FIRES

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FIRES 2020

A DETAILED LOOK AT THE PRESENTATIONS, TOPICS AND ACTIVITIES DURING THE 2013 FIRES SEMINAR

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FIRES

July - August 2013

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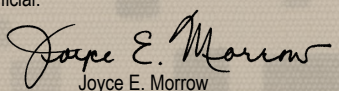

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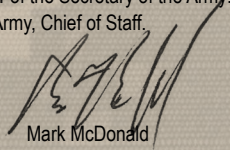

Mark McDonald
Major General, United States Army
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PURPOSE: Founded in 2007, *Fires* serves as a forum for the professional discussions of all Fires professionals, both active and Reserve Component (RC); disseminates professional knowledge about progress, developments and best use in campaigns; cultivates a common understanding of the power, limitations and application of joint Fires, both lethal and nonlethal; fosters joint Fires interdependency among the armed services; and promotes the understanding of and interoperability between the branches, both active and RC, all of which contribute to the good of Army, joint and combined forces, and our nation.

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On the cover: SPC Robert Klettke, team gunner, and SGT Tad Thompson team chief, practice air defense crew drills April 23 with the man-portable air-defense system at Camp Grafton Training Center near Devils Lake, N.D. The Soldiers spent three weeks at camp to prepare for their National Capitol Region defense mission with their unit, 1st Battalion, 188th Air Defense Artillery Regiment. (Photo by SSG Brett Miller, U.S. Army)

Regiment and battlefield coordination detachment (BCD) headquarters; 13 per FA/Fires battalion/squadron; 3 per fire support element (FSE), Fires and effects cell (FEC), effects coordination cell (ECC) fire support cell (FSC), and separate battery or detachment; 2 per fire support team (FIST); and 1 per Master Gunner. Free copies to Army ADA units: 7 per air and missile defense command (AAMDC) and ADA brigade headquarters; 13 per ADA battalion; and 3 per air defense airspace management cell (ADAM) and separate battery or detachment. The FA and ADA Schools' departments, directorates and divisions each get 2 copies. Other Army branch and US armed services units/organizations and US government agencies that work with FA or ADA personnel, equipment, doctrine, tactics, training organization or leadership issues may request a free copy—including, but not limited to—ROTCs, recruiting commands, libraries, attaches, liaison officers, state adjutants general, public affairs offices, military academies, laboratories, arsenals, major commands, etc.

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The 2013 Fires Seminar: Fires 2020

By MG Mark McDonald
Commanding General of the Fires Center of Excellence and Fort Sill, Okla.

On May 7-8, 2013, the Fires community came together by the hundreds to contribute to the discussion of what lies ahead for the Fires Force of 2020. In this issue of *Fires*, you will find a recap of the presentations from the 2013 Fires Seminar. With topics ranging from cyberspace to drawing down the force, all who attended left with a better understanding of the path ahead.

The Fires Seminar not only provided a professional forum for discussion, it also allowed some time for interaction with several of the most senior leaders in the Fires Force. The keynote speaker for dinner was the U.S. Army Deputy Chief of Staff, G1, LTG Howard Bromberg, who also officially addressed the seminar attendees, on day two, regarding force structure and the impact of downsizing. Additionally, Bromberg held parallel sessions addressing the leadership, both officers and enlisted Soldiers, regarding current and pending changes within our Army.

A most significant event this year was the tattoo ceremony to honor the equivalent of "Retired Artilleryman of the Year," LTG William J. Lennox, Jr. A 1971 West Point graduate, Lennox served in a wide variety of command and staff positions in the Army and was selected as the 56th commandant of West Point in 2001. Lennox retired in 2006, and recently worked on Wounded Warrior projects that continue to serve veterans today. We appreciate the Field Artillery Association for sponsoring this tribute to a great American Soldier.

The professional business of the seminar was just that…professional. The open discussion on preventing sexual harassment and suicide in the force strengthened our commitment to do everything possible to decrease the incidents of both. Unit sponsorship programs for new

Soldiers are critical for ensuring proper integration and discouraging isolation and withdrawal. Eighty percent of sponsored Soldiers are less likely to become victims of sexual assault. Commanders and supervisors are the first line of defense against sexual harassment and assault, and they must be personally involved and take the initiative to keep vulnerable Soldiers safe while building a climate of trust and honor among all Soldiers in their units.

As we have seen in the media recently, this problem exists at all levels in the Army. Regardless of gender or sexual orientation, treating fellow Soldiers with dignity and respect will go a long way in preventing sexual harassment problems. Reporting and investigating all complaints, and reprimanding offenders is not optional. We must change the mindset of 'alleged allegations of sexual assault,' and immediately turn these cases over to Criminal Investigations Command (CID) to do what they do best; investigate the facts.

An equally disturbing trend in the force is the increased suicide rate. At the time of publication, the Army had 118 suicides, up 20 from last year. We have discovered that when reported suicide ideations (individual thoughts of suicide) increase, suicide completions decrease. Soldiers who talk to someone, whether medical personnel, a co-worker, supervisor, battle buddy, etc., and then get help, have a much lower risk of suicide completion. It is critical to take suicide ideations seriously and follow the procedures for observation and mental health assistance. Reducing the stigma attached

to psychological counseling and increasing Soldier awareness of the value of mental and physical resiliency are all a part of the human condition and we must acknowledge both to help these 'at risk' Soldiers. The loss of a Soldier is never acceptable; however, when loss is preventable and we do nothing, say nothing, or offer no help, we are in fact adding to the problem. Be part of the solution and watch out for each other.

Although these issues are critical to the readiness of the force, the bulk of this year's seminar focused on preparing the Fires Force for future battle. Coming from years of cycled deployments, most of the junior leaders (and some senior leaders) don't know how to manage training, because they have been handed training packets their entire careers. The Fires Strategy addresses these training issues and recaptures training models.

If you don't fundamentally understand what a six-week lock-in is or how to run a battalion training meeting, go to the Army Training Network at https://atn.army.mil/ and research. Find a mentor who knows training and learn everything you can. It is critical to the future force that we do not lose these methodologies from our past.

Another challenge we have within the Fires Force is reducing redundancies in both equipment and manpower. The combat developers are taking on that challenge and are streamlining future systems and system capabilities to ensure antiquated equipment is replaced with compatible systems and systems that are readily integrated into the future inventory. A good example is our radar systems. We currently have six radars in the inventory, all of which will become obsolete as Advanced Field Artillery Tactical Data Systems (AFATDS) Inc II is projected for Program Objective Memorandum (POM) 2014 and beyond. We still have work to do; however, commandants from both the Air Defense Artillery School and the Field Artillery School continue to move forward in cooperation with the FCoE staff to maneuver through and resolve all of these gaps.

I have said this before, but the seminar discussion again proves the point; input from the field and from our operational leadership is crucial to the success of the Fires Seminar. For many of you, time zone differences were an issue, and I wanted to specifically thank BG Dan Karbler, Commander, 94 Air and Missile Defense Command, Hawaii, and all of you from overseas who listened in, losing sleep, adjusting priorities and sharing concerns with the group. While all of the questions from the DCO participants were received and most made it to the seminar microphone, the Knowledge Management staff is still coordinating responses for all questions. Feel free to email the *Fires* staff at fires.bulletin@us.army.mil if you have not received a response.

