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ARMOR & MOBILITY

**FUTURE FORCE
MODERNIZATION**

COMMANDER'S CORNER



General John Murray
Commander
U.S. Army Futures Command



MG Kurt Ryan
Deputy Chief
of Staff
Logistics, G-4
U.S. Army Forces
Command



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NETWORKED MISSION COMMAND MOVING OUT

Newly updated Army software and hardware is reducing network complexity and the size of systems, enabling both unit mobility and simplified command post operations.

By Paul D. Mehney and Justin Eimers

Features



COMMANDER'S CORNER
Balancing Force Modernization
General John Murray
Commander
U.S. Army Futures Command



USMC SPOTLIGHT
Procuring Targeted Lethality
Col. Justin Eggstaff
Director
U.S. Marine Corps Operational Test and Evaluation Activity



LEADERSHIP PERSPECTIVE
Building Readiness in Tactical Formations
MG Kurt Ryan
Deputy Chief of Staff
Logistics, G-4
U.S. Army Forces Command



SUSTAINMENT FOCUS
Addressing Future Force Sustainment
MG Rodney Fogg
Commander
U.S. Army Combined Arms Support Command



New Generation of Force Protection

The Army's Next Generation Combat Vehicle, or NGCV, is expected to support force modernization within a Multi-Domain Operations combat construct.

By COL Warren Sponsler



Addressing Future Combat Complexity from the Sky

The U.S. Army's Future Vertical Lift (FVL) effort is expected to enable a "leap-ahead" in vertical lift lethality, survivability, and reach to find, fix, and destroy pacing threats.

By BG Walter Rugen and COL Michael Best



Connecting the Corps

The Defense Logistics Agency (DLA) National Account Manager (NAM) team is working with the U.S. Marine Corps to ensure global readiness.

By Dianne Ryder



Army's Center of Gravity

The Defense Logistics Agency (DLA) Army National Account Manager (NAM) team monitors material availability, pre-positioned stock, and readiness of weapons systems.

By Dianne Ryder

Departments

2 **Insights**

36 **Advertisers Index/
Calendar of Events**



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Cover: U.S. Army National Guard Sgt. Chanelle Colbert with 445th Chemical Company, tests the chemical detection capabilities of the Stryker control vehicle in support of the Joint Warfighter Assessment (JWA) 19, Yakima Training Center, WA. The JWA is the Army's premier modernization assessment; weaving material solutions, multi-domain formations, concepts and capabilities into the Army's largest annual multinational live, virtual and constructive exercise. JWA's mission is to assess Multi-Domain Operations (MDO) concepts, capabilities, and formations at echelon. (U.S. Army Reserve Photo by Spc. Patrick Hilson / Released)

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INSIGHTS

As DoD grapples with the continued challenges of modernization, trying to maintain legacy equipment in the face of new systems integration is a continual lesson in prioritization. With open architecture network flexibility enabling greater systems integration, a key to sustaining legacy relevance is through upkeep process change so that operational compatibility remains achievable.

The October issue of *Armor & Mobility* gives readers insight into key elements of both Army and Marine Corps readiness as pertains to technology development and acquisition focus areas expected to better position the Joint DoD to address future threats. The evolution of a Joint Battle Command-Platform (JBC-P) capability to a level of standardization that enables field commanders to operate how and where conflict dictates is of paramount importance to a Multi-Domain Operations (MDO)-oriented fighting force. U.S. Army Futures Command (AFC), led by General John Murray, has been tasked to oversee the restructure of not just how the Army engages the enemy, but in what domain. On the USMC side, efforts to better target capabilities acquisition for accelerated systems procurement are a priority for Col. Justin Eggstaff, Director, Marine Corps Operational Test and Evaluation Activity (MCOTEA).

The future is coming and the Army's Next Generation Combat Vehicle (NGCV) is expected to be ready to address myriad challenges relating to ground combat maneuver within an MDO-based battle command construct. The NGCV Cross Functional Team portfolio includes several systems supporting modernization of the ground maneuver force including the Optionally Manned Fighting Vehicle (OMFV), Robotic Combat Vehicles (RCV), Armored Multi-Purpose Vehicle (AMPV), and Mobile Protected Firepower (MPF). Looking to the sky, defending the nation's interests knows no bounds. The future of Army vertical lift will be in the form of a family of Future Vertical Lift (FVL) airframes capable of everything from intelligence, surveillance, and reconnaissance (ISR) to precision engagement to transport.

From equipment maintenance and systems sustainment viewpoints, the objectives that AFC has for the Army fighting force as a whole are not attainable if the capabilities needed to effect desired results are not available. Providing readers with individual perspectives are MG Kurt Ryan, Commander, Army Forces Command (FORSCOM) and MG Rodney Fogg, Commander, Army Combined Arms Support Command (CASCOC), as they elaborate on critical maintenance and sustainment standards addressing current and projected systems readiness challenges. And of course, readiness is elevated through effective partnering which is on daily display through work done by Defense Logistics Agency (DLA) National Account Managers (NAMs) for both the Army and Marine Corps.

We welcome your comments and thanks for the continued readership!

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NETWORKED MISSION COMMAND MOVING OUT

New Army mission command systems have rolled out throughout this past year, most notable of which are updated software and hardware that reduce network complexity and the size of systems, enabling both unit mobility and simplified command post operations.

By Paul D. Mehney, Director of Public Communications, U.S. Army PEO C3T, and Justin Eimers, Public Affairs Specialist, PEO C3T



Maj. Shawn P. McNicol, Division Mission Command Node Officer-in-Charge for the 5th Squadron, 73rd Cavalry Regiment, 3rd Brigade Combat Team, Airborne Division from Fort Bragg, NC, consults one of the Mounted Computing Environment (MCE) systems in preparation of executing convoy operations. (U.S. Army photo by Mr. William C. Beach)

Delivering modernized mission command capability is a key tenet of two of the Army's tactical network modernization lines of effort: the Common Operating Environment (COE) and Command Post (CP) Modernization. Project management offices and the Network Cross-Functional Team (CFT) have advanced fielding of standard mission command systems, conducted robust Development Operations (DevOps) exercises to gain Soldier feedback and advanced key modernization efforts from development to fielding.

STANDARDIZING JOINT BATTLE COMMAND-PLATFORM

The Army's vehicle fleet is in the midst of a far-reaching effort to modernize the integrated mounted friendly force tracking system. This approach, which will "pure fleet" more than 103,000 platforms across the service, is delivering Joint Battle Command – Platform (JBC-P) hardware and software to all Active Duty, National Guard, and Army Reserve units. JBC-P provides simple and intuitive mission command on-the-move, situational awareness, and command and control down to

the platoon level, and supports incremental improvements over time to adapt to evolving threats.

"JBC-P is a critical capability that enables leaders to make informed decisions and conduct mission command from anywhere they choose," said Dan Ghio, deputy product manager for JBC-P. "It provides a joint ground solution and is accessible to allies and coalition partners to support the Army's interoperability priorities." Since the effort began in 2018, 146 units have been fielded the JBC-P capability including 73 Active Duty, 46 National Guard, and 22 Army Reserve units.

A special focus has been paid to ensuring National Guard units receive the updated JBC-P capability. To coordinate fielding, Headquarters, Department of the Army (HQDA) G-3/5/7 provides a yearly Mission Command Modernization Priority List (MCMPL) which prioritizes units. Project Manager (PM) Mission Command, and unit representatives balance the list against program funding and capability delivery timelines to create a coordinated, prioritized fielding schedule for the product office to execute. Unlike with active duty Army exercises where a brigade-sized formation is the base for planning and executing a JBC-P capability total package fielding (TPF), subordinate units in a

National Guard brigade are not co-located and often span several states, increasing time and cost required to conduct Guard TPF missions. To combat this, fielding teams and National Guard representatives align distant units to larger regional fieldings.

Another impetus behind TPF missions is the vehicle density list (VDL), a document specific to every unit that determines necessary installation kit hardware and manpower resources for each fielding. To further reduce fielding delays, PM Mission Command has allocated additional time and manpower resources to the planning phase to ensure all documentation is properly completed.

"The VDL is executed via a survey conducted by a fielding team representative, a unit representative or both. If the VDL is not completed in a timely manner or is incomplete with missing data, the TPF mission is at risk of being delayed," said Ghio.

Of the remaining 265 units yet to be fielded JBC-P, 111 are Active Duty, 87 are National Guard and 67 are Army Reserve units. Based on the current basis of issue, all units are on track to see completed fielding by 2024.

The JBC-P program office is also developing the future software upgrade to JBC-P called the Mounted Computing Environment (MCE). MCE will provide future capabilities to host third-party science- and technology-driven applications as well as those developed by Industry partners, and will converge multiple warfighting functions onto the COE. The software is currently being developed and will be taken to multiple units and user juries through DevOps agreements to gain direct user feedback of the software and help shape the future needs and gaps in the Army's mounted mission command software.

DELIVERING COMMAND POST COMPUTING ENVIRONMENT

Key to providing Army commanders with a simple, intuitive and single common operational picture (COP) is the Army's COE effort comprised of six computing environments. The most mature of these, the Command Post Computing Environment (CPCE), along with the handheld and mounted environments aim to provide an easy-to-use COP through a single mission command suite operated and maintained

by Soldiers. Program management offices from the Army's Program Executive Office Command, Control, Communications-Tactical (PEO C3T) and PEO Soldier recently conducted operational assessments and tests of these computing environments and are now poised to advance CPCE fielding to additional units for continued experimentation and operational use. Versions of the handheld capability will also be delivered as part of the Integrated Tactical Network (ITN) effort. The ITN provides critical connectivity and mission command applications to lower echelon units as part of the Army's network Capability Set 21 fielding to four Infantry Brigade Combat Teams (BCTs) starting in 2021.

CPCE provides a software and server hardware framework (common interface, data and services) upon which warfighter applications can be converged and future applications can be built. The initial version of CPCE underwent operational test as part of Network Integration Evaluation 18.2 at Fort Bliss, Texas and has been under continuous DevOps with user units since 2018. According to commanders' feedback, CPCE provides significant operational capability over current Army command and control systems but still needs functionality improvements, which are underway as part of continued DevOps.

CPCE deployed with the 1st Brigade, 101st Airborne Division from January through June of this year as part of the unit's current combat rotation to U.S. Army Central Command, in support of Operation Inherent Resolve. Brigade Commander Col. Derek Thomson said CPCE exceeds the previously deployed system's capabilities.

"CPCE is definitely a more intuitive and user-friendly system for command post operations than anything else we have used in the past," he said. "The server and bandwidth requirements are a fraction of what we have previously used, which makes it much better suited for both expeditionary and steady-state operations. The interface is easy to pick up, and we have been able to quickly get our battle staff up to speed on its functionality."

One example of continued DevOps is the enhancement of CPCE collaboration tools. During Warfighter events, units expressed concern with CPCE's ability to support collaboration through live briefing tools, such as real-time map-boarding and mark-ups on the map. The commercial CPCE software was not designed for this functionality and adding it quickly has proven technically challenging due in part




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to tactical operational environments with low network throughput and latency.

After the recent Warfighter 19.4 exercise, the developer optimized the software to improve responsiveness of built-in briefing tool functions. The new software was also rolled into the recently completed Joint Warfighter Assessment (JWA) 19. During operations, U.S. and coalition forces were able to use the CPCE briefing tool with great effect. Feedback from that exercise was markedly improved from prior events, and the Army's Test and Evaluation Command noted that "with increasing fluidity and effect throughout the event, subordinate units were able to digitally orient their higher headquarters to where on the COP they were focusing and then highlight specific areas for detailed updates." Updates to the briefing tool will continue through DevOps and the program delivery schedule of new baseline CPCE software incorporating these updates and others is targeted for 2QFY20 to support the Defender 2020 exercises.

Additionally, to improve system performance and to mitigate unnecessary data flow over constrained tactical network transport bandwidth, program managers and developers are working to address underlying data analytics, data dissemination and federation associated with the use of CPCE. These major efforts will be key focuses of Capability Set 23 development.

In July, the Army approved a Full Deployment Decision (FDD) to move CPCE into additional DevOps fielding and exercise support. The scope of fieldings that will be approved include the 82nd Airborne Division, 1st Cavalry Division in preparation for Defender 2020 exercise, 1st Brigade Combat Team 101st Airborne Division and 1st Brigade Combat Team, 25th Infantry Division to support Iraq deployments.

