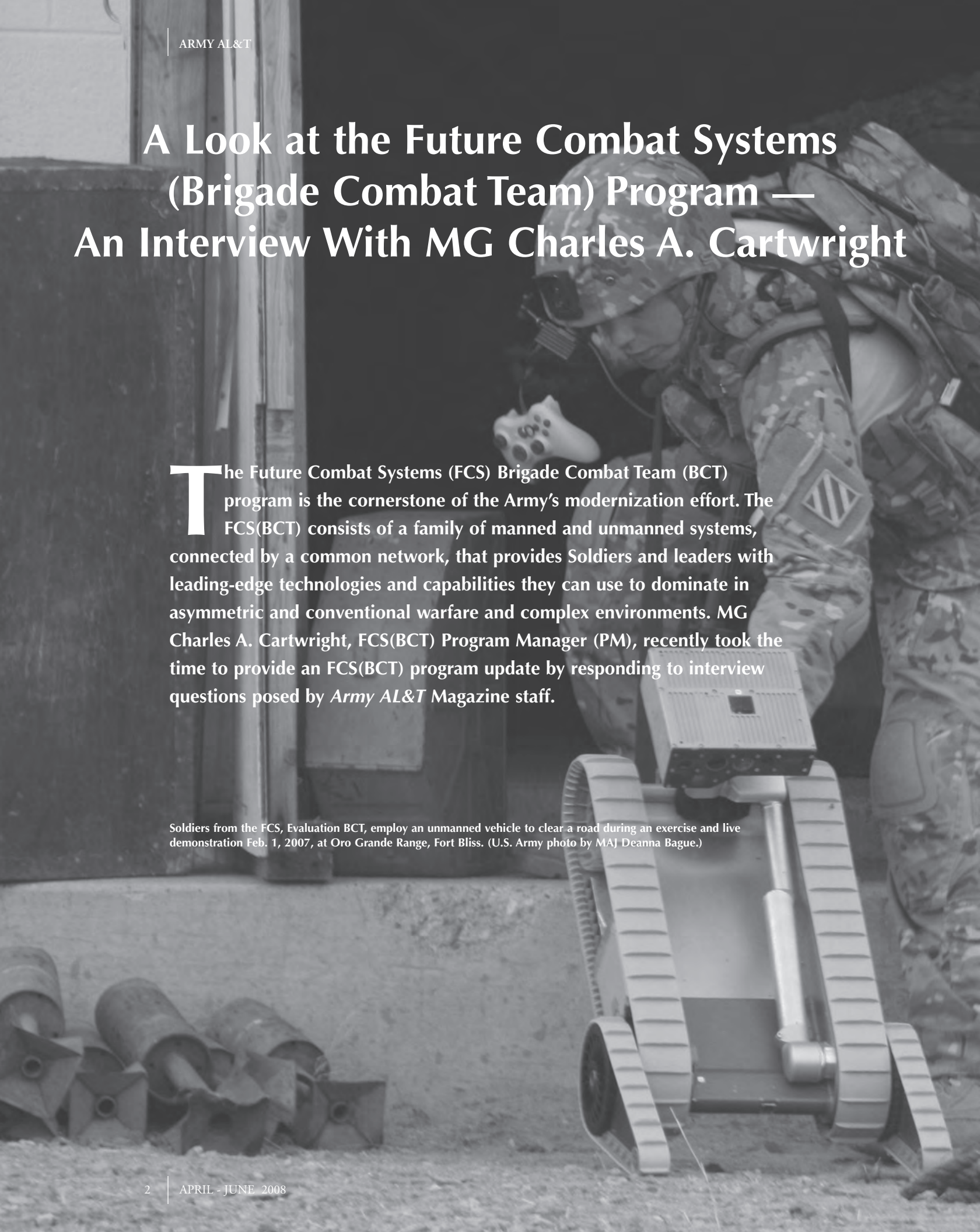
A Look at the Future Combat Systems (Brigade Combat Team) Program — An Interview With MG Charles A. Cartwright

The Future Combat Systems (FCS) Brigade Combat Team (BCT) program is the cornerstone of the Army's modernization effort. The FCS(BCT) consists of a family of manned and unmanned systems, connected by a common network, that provides Soldiers and leaders with leading-edge technologies and capabilities they can use to dominate in asymmetric and conventional warfare and complex environments. MG Charles A. Cartwright, FCS(BCT) Program Manager (PM), recently took the time to provide an FCS(BCT) program update by responding to interview questions posed by *Army AL&T* Magazine staff.



Soldiers from the FCS, Evaluation BCT, employ an unmanned vehicle to clear a road during an exercise and live demonstration Feb. 1, 2007, at Oro Grande Range, Fort Bliss. (U.S. Army photo by MAJ Deanna Bague.)

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
JUN 2008		**00-00-2008 to 00-00-2008**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
A Look at the Future Combat Systems (Brigade Combat Team) Program - An Interview with MG Charles A. Cartwright	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **Army Acquisition, Logistics & Technology (AT&L),9900 Belvoir Road Suite 101,Fort Belvoir,VA,22060-5567**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**Same as Report (SAR)**	**12**	

AL&T: How is the FCS(BCT) program using the Army Evaluation Task Force (AETF) at Fort Bliss, TX, and Soldiers in testing, evaluation and program development? Will this become the new way of doing business for all of our PMs, program executive officers (PEOs) and project/product managers?

