon systems, command-and-control systems and field ambulances, and to provide ammunition, troop and general cargo transport. It is currently equipped with a high-performance 6.5-liter turbo-charged diesel engine, electronic automatic transmission and four-wheel drive. It is air transportable and low-

velocity airdrop (LVAD) certified (except for the maxi ambulance variants). The Humvee can be equipped with a self-recovery hydraulic winch and can support payloads from 2,500 to 5,100 pounds (including crew and pintle loads), depending on the model.

Current production Humvees are built on the expanded capacity vehicle (ECV) chassis. The ECV variants were first introduced in 1995 as the M1113 Shelter Carrier, providing up to 5,100 pounds of payload, and the M1114 Up-armor Humvee (UAH), to provide crew protection from small-arms fire, overhead fragmentation from artillery and mortar shells, and underbody from antipersonnel/antitank mines. Current production variants of the Humvee family include the M1151A1 ECV Armament Carrier, M1152A1 ECV Cargo/Troop/Shelter Carrier, M1165A1 ECV Command and Control Carrier and the M1167 ECV TOW Missile Carrier vehicles. Like the M1114, the M1151 has a rooftop weapon station that can accommodate an M60 machine gun, M2 machine gun, Mk 19 grenade launcher or the M240/M249. Unlike most earlier models, these latest versions are also designed for the application of additional armor packages over their base protection levels, as the mission profile dictates.

Humvee new production for the Army is scheduled to end in late 2010, although production for the other services and foreign military sales customers will continue into 2011. Included in the Army production is a new M997A3 ambulance configuration, built on the ECV chassis, which is planned specifically for the Army National Guard to meet its homeland security and natural disaster relief missions. Because of the large numbers of Humvee variants found throughout the Army and the continued need for their service into the foreseeable future, plans are currently being

Heavy equipment transporter system (HETS)



considered for a competitively awarded recapitalization program, which will modernize and extend the useful life of the Army's Humvees.

The **Light Tactical Trailer (LTT)** is the Humvee trailer. It has been tested and approved (materiel released) for use in accordance with the Humvee mission profile. The LTT comes in three variants: M1101 (LTT-L), M1102 (LTT-H) and heavy chassis (LTT-HC).

The **Product Manager Medium Tactical Vehicles (PM MTV)** is responsible for the **Family of Medium Tactical Vehicles (FMTV)**, including Light Medium Tactical Vehicles (LMTV), Medium Tactical Vehicles, FMTV specialty vehicles and FMTV trailers.

The medium truck fleet has historically accounted for more than half of the Army's single-lift payload capacity. In redefining this vital fleet, Army planners took the opportunity to focus on a family approach; that is, to combine both 2.5-ton and 5-ton payload classes into a single acquisition program that would yield a logistically significant degree of component commonality across all medium fleet variants.

The Army's requirement for medium trucks is now more than 83,000 vehicles. These vehicles are required across the entire spectrum of combat, combat support and combat service support units. They must perform roles such as unit mobility, field feeding, water distribution, local and line-haul transportation, maintenance platforms, engineer operations, communication systems, medical support and towing artillery pieces. All medium vehicles must be capable of operating worldwide on primary and secondary roads as well as on trails, and cross-country in weather extremes from minus 50 to 120 degrees Fahrenheit.

The FMTV achieves extraordinary commonality by sharing many subsystems and components in the 4x4 (LMTV), 6x6 (MTV) and companion trailer configurations. The trucks share, for example, common engine assemblies (with different horsepower ratings), cooling systems, transmissions, intake and exhaust systems, front axles and suspension systems, tires and wheels, cab assembly, vehicle control gauges and much more. They differ primarily in number of axles (two versus three) and standard cargo bed size (12 feet versus 14 feet) to accommodate different payload ratings (2.5 tons versus 5 tons) and body styles.

The FMTV deviates from predecessor vehicle designs by having its tilt cab over the engine. This design approach contributes to the Army's goal of significantly improving the deployability of units, since a typical FMTV vehicle is some 40 inches shorter than the vehicle it replaces, requiring less space aboard deploying aircraft or surface shipping. This reduced length also contributes to a shorter turning radius and better offroad mobility. Offroad mobility is further enhanced by a standard central tire inflation system (CTIS) and state-of-the-art suspension.