The date for next year's conference is planned for May 6-7, 2014. I hope you mark your calendars early and make time to participate in this event which is so critical to the future of the Fires Force. Watch for more information as it becomes available on Fires Knowledge Network, or call the Office of Strategic Communications at DSN 639-3944/3889, or commercial 580-442-3944/3889.

Again, we sincerely thank the guest speakers, the attendees, those who 'remoted' in through DCO Connect, and all of the Soldiers, civilians, and contractors who made the conference a huge success. It takes an enormous amount of time and energy to orchestrate this event, but we regard it as an investment in the future of Fires. Time spent now on planning and preparing will make a difference as we execute our march orders toward Fires Force 2020.

Fires Strong!★★

SFC Justin Ratti, with Headquarters and Headquarters Battery, FCoE, Fort Sill, Okla., demonstrates the Fires Warfigher Ensemble at the 2013 Fires Seminar during MG Mark McDonald's presentation on the State of Fires 2020. (Photo by Felix Sheil, U.S. Army)

The Field Artillery Force of 2020

By BG Brian J. McKiernan
Chief of the Field Artillery and Commandant of the U.S. Army Field Artillery School, Fort Sill, Okla.

I would like to start by thanking everyone for coming to, or virtually attending, the 2013 Fires Seminar "Fires 2020," at Fort Sill, Okla. The Fires Center of Excellence and the Fires community conducted a well-planned and superbly executed seminar that was not only informative but achieved the intent of enabling dialogue on some important issues – the modernization and education of our Fires Force.

During the course of the seminar, we provided an overview of the Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel and Facilities (DOTMLPF) challenges and the solutions we are presently working on.

As we move into the future, our focus remains on providing an operationally adaptable force. It is the goal of everything we do here at Fort Sill, both as a branch and as a school. From equipment modernization to training, we have our eye on providing a force capable of winning in unified land operations.

I'm also pleased to report the modernization of our force is currently fully funded. We are sustaining momentum on all our initiatives within our Field Artillery Modernization Strategy along four lines of effort: sensors, platforms, munitions, and mission command.

The following paragraphs summarize how we plan to equip and modernize the Field Artillery force, providing the right Fires and effects in the right amount at the right time in support of the maneuver, combined and/or joint force commanders.

Sensors. Accurate target location is our greatest challenge in meeting the five requirements for accurate, predicted fire. It is also our number one priority to address.

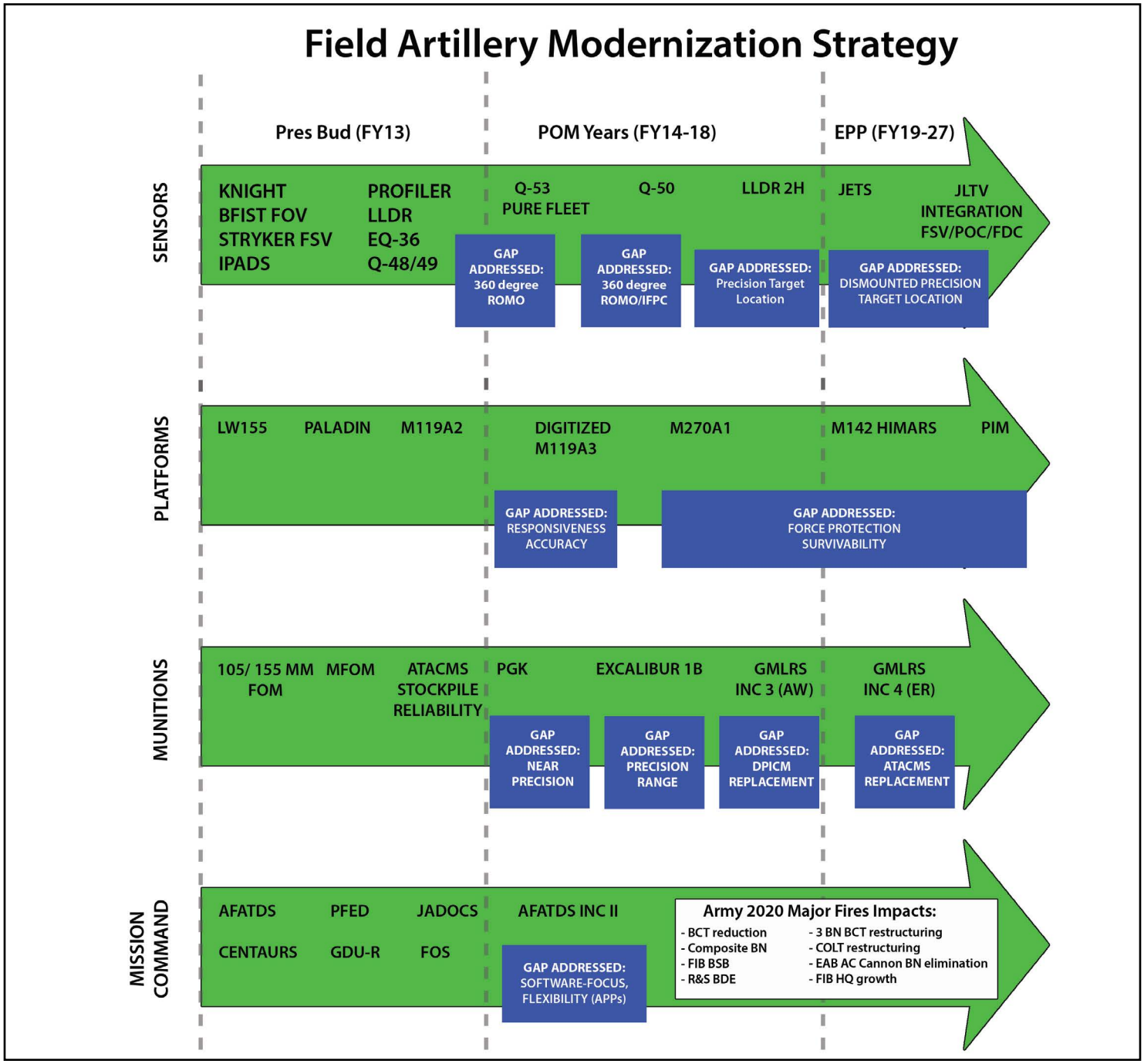
Through technology and innovations such as the Lightweight Laser Designator Rangefinder

(LLDR) to Lightweight Laser Designator Rangefinder-Hand Held (LLDR-2H), we have made significant progress in reducing target location error (TLE) capability from approximately six mils to two mils.

While we are pleased with the success of LLDR-2H, we are very excited about the future Joint Effects Targeting System (JETS) which will provide exceptional capability. With JETS, we expect to achieve 10-meter TLE out to 2,500 meters and near precision accuracy at ranges greater than 6,000 meters. However, until we can field JETS, a quick reaction capability (QRC) hand-held precision targeting device will be fielded to provide the dismounted forward observer (FO) an enhanced ability to accurately locate targets. The QRC device will bridge the gap between the target location capability found in the LLDR-2H and the objective capability found in JETS. We can expect units in Afghanistan to be the first to receive QRC handheld devices.