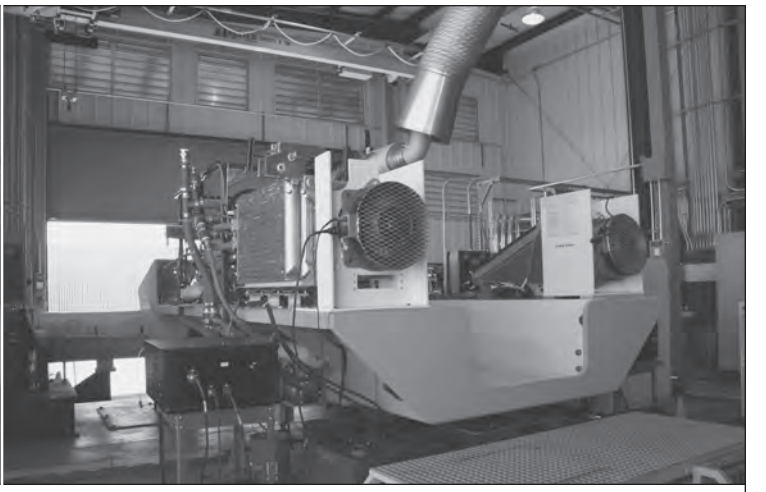
Cartwright: This is really a new way of doing business, as the Army has made a commitment to have a full brigade dedicated to providing feedback on FCS developmental hardware. This is an important step in bringing the end user into the design and developmental phase to ensure an end product that Soldiers can use at fielding. The AETF, a Current Force Heavy Brigade Combat Team (HBCT) that is equipped with a mix of combat and tactical vehicles in the Army inventory, evaluates PM FCS(BCT) spin out (SO) and core technologies/capabilities and provides feedback to the PM FCS(BCT) and platform PMs.

> The FCS(BCT) network represents the greatest advancement in tactical C4ISR that the Army has ever pursued.

The AETF assists the U.S. Army Training and Doctrine Command [TRADOC] in developing and refining doctrine, organization, training, materiel, leader development, personnel and facility (DOTML-PF) products to support the SO and the FCS(BCT) core program for the Current Force and the FCS(BCT). The AETF activated in FY07 with 971 Soldiers authorized to support SO and core training and test requirements in FY08 and FY09. Army leadership has approved a modest growth of AETF to support future SO technologies in FY10. The Army has not made any decisions about using AETF-type units for other PMs or PEOs, but it has decided to expand the AETF's role to cover Army modernization. In this new role, they will help test and evaluate technologies such as Warfighter Information Network-Tactical (WIN-T).

In the next year, the AETF will participate in the following:

- **Technical Field Test.** An event led by the Lead Systems Integrator (LSI) — Boeing Co. and Science Applications International Corp. (SAIC) — to gain technical data on SO 1 systems.
- **Force Development Test and Evaluation.** A TRADOC-led event to develop DOTML-PF products.
- **SO 1 Limited User Test.** An Operational Test Command event to gain data that will support a Milestone [MS] C decision.
- **Integrated Materiel Test 1.** An LSI-led event to support core software development.



Termed "Hot Buck," the MGV Hybrid Propulsion Test Bed (shown here) at the U.S. Army Tank Automotive Research, Development and Engineering Center (TARDEC) Power and Energy Systems Integration Laboratory (SIL) in Santa Clara, CA, is a one-of-a-kind virtual FCS test bed platform for full-load testing. The Hybrid Propulsion Engine improves mobility, reduces fuel consumption and enables use of future weapon technologies. (Photos courtesy of BAE Systems.)

In the coming years, the AETF will continue to support similar events for both SO and core FCS(BCT) program technologies.

AL&T: What, specifically, is the AETF doing and how will you integrate the feedback they provide into FCS weapon platforms?

Cartwright: The AETF's feedback will be used to improve the full range of DOTML-PF products. Some examples of the products the AETF will affect/improve are as follows:

- Man-machine interfaces.
- Platform designs and software designs/interfaces.
- Interface control documents, doctrinal and technical manuals, unit standard operating procedures.
- Basis of issue plans and fielding plans.
- Unit designs and organizations.
- System requirement documents.
- Parts storage levels.
- Maintenance allocation tables and maintenance task validation.
- Simulation designs and uses.
- Training aid types/designs and special tool types/designs.
- Embedded training.

AL&T: What is the FCS(BCT) program's overall status in areas such as unmanned aerial vehicles (UAVs), unmanned/manned ground vehicles (UGVs/MGVs), sensors and network?

Cartwright: We have made significant strides in hardware, software and network development to the point of conducting field demonstrations of FCS(BCT) systems and their capabilities. There are now more than 68 ongoing FCS(BCT) tests and evaluations. We have conducted numerous training and experimental activities with AETF Soldiers using early prototypes of our Class I UAV, Small UGV [SUGV], Non-Line-of-Sight Launch System [NLOS-LS] (XM 501) and Unattended Ground Sensors [UGS], both Urban [U] and Tactical [T], (AN/GSR-9 & 10). We continue with test firings of our NLOS-Cannon [NLOS-C] (XM 1203), NLOS-Mortar (XM 1204) and Mounted Combat System [MCS] (XM 1202), as well as demonstrating the capabilities of the end-to-end hybrid electric drive that will be used to maneuver these vehicles. We are in the midst of conducting our field test to support the SO program to the Current Force. These activities are a prelude to a series of design reviews, including an intensive network design review, to take place throughout this calendar year. These reviews will evaluate our FCS (BCT) designs and determine our readiness for proceeding into critical design activities. We already held one such event for the Multifunctional Utility/Logistics and Equipment (MULE) (XM 1217), and we are applying those lessons learned to subsequent reviews that will take place over the next 8-12 months.

> The FCS(BCT) program evaluates its needs through a robust SoS requirement process, aligns interfaces and requirements with the complementary communication programs and performs risk management.

AL&T: Is the program maintaining cost, schedule and performance that have been anticipated throughout the System Development and Demonstration (SDD) phase?