LMTV systems include the M1078 2.5-ton standard cargo, M1079 2.5-ton van, M1080 2.5-ton chassis and M1081 2.5-ton standard cargo (LVAD) [low-velocity air drop capable]. MTV systems include the M1083 5-ton standard cargo, M1084 5-ton standard cargo with MHE, M1085 5-ton long cargo, M1086 5-ton long cargo with MHE (crane), M1088 5-ton tractor, M1089 5-ton wrecker, M1090 5-ton dump, M1092 5-ton chassis, M1093 5-ton standard cargo (LVAD), M1094 5-ton dump (LVAD) and M1096 5-ton long chassis.

FMTV special vehicles include the M1087 expandable van, XM1140 high-mobility artillery rocket system (HIMARS) carrier,

M1147 FMTV load handling system (LHS) trailer, M1148 FMTV LHS truck, M1157 10-ton dump and XM 1160 medium extended air defense system (MEADS) carrier. FMTV trailers include the M1082 trailer cargo 2.5 ton and M1095 trailer cargo 5 ton.

In addition, the office helps coordinate activities on M900 series 5-ton trucks as well as the M200 and M1061 special cargo trailers.

The **Product Manager Heavy Tactical Vehicles (PM HTV)** addresses programs including the Heavy Equipment Transporter System (HETS), Heavy Expanded Mobility Tactical Truck (HEMTT), Palletized Load System (PLS), flatracks, container handling and mission modules, M915 family of vehicles, fifth-wheel trailers and special trailers.

The M1070/M1000 **Heavy Equipment Transporter System (HETS)** deploys, transports, recovers and evacuates combat-loaded M1 tanks and other vehicles of similar weight to and from the battlefield. More than 600 have been deployed in support of overseas contingency operations (OCO). The M1070 tractor and M1000 semitrailer replaced the M911/M747 as the Army's latest model HETS. The M1070/M1000 HETS was developed to accommodate the increased weight of the M1 Abrams family of main battle tanks. The M1070 provides line-haul, local-haul and maintenance evacuation on and off the road during tactical operations worldwide.

Unlike previous HETS, the M1070 is designed to carry both the tank and its crew. Approximately 2,311 HETS have been fielded to date. The M1070A1 HET tractor has been updated with a new power train with 200 additional horsepower, single-speed transfer case for ease of operation, and numerous front suspension and drive system updates to increase the safe operat-

*Heavy expanded mobility
tactical truck (HEMTT)*

ing load capacity of the vehicle steering and handling systems. The M1070A1 is designed with an armored A-kit cab and B-kit armor.

The M1000 Semitrailer has been improved with a series of maintainability changes including self-adjusting brakes, central lubrication system at each axle, and a hydraulic system upgrade that reduces trailer raise/lower times and is expected to result in significant reliability growth. The new configuration HET, model M1070A1, and the enhanced M1000 semitrailer is in the process of production verification testing.

The **Heavy Expanded Mobility Tactical Truck (HEMTT)** is the workhorse of Army combat divisions. It is the key combat service support enabler for all brigade combat teams. The 11-ton, eight-wheel-drive family of vehicles is designed to operate in any climatic condition.

There are several basic configurations of the HEMTT-series trucks: the M977 cargo truck with light materiel-handling crane; M985 cargo truck with medium materiel-handling crane; the M978 2,500-gallon fuel tanker; the M983 tractor; the M984 wrecker; and the M1120 Load-Handling System (LHS) and the M983 Light Equipment Transporter (LET), used in Stryker recovery operations and movement of heavy engineer equipment. The HEMTT is used as a prime mover for the Patriot missile system, M7 forward repair system and tactical water purification system and as the chassis for the M1977 common bridge transporter, M1142 tactical firefighting truck and M1158 HEMTT-based water tender. The HEMTT is also compatible with the PLS trailer.

The HEMTT is augmented by the M989-A1 heavy expanded munitions ammunition trailer (HEMAT) in the transport of the Multiple-Launch Rocket System (MLRS) family of munitions (MFOM). The HEMAT can transport four MFOM pods, each weighing approximately 5,400 pounds. The offroad capability of the HEMTT and HEMAT combination can transport eight MFOM pods. The M989A1 HEMAT is also required to transport six standard ammunition pallets (single stacked), two 600-gallon fuel pods or two 500-gallon fuel bladders.