We are also moving from multiple variants of AN/TPQ -36/37 Firefinder Radars and the Lightweight Counter Mortar Radar (LCMR) to two, 360-degree systems, the HMMWV-mounted AN/TPQ-50 Lightweight Counter Mortar Radar and the truck-mounted AN/TPQ-53 Radar. These radars provide 360-degree detection coverage to enhance counter-fire capability while simplifying training and sustainment.

Fielding for the Q53 is currently planned for the first quarter of FY14 and for the Q50, fielding is currently planned for third quarter of FY13. We are very excited about our future



ability to detect and destroy enemy indirect fire systems.

Platforms. We also continue to address DOTMLPF challenges within our platform line of effort, most notably within materiel, training, and organization.

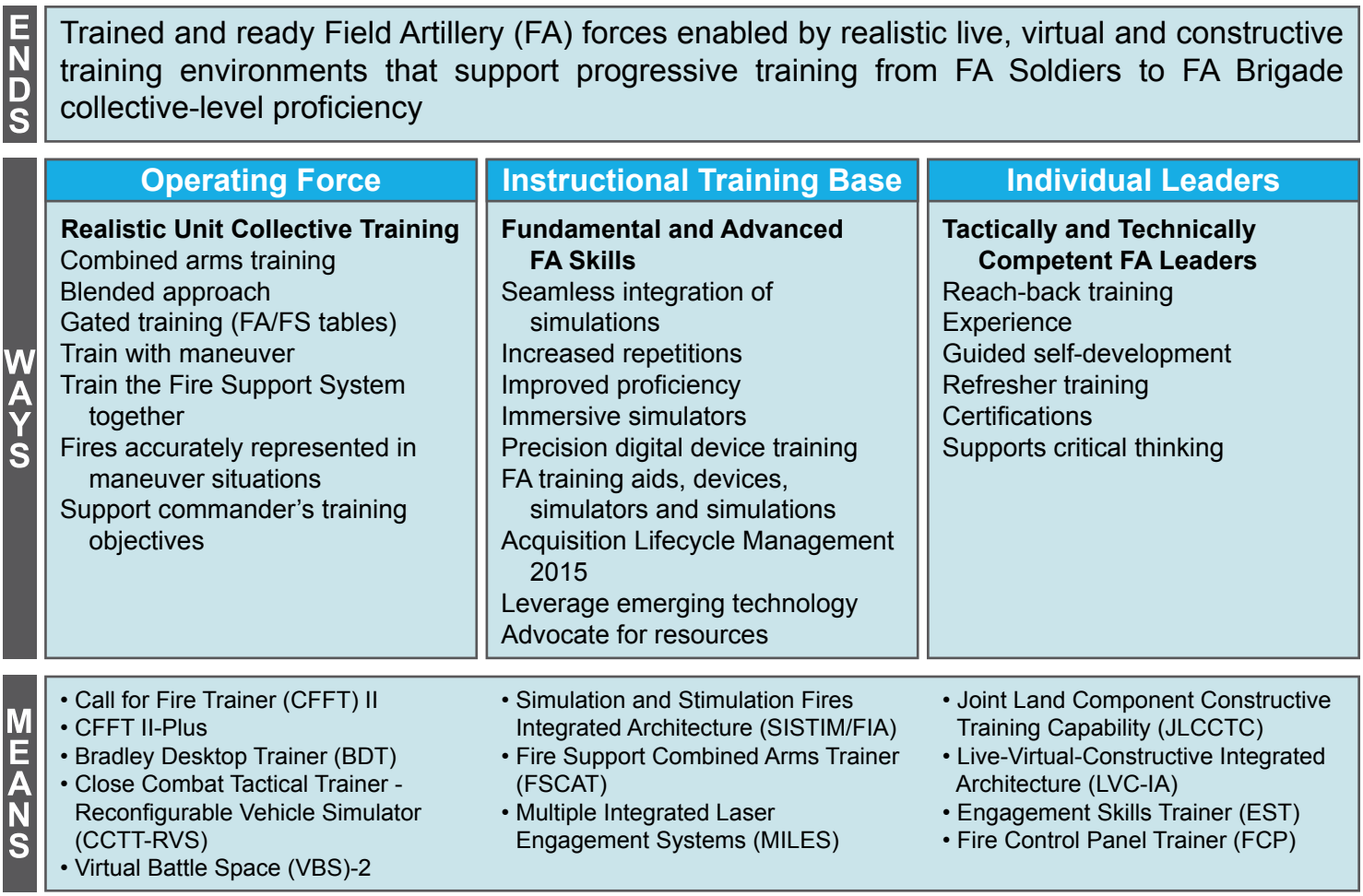
Our ongoing FA delivery system modernization efforts include the Paladin Integrated Management (PIM) program and the Digitized M119A3 Program.

The PIM is the latest howitzer in the M109 family of vehicles, the primary indirect fire support system for the airborne brigade combat teams (ABCTs). It uses the existing main armament and cab structure of a Paladin M109A6, and replaces the vehicle's chassis components with modem components common to the Bradley vehicle. The improved chassis structure provides greater survivability and commonality with the existing systems in the airborne brigade combat team, reducing operational sustainability costs by replacing obsolete components.

The Digitized M119A3 Program is on schedule and currently being fielded stateside with phenomenal results. The upgraded M119A3 is equipped with a digital fire control system (DFCS) that includes an inertial navigation unit, guided-positioning system technology and other features that will give the weapon the ability to determine its precise location.

With this being our last cannon to be digitized, we can now, more than ever, provide quicker fire power, more responsive Fires and improved accuracy. Training the cannoneer is further simplified with commonality across all howitzers using DFCS technology.

Also within our organizational construct, the addition of composite infantry brigade combat team (IBCT) battalions will provide flexibility and allow



The strategy for a trained and ready Field Artillery force. (Illustration by Rick Paape, Jr., information provided by the FA Commandant's office)

us to capitalize on the capabilities of the 105 mm and the 155 mm towed howitzers—simultaneously. This increase in scaled and precision capabilities is necessary for operational adaptability in unified land operations.

Finally, improvements to the M270 Multiple Launch Rocket System (MLRS) and the M142 High Mobility Artillery Rocket System (HIMARS) survivability further enable our rocket artillery. The improved cabs also standardize crew drills between the systems.

Munitions. We are also continuing to address DOTMLPF challenges within our munitions line of effort, most notably within materiel and training. Excalibur and the XM1156 Precision Guidance Kit (PGK) continue to be critical priorities in our cannon munitions modernization effort.

Guided Multiple Launch Rocket System (GMLRS) Increment IV addresses replacements for Dual-Purpose Improved Conventional Munitions (DPICM) and the Tactical Missile System (ATACMS) as they are phased out.

The PGK has been fielded to units in Operation Enduring Freedom (OEF) and has demonstrated 50-meter or less circular error of probability (CEP), providing a tremendous near-precision asset to the commander. Lessons learned from PGK employment are already shaping doctrine and leader development.

Mission Command. The Advanced Field Artillery Tactical Data System (AFATDS) has been the Field Artillery's primary fire support and mission command system for the past 20 years. However, we will eventually converge all fire support system software/applications into one AFATDS Increment II software system.

This migration of systems will provide ease of training, improved capability, resource savings, and a more streamlined path to software updates to accommodate future requirements. The end state for this strategy is scheduled for FY18, where one software application, designed to fit numerous roles, will support multiple Fires functions.