Cartwright: The program continues to effectively use our Earned Value Management System to monitor and manage expected cost and schedule performance.

AL&T: What are the major challenges with bringing such divergent systems together in a horizontally integrated network?

Cartwright: Integration, in simplest terms, is the major challenge facing any program (FCS included) that goes beyond the focus of singular platform or subsystem development. In the context of the FCS(BCT) program, integration goes beyond our ability to ensure that the FCS(BCT) core systems can interface with each other, with Current Force systems and with Joint, Interagency and Multinational Force systems. Integration involves a shared understanding of responsibilities for data transmission and utilization, and how a system-of-systems [SoS] comes together during a conflict to execute the assigned mission. The FCS(BCT) program embraces this concept and uses our system engineering processes and design reviews at the platform and network levels to clearly demonstrate our understanding of how each of our core systems must integrate as an FCS(BCT) member before we approve critical design activities. It is that context — bringing network performance in as part of platform reviews and culminating in the SoS Preliminary Design Review — and focus that strengthens our belief in the ability to resolve the complex integration issues associated with network and SoS development.

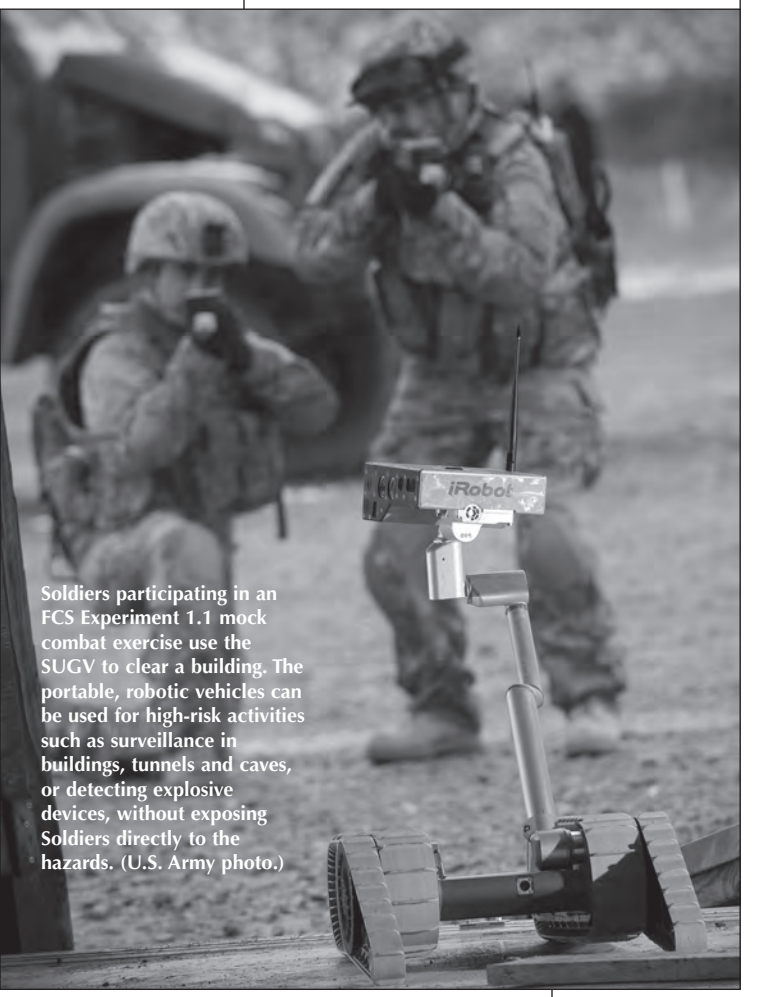
AL&T: What is the status of the SoS network development? How is it being developed?

Cartwright: The FCS(BCT) network represents the greatest advancement in tactical C4ISR [command, control, communications, computers, intelligence, surveillance and reconnaissance] that the Army has ever pursued. The network, from its initial conceptual stages, was envisioned to provide fully integrated, distributed information management. The SoS network development is on track. The first increments of capability are currently under evaluation in Integrated Mission Test 1 and in the field at Fort Bliss and White Sands Missile Range [WSMR], NM, for SO 1. The FCS(BCT) network will have demonstrated integrated battle command [BC] capabilities that provide the underpinnings for a unified BC for the Army. The dynamic, self-healing communications have been synchronized with the Joint Tactical Radio Systems (JTRS) and WIN-T programs. The FCS(BCT) program evaluates its needs through a robust SoS requirement process, aligns interfaces and requirements with the complementary communication programs and performs risk management.

AL&T: Why is the Army using a phased-development approach in building FCS? How will it be used to increase Soldier survivability, sustainability, maneuverability and lethality on the modern battlefield?

Cartwright: FCS(BCT) phased development serves two primary purposes: alignment of software/hardware development and focus of SoS capability maturation over time. We have developed a software build strategy based on phased capability to prioritize development around key BC mission execution and network requirements and have linked that phasing with our hardware development and demonstration schedules to establish a "design, test, build" paradigm. Phased development maintains focus on the SoS by requiring each of our individual platforms/systems to demonstrate its ability to integrate with each other and with Current Force systems as a prelude to final designs. Our management execution strategy does not allow for the final design approval of an individual system without understanding its effectiveness as a member of the SoS.