PM Mission Command will also be rolling out its latest Tactical Server Infrastructure, or TSI, variant to units being fielded CPCE. TSIv2 provides several improvements over the legacy Battle Command Common Services server stacks including an 800-pound weight reduction, a 50 percent reduction in setup and teardown time, and a reduction in the number of transit cases from nine to three, significantly increasing agility.

COMMAND POST INTEGRATED INFRASTRUCTURE

Last year also marked the launch of an Army program to provide modernized mobile, scalable and survivable CP platforms. Key to the effort is identifying and providing a balance between mobile, survivable CPs while allowing commanders and staff sufficient flexibility to tailor the command post to support different mission sets. Meanwhile, a challenge exists in affording the capability to conduct collaborative work with an environment where mobile CPs may have to be dispersed.

A June 2018 material development decision enabled the acquisition community to begin seeking mobile command post solutions. The program effort, called the Command Post Integrated Infrastructure (CPI2), will address current mobility issues while ensuring communications hardware and mission command application integration across platforms.

The Army is executing CPI2 in increments. Culminating now, in the first step of the first increment, the Army equipped selected units with mobile platforms, secure wireless and intelligent power solutions. Within the first increment there are two efforts – one led by the Army's Forces Command (FORSCOM) and the other by PEO C3T. The FORSCOM lead activity allowed units to conduct their own integration of systems onto platforms in order to inform future command post designs. Units provided comments, suggestions and lessons learned through command

post design workshops and field exercises. FORSCOM published an assessment report and recommendations in July.

The Army approved an acquisition Milestone A decision in January 2019 enabling the second effort of the first increment. This effort, led by PM Mission Command, manages the follow-on formal design, integration and CPI2 prototyping. PM MC will work with industry via an Other Transactions Agreement (OTA) and the Army's Combat Capabilities Development Command (CCDC) C5ISR Center to enable integration of solutions across the C4ISR spectrum. This effort will be supported by project management offices across the Army including PEO Ground Combat Systems and PEO Combat Service & Combat Service Support.

The Milestone A decision authorized the project office to begin what is known as Technology Maturation and Risk Reduction. This effort will execute competitive prototyping for brigade combat team designs. One BCT is planned to be a government design through a support agreement with the CCDC C5ISR Center, while the other BCT will be an industry-driven design. Both BCT configurations will enable the Army to experiment to inform future command post decisions.

In some cases, the CPI2 program is arranging for the acquisition of select platforms such as the Family of Medium Tactical Vehicles, which will be integrated with C4ISR systems provided and integrated by CPI2 or other programs of record. In other instances, such as with the AMPV and JLTV, these programs of record are already providing mission command variants that will be fielded with capabilities required for command post operations. CPI2 will also support the integration of any additional capabilities that may be required.

CPI2 platforms will exist from the corps to the battalion echelons. Product Manager CPI2, assigned to PM Mission Command, plans to field two BCTs in 2020 and conduct early user tests. The remaining three BCTs will be fielded in FY21-22. CPI2 will also field one Corps and one Division Mobile Command Group (MCG) as well as one mobile CP solution for a Division HQ MAIN Command Post.

So far, HQ FORSCOM has designated 3rd Brigade Combat Team, 101st Airborne Division; 2nd Stryker Brigade Combat Team, 2nd Infantry Division; 4th Infantry Division for both the MCG and DMAIN; and I Corps for the Corps MCG as participant units in CPI2 Increment 1. The CPI2 product management office has been in coordination with most of these units and design activities are already underway. Soldiers are actively encouraged to contribute innovative ideas that can be integrated in the formal designs. Unit participation in the design process is a foundational element to CPI2 successfully providing mobile CP solutions.

MODERNIZING FOR MULTI-DOMAIN OPERATIONS

The Army's pursuit of its Multi-Domain Operations (MDO) 2028 concept relies heavily on the rapid and continuous integration of new and emerging capabilities through the service's network modernization strategy. Since near-peer adversaries will disrupt friendly communications and plans, mission command must expand to enable initiative and dynamic cooperation across the service to preserve the ability to continuously and rapidly integrate multi-domain capabilities.

Progress across PEOs and CFTs are advancing multi-domain command and control to enable and exploit interoperability, enabling commanders to command distributed forces using rapid decision making tools, and providing cross-cutting capabilities Soldiers need to fight and win against near-peer adversaries in contested and congested environments. ■

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A NEW GENERATION OF FORCE PROTECTION

The Army has big plans for its Next Generation Combat Vehicle, or NGCV, in support of force modernization within a Multi-Domain Operations combat construct.

By COL Warren Sponsler, Chief of Staff, NGCV-CFT



Next-generation combat vehicles, to include the Optionally Manned Fighting Vehicle (OMFV) and the Robotic Combat Vehicles (RCV), shown here in a graphic maneuvering on the future battlefield will increase force lethality, reduce risk, and enable more effective command decision making. (NGCV-CFT)

The Next Generation Combat Vehicle, Cross-Functional Team (NGCV-CFT) portfolio includes several systems supporting modernization of the ground maneuver force including the Optionally Manned Fighting Vehicle (OMFV), Robotic Combat Vehicles (RCV), Armored Multi-Purpose Vehicle (AMPV), and the Mobile Protected Firepower (MPF). These platforms will support effective combined arms maneuver in the Army's forward combat formations within the construct of the Multi-Domain Operations (MDO) concept.

Development of requirements for systems in the NGCV portfolio starts with an assessment of our adversaries' capabilities and vulnerabilities as a collaborative process, combining the perspectives of the NGCV-CFT, the traditional requirements community, acquisition program managers, science and technology subject matter experts, and our industry partners. The goal is to develop realistic, achievable requirements that bridge capability gaps and maintain our units' overmatch against the adversaries of tomorrow. Our combat formations today are equipped with some of the best equipment in the world, and we are laser-focused on developing requirements that will ensure the success of future formations against future adversaries.

To remain stable in the future, all our requirements have been developed to fully support the Army's Modernization Strategy under the personal guidance of our Army Senior Leaders. Additionally, the Army is empowered through section 804 Mid-Tier Acquisition (MTA) authorities to develop prototypes, mature technologies, and refine requirements on a much faster pace, significantly reducing the overall time to begin material development efforts. Dedicated Soldier experimentation exercises with fully-functioning prototypes allow the Army to get equipment into operational units for testing and maneuvers, thereby providing the opportunity for immediate feedback on what works and what doesn't. The operational Soldier, the eventual user of these systems, remains central to



COL Warren Sponsler

the process to make certain that we are acquiring the right equipment with the right capabilities.

TAILORING CAPABILITY TO MEET REQUIREMENT

The OMFV will undoubtedly be the best system in the world of its class. The MDO concept in combination with an assessment of the threat remains the base from which we define system requirements from the start. The OMFV will integrate new mature technologies providing advanced capabilities to further enable battlefield effectiveness. For example, the ability for the system to be operated either with a manned crew or without, as the tactical situation develops, will provide commanders with options they did not previously have, thereby supporting maneuver in the highly lethal and complex future operating environment. Commanders will be able to use this capability to reduce risk, expand operating space, and enable faster decision making to mitigate some of the challenges of the future multi-domain battlefield. Further, the OMFV is being optimized to operate in multiple combat environments with the necessary lethality and survivability characteristics. It will be capable of quickly transitioning from open combat against near-peer adversaries to fighting in the tight confines of city streets.

The NGCV-CFT is continuing a campaign of learning through an experimental prototyping and demonstration effort to enable a better understanding of how the OMFV, RCV, and other platforms with these advanced capabilities will fit into the MDO-capable force. These prototyping and demonstration efforts will also inform how the Army will adjust its doctrine, organization, training, sustainment, manpower, and other structures to better support our Nation's warfighters. Ultimately, the OMFV must be able to effectively maneuver Soldiers on the



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battlefield, bringing decisive lethality and unmatched survivability, no matter the environment, to achieve operational objectives against our adversaries. We are confident that the requirements and the ability of our partners in government and industry to develop the OMFV platform will achieve these goals.

OVERCOMING SWAP HURDLES

Development of a combat vehicle to achieve capabilities in size, weight, and performance (SWaP) is a challenging proposition, especially as it relates to protection and mobility. The characteristics of lethality, protection, survivability, mobility, and capacity, often work against each other when developing system requirements, forcing developers to make hard tradeoffs. Working with our partners both in government and industry, the team has sought to develop realistic system parameters based on feasible solutions, specifically with respect to the weight and performance challenge.

We are confident that the survivability of the OMFV will be much better than the Bradley, while still meeting critical mobility and transportability requirements. Additionally, the U.S. Army has demonstrated over the past several decades that once it commits to a combat platform, that platform will be in our units for a long time and must have the capacity to grow as technology develops and new opportunities to increase capability arise. For this reason, the OMFV and other future platforms will retain margin for growth in size, weight, power, architecture, and computing capability as a base design principle.

TARGETING SYSTEMS INTEGRATION

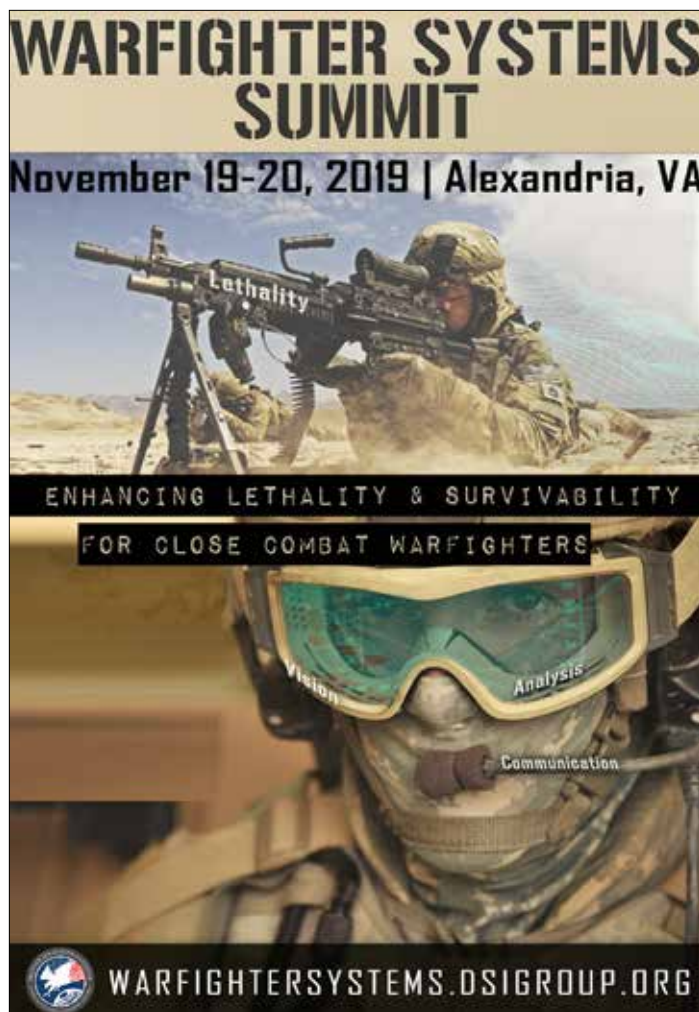
Each platform within the NGCV-CFT portfolio has its own set of requirements and desired capabilities depending on the system's role on the battlefield within MDO. Future growth has been a foundational consideration of all of our requirements development and designs, acknowledging that the mature technologies today will likely be insufficient for the battlefield of tomorrow. Technological advances are happening at an ever-increasing pace. If our forces are to outmatch our adversaries, the room to grow with technological advances becomes more and more important. The systems we are developing for the future must retain the characteristics that make our combat platforms today the most lethal in the world, and decisive lethality remains a central principle in the design of systems that will be on the forefront of the battlefield. Additionally, any system being developed today must be able to fight and win on the future battlefield that continues to incorporate more diverse and lethal threats in all domains - air, electronic warfare, and cyber - among others. Lastly, future systems must reduce logistic and sustainment burdens, taking advantage of new efficiencies in vehicle power, prognostic logistics, and intelligent sustainment, to increase operational reach and enable flexibility for commanders.