The Field Artillery Modernization Strategy is only one part of the equation in building the operationally adaptable Field Artillery force of the future. We are also making a monumental shift in the ideology of how we approach training and the education of our Soldiers and leaders.

As our equipment and materiel have become more technology driven so must our training. For decades, we have relied on manual, analog methods of training our troops, but we are moving away from this outmoded philosophy.

Field Artillery Training Strategy. Primarily all units should train with its full complement of digital devices and communications devices, from sensor to shooter. To a lesser degree, units should train in a degraded voice mode. Only rarely should a unit train in a fully degraded manual-only mode. This rein-

forces the mantra of 'train as you will fight, fight as you train.'

Within the branch, and here at the United States Field Artillery School, we are following this route within our training. It is the cornerstone for building precision Fires warriors, ready to execute discriminate lethality in support of unified land operations.

60-30-10. These are the percentages we are using to redesign our Field Artillery and fire support instruction. While not an exact percentage, 60 percent represents the goal that the majority of our instruction will focus on using our tools, systems and digital communications. Thirty percent represents a blend of teaching digital devices with manual communication, while 10 percent represents teaching all analog or legacy methods as back-up knowledge.

Access to adequate home station training (HST) areas or combat training centers (CTC) will continue to be constrained in the near future. Competition for training areas, limited money, time and resources will continue to exacerbate the problem. Continued creativity in training and leadership development is imperative. Use of live, virtual, constructive and gaming (LVC/G) opportunities help offset the constraints and enhance decision making through simulations. We are further defining our training strategy through 'ends, ways and means.'

Ends. Our strategic 'ends' is a trained and ready Field Artillery force. We must enhance maneuver by being the premier, all-weather, continuously available Fires Force, that is organized, equipped, and trained to deliver and integrate Army, joint, and combined Fires at all echelons.

Ways. Our 'ways' are defined by training opportunities that are spread across three domains; operational domain, institutional training base (ITB) domain, and the self-development Domain. By addressing all three of these domains, we are promoting a life-long learning mindset to ensure our FA leaders and Soldiers are empowered with the tools and resources necessary to continue to learn throughout their career. The operational domain encompasses realistic unit collective training that takes into consideration combined arms training and strategies, gated training, such as FA/FS tables, training with maneuver, training the Fire Support System together as a whole, Fires being accurately represented in maneuver simulations, and supporting all the commanders' training objectives.

The institutional domain encompasses fundamental and advanced FA skills, and takes into consideration the seamless integration of simulations, increased repetitions, how to improve proficiency, and the use of immersive simulators, while taking advantage of all precision digital device training, FA training aids, devices, simulations and simulators (TADSS). It also relies heavily on the Army Learning Model (ALM) 2015, how to leverage emerging technology, and Center of Excellence (CoE) collaboration.

The self-development domain includes structured self-development, guided self-development and personal self-development. Admittedly, we still have much work ahead in realizing a vision of using learning technologies to provide our Soldiers with opportunities for engaging, relevant learning at any time and place.

While there are opportunities for our Field Artillery Soldiers to conduct self-development and refresher training through web sites, such as Army Knowledge Online (AKO), we are not there yet when it comes to providing this robust, on-demand learning capability.

We are fully committed to bringing technology enabled access to training and education regardless of the physical location of the Soldier. This initiative remains a key imperative of ALM 2015 and is critical to expanding training and education within the self-development domain.

Means. Our 'means' fully encompasses the use and the continued develop of TADSS training in the virtual realm which enables commanders to save, not only time but money on munitions, fuel, and wear and tear on their equipment. This type of savings is something all units can take advantage of as resources and money will continue to be limited.

The Field Artillery Force 2020. The Field Artillery must continually seek new ways and technologies to promote both effectiveness and efficiency. This translates into anticipating warfighter requirements in survivability, precision, accuracy, and reliable systems and equipment that support force application and command and control functions.

I'm confident we're not only developing the right materiel; but the right training solutions to support the maneuver commander in all unified land operations as well. ★★

Soldiers from, B Battery, 1st Battalion,14th Field Artillery, Fort Sill, Okla., fire a rocket from the High Mobility Artillery Rocket System, April 27. The HIMARS offers the firepower of a Multiple-Launch Rocket System on a wheeled chassis. This training is part of the culmination of a multi-year development effort to enhance the capability and utilization of the launcher on the battlefield. (Photo courtesy of 97th Air Mobility Wing, Public Affairs)

Air Defense Artillery: Fires 2020

By COL(P) Don Fryc
Chief of the Air Defense Artillery and Commandant of the U.S. Army Air Defense Artillery School, Fort Sill, Okla.

Shaping the fight for area access, force protection and homeland defense were the cornerstones of the Air Defense Artillery mission yesterday, as it is today. In World War II, our force was transformed during wartime to meet a strategic requirement.

On Jan. 1, 1944, the Army reflagged coastal artillery (anti-aircraft) brigades to anti-aircraft brigades in preparation for the allied invasion of Normandy. The new brigades were commanded by brigadier generals and consisted of 22 battalions, with a total of approximately 22,000 coalition and U.S. Soldiers.

Shortly after standing up, the brigade commander and his staff initiated liaison with the Army Air Corps as a mission priority, a task which continues to endure today. We fought then – and we fight now – as part of a joint and combined force.

The 105th Anti-Aircraft Group was part of the initial landing to secure beach heads across Normandy. The 105th fought to assure area access and defend the landing forces.

As the allies began moving further into Europe, anti-aircraft brigades began their follow-on missions of providing force protection to troop assembly areas, command and control nodes, aerial port of debarkation and sea port of debarkation and other critical assets.

At the same time across the globe, coastal artillery units maintained their vigilant watch across the U.S. coast line and ports in order to defend the homeland.

The emergence of Air Defense Artillery, as the transition from anti-aircraft, brought increased tasks, while essentially retaining the same mission – defeat aerial threats.

Today's Air Defense Artillery forces are more globally postured than our predecessors in World War II.

We have major air and missile defense headquarters, Army air and missile defense commands (AAMDCs), in the major combatant command areas where air and missile threats exist. Today, approximately 50 percent of the Patriot units are forward stationed or deployed in Japan, Korea, Qatar, Kuwait, Bahrain, UAE, Turkey, and Germany. Our National Guard units are protecting the homeland with ground-based missile defense units in Alaska and Avenger units in the National Capitol Region (NCR).

We are helping to prevent conflict by our presence; Air Defense Artillery is the deterrent, nested within the chief of staff's strategic principles of 'Prevent, Shape, and Win,' which signals U.S. commitment to our allies and U.S. resolve to our potential enemies. Our global posture also shapes the environment by building partnership capacity, and supports the U.S. capability to win conflicts.

However, we have some operational gaps which we must overcome in the areas of mission command and countering ballistic missile, rocket, artillery, mortar, unmanned aircraft system, and cruise missile threats.