In phased development, we use multiple means (simulation, analysis, experimentation and test) to determine SoS effectiveness against our stated key performance parameters (KPPs), which include the capabilities mentioned in the question. Our use of phased development requires us to analyze continuously



Soldiers participating in an FCS Experiment 1.1 mock combat exercise use the SUGV to clear a building. The portable, robotic vehicles can be used for high-risk activities such as surveillance in buildings, tunnels and caves, or detecting explosive devices, without exposing Soldiers directly to the hazards. (U.S. Army photo.)

the FCS(BCT) systems and their capabilities to help optimize our approach to meeting the KPPs and gives us the ability to influence both platform and network designs at the earliest stages of development before such changes become cost-prohibitive. The force effectiveness models, simulations in use at the FCS(BCT) program SoS Integration Laboratory (SoSIL) and the other SILs for Integrated Mission Tests, as well as our participation in experimentation exercises, all provide the early feedback on KPP performance to promote continuous improvement. We have structured these test objectives around SoS effectiveness and the KPPs, so we're confident that these events, the feedback they provide and the resulting design changes we make will all contribute to increased Soldier effectiveness.

A Soldier performs an SUGV demonstration at WSMR in January 2008. (U.S. Army photo courtesy of FCS(BCT).)

AL&T: FCS is developing a family of new MGVs. What is the MGV program's development status?

Cartwright: The MGV team is finalizing its preliminary design, which will be completed by January 2009. The MGV design is being developed to achieve the optimal balance of capabilities to ensure that its lethality, survivability, sustainability and force effectiveness attributes are equal to or better than those of Current Force vehicles.

> Phased development maintains focus on the SoS by requiring each of our individual platforms/systems to demonstrate its ability to integrate with each other and with Current Force systems as a prelude to final designs.

Combat vehicle design has always been a delicate balancing act of these competing priorities. Striking the right balance between these constants is always a challenge. Because the FCS(BCT) is a radical paradigm shift in the concept of how we fight, the vehicle systems we design to meet the FCS(BCT) program requirements will not always be traditional in their design. For example, the MGV is designed for facing the most likely threat and incorporates a flexible system to meet the threat that is anticipated but not known. This is not another 70-ton Abrams vehicle. We cannot count on the thickness of our armor to protect troops as we have in the past. We must develop systems that will destroy targets beyond-line-of-sight (BLOS) as the norm and line-of-sight (LOS) as the exception. Our mission is to balance lighter and faster with improved survivability. As we mature advanced armor solutions, we are developing and planning for upgrades and changes to our armor solutions as threats change. These capabilities, coupled with an Active Protection System (APS) that defeats incoming threats, provide MGVs with greater survivability than that found in Current Force systems.

AL&T: What other exciting testing is ongoing for MGV variants?

Cartwright: The NLOS-C (XM 1203) System Demonstrator fired more than 2,000 rounds from 2005 to 2007 and the NLOS-C (XM 1203) Firing Platform has fired more than 1,600 of the scheduled 5,000 rounds since its October 2006 delivery to Yuma Proving Ground (YPG), AZ. The XM 1203 Firing Platform's primary objectives are to provide risk reduction for cannon and mount development, to advance safety certification and manned rating for 2008 prototype deliveries, and to provide reliability growth for weapon module components. Additionally, the MCS (XM 1202) 120 (XM360) Primary Weapon Assembly has fired more than 860 rounds to date. The gun is being developed to provide the performance of the current 120mm M256 cannon on the M1A2 in a lighter weight, more compact design. This assembly will enable the XM 1202 to fire

Soldiers prepare to unload the Container Launch Units (CLUs) for the NLOS-LS demonstration held at Fort Bliss in January 2008. (U.S. Army photo courtesy of FCS(BCT).)

120mm main gun ammunition from a vehicle weighing roughly half the Abram's weight. Successful testing and integration are key factors that will enable the XM 1202 to conduct full-spectrum operations and to "deliver precision fires at a rapid rate to destroy multiple targets at standoff ranges."

AL&T: Many new developments are being employed in robotic research for UGVs. What other platforms are being developed in addition to the MULE vehicle?

Cartwright: The FCS(BCT) UGV team has been one of the first in the FCS(BCT) program to move from Microsoft® PowerPoint to actual hardware. The SUGV (XM 1216) is participating in experiments with the AETF this summer. The MULE Engineering Evaluation Unit [EEU] has conducted numerous demonstrations and is preparing for Critical Design Review [CDR]. Progress with the Autonomous Navigation Systems [ANS] is progressing as scheduled. The ANS has integrated prototype systems on the MULE EEU, Stryker and Light Medium Tactical Vehicle (LMTV) truck in an effort called the Robotic Convoy Experiment and on a TARDEC platform called Crusher. We are excited about the progress the FCS(BCT) program has made to date and look forward to greater accomplishments as we move to CDR in FY09.

SUGV (XM 1216) is a small, lightweight (30 pounds) robot that will support the dismounted Soldier in urban environments to clear buildings, tunnels, caves or sewers. The Army has many small prototype systems in Iraq today that demonstrate the need for the SUGV. The FCS(BCT) SUGV (XM 1216) capitalizes on that success and provides the lightest possible robot for dismounted Soldiers. As the platform weight decreases, the mobility must stay the same. The lightweight XM 1216 can still take on steps found in most buildings, operate in 6 inches of water, tackle tough terrain and inclines, and operate in various climates.

The ANS functions as the "brains" of the robotic platform for UGVs such as the MULE (XM 1217). The ANS is a complex integration of hardware and

Soldiers set up the CLUs for the NLOS-LS demonstration at Fort Bliss in January 2008. The NLOS-LS will provide warfighters with a reliable, sustainable and dependable system. (U.S. Army photo.)

software that interprets what is in front of the XM 1217 and provides a safe and efficient path for it, taking speed and operational tempo into consideration. Ongoing ANS Laser Radar, Laser Detection and Ranging, data processing integration, and testing and evaluation work were successful in 2007 and will continue at a higher level in 2008.