LOOKING AHEAD

The goal of the NGCV program is to get the best equipment to our ground combat formations as quickly as possible, all with the requirement that we retain overmatch against our adversaries on tomorrow's battlefield. While some of the systems are evolutionary in nature, others will provide tomorrow's commanders with capabilities that will fundamentally change how our units fight. The addition of the RCV - built from the ground up, to increase lethality of the unit, expand the battlefield geometry and enable decision space for commanders while reducing risk to Soldiers - will make our Army even more capable and effective than it is today. As technology for advanced weapon systems, autonomous ground mobility, target recognition and detection, and AI-enabled decision making matures, the NGCV-CFT will incorporate these capabilities onto future platforms to continue to outpace our adversaries.

Keeping up with technological advancements will continue to be a challenge for large-scale modernization programs like those systems within the NGCV-CFT portfolio. Prioritizing growth characteristics is a good start, however, we must also continue to improve how the U.S. Army modernizes to enable our ability to find the best technology and integrate it as quickly as possible to retain our edge on the future battlefield. How the U.S. Army modernizes combat systems in the current environment necessitates a cultural adjustment in how our requirements, research and development, and acquisition processes work and ensuring that stable and predictable resources are available to enable a faster turn on upgrades into our existing systems. Our adversaries will continue to evolve both before and during conflict - we must have the flexibility in our processes to do so as well.

The NGCV-CFT is absolutely committed to modernizing the U.S. Army's ground combat vehicles and adding new capabilities that our Soldiers require to fight and win on tomorrow's battlefield. The systems currently being developed in the NGCV-CFT portfolio will ensure that our mounted ground forces will be the best in the world, no matter the environment and against any adversary. ■





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BALANCING FORCE MODERNIZATION WITH THREAT EVOLUTION

General Murray was commissioned as an Infantry officer in the U.S. Army upon graduation from the Ohio State University in 1982. Throughout his career, General Murray has served in leadership positions and commanded from Company through Division, with various staff assignments at the highest levels of the Army.

General Murray has held numerous command positions. His command assignments include: Commanding General Joint Task Force-3; Deputy Commanding General – Support for U.S. Forces Afghanistan; Commander Bagram Airfield; Commanding General 3rd Infantry Division at Fort Stewart, Georgia; Commander, 3rd Brigade, 1st Cavalry Division, at Fort Hood, Texas while serving in Operation IRAQI FREEDOM; Commander, 1st Battalion, 18th Infantry, 1st Infantry Division, United States Army Europe and Seventh Army, Germany; Commander, C Company, 1-12th Infantry Battalion, 4th Infantry Division (Mechanized), Fort Carson, Colorado.

Previously, he was the Deputy Chief of Staff, G-8, in the Pentagon; Director, Force Management, the Pentagon; Assistant Deputy Director for Joint Training, J-7, Joint Staff, Suffolk, Virginia; Director, Joint Center for Operational Analysis, United States Joint Forces Command, Suffolk, Virginia; Deputy Commanding General (Maneuver), 1st Cavalry Division, Fort Hood, Texas; Deputy Commanding General (Maneuver), Multi-National Division-Baghdad OPERATION IRAQI FREEDOM, Iraq; G-3 (Operations), III Corps, Fort Hood, Texas; Chief of Staff, III Corps and Fort Hood, Fort Hood, Texas; C-3, Multi-National Corps-Iraq, OPERATION IRAQI FREEDOM, Iraq; G-3 (Operations), 1st Infantry Division, United States Army Europe and Seventh Army, Germany; Chief, Space Control Protection Section, J-33, United States Space Command, Peterson Air Force Base, Colorado; S-3(Operations), later Executive Officer, 1st Battalion, 5th Cavalry, 1st Cavalry Division, Fort Hood, Texas; Chief, Plans, G-1, III Corps and Fort Hood, Fort Hood, Texas.

General Murray's awards and decorations include: the Distinguished Service Medal w/ Oak Leaf Cluster, the Defense Superior Service Medal with Oak Leaf Cluster, the Legion of Merit with two Oak Leaf Clusters, the Bronze Star Medal with three Oak Leaf Clusters, the Defense Meritorious Service Medal, the Meritorious Service Medal with two Oak Leaf Clusters, the Army Commendation Medal with Oak Leaf Cluster, the Joint Service Achievement Medal, the Army Achievement Medal with Oak Leaf Cluster, the Ranger Tab, the Combat Infantryman Badge, the Expert Infantryman Badge, the Parachutist Badge, the Air Assault Badge, the Joint Chiefs of Staff Identification Badge and the Army Staff Identification Badge.



General John Murray

Commander
U.S. Army Futures Command

GEN John Murray, Commander, U.S. Army Futures Command, spoke recently to A&M regarding his top priorities as the Army continues modernizing, targeting operational systems for improvement.

A&M: What are some of AFC's primary focus areas as the command oversees broad force enhancements?

GEN Murray: The aim of the Department of Defense's newly-activated U.S. Army Futures Command (AFC) is to provide concepts, capabilities and organizational structures for future soldiers to dominate a future battlefield. The command works closely with the eight Cross-Functional Teams, or CFTs, that focus on top modernization priorities, those CFTs include: Long-Range Precision Fires, Next Generation Combat Vehicle (NGCV), Air and Missile Defense, Future Vertical Lift (FVL), Army Network, Synthetic Training Environment, Assured Position and Navigation, and Soldier Lethality.

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U.S. Army Spc. Haley Haye (back) and Sgt. Leonalyn Barnes, assigned to 5th Squadron, 4th Cavalry Regiment, 2nd Armored Brigade Combat Team, 1st Infantry Division, perform maintenance on an M3 Bradley Fighting Vehicle to prepare for a tactical movement, part of the Joint Warfighting Assessment (JWA), Grafenwoehr, Germany. JWA helps the Army evaluate emerging concepts, integrate new technologies, and promote interoperability within the Army, other services, U.S. allies, and other coalition partners. JWA is the only exercise venue assessing 27 concepts and capabilities while aligning with U.S. Army Europe Readiness and other component exercises, such as Combined Resolve X and Blue Flag 18 with a focus on a ready, interoperable joint force capable of accomplishing the mission and over matching current and future enemies across the range of military operations. (U.S. Army photo by Staff Sgt. Julie Jaeger)

A&M: What are some program priorities that you see as critical to future force readiness?

GEN Murray: Army Chief of Staff Gen. Mark Milley has made it clear that the ability to grow new systems over long periods is a top priority.

The Bradley concept went on the drawing board in the 1960s but didn't come into the formations until the early 1980s. It has been incrementally upgraded for more than four decades to continue service.

The Next Generation Combat Vehicle, or NGCV, must do the same. It will arrive with advanced capabilities but must continue to be upgraded and adapted. Specifically, its onboard power must be able to be increased as power needs on the future battlefield will be greater than they are today.

That's the one thing we know that's going to go up is you're going to hang more stuff on a vehicle and it's going to take more and more power. So the ability for that vehicle to generate more onboard power was the number one growth requirement. Realistically, the Army will be able to field about a brigade's worth of NGCVs each year under current budgets. That means 20 years before all Army ABCTs are fielded. But version two of the NGCV won't wait on version one in the fielding calendar. New iterations will fill the inventory as the vehicle advances.

A&M: In terms of Multi-Domain Operations, how is AFC working to adapt Army culture to the concept?

GEN Murray: The U.S. Army in Multi-Domain Operations (MDO), 2028 is the first step in this doctrinal evolution. MDO describes how U.S. Army forces, as part of the Joint Force, will militarily compete, penetrate, dis-integrate, and exploit our adversaries in the future. It will start to drive how we're organized. It will start to drive the leader development process. It will start to drive the facilities that we'll need to either be capitalized or built new.

Past efforts at radical change to Army platforms, such as failed efforts to effectively field the Comanche helicopter, Crusader self-propelled artillery and Future Combat Systems brigade-level manned-unmanned vehicle teams, faced a number of challenges that led to their cancellations.

The current push has the Multi-Domain Operations (MDO) concept of future warfare driving the individual programs, cross-functional teams and the futures command. Part of the past failures involved messaging. When the Army went to Congress and said it needed a cannon that fired twice as far, the explanation was because it was better to fire twice as far. By pointing to the near-peer threats and realistic scenarios on actual terrain such as regional flare-ups with China and Russia, there's more understanding of why the Army needs what it needs and why it's important.

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General Murray answers questions about AFC during a press conference held at the University of Texas System's building in Austin, Texas. The establishment of Army Futures Command marks one of the most significant Army reorganization efforts since 1973, when the Army disestablished the Continental Army Command and Combat Development Command, and redistributed their functions between two new commands, U.S. Army Forces Command and U.S. Army Training & Doctrine Command. (U.S. Army photo by Sgt. Michael L. K. West/Released)

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The use in recent years of a continuing resolution to intermittently fund Pentagon priorities rather than a full, annual budget will have impact on Army priorities. The Army will continue to prioritize readiness over future commitments. That means if budgets are delayed or they dwindle, the projected timelines will shift out longer. Also, quantities of items that the Army needs will take a hit. Anticipated quantities of vehicles, tactical kit, weapons and necessary munitions for both current operations and stockpiles may be reduced.

A&M: In terms of the Army's view of acceptable risk, how do you assess as needed here?

GEN Murray: The Army needs to change its culture of addressing risk. The core values and initiatives the Army must remain the same. But what will have to change is the Army's culture of risk aversion. In the past few decades, anytime something failed in acquisition, a new regulation, instruction or law was put in place. That's resulted in a maze of regulations that slow-walk items through development and discourage risk taking.

The first true test will come when something fails. If the Army or Congress crushes the responsible individual or program then they'll never change the risk-averse Army culture. The Army must better communicate what it does and why it does it.

A&M: As new technology arises, how can the Army create a culture of openness to investing in future capability?

GEN Murray: The Army's newly acquired Integrated Visual Augmentation System will blend augmented reality, night vision, way-finding and targeting information much like a jet fighter pilot's helmet but in an infantryman's goggles.



General Murray addressed the U.S. Army Combat Capabilities Development Command Aviation & Missile Center workforce during a town hall held at the Bob Jones Auditorium in Redstone Arsenal, Ala. (U.S. Army Futures Command)

As artificial intelligence, or AI, becomes more prevalent, ultimately the American people will decide what is the ethical application of AI and what is not. The military-to-industry and military-to-civilian conversation is important.

Other countries are leading AI implementation on the battlefield. The U.S. public needs to understand the threats and uses of AI and other advanced tech. The previous Army strategy, which was delivered to Congress last year, was more focused on materiel solutions. However, the upcoming doctrine will drive the Army towards more of a holistic solution as opposed to just materiel. Specifically, the Army will be focused on "DOTMLP," or Doctrine, Organization, Training, Materiel, Leadership and Education, and Personnel and Facilities. The new doctrine addresses how the service plans to operate against adversaries who engage in provocative behavior in a gray area that doesn't quite classify as conflict. These adversaries have studied U.S. capabilities, and have developed equipment and operating concepts that threaten the U.S.' long-standing overmatch capability.

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ADDRESSING FUTURE COMBAT COMPLEXITY FROM THE SKY

The U.S. Army is committed to maintaining vertical lift dominance with the development of critical combat systems needed to prevail in future wars by making a “leap-ahead” in lethality, survivability, and reach to find, fix, and destroy pacing threats. Future Vertical Lift, or FVL, is expected to enable all of this and more.