In the area of mission command, Air Defense Artillery systems have historically created their own command and control nodes and components; each system and means of engagement operations were unique. This led to the potential for a single point of failure (e.g., command and control node) which could render that system out of action. We have

Air Defense Artillery Worldwide Stance

Prevent, Shape, Win

limited ability to engage evolving ballistic missiles with advanced capabilities. While having the ability to engage rocket, artillery, and mortar threats to fixed locations, such as forward-operating bases, our current counter-rocket, artillery and mortar (C-RAM) system has limited mobility and engagement range; it is not suited to move and protect the support elements of a brigade combat team when not in that fixed location. We lack the ability to engage the smaller unmanned aircraft threats that will be in the brigade combat team's area of operation.

Additionally, we require the capability to defeat the entire cruise missile threat, from the 'low end' (low and slow, with high explosive warheads) to the most sophisticated versions, potentially carrying weapons of mass destruction.

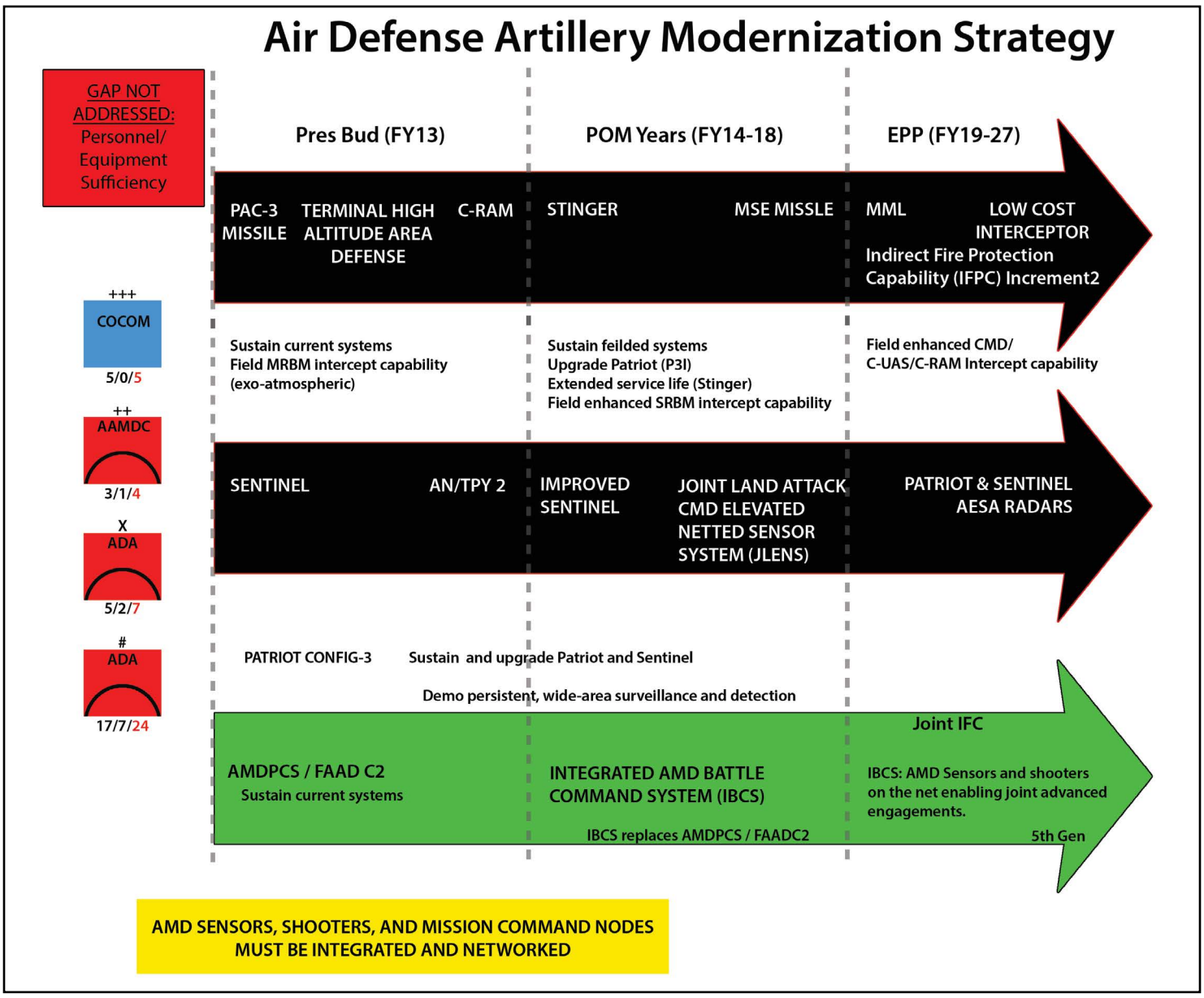
Today's threats continue to increase in capability and quantity. Our modernization strategy has been designed to provide capabilities that stay ahead of the threat.

Our Air Defense Artillery modernization strategy is focused on materiel solutions to the aforementioned gaps, but recognizes the need for non-materiel enablers (doctrine, organization, training, leadership and education, personnel, and facilities) as well. These will be mentioned in greater detail below.

The modernization strategy is divided into shooter, sensor, and mission command areas and presented in the time frames of today (President's Budget, fiscal year [FY] 2013), the program objective memorandum (POM) of FY14-2018, and the period beyond the POM, the extended planning period, FY19-2027. While separated for presentation, shooters, sensors, and mission command elements must be integrated to mitigate the gaps.

In FY13, we will continue to sustain our current weapon systems – Patriot, Theater High Altitude Area Defense (THAAD), C-RAM, and Avenger. PAC-3 missile production will be completed in 2013, and we will set the conditions for transition to Missile Segment Enhancement (MSE) production starting in FY14.

By October 2013, 22 of 44 C-RAM sys-



tems are scheduled to go through reset, with others being recapitalized, upgraded, or are in new production. The limited user test scheduled for July-August is the remaining key to getting materiel release for the C-RAM system.

In the POM period, we will sustain our fielded capabilities. We will continue to modernize Patriot, adding capabilities such as the enhanced launcher electronic system. We will initiate the Stinger service life extension program, returning the shelf life of the missile to 10 years, and field the proximity fuze, which will expand Stinger's capability against the unmanned aircraft system target set. We will begin fielding the Missile Segment Enhancement, an enhanced defense against short-range ballistic missiles. In the period beginning in FY19, we will introduce the first block of the Indirect Fire Protection Capability (IFPC), Increment 2 (Interceptor). Block one will consist of currently fielded components (missile, platform/launcher, and mission command) and will focus on the cruise missile and unmanned aircraft system gaps.

Blocks two and three will add capabilities against rockets, artillery, and mortars, and cruise missile and unmanned aircraft systems, respectively. We are also looking to the science and technology communities to develop a low-cost interceptor with increased capabilities against the threat set.

In the sensor area, we will continue to sustain and upgrade our Patriot, Sentinel, and THAAD systems in FY13. We will field the Patriot post-deployment build 7, with its modern adjunct processor among many enhanced capabilities; this software build will set the conditions for development work with the Integrated Air and Missile Defense Battle Command System (IBCS) – our priority Air Defense Artillery mission command system of the future. We will continue fielding the forward-based radar, the THAAD radar adapted to provide enhanced surveillance of ballistic missiles as part of the Ballistic Missile Defense System.