The three MULE variants offer interesting insights into the different situations that UGVs will encounter. The MULE-Transport (XM 1217) must follow the dismounted Soldier over complex terrain at a safe distance and react to the Soldier's movement. The Armed Robotic Vehicle-Assault (Light) (ARV-A(L)) (XM 1219) must be capable of delivering lethal effects on the enemy with its M240 machine gun or Javelin missiles. The Soldier's safety is paramount when considering that the ARV-A(L) (XM 1219) represents the first UGV to deploy firepower against an enemy by the U.S. Army. The MULE-Countermine [MULE-C] (XM 1218) demonstrates the teaming of two UGVs to clear a path of anti-tank mines by detecting, marking or neutralizing the mine and marking the clear path. The two MULE-C (XM 1218) systems must be in constant sync to ensure that the path is cleared.

AL&T: The NLOS-C has fared extremely well in testing over the past 2 years. What can you tell us about this new cannon system? How will NLOS-C technology revolutionize cannon and mortar fire in the close fight?

Cartwright: The NLOS-C (XM 1203) firing platform was delivered to YPG in October 2006 and fired its first round on Oct. 23, 2006. The firing platform consists of a band-tracked surrogate chassis with a threshold mission module that has an automated ammunition handling system, automatic gun pointing and an XM324, 38 caliber, zone 4, 155mm cannon. The NLOS-C firing platform's primary objectives are to provide risk reduction for cannon and mount development, to advance safety certification and manned rating for 2008 prototype deliveries, and to provide reliability growth for weapon module components. To date, 1,659 rounds have been fired.

> Our use of phased development requires us to analyze continuously the FCS(BCT) systems and their capabilities to help optimize our approach to meeting the KPPs and gives us the ability to influence both platform and network designs at the earliest stages of development before such changes become cost-prohibitive.

AL&T: What have been some of the biggest challenges with this system?

Cartwright: One of the system's biggest challenges was meeting the 27- to 30-ton weight requirement for all of the MGVs; this allows multiple MGVs to be transported on a single C-17 aircraft.

AL&T: What are some of the most significant technological breakthroughs associated with NLOS-C?

Cartwright: Perhaps one of the most important breakthroughs is the advancement of hybrid electric propulsion for our MGV fleet. This hybrid electric system is being integrated onto the NLOS-C prototype to enable a lighter-weight, higher-efficiency propulsion system. The system can conserve fuel through the use of regenerative braking to recover electrical power while the batteries provide for peak performance when required.

Another NLOS-C key component is its automated ammunition handling and firing system. This system takes the Soldier out of the loop when firing. The task of manually handling projectiles and setting fuzes, powder charges and rope lanyards to fire each round is a thing of the past. The laser igniter system enables automated high rates of fire while eliminating the sustainment burden of expendable primers and provides increased reliability.

Additionally, the Automated Cannon Cooling System also enables high rates

of fire by eliminating the Soldier task of cannon swabbing while providing tube cooling to maintain rate of fire. The combination of these components allows an efficient, faster and less labor-intensive system.

AL&T: How will NLOS-C technology revolutionize cannon and mortar fire in the close fight?

Cartwright: The NLOS-C (XM 1203) will be able to improve its accuracy round by round and mission by mission, respond rapidly to calls for fire with its networking and high rate of fire, and provide a variety of effects on demand. It will be able to move rapidly, stop quickly and deliver lethal first round fire for effects on target in record time. Last, it allows the commander the ability to service more targets accurately, with fewer systems, and with rapid responsiveness.

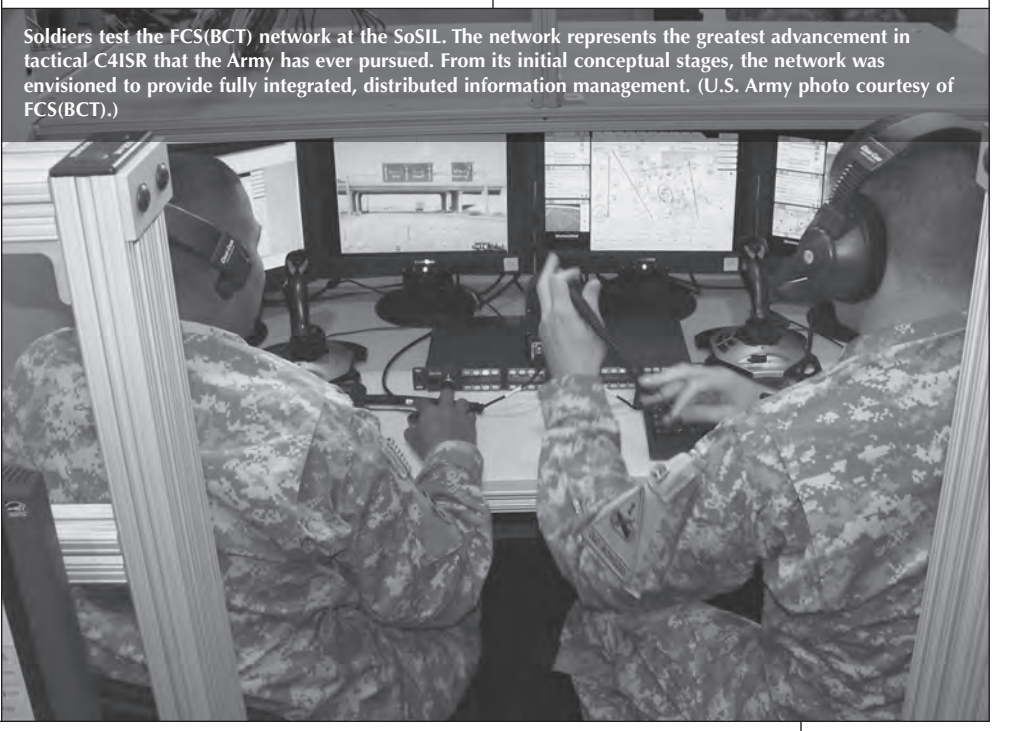
AL&T: How will the MCS and XM360 Mid-Range Munition (MRM) change the face of armored warfare for U.S. forces? What are the system's most awesome capabilities and what are some of the key components that will make it an invaluable weapon system to the HBCT?