By BG Walter Rugen, Director, U.S. Army Future Vertical Lift Cross Functional Team, and COL Michael Best, Director, Aviation Capability Development and Integration



An Army AH-64 Apache helicopter fires a rocket during a combined arms live-fire exercise near Litchoro, Greece. A Future Attack Reconnaissance aircraft is needed to prevail in future wars by enabling a “leap-ahead” in lethality, survivability, and reach to find, fix, and finish pacing threats. (U.S. Army photo by SSG Kris Bonet)

The U.S. Army currently possesses vertical lift aircraft that have served us well over the last four-plus decades and should continue to serve with distinction for several decades into the future. We’ve maximized the incremental modernization of these aircraft that were originally designed in the 1970s. We need clean sheet designs that fully leverage the digital technology environment of today versus the analogue environment of the 1970s. The Army requires the leap-ahead technology to greatly improve joint force ability to operate dispersed over wide areas with the ability to rapidly converge in order to penetrate the multiple layers of stand-off employed by the threat, dis-integrate A2/AD systems, and exploit this advantage to achieve strategic objectives in order to return to competition. Capabilities in reach (speed, range, endurance, and range/agility), lethality and protection to provide the effectiveness required in a future, more complex operating environment are at the core of Future Vertical Lift (FVL). We’ve entered into a period of great risk with increased power competition fueled by near-peer



adversaries and continual rapid advancements worldwide in artificial intelligence, radar and drone technologies. The proliferation of technology among state and non-state actors is challenging the advantages the U.S. and our allies have enjoyed for decades. As we assess the emerging capabilities of peer and near-peer threats, especially in the multi-domain environment, it’s evident that capability gaps exist in our current fleet. Without intervention, without modernization, U.S. capability will fall short in providing the preeminence the Army has experienced since WWII. Not only must we maintain U.S. and allied dominance, we must expand our supremacy to counter these increasingly lethal and complex threats.

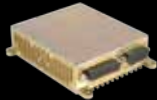
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The threat environment in Multi-Domain Operations (MDO) will be precipitously more intense, dictating the requirement for increased speed and greater range

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A RQ-7B Shadow tactical unmanned aircraft system from Regimental Engineers Squadron, 2d Cavalry Regiment climbs for altitude at Balli UAS Airfield on Rose Barracks, Vilseck, Germany. Beginning in fiscal year 2020, Brigade Combat Teams will field "off the shelf" Unmanned Aerial Systems for a long-term evaluation to determine requirements for an RQ-7 replacement. (U.S. Army photo by Gertrud Zach)

combined with improved agility. To ensure increased lethality and survivability of Future Vertical Lift or FVL systems in the MDO fight, we must operate at low altitude, within radar clutter in urban areas and be remarkably interoperable across all Army modernization priorities, to create a highly capable ecosystem of aviation platforms. We must bring tactical effects from operational and strategic distances, operating from relative sanctuary with the agility to quickly aggregate and penetrate enemy A2/AD capabilities. Then, proceed to dis-integrate air defense and fires systems at the time and place of our choosing to create chaos in the enemy's decision cycle. Finally, exploit through superior speed, range, endurance, and agility. We will be lethal through generating overmatch with deep interoperability and synergy between intelligence, long-range precision fires, maneuver, and network. Our recent round of high fidelity physics-based modeling informs us that the lower tier of the air domain could prove decisive due to the future capability and aviation force the Army is developing.

FVL systems will possess leap ahead capabilities over our current fleet, providing our forces with a striking advantage on the future battlefield. FVL will employ disruptive technologies including considerable advances in vertical lift design in advanced configurations. Innovative design will enable FVL to overcome current rotary wing limitations, setting the conditions for revolutionary improvements in speed, agility, flexibility, efficiency, and sustainability. Success on the future battlefield will require an unprecedented level of integration, enabling simultaneity of action across our formations. Simultaneity will be the result of increased processing power, algorithms supporting artificial and augmented intelligence, robotics, advanced teaming, and resilient networks--the glue that will hold the enterprise together.

FVL will embed an open system architecture that will allow it to be optionally manned, fully leveraging autonomy, and efficiently upgrade at the pace of technology through multi-core processing. The teaming between the manned and unmanned aircraft will be taken to the next level, so that we can find, fix, and finish our pacing threats well within our critical path kill chain timeline. FVL will advance and achieve flight in degraded visual environments, employ air-launch drones, be capable of in-flight dynamic re-routing based on changing threat or weather conditions, and autonomously refuel. FVL cockpits will drastically off-load the cognition required for aircrew so they can concentrate on the highly complex fight in degraded and denied environments and aircrews will fight our drones, or air-launched effects, so the drones conduct the dangerous, dirty and/or dull aviation tasks. Lastly, our lethal capabilities will generate the stand-off required to operate outside threat system ranges and generate the overmatch to destroy, degrade, or suppress these threats.

SOLDIER-TARGETED ADVANCES

In the near-term, we have an effort underway to develop requirements for the replacement of the RQ-7 Shadow Unmanned Aerial System (UAS) within our Brigade Combat Teams (BCTs) that will include fielding "off the shelf" UAS to six Shadow Platoons for long-term evaluation beginning in FY20. This is in response to validated Operational Needs Statements from commanders in the field which delineated the need for runway independence, reduced audible signatures, and smaller equipment footprints. In 2020, we will put these new systems into Soldiers' hands in order to gather their feedback and insights from employing the aircraft in training

and in operational environments. The six BCTs will receive systems to demonstrate at home station and during Combat Training Center (CTC) rotations. Units will have these systems for a minimum of six months to integrate into their training and develop Tactics, Techniques, and Procedures. The lessons learned from these non-developmental systems will provide critical information to develop the future system which will replace the Shadow Tactical UAS in BCTs with expeditionary, highly capable, and runway-independent UAS.

An additional, new capability being developed is called Air Launched Effects, or ALE. The paradigm of counter-insurgency operations with the employment of UAS in a high altitude, loitering intelligence, surveillance and reconnaissance asset is no longer valid in the MDO environment. ALE will, in essence, be an unmanned aircraft which is launched from another, larger aircraft. ALE will be a family of air vehicles in varying sized form factors with differing missions, speeds, ranges, and endurance. ALE will conduct Reconnaissance, Surveillance, Target Acquisition (RSTA), Electronic Warfare (EW), and other offensive operations in support of the ground tactical commander. ALE will function as part of the Advanced Team with a large group of other ALE, UAS and manned aircraft. This Advanced Team will create chaos for the enemy and enable penetration of Area Access/Area Denial in MDO. Current and future fleet aircraft, such as Apache, Future Attack Reconnaissance Aircraft (FARA), Future Long Range Assault Aircraft (FLRAA), and Gray Eagle will have the ability to launch ALE and to interact with ALE via a handheld Scalable Control Interface (SCI). Army aviation already successfully demonstrated an ALE launch from a UH-60 Blackhawk in May 2019 during the Joint Warfighter Assessment Robotic Complex Breach demo in Yakima, WA.



Army Aviation successfully demonstrated an Air Launched Effects launch from a UH-60 Blackhawk during the Joint Warfighter Assessment Robotic Complex Breach Concept demonstration in Yakima, WA. (U.S. Army photo by CCDC AvMC ADD)

efforts and resourcing on development of the future fleet. The CBO further projects that the annual costs of aircraft procurement from 2019 to 2050, inclusive of FVL acquisition, is below the average budget for the procurement of Army aircraft from 2010-2018.

We've built a very lean and cost-conscious strategy and culture. As we near the end of the 2020s, the current fleet will require recapitalization as the FVL systems begin production and fielding. Fielding of new platforms will negate the requirement and cost of recapping the majority of the current fleet. The result will be a leap ahead in capability as opposed to investing in recap of the legacy fleet, only to be stuck in 2030 with the same capability we had in the 1990s. We must develop and generate the ability to dominate on future battlefields. ■

BUDGETING FOR FULL LIFE CYCLE

The timing is right to begin development of future aircraft systems now as the Army frankly cannot afford to delay Army Aviation modernization. According to the May 2019 Congressional Budget Office (CBO) report regarding the cost of replacing today's fleet, the significant investment in Army aircraft that occurred from 2007-2016 greatly reduces acquisition costs of current aircraft types through the 2020s while we focus our

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PROCURING TARGETED LETHALITY FOR ACCELERATED READINESS

Colonel Justin W. Eggstaff currently serves as the Director of the Marine Corps' Operational Test and Evaluation Activity (MCOTEA). Colonel Eggstaff was commissioned in January 1996 through the Marine Corps' Platoon Leader's Course. After graduating from The Basic School in October 1996, he was designated an Unrestricted Naval Aviator in August 1998. Assigned to fly the AH-1W Attack Helicopter, Colonel Eggstaff served with HMLA-369 at Camp Pendleton, CA deploying multiple times to the Asia-Pacific and Middle Eastern theaters. While at HMLA-369, he served in numerous squadron billets, including the Logistics Department Head, Ground Safety Officer, NATOPS Officer, NATOPS Instructor, Human Affairs Officer, and several maintenance officer billets. In addition, Colonel Eggstaff served as a Forward Air Controller (FAC) with the 3rd Battalion/5th Marine Regiment.

In June 2003, Colonel Eggstaff was selected to the U.S. Naval Test Pilot School Cooperative Program. After graduate school at the Air Force Institute of Technology in Dayton, OH, and Test Pilot School at Naval Air Station Patuxent River, MD Colonel Eggstaff served as the lead H-1 Developmental Test Pilot and Operations Officer for the Navy and Marine Corps' rotary wing test squadron, HX-21. While at HX-21, Colonel Eggstaff became a member of the Defense Acquisition Corps (DAC) and was selected for the Marine Corps' Professional Acquisitions Community (PMOS 8059). Following his assignment as a Developmental Test Pilot, Colonel Eggstaff served in numerous billets at Naval Air Station Patuxent River, including: H-1 Class Desk, Chief Engineer, Deputy Program Manager, and Marine Detachment Executive Officer. In July 2013, Colonel Eggstaff was selected to attend Top Level School at the Eisenhower School, National Defense University. At the completion of Top Level School, he was assigned to the Joint Staff as a Requirements Officer in the Capabilities and Acquisition Division of the J-8 Directorate. In July 2017, Colonel Eggstaff was selected to serve as the Military Deputy to the Deputy Assistant Secretary of Defense for Manufacturing and Industrial Base Policy in the Office of the Secretary of Defense.



Colonel Justin W. Eggstaff

Director, Marine Corps
Operational Test and Evaluation Activity

A&M: With Operational Test Activity (OTA) involvement throughout the acquisition lifecycle, how does your team focus target aspects to shorten OTA and lengthen optimal system life?

Col. Eggstaff: Can I start with an analogy? At some point, we've all been given a project from our boss. How frustrating would it be to go back to your boss to show what you've done only to have your boss say, "That's not what I wanted! Try again." The waste...time, money, opportunity lost on other things you could have been doing. No way! For any project, you incorporate status checks, regular updates, etc. to ensure your work is on track with your boss's vision so that you don't waste precious resources. Traditionally (or historically), so-called "Operational Testing" in DoD acquisitions occurs towards the end of a program's development cycle. By DoD Instruction 5000.02, the capstone Independent Operational Test & Evaluation or IOT&E event occurs after system development and the Milestone C Acquisition Decision (effectively, the decision to enter low rate initial production (LRIP)) and prior to approving Full-Rate Production (FRP) and Fleet introduction. In that view, IOT&E is sometimes referred to as the program's "Final Exam." Of course, waiting until the very end of the Engineering, Manufacturing and Development (EMD) portion of the acquisition lifecycle to finally hear how the system performs under realistic conditions is a terrible idea. By that time, it's often too costly to make meaningful changes or worse, start from scratch. At MCOTEA, we start by "imagining" what a full-blown IOT&E would look like if we were

A&M: Please provide some background into your role and mission in today's global operational environment.

Col. Eggstaff: The U.S. Marine Corps established the Marine Corps Operational Test and Evaluation Activity (MCOTEA) as a way to provide the Commandant of the Marine Corps with an independent assessment of materiel solutions in order to inform production decisions. At MCOTEA, we take a combat system like the new Joint Light Tactical Vehicle (JLTV), give it to Marines, place them in a realistic operational environment, collect data on how well they accomplish their mission with the new equipment, survey the Marines to hear their thoughts, and report about how effective, suitable, and survivable that system can expect to be if purchased for the Marine Corps.

to actually wait until that production representative test article were available after Milestone C, break down the mission sets into measurable components and knowledge points, then look across the development cycle to find where we can gather as much data as soon as possible in order to provide that insight to the decision-maker. That translates into a shorter and more deliberate IOT&E AND the better chance we have to catch an issue before it becomes too late or too costly to fix. The more we “know” about a system before we have to test it, the less we have to “find out” during the Final Exam.

A&M: As the testing morphs to demonstrating a system in an operational environment, talk about some strategies your team is using to maximize true results.