During POM 14-18, Patriot enhancements will continue with the radar digital processor and combat identification upgrades, among others. We will continue fielding the improved Sentinel, transitioning to the family of medium tactical vehicles as prime movers, enabling network integration with the IBCS, and extending its current detection, tracking, and classification capabilities – at

SPC Charles Chesbro and SGT Zachary Perez, Patriot launcher maintainers, from 3rd Battalion, 2nd Air Defense Artillery, Fort Sill, Okla., complete a checklist for Patriot launching station Feb. 28, 2013, near Gaziantep, Turkey. (Photo by Senior Airman Daniel Phelps, U.S. Air Force)

extended ranges – against smaller cruise missile, unmanned aircraft systems, and rotary- and fixed-wing aircraft. In the extended planning period, we will develop the active electronically scanned array (AESA) technologies for Patriot and Sentinel to increase capabilities and lower operational costs. Mission command is the key component of our modernization efforts. We will sustain our current capabilities (Air and Missile Defense Planning and Control System [AMDPCS] /Forward Area Command and Control [FAAD C2] system) throughout FY13 and the early period of the POM.

Beginning in the POM period, we will introduce the IBCS, the number one materiel priority for Air Defense Artillery. It will completely transform how our Air Defense Artillery forces fight and support the joint force commander. It will provide a common mission command capability throughout the Air Defense Artillery force, limiting single points of failure, while adding better situational awareness and situational updates, better combat identification of friends and foes, and a 'plug and fight' capability with sensors and shooters.

In FY19-27, we will continue to field the IBCS and add advanced capabilities, such as, launch on the Link 16 network – facilitating engagements by joint platforms and resulting in larger defended areas and more defended assets – and individual Patriot launchers and radars on the network, vice an entire Patriot battery, providing operational flexibility and 'right sizing' capabilities to tasks and missions.

In support of the above materiel efforts, we have a series of ongoing air defense doctrine, organization, training, leadership and education, personnel, and facility initiatives. In the doctrine realm, the Fires Center of Ecellence Doctrine and Training Directorate (DOTD) has produced the Army Doctrine Publication 3-09 and Army Doctrine Reference Publication 3-09, *Fires*, which provide overarching views of Fires; the reference publication adds more specificity about Air Defense Artillery and Field Artillery in support of unified land operations.

The DOTD is in the process of reworking Field Manual 3-01, *Air and Missile Defense Operations*, which is the Air Defense Artillery's base operational document and focuses on tactics and procedures. The manual is currently in staffing and is anticipated to be published this December. Supporting the field manual will be a series of Army techniques publications, focused on current systems and organizations; all of these are expected to be published between now and the end of FY15.

In the organization arena, we have fielded a third THAAD battery and continue fielding a rocket, artillery, and mortar warn capability to brigade combat teams in FY13; and will field the C-RAM capability to two battalions (5-5 Air Defense Artillery and 2-44 Air Defense Artillery) in FY14 and FY15, respectively. In the training realm, we will stand-up the THAAD institutional base in FY15, the C-RAM training by FY16, and the IBCS by about FY19. We have also begun to develop an Air Defense Artillery Training Strategy for 2020. This strategy will focus on how we continue to provide an air and missile defense capability with trained and ready Soldiers and leaders, while at the same time transforming the branch, to include the institutional training base, across all of the materiel and non-materiel domains in light of our current equipment modernization strategy. The strategy will be executed along three lines of effort: transforming officer, warrant officer, and non-commissioned officer professional military education; transforming Air Defense Artillery functional courses; and realigning individual Air Defense Artillery training requirements.

Our End State: Air Defense Artillery training and education transformed to produce leaders and Soldiers who, by 2020, are masters in joint and combined air and missile defense and unified land operations. Our leadership and education initiatives are embedded in the "Air Defense Artillery Strategy for 2020."

Personnel efforts will focus on military occupational specialties and skill identifiers for our emerging systems. In the facility realm, the THAAD facility is currently under construction at Fort Sill, Okla., and it is expected to be complete by April 2014.

In June, we will celebrate our 45th birthday as a branch. Since our conception, weapon systems have come and gone, units have been activated and deactivated, and long held fighting positions have changed to new locations. Through all of this change, our one constant has been our Soldiers and leaders.

With the right Soldiers and leaders in place, our future looks as bright as ever.

FIRST TO FIRE!★★

The 2013 State of Fires

By Shirley Dismuke

For well over 40 years, Fort Sill, Okla., has hosted a professional forum for senior leaders in the Fires Force to come together in one central location, share ideas, discuss problems, and brainstorm solutions. Whether it was called the Senior Fire Support Conference of the 1970s, or the Field Artillery Conference of the 1990s, the 2013 Fires Seminar fulfilled its purpose as envisioned by the Commanding General (CG) of the Fires Center of Excellence (FCoE), MG Mark McDonald: provide a two-way means of knowledge-sharing to facilitate senior leaders in their ability to make educated decisions and recommendations to Army leaders that affect the future Fires Force of 2020 and beyond.

While years of deployments have taught the force much about soldiering during war, some leader skills have atrophied to the point of near extinction and we are at a turning point. McDonald noted that those times of leaders being handed training packets are at an end. Managing training is a core leader skill and officers especially, if they don't already know how, must re-learn to conduct and manage training.

Back to the Future – Roller Coaster of Deployments. Deployment training packets were one of several means the Army used to train-up units for quick deployment into theater. Providing young leaders with prepared training packets allowed more time to actually 'do' the training; however, it also made planning, conducting and managing training a dying art. The Army Training Network, at https://atn.army.mil/, along with senior leaders, such as division commanders, are great assets for younger officers and noncommissioned officers to tap into and relearn training. "Now, during a time of leaner budgets, is the right time for us [the Fires Force] to get at it and re-learn training management. It is critical to the survival of the force," McDonald stated.

The FCoE's focus remains on closing gaps in the Field Artillery and Air Defense Artillery (Figure 1) to attain the end state for the force of 2020. The FCoE's Concept Development and Integration Directorate (CDID) is working closely with the various program managers to resolve many of the gaps shown in black; however, McDonald focused on those gaps identified in blue – those not specifically material driven.

NTC/Avenger/National Guard: What Does it Mean? As the Avenger System closes, it will be phased into National Guard units. Avenger is currently the only system viable against unmanned aerial surveillance (UAS).

"Currently, brigade combat teams going to the National Training Center (NTC) Fort Irwin, Calif. to train cannot take their Avengers with them because we don't have the latch-up between the NTC and the National Guard," McDonald noted. He and the staff are working closely with both Forces Command (FORSCOM) and the National Guard to resolve this; however, money constraints and cancelled rotations to the NTC (except for deploying units) have put the fielding of Avenger to Guard units on hold for the near future.

The shift of air and missile defense to the Pacific is in response to the chief of staff of the Army's directive to 'Prevent, Shape, Win." The Army is moving critical assets to where they will best 'Prevent' future conflict…where they will 'Shape' the outcome of the next conflict…and where they will ensure we 'Win' future battles. These moves have created some necessary chaos that will resolve as units are settled and missions realigned.