Cartwright: The MCS (XM 1202) with the MRM (XM 1111) will revolutionize the way the FCS(BCT) and the U.S. Army conduct traditional "tank-on-tank" engagements. The density of manned and unmanned sensors in the FCS(BCT) will enable the formation to "see first" and detect enemy armored vehicles while out of contact. The combination of FCS(BCT) Battle Command and Sensor Fusion will enable the FCS(BCT) to "understand first" and "act first" by developing orders that facilitate precision maneuvers and fires. By using the robust FCS(BCT) network that links the off-board sensors with the MCS (XM 1202), FCS(BCT) leaders will retain the initiative and the ability to maneuver the XM 1202 to areas of advantage and to engage the enemy while safely out of contact. The MRM (XM 1111) round will provide the capability to expand significantly the engagement area with its extended range capabilities. While traditional tank rounds are designed to conduct LOS engagements at the 3-kilometer [km] range, the XM 1111 round will provide the range and accuracy for the XM 1202 to conduct precision, BLOS engagements and destroy a range of moving or stationary targets out to 12 km when the XM 1202 is stationary or 8 km when it is moving. The XM 1111 round will have a dual-mode seeking capability that allows it to acquire targets that are either laser designated by a sensor or autonomously. Its warhead will have the ability to defeat current and future high-payoff targets on a complex battlefield to include main battle tanks with explosive reactive armor, light armored vehicles, self-propelled artillery and air defense, trucks and bunkers. The increased lethality of the XM 1202 at extended ranges through the MRM rounds will improve this system's survivability and exponentially decrease the number of traditional LOS engagements. Although the XM 1202 will retain the ability to fire current and future LOS 120mm munitions, the XM 1202 in the FCS(BCT) formation will make the traditional tank-on-tank engagements obsolete.

> The MGV design is being developed to achieve the optimal balance of capabilities to ensure that its lethality, survivability, sustainability and force effectiveness attributes are equal to or better than those of Current Force vehicles.

AL&T: How are today's warfighters benefitting from the FCS technology already matured?

Cartwright: Today, the Army is making use of many FCS-developed technologies. Navy and Army units are using the



Soldiers test the FCS(BCT) network at the SoSIL. The network represents the greatest advancement in tactical C4ISR that the Army has ever pursued. From its initial conceptual stages, the network was envisioned to provide fully integrated, distributed information management. (U.S. Army photo courtesy of FCS(BCT).)

Micro-Air Vehicle (MAV) in explosive ordnance disposal operations. The MAV is a precursor to the Class I UAV. Also, armor technology developed for FCS is being used in fragmentation kits placed on our tactical vehicle fleet in Iraq and Afghanistan. The Army has also successfully used the Excalibur artillery round during counterinsurgency operations. This round will be the NLOS-C's chief ordnance.

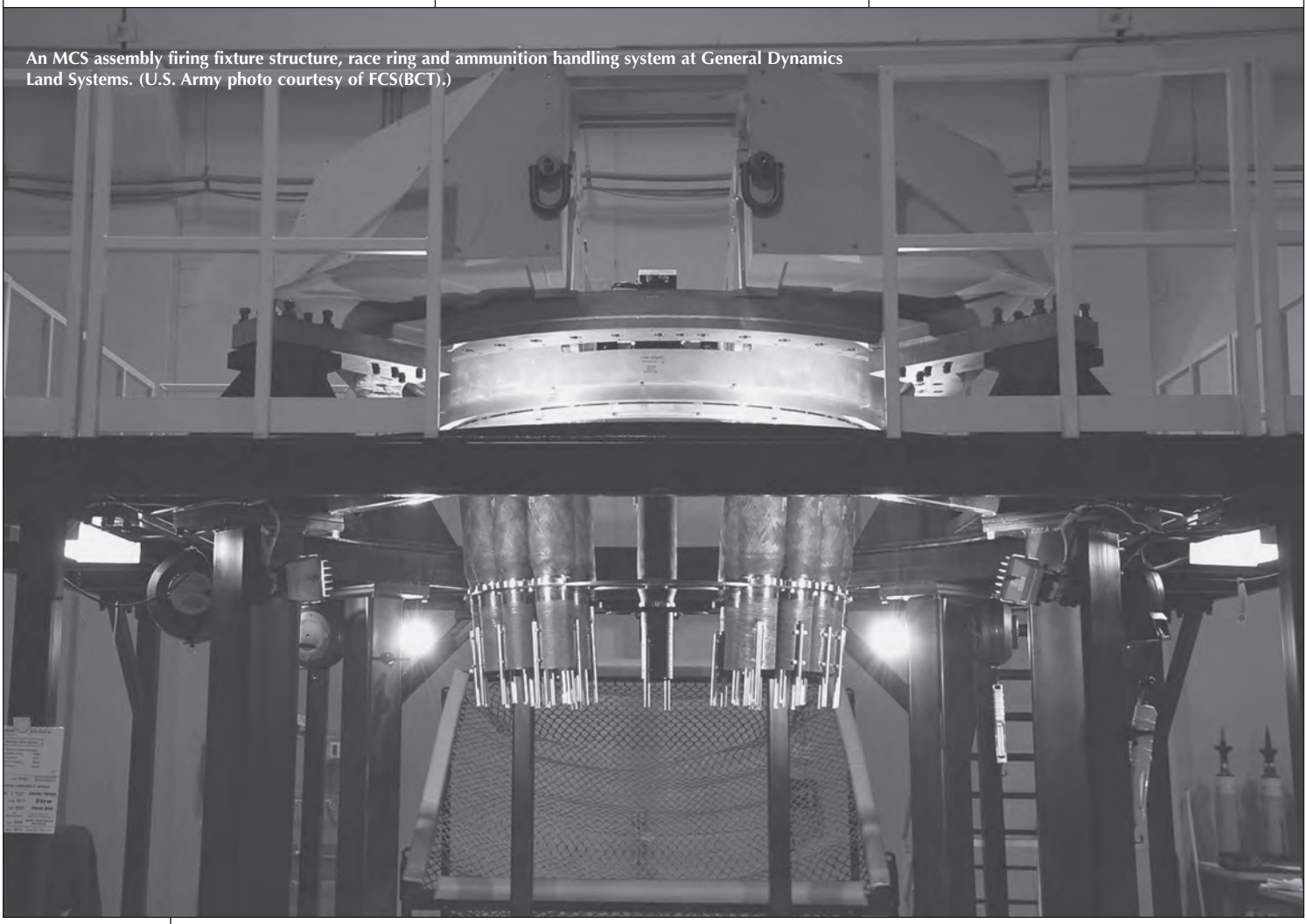
The FCS(BCT) will be optimized for counterinsurgency operations and the Army will accelerate fielding of select FCS(BCT) capabilities (called Spin Outs) to reduce operational risk to the Current Force. The plan expands the scope of the program's SDD phase by adding discrete SOs of capabilities at 2-year increments for the Current Forces. SO 1 will begin this fiscal year and consist of prototypes issued to the AETF for its use and evaluation. Following successful evaluation by the AETF, production and fielding of SO 1 will commence to Current Force units in 2011. SO 1 is under development, program acquisition controls are in place and all systems within SO 1 are progressing through key engineering milestones.