The HEMTT recap program will recap-



italize HEMTT vehicles to 0 miles/0 hours and to the A4 configuration, which consists of bumper-to-bumper recap of the entire truck with the following technology insertions: CAT 15 engine, electronic transmission, ABS and traction control, and larger cab. The HEMTT A4 is designed with an armored A-kit cab and B-kit armor.

The **Palletized Load System (PLS)** is the primary component of the maneuver-oriented ammunition distribution system. Roughly 1,000 PLS are being used in overseas contingency operations. It also performs local-haul, line-haul, unit resupply and other transportation missions in the tactical environment. In addition, it is used as the prime mover for the M7 Forward Repair System and various engineer mission modules (M4 Bituminous Distributor Module, M5 Concrete Mobile Mixer Module and M6 Dump Body Module). The PLS is also the host chassis for the dry support bridge launcher vehicle (M1975).

The PLS consists of a 16.5-ton payload tactical truck with a flatrack. It is a five-axle, 10-wheel drive vehicle with a 500-hp Detroit Diesel engine, an Allison automatic transmission and a CTIS. This combination provides a highly mobile system able to transport its payload in virtually any type of terrain or weather and maintain pace with the self-propelled artillery systems that it supports. The PLS comes in two mission-oriented configurations: the M1074 and the M1075. The M1074 is equipped with a variable reach materiel-handling crane (MHC) to support forward-deployed field artillery units. The M1075, without MHC, is used in conjunction with the M1076 trailer to support transportation line-haul missions.

The M1076 PLS trailer is a three-axle, wagon-style trailer with a 16.5-ton payload capacity that is equipped with a flatrack that is interchangeable between truck and trailer. The combination of truck and



Palletized load system (PLS)



trailer provides the combined payload capacity of 33 tons. The flatracks are lifted on and off the truck and trailer by a hydraulic-powered arm mounted on the truck, eliminating the need for additional materiel-handling equipment. The controls for the arm are located inside the cab, allowing the operator to load or unload the truck in less than one minute without leaving the cab of the truck. The trailer can be loaded or unloaded in less than five minutes using the remote-control arm.

The PLS can transport multiple cargo configurations by using a variety of flatracks. The M1077 and M1077A1 flatracks are sideless and used to transport pallets of ammunition and other classes of supplies. The M1 flatrack carries identical classes of supplies. It is ISO/CSC certified and suitable for intermodal transport, including transport on container ships. Ammunition can be loaded on the M1 at depots, transported via container ship to theater, picked up by the PLS truck and carried forward without using any materiel-handling equipment. The walls fold inward when empty to facilitate stacking for retrograde. The M3/M3A1 container roll-in/roll-out platform is a flatrack that fits inside a 20-foot ISO container. The container-handling unit is a kit installed on the PLS that allows the direct load, transport and unload of 20-foot ISO containers without an external flatrack.

The PLS vehicle is in the process of upgrade to incorporate a modern powertrain with increased horsepower, independent suspension and an updated cab that is common with the latest HEMTT vehicles. The updated PLS vehicles, model suffix A1, have completed production verification testing and are preparing to enter production as new production and recapitalization programs. The PLS A1 is long-term protection strategy (LTPS) compliant with A-Kit cab and B-kit armor.

M915 Family of Vehicles

The Army's **M915-Series Line-Haul Tractors** operate on highways and secondary roads to transport bulk supplies and fuel to U.S. forces. The Army's line-haul fleet consists of the current M915 family of vehicles (FOV) including the M915A5, M916A3 and M917A2 vehicles. The M915A5 is based upon Freightliner's commercial Western Star tractors and incorporates transport industry technologies for safety, fuel efficiency and low operating costs per mile.

The M915-series fleet of vehicles is found primarily in active and reserve component transportation units that are responsible for the rapid, efficient transport of bulk supplies from ocean ports to division support areas within a theater of operation. They are used primarily to transport the M871 semitrailer (flatbed, 22.5 tons), M872 semitrailer (flatbed, 34 tons), M967/M969 semitrailer (5,000-gallon tanker), M1062 semitrailer (7,500-gallon tanker), and M1062A1 semitrailer (9,000-gallon tanker). The M915A5 is the latest series and has a maximum gross combined vehicle weight of 120,000 pounds when operating with the M872A4 semitrailer. Only the M915A5 variant is in production and fieldings are scheduled for FY 2010.