Figure 1: Fires Focus

Fires Center

Make it more effective (JFU),
3 BDE, 4 Schools
ALM (Army Learning Model)
Leader development
Training
Nonlethal Fires
Electric Fires

Portfolio (STRATCOM)

Comprehensive
Prevent, Shape, Win
Gaps and strategy to close
Reduce redundancy

Fort Sill

Physical fitness
Information distribution
Customer service

Air and Missile Defense Gaps

Networked mission command
Counter-UAS
Cruise missile defense
Counter-RAM
Early release sub-munitions
Persistent, elevated sensors
NTC / Avenger / National Guard
Shift to the Pacific

Field Artillery Gaps

Networked mission command
Target location error
360 degree radar coverage
and range
Precision and area Fires
Force protection / survivability
Long-range Fires
Modernize gunnery
Fires headquarters - EAB
Reinforcing cannons

"Fires: eight percent of the force - best bang for the buck."

The gaps in the Field Artillery are a little more obvious, and often more difficult to close than those of the ADA. Modernization of gunnery skills and practices is being addressed at the Field Artillery School with updates to the program of instruction quickly focusing on digital computations, rather than 'pen and paper' methods.

The Army's transition to modularity in the late 1990s and early 2000s, left the force with some necessary growing pains, the most noticeable of which was the inadequate number of Fires headquarters. "With 14 division and corps headquarters supported by six (going to seven) Fires brigades, the math just doesn't work. And it sure doesn't work if you start rotating [to theater]," McDonald stated. The Force Design Update, which was briefed to the chief of staff of the Army, is under consideration now and McDonald is confident it will look something like this: a Fires headquarters in every division which will provide force Field Artillery or fire support and Training and Readiness Authority (TRA). McDonald added that these units will not be division artillery (DIVARTYs) because they will not command the units in the BCTs. "We will retain four Fires brigades as they are today: one for XVIII Corps, one for I Corps, one for III Corps and one for Eighth Army, and we are excited about that," he added.

With the Fires Force at about eight percent of the Army's total strength, McDonald is keenly aware of the challenges that lie before the Field Artillery and Air Defense Artillery branches. He also knows the Army gets the "most bang for

the buck" with his Fires Soldiers and systems, and funding invested in them is money that saves lives during war, a fact which McDonald has first-hand knowledge. He shared a story with the seminar attendees about personally witnessing the interception of incoming enemy missiles while at one of the forward operating bases in Kuwait. When 'incoming' sirens sounded the warning, McDonald was in no hurry to take cover.

"I saw the path of the arc, and being artillery, knew the rockets would continue that path and hit hundreds of meters away into the Gulf." He didn't realize at the time that those incoming rounds would "nose-dive" at the peak of their arc and rain straight down on the headquarters and all of those assigned there. "Had U.S. Patriot missiles not intercepted those three incoming rounds, the 101st Airborne and 3rd Army would have taken significant losses that day instead of dodging falling debris," McDonald added.

And his experience was not that uncommon in Operations Iraqi Freedom and Enduring Freedom (OIF/OEF). While the Fires Force supported many 'in lieu of' missions in both Iraq and Afghanistan, most people aren't aware of the huge number of munitions actually fired in OIF/OEF. Figure 2 is a breakdown that shows the quantity and variety of systems and munitions fired. While compared to the number of rounds fired in World War II, this seems relatively small; however, when you consider the OIF/OEF mission and environment, it was an enormous arsenal.

Also a surprising fact is the number of Army Tactical Missile Systems (ATACMS) and Guided Multiple Launch Rocket Systems (GMLRS) fired (more than 3,000 combined), with 97 percent of these being successfully fired into urban terrain. Each of these rounds has a lethal consequence attached to it and a high probability that American lives were saved; however, this is much harder to numerically quantify. When incoming rounds, targeting U.S. Soldiers and civilians, are knocked out of the sky, as in the case with 101st Airborne, we know exactly how many people were on the ground whose lives were threatened.

More than 175 C-RAM intercepts represent thousands of lives potentially saved and injuries averted. The impact on morale, if those rockets would have hit their targets, would have been horrific, especially in the case of the averted attack at the Toby Keith concert at Victory Base in 2007, with more than 3,000 Soldiers and civilians attending.

In order to ensure the Fires Force is best prepared for 2020, the FCoE has taken on the task of managing the Fires Force Modernization Strategy with specific goals and outcomes to ensure all systems communicate internally and externally [with the joint and combined forces] and significantly reduce redundancies within both branches. BG Don Fryc, commandant of the Air Defense Artillery School, and COL(P) Martin Clausen commandant of the Field Artillery School, in conjunction with the program managers, are charged with implementing the strategy, which will take the force into 2020 and beyond.

McDonald honed in what he called "the biggest problem I've got in the Field Artillery is target location." He explained, "10 or 15 years ago, our average target location error at NTC was 270 meters. We worked hard and got it down to 250 meters. Ask yourselves, how, with all of the equipment we've got out there, are we still at 250 meters?

It gets back to the training strategy. We teach people to guess grids and adjust fire. It is changing."

Going from manual gunnery to precision targeting will take time and McDonald, as well as the FA commandant, want to ensure the training is properly planned and conducted. Getting the right equipment to Fires Soldiers is key to this training and implementing the training in battle. McDonald introduced the Precision Fires Warfighter gear and explained how the system is fully integrated and automated to instantly call for fire with less than a 10-meter target location error.

The future of artillery is exciting and those involved in the planning and execution of the various paths we are taking to get to that future are equally as excited in what they do. With new, fully integrated, easily maintained and readily accessible equipment and Soldiers who are dedicated professionals, McDonald is confident the next generation of Fires Soldiers will be the best ever.

Fires Strong!★★

Figure 2: Munitions Use: OIF/OEF

ATACMS/GMLRS

Army Tactical Missile System

Internal navigation/
GPS guidance with a 270 km range
525 missions fired
63% in support of pre-planned targets

Guided Multiple Launch Rocket System

GPS guidance with a 15-84 km range
2,579 rockets fired
76% in support of pre-planned targets
97% of missions fired into Urban Terrain/ counterinsurgency

Howitzer Systems

155 mm - Paladin & M777

333,210 rounds fired
71% high explosive missions
8% smoke missions
21% illumination missions
236 Excalibur rounds fired/ precision guided

105mm - M119

217,101 rounds fired
70% high explosive missions
10% smoke missions
20% illumination missions

Patriot

9 engagements with 25 missiles fired
8 of 9 achieving warhead kill
Successfully detected, traced, engaged and intercepted missiles threatening defended areas

Combat Vignettes

Successful intercept of enemy missiles targeting Camp DOHA (CFLCC Headquarters) in March 2003

Successful Intercept of enemy missiles targeting TAA Thunder (101st Airborne Assembly Area) in March 2003

C-RAM/IFPC*

C-RAM - 20 mm

175+ Intercepts in support of OIF/OND
2,500+ attack sense & warn

Combat Vignettes

Successful rocket detection and destruction at Victory Base protecting more than 3,000 Service Members and Civilians at Toby Keith MWR Concert in May 2007

Successful rocket detection and destruction at Dodge City South LSA protecting more than 300 Service Members and Civilians in October 2010

Shifting Back to Known Points:
Field Artillery Battery Preparation for the Decisive Action Fight