Col. Eggstaff: The difference between “testing” and “demonstrating” a system in an operational environment has a very specific nuance that is incredibly important to us at MCOTEA as it relates to uncertainty. Testing ensures that a product works, while a demonstration assumes that a product works. We’ve all walked through the mall and have been asked to watch a salesman demonstrate a product. Through one demonstration, the salesman’s intent is to convince us that their product has an intended effect. However, the decision to buy this product comes with a high level of uncertainty. What happens when you get it home? Will it perform the same way it did in the mall? Is your home even like the environment in the mall? Did the salesman have certain tricks for the making it work? All of this leads to uncertainty. Of course, the salesman knew that the demonstration would be successful because he’s repeated it enough times to know that it would work. At MCOTEA, our job is to make sure the products the Marine Corps intends to purchase have been repeated enough times and in all of the scenarios and intended environments that we are as certain as the salesman before we decide to buy. We work to develop a testing strategy that uses the power of repeated demonstrations over time to reduce uncertainty. Our accumulation of knowledge over time informs the various decisions throughout the acquisition lifecycle. Ideally, we are involved during requirements generation. Starting at that “good idea” and continuing throughout the development of a system, if we hope to field systems rapidly at the “Speed of Relevance” in accordance with the National Defense Strategy, we must start with the end-state in mind.

A&M: Some challenges in today’s Marine Expeditionary Force (MEF) are dictating greater flexibility of deployment, can you speak to some areas?

Col. Eggstaff: The Marine Corps needs to be adaptable and able to tailor its forces to meet existing and emerging adversaries. In order to maintain flexibility and deploy Marines at the cutting edge of technology, we must be able to rapidly prototype and field capability. In other words, we are now in an environment where decision-makers are willing to take acceptable risk and field systems that are “good enough.” When “speed” is the name of the game, many consider our traditional development processes “broken.” They’re not. They’re just not designed to provide less than “complete” solutions. Our so-called traditional acquisitions processes, whether you call it DoD 5000, a waterfall approach, a systems engineering “V,” or another classic development process, are designed to systematically buy down or eliminate risk. Their intent is to navigate from a user need or capability gap to a robust, stable materiel solution, complete with mature logistics support and supply chain, adequate training, and tactics, techniques and procedures that ensure a seamless introduction and integration to the Fleet. Sure, we can tailor these

processes in an effort to go faster; however, eliminating bureaucracy, “trimming the fat” or otherwise skipping so-called unnecessary steps has proven hard to do. Acquisition professionals across DoD are trying to figure out innovative ways to develop and deploy systems faster.

A&M: In terms of rapid prototyping and fielding, elaborate on ways your team is working to shorten the front-end of the acquisition lifecycle.

Col. Eggstaff: So, I stated that we are now in an environment where decision-makers are willing to field systems that are “good enough,” realizing that waiting for that complete solution will take too long. Decision-makers are willing to take acceptable risk. That being said, decision-makers must know the truth, good or bad, about the system they intend to field. So, what does that mean for MCOTEA? It means that operational testing, especially when rapidly prototyping and fielding, must be understood for its true purpose, reducing uncertainty, not reducing risk. We want the decision-maker to understand the risk they are preparing to take. I’ve been talking a lot about how we are working to be involved throughout the acquisition timeline. I’ve argued that operational test shouldn’t be considered a final exam for an acquisition program. That doesn’t change. In fact, it now becomes more important than ever. If we are going to field systems faster, decision-makers need to understand the risks associated with a system in order to decide when they’re at an acceptable level to deploy. In order to facilitate this, we’ve been working to characterize a system’s risk in terms of their suitability and effectiveness in the clearest terms possible. One area where I feel we’ve really made headway is in cyber. Instead of simply listing gaps or vulnerabilities in the system, we’ve begun to explain cyber survivability in terms of a system’s resilience and durability, much more meaningful metrics of a system’s survivability in a cyber contested environment.

A&M: From a cybersecurity testing perspective, speak to the resilience and durability of USMC expeditionary systems.

Col. Eggstaff: Let’s say you’re in your car. Do you need gas? It depends. Some people wait until the low fuel light comes on, while others look for a gas station at ½ tank. We may not all agree on when to fill up, but we can agree on the objective measure that informs our opinion: the gas gauge. The gas gauge is a way to assess risks. If we’re in town near a gas station, the risk may be low, but if we’re on an empty desert road with an empty tank, then the risk is higher. No matter the situation, the gauge shows how much fuel is left, and we can decide how much further we’re willing to drive before getting fuel. So, what if we had a gas gauge for cyber? With a cyber gauge we could determine how risky it is to take on a mission, and how many missions we can expect to complete before the risk gets too high. A gauge like this could help us decide if our system was good enough, or if we needed to stop to “fill up with gas.” MCOTEA’s cyber gauge measures operational resilience, the ability to resist, absorb, and recover from adverse cyber impacts to mission-essential functions. It’s sophisticated enough to consider a multi-function, multi-impact environment. It enables a decision-maker to look at this gauge, and if the risks are too high, then they can decide to spend more time and money fixing vulnerabilities. The cyber gauge has one other feature that’s useful, it changes with use. It helps us see the durability of our resilience over time and helps us understand how much current and future risk we face. With this information decision-makers can consider how much risk they are willing to accept. If they want to reduce risk, they can put more “gas in the tank” (i.e., fix vulnerabilities, update anti-virus, etc.) and buy back resilience.

CONNECTING THE CORPS

The Defense Logistics Agency (DLA) National Account Manager (NAM) team is working closely with the U.S. Marine Corps to ensure readiness regardless of location or conditions.

By Dianne Ryder, Defense Logistics Agency



Marine Corps Lance Cpl. Gregory M. Crossway, a bulk fuel specialist with Marine Wing Support Squadron 371, extracts fuel using an aviation test kit during a deployment for training at Grant County International Airport, WA. DLA-procured fuel is one of the service's high-demand items. (Photo by Marine Corps Lance Cpl. Juan Anaya)

Marines have historically worked in austere environments and virtual isolation. Self-sufficient, they've learned to solve problems on their own.

Relying on anyone outside their immediate sphere is contrary to Marine Corps ethos, said Col. Steve de Lazaro, Marine Corps National Account Manager for the Defense Logistics Agency (DLA). He also mentioned that his team ensures the Marine Corps understands what DLA can offer it as an expeditionary force supporting naval and joint operations. "The art of that comes in when you can marry up the service's needs with the capabilities DLA has," de Lazaro said.

Nurturing relationships with subject matter experts at DLA's headquarters and major subordinate commands is key to getting the right data to Marine Corps partners. "Having all the NAM teams next door to one another is a great way to bounce ideas off each other and find out what one service might be doing, even borrowing good ideas," de Lazaro noted. "That's why they pull us into DLA, to bring that operational experience and see how we can apply those DLA capabilities to some of the problems and challenges we've seen as operators."

The NAM team gets daily calls from Marines who need help developing solutions for a variety of operational logistics problems and clarifying how DLA processes can help them, de Lazaro said.

"We do a fair bit of trouble-shooting as we focus on operational and strategic programs," he said. "We give them a good answer or we direct them to the folks they need to be speaking with. That's another facet of the NAMs' job – not necessarily solving everybody's problems, but getting them connected to the right people."

Like most of the Marine Corps NAM team members, Senior Logistics Specialist Tom Adissi is a former career Marine who served for 23 years. "Helping the Marine Corps get tied in from a service perspective and understand how the industrial base keeps that going – that's the big motivation," Adissi said. "The team helps Marines adjust some of their processes and procedures to leverage DLA support."

FROM ADDITIVES TO ACQUISITION

A priority for the Marine Corps and DLA is increasing the use of additive manufacturing. Manufacturing parts with a 3D printer reduces time and cost, especially compared to ordering specialized parts that may not be readily available. The service hopes to have Defense Department guidance on certification and testing of 3D parts in the

coming months, Adissi said. Until then, DLA will continue pursuing additive manufacturing opportunities with Marines.

The NAM team is also working with Marines to get involved earlier in the service's acquisition process for vehicles and parts, such as with the Joint Light Tactical Vehicle being fielded to Marine Corps units in the next few months. The agency already has the majority of the parts cataloged and provisioned, which allows supply planning for as many as 10,000 parts and eliminates the need for extended contracted support, Adissi remarked.

"Early inclusion of DLA in the acquisition process eliminates the two- to three-year process of establishing cataloging data for the parts and appropriate industrial base support after the weapons system is fielded," he added.

SERVICE ACCURACY PARAMOUNT

Customer support representatives (CSRs) like Dean Cassel are also a valuable part of the NAM team and regularly interact with Marine operating forces and supporting commands. Cassel has been a CSR to the Marine Corps for 11 years and is co-located with Program Executive Officer Land Systems and Marine Corps System Command customers in Quantico, VA. He answers requests for assistance, trains customers to use DLA ordering and self-help tools, and helps solve emerging issues. Because of his military and civilian experience, his customers know him and continually seek his help. "To build trust, you show up; and when I say that, I mean you show up to their meetings when you get invited," Cassel indicated. "You show up and talk to them on a daily basis. I don't sit at my desk all day. I walk around, I talk to these people and I ask them what's going on."

Errors in the service's stock control system and Distribution Standard System recently sent Marine Corps stock to DLA Disposition Services for disposal. The stock, worth more than \$1 million, included items needed to complete an upgrade of the Marine Corps' medium tactical vehicle fleet. "They needed immediate assistance to get this stuff back. I made the phone calls and connected all the dots, discovered what actually happened and was able to explain that to the different commands," Cassel said.

"NAM team members rely on the CSRs to identify, engage and resolve issues for the Marine Corps commands they support, keeping the team informed as they work various issues," de Lazaro emphasized. "There are times when resolution requires a more holistic response from the agency. The NAM team may be able to anticipate obstacles and request resources from DLA directorates or MSCs. This was the case with the Marine Corps stock scheduled for disposal," he added. "We assisted Dean by enlisting the support of various subject matter experts across DLA Logistics Operations, DLA Finance, DLA Distribution, and DLA Disposition Services."

Tom Stevenson, assistant program executive officer for acquisition, logistics and product support at the Program Executive Office Land Systems (PEO LS), can testify to Cassel's commitment to the service. Stevenson has spent the past 10 years at PEO LS arranging acquisition support for the Marine Corps' transportation equipment. Cassel recently helped him resolve thousands of discrepancies between Marine Corps data systems and DLA's weapons systems support database. "His expertise has allowed for orders to flow smoothly between our Marines and DLA," Stevenson said. "A lot of work was done by my folks, but Dean helped make sure we were getting the right information so we knew what to go fix in terms of the data."

Stevenson recounted a 2017 incident when the Marine Corps noticed the cost of parts for its medium tactical vehicle replacement trailer had skyrocketed. Because DLA had made no purchases within the last couple of years, the production line had gone cold, he noted.

Working with DLA's Logistics Information Service and DLA Land and Maritime, Cassel helped Marines correct technical data and drawings, which enabled DLA to competitively procure the parts and return costs to normal. "I researched the technical data and found that the drawing they provided had errors, causing the DLA supply chain to try and procure the parts from the trailer's original manufacturer," Cassel said. "These items had a cold production line which had to be restarted, raising the costs by 1,000%."

"Problems and issues like this aren't easily resolved without the NAM team helping the Marine Corps," Adissi added. "We should be their focal point. All their questions should come to us; we have the expertise to fan it out to the enterprise as opposed to them going to all the MSCs," he said. "The front door for them is us." ■



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BUILDING SUSTAINABLE READINESS IN TACTICAL FORMATIONS

MG Kurt Ryan currently serves as the Deputy Chief of Staff, G-4, U.S. Army Forces Command (FORSCOM), Fort Bragg, NC. He comes to FORSCOM from Scott Air Force Base where he recently served as the CG of the Military Surface Deployment and Distribution Command.

A graduate of York College of Pennsylvania, Major General Kurt J. Ryan was commissioned a Second Lieutenant, Regular Army in 1987.

He began active duty service in the U.S. Army Ordnance Corps, a career now spanning 32 years. The majority of his defense experience is with tactical Army formations, twice serving as a Paratrooper in the 82nd Airborne Division, two tours with the 101st Airborne Division (Air Assault), a tour in Germany with the 1st Armored Division, duty in upstate New York with the 10th Mountain Division (Light Infantry), and assignment with the First U.S. Corps in Washington State.