The M915A5 includes the improvements over the legacy M915A3 with suspension upgrades for increased weight capability for B-kits and an extended cab that is 10 inches wider and 34 inches longer than the M915A3 crew cab. The M915A5 is designed with an armored A-kit cab and B-kit armor.

The **Product Manager Armored Security Vehicle (PM ASV)** has the mission to develop, produce, field and sustain the **M1117 Armored Security Vehicle** to an expeditionary force. The M1117 ASV is a turreted, armored, all-wheel drive vehicle that supports military police missions—

such as rear area security, law and order operations, battlefield circulation and enemy prisoner of war operations—over the entire spectrum of war and operations other than war as well as convoy protection missions.

The ASV provides protection to the crew compartment, gunner's station and the ammunition storage area. The turret is fully enclosed, with both an MK-19 40 mm grenade machine gun and a .50-caliber machine gun, and a multisalvo smoke grenade launcher. The ASV provides ballistic, blast and overhead protection for its four-person crew. The ASV, with a payload of 3,600 pounds, 400-mile-plus range, and top speed of nearly 70 miles per hour, ensures both lethality and survivability to the warfighter.

In addition, on the ASV chassis, the U.S. Army is fielding the M1200 Armored Knight to provide improved survivability over the current M707 Knight (Humvee-based Knight). Used by field artillery combat observation lasing teams (COLTs) in both Heavy and Infantry brigade combat teams, the Armored Knight will combine the proven ASV with the M707 Knight Mission Equipment Package (MEP).

PM Joint Combat Support Systems

The office of **Project Manager Joint Combat Support Systems (PM JCSS)** includes the Product Manager Joint Light Tactical Vehicles (PM JLTV); Product Manager Sets, Kits, Outfits and Tools (PM SKOT); Product Director Test, Measurement and Diagnostic Equipment (PD TMDE); and Product Director Horizontal Technology Insertion (PD HTI).

Product Manager Joint Light Tactical Vehicles (PM JLTV) is responsible for the Army's participation in the **Joint Light Tactical Vehicle (JLTV)**. The JLTV family of vehicles and companion trailers is a central component of the Army and Marine Corps' tactical wheeled vehicle strategy, balancing long-term warfighter needs of protection, performance and payload in a transportable and expeditionary platform designed for global operations. The joint protection requirements found within the JLTV specifications are designed to meet our warfighters' current and future survivability needs, packaged in a mobile, transportable and expeditionary solution.

The services are currently executing the technology development (TD) phase in which they will demonstrate the integration of mature technologies as a complete system, providing an assessment of the technical and performance risks relevant to entering the engineering and manufac-

turing development (EMD) phase and establishing an achievable set of requirements for the JLTV program.

JLTV features a design that supports mobility, reliability and maintainability within weight limits to ensure tactical transport to and from the battlefield. JLTV will use scalable armor solutions to meet requirements for added protection while maintaining load carrying capacity. Commonality of components, maintenance procedures, and training between all variants will minimize total ownership costs.

In May 2010, the Army and Marine Corps took delivery of TD phase vehicles, seven from each TD phase contractor, marking the beginning of a 12-month test-and-evaluation effort at Aberdeen Proving Ground, Md., and Yuma Proving Ground, Ariz., wherein armor coupons, ballistic hulls, vehicles and trailers will execute a series of performance and reliability testing that will include assessments from the joint warfighters.

Vehicles will undergo performance and ballistic testing at Aberdeen and reliability and maintainability (RAM) testing at Yuma. Once performance testing is complete at Aberdeen, the vehicles will be subjected to a limited user test, with soldiers and marines running the vehicles through a series of vignettes soliciting feedback from the user jury.

Australian vehicles (delivered during June and July 2010) will concurrently undergo testing with the U.S. vehicles, enhancing global interoperability between the U.S. and Australian forces. The Australian vehicles feature righthand operation; commonality with the lefthand-operation vehicles is around 95 percent for all three TD contractors. Different design approaches among the three TD contractors have shown no significant weight increase for the righthand-operation design.