> The NLOS-C firing platform's primary objectives are to provide risk reduction for cannon and mount development, to advance safety certification and manned rating for 2008 prototype deliveries, and to provide reliability growth for weapon module components.

AL&T: How will you spiral that technology into the Current Force?

Cartwright: The Army will field selected FCS(BCT) capabilities to operational forces in the SO fielding concept. The first FCS(BCT) capabilities will be provided to Current Force BCTs beginning in 2011 as part of SO 1. The SO strategy consists of prototypes fielded to the AETF for testing and experimentation. The SOs provide early capability in force protection, networked fires, expanded operational environment and BC in a series of SO capability releases.

AL&T: How will FCS strike the right balance between modernization,



An MCS assembly firing fixture structure, race ring and ammunition handling system at General Dynamics Land Systems. (U.S. Army photo courtesy of FCS(BCT).)

The ANS has integrated prototype systems on the MULE EEU, Stryker and LMTV truck as well as on TARDEC's Crusher (shown here), an unmanned ground combat vehicle that was unveiled in May 2006 by the Defense Advanced Research Projects Agency. (U.S. Army photo.)

recapitalization (recap) and reset when U.S. forces begin returning home from Southwest Asia?

Cartwright: Modernizing the Army is not an option, but a necessity. The FCS(BCT) program is a key component to the Army modernization effort and will provide warfighters with capabilities never before used by a military force. Our goal is to sustain the momentum of Army modernization as we rebalance current capabilities in the Army to ensure that our warfighters maintain a decisive advantage as the preeminent power in the world. FCS(BCT) technology is being designed to work Jointly across all services to bring a new level of battlefield awareness and Joint interoperability.

AL&T: How will this modernization improve tactical and strategic mobility?

Cartwright: The FCS(BCT) program systems were designed from the ground up with supportability and strategic mobility in mind. PM FCS(BCT) has worked closely with TRADOC, the Air Mobility Command and the U.S. Transportation Command during the design process to ensure that FCS(BCT) systems are easier to deploy in a shorter time period. As a result, FCS(BCT) enhances agility, responsiveness and sustainability by using platforms that are lighter, common and have more robust interoperability capabilities than Current Force systems. One of the best examples of this is the family of MGVs, which uses a common chassis for all of its variants. FCS(BCT) formations built around MGVs will have a significantly smaller logistic footprint because of common repair parts stockage, tool kits and component replacement instead of repair to lessen maintenance requirements at unit level. These formations will also be more lethal, more capable and more survivable through a combination of armor, enhanced situational awareness [SA] and APS. As a result, FCS(BCT) units will be able to handle operations in a larger area with fewer Soldiers. This capability provides a greater strategic advantage when quick response is needed around the world.

Our goal is to sustain the momentum of Army modernization as we rebalance current capabilities in the Army to ensure that our warfighters maintain a decisive advantage as the preeminent power in the world. FCS(BCT) technology is being designed to work Jointly across all services to bring a new level of battlefield awareness and Joint interoperability.

AL&T: What new technology will be spiraled into Current Force weapon systems as they go through recap/reset in Army depots?

Cartwright: The FCS(BCT) deployment strategy consists of a series of three SO releases beginning this year with SO 1. Spinning out FCS(BCT) capabilities/systems when they are available will allow the Army to field the FCS(BCT) network elements and some individual FCS(BCT) systems over time, thus reducing the risk to the FCS(BCT) program while simultaneously adding capability to the Current Force. SO 1 addresses Current Force capability gaps in SA, force protection and lethality through the use of the UGS (U&T) (AN/GSR-9 and -10) and NLOS-LS (XM 501). Other technologies include the FCS(BCT) network components, such as the Integrated Computer System, SoS Common Operating Environment, BC, Network Management Services and JTRS, which will be integrated into Current Force Abrams,

Here (left to right), Joe Zinecker, Lockheed Martin, shows MG Cartwright, PM FCS(BCT), and Dennis Muilenburg, Boeing Co., the EEU's progress. The EEU was used in multiple tests and demonstrations throughout 2007. Looking on from behind is Chris Yuknis, a Lockheed Martin vice president. (Photo by Glenn Helm, Lockheed Martin.)