He commanded troops on six occasions; as a Company Commander in Germany, Battalion Commander in North Carolina, Brigade Commander in New York, Commanding General of an Expeditionary Sustainment Command in Washington State, as the CG, U.S. Army Ordnance Corps in Virginia, and as the CG, Military Surface Deployment and Distribution Command in Illinois.

Over his career, he participated in seven named military operations, ranging from humanitarian assistance and disaster relief (New Orleans and the Philippines), peace-enforcement and peace-keeping (Bosnia-Herzegovina), and four combat tours in U.S. Central Command (Iraq and Afghanistan).

Major General Ryan has a lifelong passion to continue to learn and grow. He is a graduate of numerous military schools and received two Masters of Science degrees; from the Florida Institute of Technology (Logistics Management) and the U.S. Army's War College (Strategic Studies).



MG Kurt Ryan

Deputy Chief of Staff for Logistics
U.S. Army Forces Command

Armor & Mobility spoke with MG Kurt Ryan, Deputy Chief of Staff for Logistics, U.S. Army FORSCOM, regarding readiness in tactical formations as the Army has moved from the Army Force Generation concept to Sustainable Readiness.

A&M: Could you give us a quick review of how the Army readiness concept has changed over the last few years and why the new change in how readiness is generated?

MG Ryan: Let me first start by saying that our nation has found itself preparing for future conflict since it declared independence from Great Britain in 1776. In fact, George Washington once said "To be prepared for war is one of the most effective means of preserving peace". Clearly our methods to build and sustain readiness have evolved over the last two hundred plus years but still today we must remain ready to defend our nation whenever and wherever we are called.

In 2006, the Army implemented a new force generation construct called Army Force Generation (ARFORGEN). ARFORGEN was a model to achieve progressive levels of readiness with recurring periods of availability. Units returning from deployments went over the proverbial "readiness cliff" and equipment used during deployment was turned in for months of required reset, and left-behind equipment was reclaimed from a low-usage status after long-term storage.

Observations in the field showed us that ARFORGEN led to significant atrophy of fundamental components of readiness because it did not focus on building and maintaining sustained readiness. Crewmembers and maintainers alike lost the critical skill sets of maintaining their own equipment and leaders atrophied in the skills to manage maintenance, supply discipline and property accountability. General Milley, in his role as the 39th Chief of Staff of the Army, commented in a recent Army Sustainment article that "We were on a downward slope of readiness relative to the tasks required to be able to fight near-peer competitors. Our readiness was probably okay for counterinsurgency and counterterrorism but not for the higher end of warfare." General Milley's comments highlight earlier assessments that drove the institutional change to Sustainable Readiness (SR) in 2016.

Under SR, it is no longer good enough to focus solely on the next assigned unit mission. Combat formations must be "Ready Now" to



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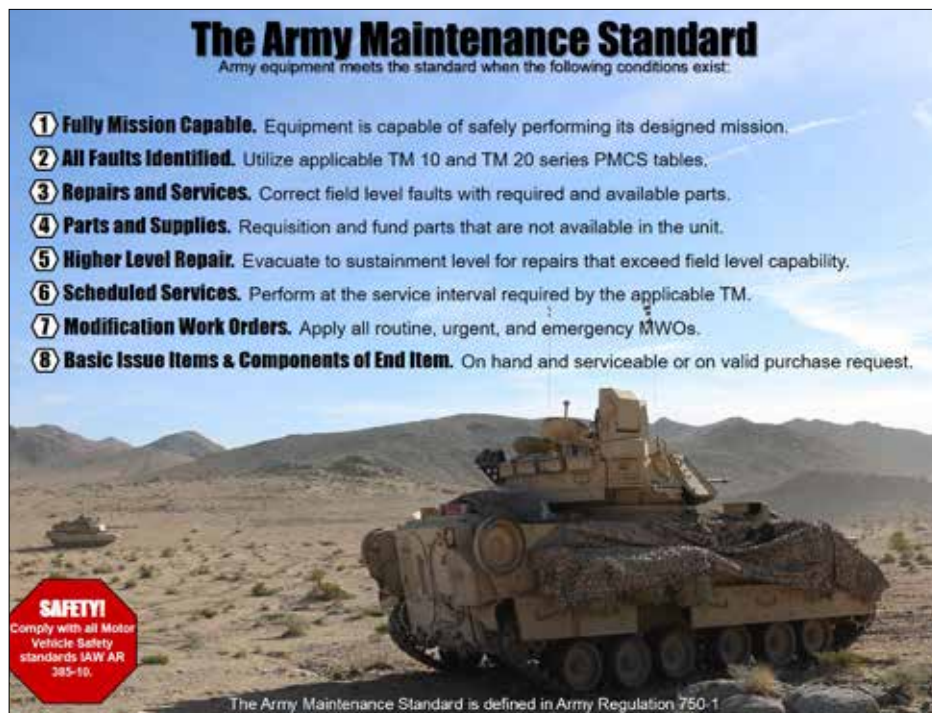
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The Army's Maintenance Standard as outlined by AR 750-1 addresses requirements including eight standards that must be met before equipment can be considered TM 10/20 compliant. (DA)

mitigate risk which accompanies uncertainty in our environment, and be prepared to fight Large Scale Ground Combat Operations (LSGCO) in multi-domain environments. Unlike ARFORGEN that created steep peaks and valleys in readiness levels, SR means resourcing units within a band of excellence that allows commanders to sustain the highest levels of readiness over time, and stay there.

A&M: U.S. Army FORSCOM has the tremendous responsibility of providing trained and ready forces to the Combatant Commands. From your position as the HQ's senior logistician, where has the change from ARFORGEN to SR been most apparent in regards to readiness?

MG Ryan: Let me answer that by first saying that I believe readiness begins with how well our units are manned, equipped, operationally maintained, trained, and led. Commanders need to empower subordinate leaders to focus on hard, realistic, and demanding training. Within my purview, they must also maintain the readiness of their equipment and be cautious to not allow training to outpace their unit's ability to sustain itself.

Over the last three years, we've made a fundamental change in how we train and deploy our formations. Tactical formations are back to fully using all equipment authorized by their modified tables of organization and equipment. They are exercising vehicles and systems at a higher operating tempo and conducting more training at home station. The fundamental change requires an effective command maintenance program regardless if the unit is in garrison, home station field training, a Combat Training Center (CTC) / Warfighter Exercises (WFX) or deployed.

FORSCOM's command training guidance makes it clear that commanders are responsible for maintaining all equipment to "TM 10/20" standard. Maintaining equipment to the TM 10/20 standard is a readiness imperative. Surprisingly though, I've spent much of my time since arriving at FORSCOM conveying to the field what TM 10/20 really means. The vast majority of our junior Soldiers and leaders perceive that the standard of equipment readiness is fully mission capable (FMC).

FMC is but just one of eight conditions of the Army's TM 10/20 standard.

I do acknowledge that there are multiple drivers to why units might accept risk and not complete all eight TM 10/20 tasks to the full standard. Leaders must carefully manage all resources (manning, funding, facilities, equipment, and time) to achieve 90-percent or better operational readiness rates for ground fleets and 75-percent or better readiness rates for aviation fleets. 90-100% is the band of excellence we should aspire to achieve.

The results of not conducting TM 10/20 maintenance was revealed in a recent FORSCOM Inspector General report on Field Level Maintenance. The findings concluded that the high tempo, lack of predictability, and disregard for established standards are driving poor, high-risk decision making at company-level and below. Taking short-cuts or failing to take corrective action in accordance with all requirements of the TM 10/20 standard places undo risk on the operator and crews and adds risk to the mission as well. A unit not ready cannot fight. A unit that cannot fight effectively

with all of its equipment will not win.

A&M: You have mentioned that the Army Standard of TM 10/20 goes beyond a piece of equipment just being fully mission capable. With that said, can you give us a greater sense of what conditions must exist in order for a piece of equipment to meet the standard and be operationally ready?

MG Ryan: The Army has one maintenance standard and that standard is clearly defined in Army Regulation 750-1. TM 10 series and TM 20 series, and/or other appropriate technical data plans specifically describe the maintenance requirements and conditions that must be met for each piece of equipment. Only when all eight conditions are met is the equipment considered to have met the TM 10/20 standard.

The following are those eight conditions as I can best define them:

The equipment is FMC. Simply put, the equipment can perform all missions it was designed to perform. The reinforcing safety considerations within the Army Safety Program (AR 385-10) are noted with FMC. That said, we must strike the lexicon of Partial Mission Capable or FMC plus Safety from our culture. There is no such standard. Safety is inherent to FMC.

All faults are identified following prescribed intervals using the TM 10/20 Preventive Maintenance Checks and Services (PMCS) tables. Equipment readiness begins with the operator of the equipment. A critical element for achieving fleet readiness in both ground and air systems is teaching and training operators and crews how to maintain their gear.

All repairs, services, and other related work that will correct field-level equipment and/or material faults for which the required parts and supplies are available are completed. The depth and breadth of unit shop stocks, bench stocks, and supply support activities (SSA) are critical to the sustainment of our operational readiness. Supply availability at the

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tactical level reduces customer wait time and enables maintainers to more rapidly repair identified faults so that equipment can get back in the fight. Repair parts and petroleum, oil and lubricants are the lifeblood of equipment readiness.

Parts and supplies required to complete the corrective actions, but are not available in the unit, are on a valid funded requisition. Requisitioning parts based on accurate demands enable the wholesale level to improve supply availability over time. All leaders must master the Global Combat Support System - Army (GCSS-A). It is not a logistician's system - it is a Commander's system. Understanding every element of the "life of a requisition" will prepare leaders to ask the right questions at maintenance meetings, while walking through motorpools, or while visiting supply activities such as the SSA or unit supply rooms.

Corrective actions that are not authorized at the field level are evacuated to the sustainment level for repair on a valid work order. If the repair is not a responsibility at the field-level (level one of a two-level system) then it must be evacuated to an Army Materiel Command (AMC) maintenance activity. Only AMC maintenance activities are authorized to perform Sustainment Level repairs and the unit does not burden the cost of these repairs.

Scheduled services are performed at the required service interval. Soldiers must perform PMCS and scheduled services on their equipment as a qualification that is no different from qualifying on a rifle, tank or aerial gunnery range.

All routine, urgent, and emergency Modification Work Orders (MWOs) are applied to equipment and reported in the Modification Management Information System (MMIS). This condition also covers one-time Safety of Use Messages (SOUTs) and emergency Safety of Flight Messages (SOFMs).

All authorized Basic Issue Items (BIIs) and Components of End Items (CoEIs) are present and serviceable or on a valid supply request. This step of TM 10/20 is arguably the most overlooked of all. One notion why this step is often overlooked is because there is limited supply status provided on the DA Form 5988-E (Equipment Maintenance and Inspection Worksheet). FORSCOM is working closely with the Ordnance School and Combined Arms Support Command to revamp the 5988-E provided in GCSS-Army so that all eight conditions of TM 10/20 are depicted. This will help leaders at the lowest echelon to fully understand the readiness condition of their vehicles.

A&M: Obviously the supply system must support the maintenance operations of the organization. Can you elaborate more on what actions you see at the tactical level?

MG Ryan: Disciplined maintenance programs require disciplined supply operations, including the management of authorized stockage lists (ASLs), shop stocks, and bench stocks. Disciplined demand at the unit level is critical to driving readiness throughout the organic and commercial industrial bases. Disciplined demand drives down customer wait time and drives up availability and operational readiness. Brigade commanders must own the ASL review process to help shape the breadth and depth of the ASL, particularly the stock of readiness drivers and shop stocks.

Tactical commanders don't often realize that they are also the pseudo Chief Executive Officer of a multi-million dollar supply operation. Our Soldiers working in the tactical SSAs are responsible for the requisition, receipt, processing and storage of thousands of supplies each and every day. Fortunately, leaders are now empowered with the analytics to see equipment and materiel readiness across formations

in near-real time and they must leverage these improved analytics to improve their supply processes.

As stated earlier, long customer wait time contributes to low operational rates and commanders can directly influence wait time by driving disciplined supply processes. Three specific drivers of customer wait time that is greatly influenced at the tactical level are (1) requisition processing time - standard is one day to clear ZPARK and Release Strategy; (2) processing time for SSA to issue to customer - standard is one day from when supply arrives from wholesale; (3) part picked-up by the customer - one day standard. In total, the standard for customer wait time for high priority parts is ten days in total. This includes the seven days given to the wholesale level to process and ship the required part from national stocks.