JLTV TD contractors will also deliver one ballistic hull and vehicle prototype with enhanced protection, called JLTV-A Enhanced Protection (EP), during the TD phase. This vehicle modification will increase the inherent protection requirements originally required for the JLTV Category A General Purpose vehicle by improving its side and underbody protection capabilities. The government will take delivery of the JLTV-A (EP) vehicle in October 2010.

Following the TD phase, the services intend to conduct another full and open competition for the EMD phase, with a Milestone B decision planned for the end of FY 2011.



Product Manager Sets, Kits, Outfits and Tools (PM SKOT) responsibilities include diving equipment, sets, kits and outfits (stand-alone, shelter-mounted and mobile), and shop sets/support equipment.

Product Director Test, Measurement and Diagnostic Equipment (PD TMDE) is responsible for calibration sets (CALSETS), Integrated Family of Test Equipment (IFTE), At-Platform Automatic Test Systems (APATS) and Off-Platform Automatic Test Sets (OPATS), and test equipment modernization (TEMOD).

The **Product Director Horizontal Technology Insertion (PD HTI)** is responsible for the Army's **Expedited Modernization Initiative Procedure (EMIP)**. As a "process" rather than a "product," EMIP represents a multiphased and continuous market research process. EMIP is primarily intended to suggest improvements to the current and future fleet of CS&CSS vehicles and other systems. The process seeks to identify industry's investments in proven, advanced, commercial technologies at the component and subsystem levels, at a technology readiness level 7 or better, with the goal of EMIP to educate government representatives about these technologies. Information developed as part of this market research will be shared within the PEO CS&CSS, other program executive offices and other services.

PM Mine Resistant Ambush Protected

The **Project Manager Mine Resistant Ambush Protected (PM MRAP)** vehicles encompasses thousands of highly survivable MRAP vehicles under several product managers, including Vehicle Systems, MRAP All-Terrain Vehicles (M-ATV), and Assured Mobility Systems, frequently referred to as route-clearance vehicles (RCVs).

MRAP vehicles are armored vehicles with a blast-resistant V-bottomed underbody designed to protect the crew from mine blasts, fragmentary and direct-fire

weapons. MRAP features four vehicle categories: Category I for urban combat missions; Category II for convoy escort, troop transport, explosive ordnance disposal and ambulance missions; Category III for clearing mines and improvised explosive devices (IEDs); and the M-ATV, a smaller, lighter-weight platform. The MRAP Vehicle Program is the Department of Defense's highest priority defense acquisition program.

The **Product Manager MRAP Vehicle Systems** was responsible for the initial acquisition of the MRAP fleet of vehicles consisting of 16 discernable variants from five different commercial manufacturers. Originally envisioned as a few thousand vehicles to assist with the growing threat of IEDs, the fleet immediately demonstrated significantly higher survivability than other vehicles fielded. Follow-on acquisition based on MRAP success now supports all five services and Special Operations Command. The current MRAP fleet has grown to approximately 17,000 vehicles. The smaller Category I vehicles in the 17- to 25-ton range can carry a crew of up to eight, whereas the larger Category II vehicles weigh as much as 40 tons and protect a crew of up to 10. MRAP vehicles can be found in a multitude of missions and are the wheeled vehicle of choice for the most dangerous combat encounters in current operations.

Several other features make the MRAP well-suited for its mission. As mentioned, they provide significant protection from small arms from all angles and are especially adept at mitigating blast effects—much more so than lighter vehicles. Most also have the ability to carry extra protection for other types of specialized threats if the mission dictates. All variants come complete with a communications suite, a gunner's turret and a chassis capable of much higher mobility than other vehicles of similar weight. Overall, the MRAP family of vehicles provides incredible flexibility and capability to the warfighter.

While already considerably mobile, many

Category I vehicles have been scheduled to receive suspension upgrades, including a fully independent suspension system (ISS) to replace the solid-axle system provided at the time of initial purchase. Other enhancements planned for the fleet include the integration of a remote weapons system, CROWS, as well as TOW/ITAS, interior and exterior survivability enhancements, ride and comfort upgrades, and lighting packages. Some examples of **Category I** vehicles are: the **MaxxPro Dash**, **MaxxPro Ambulance**, **Cougar A1**, **RG-31 A2** and **Caiman**.