Bradley and High-Mobility Multipurpose Wheeled Vehicle (HMMWV) platforms during SO 1. This network backbone provides control of UGS (U&T) assets and SA of objects detected by these systems, while also providing a start point for the application of increasing capability in subsequent SOs. The FCS(BCT) program has also accelerated to the AEFT for evaluation of the Class 1 UAV (gMAV [gasoline engine MAV] Block 0, early prototype) and the SUGV (Block 1, early prototype) as a result of the overwhelmingly positive results in the testing of their capabilities and the need for these systems in theater. Both systems provide real-time video and pictures to warfighters and combatant commanders while keeping Soldiers out of harm's way. Over the next few years, the FCS(BCT) program will equip the centerpiece of our modernization program, the warfighter, with the most advanced systems in the world to become more lethal, more situationally aware and more confident to deploy anywhere in the world in defense of our Nation.

> FCS(BCT) formations built around MGVs will have a significantly smaller logistic footprint because of common repair parts stockage, tool kits and component replacement instead of repair to lessen maintenance requirements at unit level.

AL&T: What acquisition strategy is FCS (BCT) using and how will this change over the next 5 to 10 years?

Cartwright: The FCS(BCT) program acquisition strategy conforms to the *DoD 5000* framework for systems acquisition. The FCS(BCT) PM is responsible for FCS(BCT) SoS development, production, fielding and support. Additionally, the program will develop and position the SO of FCS(BCT) capabilities/systems for production and fielding to the Current Force.

From its inception, the FCS(BCT) program acquisition strategy was designed to employ an LSI to support the Concept and Technology Development phase and continue through the SDD and Low-Rate Initial Production (LRIP) phases. This strategy was determined to be in the government's best interest. The Army's partnering with the best of industry allowed it to use cutting-edge technology, best business practices and performance objectives in FCS(BCT) SoS development to provide the Soldier with greater capability at lower life-cycle costs. It is the Army's intent to maintain the relationship with its LSI (Boeing and SAIC) through the core program LRIP phase to ensure that SoS operational verification, as demonstrated in the Initial Operational Test and Evaluation (IOT&E), is in compliance with the SDD's contractual requirements.

The Army now uses this LSI arrangement for the FCS(BCT) program SDD acquisition phase, scheduled to complete with a successful MS C decision for the core program in FY13.

In compliance with the FCS(BCT) program acquisition strategy, the program is preparing to enter into production contracts for the MGV Initial Production Platform (NLOS-C) (XM 1203) Special Interest Program and SO 1 beginning with advance procurement items in 2008 and production contracts in early 2009.

These 18 units will be delivered to the AETF in 2010, 2011 and 2012, respectively, at a projected rate of six vehicles per year.

SO 1 involves procurement of 17 BCT sets providing enhanced SA and communication capabilities for the Current Force through technology insertions to the Abrams, Bradley and

HMMWV. These technologies will be delivered to the Current Force in FYs 10-14.

The Army's acquisition plan for the core program LRIP effort is on target to begin in 2013. The minimum core LRIP quantity of three BCTs would be managed under the LSI arrangement that has been used for the program's entire SDD phase.

A Full Rate Production decision MS will be convened in FY17, and will be based upon demonstration of supportability/producability and after IOT&E substantiates FCS(BCT) effectiveness, suitability and KPP achievement.

AL&T: What is the most important message you would like to convey to the Acquisition, Logistics and Technology Workforce and Soldiers who read our family of publications?

> The Army's partnering with the best of industry allowed it to use cutting-edge technology, best business practices and performance objectives in FCS(BCT) SoS development to provide the Soldier with greater capability at lower life-cycle costs.

Cartwright: The FCS(BCT) program is a commitment to modernize our Army, not an option. The FCS(BCT) is the Army's promise to provide its Soldiers the best available equipment and technology. This is not just a technology development program; it is also the development of new BCTs. These new brigades, with more infantry, better equipment and unmatched SA and communications, will change the way the U.S. Army fights wars. These BCTs will prove invaluable during asymmetric and stability operations by allowing for precision targeted fires to keep civilians out of harm's way and more infantry on the ground to patrol civilian populations. And through sensors connected to the BCT's network, real-time situational updates will allow the Army to neutralize targets before they strike military or civilian personnel (see them first and take them out). Through a state-of-the-art network, the FCS(BCT) will have vastly increased SA, survivability and lethality — ensuring that our Soldiers can take the fight to the enemy before he knows we are there and has time to react. By reducing vehicle crew sizes, logistics and maintenance burdens, the FCS(BCT) will have 50 percent more infantry Soldiers in the fight.

The FCS(BCT) is happening now. AETF Soldiers are training with FCS(BCT) hardware and software systems and will begin brigade-level evaluations of SO equipment in early summer 2008. FCS(BCT) SO capabilities/systems will reach operational brigades in the 2010 timeframe. The first MGV — the NLOS-C prototypes — are being built at locations in York, PA; Santa Clara, CA; Minneapolis, MN; Lima, OH; and Sterling Heights, MI, and will be completed in June 2008. In December 2007, the Army Chief of Staff directed the FCS(BCT) program to accelerate test schedules for the SUGV robot and the Class 1 UAV. As a result, AETF training and evaluations of these platforms started in mid-January 2008.

A MULE drives over a ditch during a demonstration at Fort Bliss in January 2008. (U.S. Army photo courtesy of FCS(BCT).)