We must gain proficiency in operating our supply activities in austere field conditions and in supporting combat formations on the move in the LSGCO environment. FORSCOM directs Commanders to deploy their ASLs to the CTCs. This is a major change in the way we've done business for the last couple of decades and begins to shape the expeditionary capabilities of our sustainment organizations.

A&M: What other changes are being shaped at the CTCs that get after building readiness within our Brigade Combat Teams (BCT)?

MG Ryan: The CTC program remains the crown jewel of our training program for BCTs. The focus of our maneuver CTCs is honing brigade and battalion command and control and battalion maneuver and live fire proficiency in a high-fidelity, live training environment. To compete globally we must be able to win decisively against a near-peer enemy and we must be able to project power across multiple domains.

The efforts to increase rigor throughout the unit's National Training Center and/or Joint Readiness Training Center experience are paying huge dividends in challenging our Soldiers and developing our leaders to be able to cope with unknown and rapidly changing situations. For instance, at the CTCs we now require all logistics units supporting rotational BCTs to compete in the maneuver box as well. As a young Second Lieutenant, this was a crucible experience for me and it remains the hardest combat-like experience for our future leaders. Our logisticians have to contend with interdicted supply routes, jammed communications and networks, civilians and casualties on the battlefield, unmanned aerial vehicle swarming, and a whole host of other hazards that degrade their mission performance. It is the most realistic environment we can create to prepare the force for Multi-Domain Operations and drives home the integration of maneuver and sustainment efforts, as well as the synchronization of all the warfighting functions.

A&M: What final thoughts would you like to leave with readers?

MG Ryan: Sustainable Readiness will continue to be the Army strategy for generating the most trained and ready forces to meet current and future global requirements. Soldiers and leaders must continue to build upon the readiness gains achieved since the Army moved to the Sustainable Readiness concept. Leaders need to remain involved and focused on all aspects of warfighting readiness - manning, equipping, training, and maintaining.

Balancing current sustained readiness with the immense efforts of modernization will require all of us to roll-up our sleeves. I am confident that our Army in 2028 and beyond will be the envy of the world and a deterrent for threats for generations to come. Thank you for what you will do to realize the Modernized Army.

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ADDRESSING FORCE SUSTAINMENT FOR FUTURE COMBAT OPERATIONS

Major General Rodney D. Fogg currently serves as commanding officer, U.S. Army Combined Arms Support Command (CASCOM). He is a native of Castlewood, Virginia. In 1987, he graduated with a Bachelor of Arts in History from King College, Bristol, Tennessee, and was commissioned through Army ROTC at East Tennessee State University, Johnson City, Tennessee.

MG Fogg's key leadership and command assignments include: Company Commander of the 102nd Quartermaster Company (POL), 561st Corps Support Battalion, Fort Campbell, Kentucky, deploying to Somalia and Haiti; Logistics Officer for the 3rd Battalion, 160th Special Operations Aviation Regiment (Airborne), Hunter Army Airfield, Georgia; Support Operations Officer and Battalion Executive Officer, 526th Forward Support Battalion, 101st Airborne Division (Air Assault), Fort Campbell, Kentucky, deploying to Iraq; Commander, 17th Combat Sustainment Support Battalion, Fort Richardson, Alaska, deploying to Iraq; Commander, 49th Quartermaster Group (POL), Fort Lee, Virginia; Executive Officer to the Commanding General, U.S. Army Materiel Command, Redstone Arsenal, Alabama; Commanding General, 13th Sustainment Command (Expeditionary), Fort Hood, Texas, deploying to Iraq; the 54th Quartermaster General and Commandant, U.S. Army Quartermaster School, Fort Lee, Virginia; and most recently as the Deputy Chief of Staff for Operations, G-3/4, U.S. Army Materiel Command, Redstone Arsenal, Alabama.

He is a graduate of the Quartermaster Officer Basic and Advanced Courses, the U.S. Army Command and General Staff College, and the Army War College. He has a master's degree in Logistics Management from Florida Institute of Technology and a master's in Strategic Studies from the U.S. Army War College.



MG Rodney Fogg

Commander

U.S. Army Combined Arms Support Command

Armor & Mobility had the opportunity to speak with MG Rodney Fogg, Commander, Army CASCOM, regarding command efforts to support force sustainment and readiness objectives, including developing better processes to advance related priorities.

A&M: Please discuss the primary mission and current focus for CASCOM Sustainment Center of Excellence.

MG Fogg: CASCOM's primary mission is to train, educate, and develop agile sustainment professionals for the U.S. Army. We are also responsible for innovative Army and joint sustainment capabilities, concepts, and doctrine to sustain Large Scale Combat Operations (LSCO). Our current efforts are primarily focused on these two broad areas.

As the Army's Sustainment Center of Excellence, we are responsible for training all Adjutant General, Financial Management, Ordnance,

Quartermaster, and Transportation professionals. We train 57 military occupational skills (MOSs), which makes up 35% of TRADOC's annual training load. This equates to over 240,000 sustainers trained per year across all ranks—nearly 83,000 in face-to-face courses and over 157,000 through distributed learning. The professionals here at Ft. Lee do not take this mission lightly and are constantly looking for better ways to perform it. We understand the way we do business must evolve with the younger populations joining the Army, and we embrace that change. Maximizing the use of smart devices and virtual training environments is just one way we are evolving to best prepare sustainers to support the Army across the globe.

An important part of training and leader development in support of LSCO is our responsibility to create multi-functional leaders – those that can think beyond a single area of expertise in transportation, supply or maintenance. Sustainment leaders must understand LSCO and the challenges of being contested on a multi-domain battlefield where the integration of sustainment will be larger in scope, more complex, and under the most adverse conditions compared to recent counter-insurgent operations. One of our initiatives in this area involves incorporating new ways of thinking early in an officer's career, starting at the Basic Office Leaders Course (BOLC).

CASCOM has implemented a multi-functional BOLC that consolidates maintenance and ammo (OD), supply, aerial delivery, mortuary affairs (QM), and transportation (TC) into one course. While CASCOM still provides branch-specific training for officers, we are focused on creating strong multi-functional leaders that are ready no matter what duty position they are placed in for their first assignment. The goal is to provide sustainment professionals capable of visualizing the multi-domain battlefield and leading complex multi-functional sustainment operations in combat.

We are not limiting this required culture shift to officers. For NCOs, we are revamping the Advanced Leaders Course (ALC) and the Senior Leaders Course (SLC) to include more rigorous training focused on strengthening the backbone of the Army. As sustainers, our NCOs need to be technically proficient but also ready to transition into staff jobs. SLC is working to inculcate an understanding of integrated sustainment and battle staff procedures to ensure success at any level. NCOs armed with this type of understanding become critical to a staff working across the planning and execution spectrum. Part of this understanding for all cohorts includes integration of sustainment into maneuver operations in LSCO. Sustainment is critical to all commanders' ability to maintain momentum.

We are also charged with integrating total force sustainment which includes Regular Army, National Guard, and Reserve components. We work hand in hand with all the components on this training mission and our other responsibilities because almost 80% of the Army's sustainment resources are in the Guard and Reserve.

In addition to training world-class logisticians, CASCOM is also responsible for capturing sustainment requirements and making them reality. For new combat systems, we work to ensure the sustainment plans include maintenance, movement/recovery, and deployment plans as well as the right training. Synchronizing new systems with sustainment plans is critical to ensuring that operational units are equipped with an end-to-end enabling capability as we continue to modernize.

A&M: In terms of prioritization of weapons support, what are some areas of CASCOM focus in maximizing force potency?

MG Fogg: Modernizing weapons systems has significant impacts on the supply chain and sustainment support on the battlefield. A new weapons system may increase our warfighting capability but only if we can adequately sustain it. Without repair parts, ammunition, and other support, it quickly becomes useless in battle. CASCOM uses the DOTMLPF-P (doctrine, organization, training, materiel, leadership, personnel, facilities, and policy) framework to determine the capabilities required to sustain weapon systems. We work closely with the Army Futures Command (AFC), and the Acquisition community to ensure that our efforts are synchronized with the modernization priorities of the Army. The CASCOM team also works closely with Army Materiel Command (AMC) and HQDA G-4 on development of the holistic sustainment plan for all new systems. We adjust sustainment concepts and support equipment to meet the demands of those new systems. This is a fairly technical process that is a joint effort between technical experts and resource managers working within tight time constraints.

To keep up with the speed of technology, we invest a lot of manpower into the development of everything from maintenance plans to fielding plans.



91H (Tracked Vehicle Repairer) AIT students replace track on an M88 Recovery Vehicle. (CASCOM)

A&M: With the Army's modernization strategy including Multi-Domain Operations (MDO) readiness, how is CASCOM supporting force needs?

MG Fogg: My job as the CASCOM commander is to define equipment requirements and organizational formations necessary to deliver the potential solutions for MDO. We have taken several steps to enhance our ability to perform that role in the wake of the stand-up of the AFC.

Army Futures Command's sustainment directorate was created from a slice of the CASCOM staff. Though that group has been moved to the AFC structure, it still resides at Ft. Lee. This is advantageous to sustainment because AFC and CASCOM create synergy by having both teams working side by side. The processes of integrating fielded force readiness and planning for future MDO are highly dependent on one another. As the two staffs work different perspectives of support requirements, they ensure sustainment is comprehensively addressed from the cradle to grave of systems.

To fulfill our duties in this approach to modernization, CASCOM will continue to focus on maintaining current force readiness while planning for an objective Army of 2035, capable of countering the security threats of a peer competitor nation. That responsibility involves addressing several areas that we expect could lead to potential gaps for sustaining forces on the future battlefield. As we attack these challenges, we invite

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92W (water treatment specialist) AIT students test water for possible contamination. (CASCOM)

innovative thought processes and out-of-the-box thinking! Our staff is constantly scouting for the latest innovations in coordination with AFC, and we work to leverage industry innovations as we pursue solutions to sustainment challenges delivering a combat credible force.

A&M: In terms of large scale combat operations (LSCO), talk about some ways CASCOM is working to better integrate sustainment capabilities.

MG Fogg: The focus on LSCO is changing how we operate on the battlefield. The approach to sustainment that the Army has used for over a decade in counter-insurgency (COIN) operations is vastly different than what is needed to sustain LSCO. Instead of focusing on large stockpiles of supplies and contracted support for sustainment on the front lines, we must be ready for a very austere environment with minimal luxuries. This fundamental shift has led us to significant changes in sustainment doctrine, organizations, and equipment development, in addition to the changes in training and leader development discussed previously.

In the doctrine area, CASCOM has re-written FM 4-0, Sustainment Operations, to align with FM 3-0, the Army's capstone operations doctrine. This manual changes our mission command approach and lays out how sustainment units conduct support operations during LSCO against a peer enemy in a highly contested environment. Included is how the new organizations we are creating will operate. Those organizations include division sustainment brigades (DSBs) and division sustainment support battalions (DSSBs) with organic companies in order to better support and enable the division as a warfighting organization.

Fundamental to the DSB and DSSB design is that they belong to the division. This change moves sustainment away from the modular structure more suitable for COIN. The new DSB has an organic special troops battalion (with field feeding, finance, and human resources capabilities) and a DSSB with assigned maintenance, supply, and transportation companies. This allows division commanders to operate with an organic sustainment capability optimized to support their division in LSCO and MDO. It also enables units to train as they fight without having to ask for significant external support.

In terms of equipment initiatives designed for LSCO, CASCOM is working to extend operational reach by increasing sustainment capacity. One effort is the bulk fuel distribution system. Its 8,500-gallon fuel capacity will replace the outdated 7,500- and 5,000-gallon line

haul fuel tankers we currently have. This increases the Army's fuel capacity without increasing the number of Soldiers required to move the fuel on a highly lethal battlefield. We're also re-designing our division sustainment organizations (DSSBs) adding approximately 100,000 gallons of fuel distribution inside 10 divisions. These efforts significantly increase our battlefield fuel capabilities answering the demands of our heavier combat platforms and higher OPTEMPO required during large scale combat.