Vehicles in **Category II** also provide a host of special capabilities. They include the **RG-33L**, **Cougar**, **RG-33 Ambulance**, and **RG-33 with add-on armor**. Although somewhat less mobile over uneven terrain, many of these vehicles will also receive suspension upgrades to enhance ride quality. Other improvements include C⁴I, government-furnished equipment and weapons suites. Category II vehicles make up approximately a third of the fleet and will continue to serve in all theaters in highly protected troop transport and warfighting roles.

The MRAP **Buffalo** stands alone as the one variant in **Category III**. It is physically larger than any other variant and weighs just as much as other up-armored variants. Purpose-built for roadside bomb detection and route clearance, the Buffalo uses a highly maneuverable articulating arm to investigate debris or other roadside materials, providing a safe stand-off for soldiers. The hull structure and other interior appointments all enhance the survivability of the vehicle.

The **Product Manager MRAP All-Ter-**

rain Vehicle (PM M-ATV) manages the newest member of the MRAP family. The M-ATV was designed to provide MRAP levels of protection with offroad maneuverability in Afghanistan. The lighter weight and smaller size also lend the vehicle to somewhat easier transportability. It can carry up to five personnel—four plus a gunner. The M-ATV is used in small unit combat operations in highly restricted rural, mountainous and urban environments. Missions include mounted patrols, reconnaissance, security, convoy protection, communications, command and control, and combat service support.

Product Manager Assured Mobility Systems (PM AMS) is responsible for managing the entire life cycle of development, acquisition and sustainment of route-clearance equipment for the Army. This mission involves equipping the forward-deployed route-clearance teams and explosive ordnance disposal teams operating in both Iraq and Afghanistan with the capability to detect, identify, interrogate and neutralize improvised explosive devices (IEDs). PM AMS vehicles are combined at the discretion of the field commander to create the “route-clearance package” to support route-clearance teams. The future route-clearance company configuration of a route-clearance team will consist of a Buffalo, a vehicle-mounted mine detection set consisting of two Husky vehicles and two medium mine protected vehicles (MMPV), used for command and control.

The AMS Family of Vehicles includes the **Buffalo**, **Panther**, **RG-31 MK5E**, **VMMD** and **JERRV**.

The **Buffalo Mine Protected Clearance Vehicle (MPCV)** is a six-wheeled, mine-protected, armored personnel carrier with a one-piece body designed to provide survivability for a crew of six. The front, side and rear armor provide small-arms protection, while its V-shaped hull deflects blasts from mines/IEDs. The Buffalo MPCV has an articulated hydraulic arm mounted on the front bumper and can be used to investigate suspected mine/IED locations. The Buffalo MPCV is used by engineer units during area and route-clearance missions.

The **Vehicle Mounted Mine Detection (VMMD)** system consists of two Husky vehicles operating in tandem to detect buried explosives. Each Husky has a detection array mounted under the vehicle, that is deployed during route-clearance operations. If a suspected explosive is detected, the system marks the spot on the ground for follow-up interrogation by either the Husky, Buffalo or RG-31 fitted with an interrogation arm.

The **RG-31 MK5E** vehicle is designed to safely transport personnel or equipment in areas where mines and IEDs may be deployed due to the capabilities of the armored crew capsule. In addition, the hull of the vehicle is designed utilizing a V-shape, which serves to provide mine blast protection. The RG-31 MK5E is the interim solution for the Panther.

The **Panther** is a 6x6 wheeled vehicle designed to provide enhanced crew protection and system survivability with add-on armor protection, an automatic fire extinguishing system, and a chemical, biological, radiological, nuclear or high-yield explosive overpressure system. There are three variants of the Panther: the XM1226 Engineer (holds four combat engineers, one robot and 180 cubic feet of storage), the XM1227 EOD (holds four explosive ordnance specialists, two robots and 197 cubic feet of storage) and the XM1229 Prophet (seats six soldiers for intelligence, surveillance, electronic warfare and target acquisition operations). The XM1226 provides soldiers the ability to transport, charge, configure and deploy the robot without compromising force protection. The Panther has a rear hydraulic ramp for crew and robot ingress/egress, and the XM1226 has a bulkhead door separating the crew compartment from the cargo area.

The **Joint EOD Rapid Response Vehicle (JERRV)** is a joint service, mine-protected vehicle with a primary role of supporting first responders such as explosive ordnance disposal specialists in neutralizing improvised explosive devices, mines and other ordnance.



Buffalo mine protected clearance vehicle (MPCV)