We are also working on a leader-follower solution for our palletized loading system (PLS) truck companies. This technology integrates unmanned vehicles in convoys to increase our ability to distribute critical supplies without requiring more Soldiers. We can improve the effectiveness of our truck companies by increasing the number of sustainment vehicles on the road with more frequency while minimizing Soldier exposure to risk.

The future of sustainment has many other technology-based capabilities that are being tested now. We are excited to be a part of this pivot towards technology enabling sustainment formations to keep pace with LSCO.

A&M: Feel free to speak to other goals/challenges moving forward.

MG Fogg: I touched on it earlier, but CASCOM is working hard at increasing rigor in the classroom and field environments while leveraging virtual training that improves the technical and tactical proficiency of our Soldiers as they take their assignments in the operating force. We are working across all our Army schools and taking a comprehensive approach toward change that includes every rank, sustainment cohort, and skill set - from AIT Soldiers, BOLC officers, leaders in the Logistics NCO Academy and captain's courses all the way up to Command and General Staff College (CGSC) and the Army War College (AWC).

In other areas, CASCOM is working a host of materiel, concepts, and doctrine initiatives, as well as updating force design in order to sustain LSCO and drive toward a Multi-Domain capable force. Examples include:

- Incrementally improving our information and mission command systems toward a Sustainment COP (Common Operating Picture) using Global Combat Support System – Army (GCSS-A) and Integrated Personnel and Pay System – Army (IPPS-A)
- Joint Light Tactical Vehicle (JLTV) fielding
- Improvements to materiel management and maintenance capabilities

Finally, CASCOM is working closely with the entire sustainment enterprise to develop and deliver a holistic concept of sustainment connected to LSCOs and MDO requirements, while maintaining a readiness focus. Codified in FM 4-0, our doctrine describes sustainment across the strategic roles - shape, prevent, consolidate gains, and offense/defense. It links sustainment capabilities required to project forces from "Fort to Port" through an operationalized strategic support area (CONUS) into a theater set for reception, staging, onward movement, and integration of combat units into the fight. It provides improved sustainment capabilities to better enable our corps and division headquarters. Modernization and reorganization improve our most significant challenges – fuel, mobility, materiel management, and maintenance in the near term while looking for 10X innovations to reduce the overall sustainment demands on the battlefield through alternative power, sensors, and artificial intelligence-enabled command systems.

THE ARMY'S CENTER OF GRAVITY

The Defense Logistics Agency (DLA) Army National Account Manager (NAM) team monitors material availability, pre-positioned stock, and readiness of weapons systems.

By Dianne Ryder, Defense Logistics Agency



Sgt. Ray Adams and Pvt. Frank Taiese from 1st Stryker Brigade Combat Team, 25th Infantry Division, change a flat tire on a Humvee at the National Training Center at Fort Irwin, CA. DLA's Army NAM team worked with DLA Land and Maritime to resolve issues with Humvee tires cracking and blowing out. (Photo by Army Sgt. Michael Spandau)

Often described as the glue between DLA and the U.S. Army, the NAM team works with Army Materiel Command's (AMC) life-cycle management commands: U.S. Army Aviation and Missile Command (AMCOM), U.S. Army Tank-Automotive and Armaments Command (TACOM), U.S. Army Communications-Electronics Command (CECOM), and U.S. Army Forces Command (FORSCOM).

Beyond the six-member DLA Headquarters team at Fort Belvoir, Virginia, the Army NAM team has representatives with FORSCOM at Fort Bragg, North Carolina; Army Sustainment Command at Rock Island Arsenal, Illinois; and AMC at Redstone Arsenal, Alabama. COL Mondrey McLaurin, the Army NAM team's recently-departed military deputy director, said the NAM team is the service's center of gravity and axle to its gears. Since they monitor more than a dozen ground vehicles including Abrams tanks, Bradley fighting vehicles, Strykers and Paladin howitzers, the axle analogy is fitting.

"The Army NAM team involves DLA Headquarters directorates and major subordinate commands bridging the gap between customers and DLA personnel," said LTC Delarius Tarlton, who replaced McLaurin as the Army NAM team's military deputy and liaison to the Army's deputy chief of staff for logistics. "The customer comes to us with a problem, we identify the appropriate place to handle the problem, and we ensure they're put in contact with each other," he said. "DLA is a very large organization, so rather than have a customer call every department within DLA until they find the right place, the NAM team saves them a whole lot of time."

Of note, DLA recently assisted with a problem involving tires and wheel assemblies on Humvees. "Multiple unit reports indicated cracking and some instances of blowouts involving the tires," McLaurin said. "Sudden blowouts can cause accidents and rollovers." DLA Land and Maritime is monitoring 12 parts in support of the program, and material is being expedited and shipped to keep up with demand for repairs. "We kept the communication flowing here in DLA Headquarters to DLA Land and Maritime, which is working with Goodyear and Michelin to try to resolve the issue," McLaurin emphasized.

MAXIMIZING THE PROPERTY CHAIN

A National Guard unit recently requested standard operating procedures on turning in excess property to DLA Disposition Services.

"They wanted to know what they were doing wrong and wondered if there was a new SOP," Tarlton noted. "They also wanted a recent copy of the DLA Customer Assistance Handbook. Then I reached out to DLA Disposition Services and told them what the customer was requesting. They sent me a link with a step-by-step process of how to turn in vehicles, the appropriate things that need to be in the vehicles and what needs to come out of the vehicles," he added.

DLA Disposition Services even gave pictures to illustrate the process. "I sent that to the National Guard unit; they were very thankful for it. I haven't heard anything back, so I'm willing to bet that resolved their issue," Tarlton mentioned.

Logistics Management Specialist Michael Boone, the Army NAM team's civilian deputy, said, "The agency is prioritizing 104 readiness drivers for the service by resolving material availability issues. We're in the DLA director's office two to three times a week for some meeting or engagement. Every other Wednesday, we brief readiness as it impacts the Army's top 13 air and ground systems and any DLA readiness drivers that may be impacted," he said. "We're briefing trend data, material availability and on-target inventory."

PROACTIVE READINESS TRACKING

The primary tool for tracking readiness drivers is DLA's Service Readiness Dashboard, which provides near real-time views of key weapons systems.

"Some of the drivers belong to DLA Land and Maritime, some belong to DLA Aviation, and a few belong to DLA Troop Support," Boone said. "The DLA director has requested a consolidated enterprise view of Army systems to see trends and track the agency's performance."

The NAM team also meets regularly with AMC, which recently identified 26 parts as no longer being purchased by the service. "Yet they're still holding systems down, so we actively investigated those and provided a response back to them," Boone said. "Those are the types of actions that we handle at the monthly readiness review with AMC. We also hold partnership action council meetings at the action-officer level so we can resolve issues and arrive at topics that may need senior-leader guidance and updates," he continued. "That's what's presented at Army-DLA Day."

Earning the service's confidence is key, and Boone said his team establishes trust through continuous, honest contact with teammates. "We're all in it together and we all have the same goal – to improve readiness to the Army. We're on the phone and email with the Army G4 [logistics] and AMC almost daily," he said. "In most cases, our customers are looking for answers immediately. Rarely do I get a call and someone says, 'Hey, by this time next week can you get this for me?' Most of the time it's in the morning and they're looking for something in the afternoon."

"Teamwork is critical," Tarlton stressed. "The team courtesy copies each other on emails, so someone is always available to assist," he said. "Members work together to anticipate questions and find answers before they're asked. That way, they look good and we look good." ■



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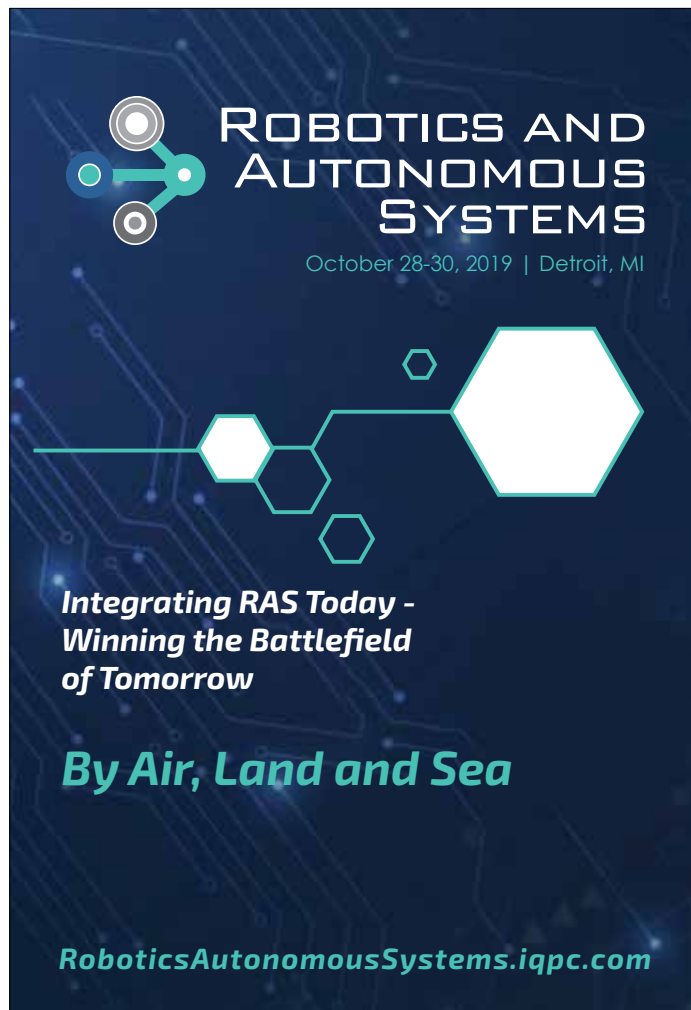
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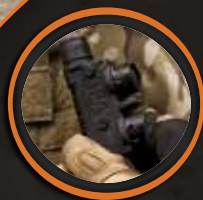
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A Day in the Life of Government Solutions at KBR

05:45 At Camp Lemonnier in Djibouti, Kenya, a KBR air operations manager is reviewing the day's military aircraft arrivals and departures. He and his team will be responsible for the safe handling of all aircraft, cargo and passengers.

07:35 On a ship in the Indian Ocean, a KBR employee is completing maintenance on a piece of military equipment and ensuring that it is combat-ready. It is one of over 390,000 offshore prepositioned Army stock items we maintain for rapid deployment.

08:25 KBR cyber and physical security engineers in Charleston, South Carolina are immersed in testing the latest electronic devices for vulnerabilities and capabilities inside the KBR Security Lab.

09:15 In Lexington Park, Maryland, KBR experts are providing systems engineering and software development support on an application that allows Naval Air Systems Command stakeholders to analyze aircraft and weapon system performance.

10:05 KBR members of the International Space Station (ISS) flight control team are communicating with the ISS Commander and a flight engineer to assist with annual maintenance on the primary inflight countermeasure device used by the crew to combat the negative effects of microgravity.

11:15 KBR modeling and simulation experts in Colorado Springs, Colorado and Huntsville, Alabama are supporting the Missile Defense Agency with wargaming exercises to assess performance and provide analysis and training.

12:25 At the U.S. Air Force Research Lab in Dayton, Ohio, a KBR scientist and software developer are about to sequence a test using image generation software and the world's first 5th Generation Aircraft Helmet Mounted Display System (HMDS).

13:15 A KBR instructor at the U.S. Air Force Test Pilot School, Edwards Air Force Base, California is beginning his afternoon training young pilots in the T-38 aircraft.

14:35 In Houston, Texas a team of KBR managers are quickly assembled to begin planning for rapid mobilization in response to a national disaster through one of our on-call contingency contracts.

15:15 KBR engineers conclude testing on the Counter- Rocket Artillery and Mortar System (C-RAM) at the U.S. Army Yuma, Arizona test range. Test and evaluation are among the many air and missile defense services we provide.

16:44 After exhaustive analysis, planning and simulation, KBR's Aqua Earth observing satellite flight control team at NASA Goddard Space Flight Center in Greenbelt, Maryland uplinks commands to move the satellite to avoid a possible collision with orbital debris.

18:52 At a military camp in the Middle East, KBR employees are serving the evening meal to tired U.S. soldiers. We have been providing a home away from home for deployed military troops since WWII.

20:22 Another day of delivering safe and reliable technical and professional services ends and the momentum shifts to preparing for tomorrow.