By CPT Joseph R. Power

SFC Parker, assigned to *Bulldog* Battery, Field Artillery Squadron, 2nd Cavalry Regiment, unloads ammunition for a fire mission on an M777A2 towed 155 mm howitzer during the regiment's mission readiness exercise at Grafenwoehr Training Area, Germany, March 12, 2013. The regiment trains troops for an upcoming deployment in support of Operation Enduring Freedom. (Photo by Gertrud Zach, U.S. Army)

As the Army returns to its core principles of combined arms maneuver warfare, artillerymen have found themselves re-identifying with the doctrinal concepts of fire support. Once again, the Field Artillery (FA) will be shooting, moving and communicating. The primary role of the FA, in this case the rule, has always been manning guns, conducting fire missions, observing Fires, and supporting the maneuver units. The exception to this rule has been conducting numerous in-lieu-of missions, such as kicking in doors, mentoring host nation military personnel, or driving trucks. For more than 10 years, between the two conflicts in the Middle East, a majority of *Redlegs* have primarily trained for, executed, and repeated the exception, not the rule. Even for the lucky few who have been able to do a portion of the artillery mission, they likely fell in on a firebase (forward operating base /combat outpost), with clearly defined target list worksheets, high payoff target lists, and ammunition resupply chains. As the Army returns to the complexity of Fires planning for the full range of military operations, it must truly return to the basics and rebuild the core of the artillery; it must develop the next generation of artillerymen who are knowledgeable in all aspects of branch competencies.

Recently, a FA squadron conducted their decisive action training environment (DATE) rotation at the Joint Multina-

tional Readiness Center (JMRC) in Hohenfels, Germany. Prior to the execution of the DATE rotation, the FA squadron orchestrated a heavily resourced training plan to develop their artillerymen for this challenge. This article addresses that training plan and the friction points that arose in its execution.

Beginning more than 10 months prior to the DATE rotation, the FA squadron conducted individual training tasks, section level training, and a majority of their platoon tasks in preparation for their Table XII battery tasks, see Figure 1 below. After coordinating with JMRC's fire support trainers, the *Vampire* Team, the FA squadron arranged for an observer/controller-trainer (O/C-T) team to observe the execution and provide feedback along the way. According to the operation order, the intent of this battery-level Dragoon Artillery Readiness Test (DART) exercise was "to allow the squadron commander the opportunity to conduct a rigorous, realistic, and safe qualification event that thoroughly stresses battery systems and allows the commander to assess and qualify his battery's capabilities to operate as a unit."

The initial training plan, the DART, and the DATE rotation all required the unit to maneuver throughout the German countryside in an area known as the maneuver rights area (MRA). The MRA concept is ideal for any unit that becomes too familiar to their home station/training area/installation. The MRA was also preferred because of competing land requirements with the other squadrons and the multinational forces conducting training.

The initial phases of the operation included displacing an average of five to seven times within a 24-hour period for the first 72 hours, establishing secondary and supplementary positions, interacting with civilians on the battlefield – who were portrayed by both Soldiers and actual German civilians – and supporting the maneuver elements as they moved along their axis of advance. Squadron assets, such as the target acquisition platoon, were made available to the commanders as enablers to provide radar, survey and meteorological sections at the battery commander's discretion.

Commanders were forced to maintain their fire direction centers (FDCs) and battery operations centers, plan for refueling locations and times, and concurrently maintain the operational tempo of the maneuver elements navigating through the MRA. This was immensely more complex because of the German patterns of life and traffic which forced additional constraints and considerations in every aspect of the operation. After a 48-60 hour period, the batteries received march-orders to move back to Grafenwoehr Training Area (GTA) and prepare for the live-fire and defensive portion of the training event. Batteries rotated through a re-arm, refuel, and resupply point and were able to verify survey at the survey control point. Two of the batteries began planning for sling-load operations with the assistance of German CH-53 helicopters. During the GTA portion, the batteries were evaluated on hip-shoot procedures, fire base construction, and reacting to chemical, biological, radioactive, and nuclear attacks.

The O/C-Ts were not responsible for managing the squadron's planning process, mission event list, or conduct of the exercise. The team's primary task was to provide feedback and enable the unit to 'see themselves' by collecting observations and lessons learned and providing those results back to the unit leadership through after-action reviews or informal AARs or 'hot washes.' No matter how challenging or realistic the scenario, capturing these lessons facilitated the unit's ability to conduct discovery learning and recommend fixes for future operations.

Most of the trends noted were similar to those briefed for the past several years by the Army's combat training centers, the FA School, and other FA units that compile their lessons learned from de-

Figure 1. Fiscal year 2012 training strategy. (Information provided by CPT Joseph R. Power)

ployments or major training exercises. Junior leaders are expected to accomplish missions and tasks they may not have witnessed or actually performed in the past. Senior leaders are now responsible for tasks that were last performed while they were two to three grades junior to their current grade. Many junior and senior leaders likely skipped several key developmental steps along the way due to the demand for artillerymen to perform other missions within the force. Consequently, leader professional development and certification are keys to any successful training program and, together, will ensure our senior noncommissioned officers (NCOs) and junior officers know 'the how, the why, and the way.'

Several trends emerged relating to basic artillery fundamentals among units in the Field Artillery squadron: advanced party procedures, degraded emplacement, and manual gunnery/troubleshooting. Batteries are able to refine these issues by executing them multiple times. Units must commit themselves to understanding these trends, identifying corrective measures to account for them and training to eliminate them.

Advanced Party Procedures:

- Assess tactical situation and operations, Collective Task 71-8-5130
- Synchronize actions to produce maximum effective application of military power, Collective Task 71-8-5134
- Execute troop leading procedures, Individual Task 061-C09-2033

Many units seem to take advanced party procedures for granted, not fully realizing that standardizing training drastically reduces emplacement times for individual sections and entire firing elements. There are several tactics, techniques, and procedures (TTP) that help enable successful advanced party procedures. Erecting a communications enhancer (OE-254/COM-201B antenna group) provides the firing unit the ability to establish communications with the higher headquarters, a maneuver task force, and the forward observers prior to the main body's arrival. Units must learn the operational differences between the two types of antennas and utilize them accordingly.

Units should provide the FDC advanced echelon (ADVON) personnel 'manpacked' or vehicular radios to establish communications with observers; ensure that personnel are conducting radio checks with the right personnel and are not having to use a relay through another mission command node; provide FDC ADVON personnel with jump charts and/or Centaurs (lightweight technical fire direction systems) to establish basic firing capabilities and 90 percent of FDC emplacement requirements prior to the main body's arrival. If a battery has no substantial personnel shortages or certification issues, then they should consider sending an entire FDC forward in order to establish the firing capabilities for the main body.

Units also need to direct the ADVON

U.S. Army Soldiers, with *Bulldog* Battery, Field Artillery Squadron, 2nd Cavalry Regiment, prepare for a fire mission on an M777A2 towed 155 mm howitzer during the regiment's mission readiness exercise at Grafenwoehr Training Area Germany, March 12, 2013. (Photo by Gertrud Zach, U.S. Army)

leadership to initialize a base defense diagram, identifying threats and providing recommendations to the main body/battery mission command element upon arrival. Providing the vertical angle computed subtense measurement, minimum quadrant elevation, and gun grid locations for the main body during the time available before the main body's arrival will boost the artillery awareness of the ADVON and also produce a secondary independent check for the gun sections upon occupation. Also ensuring leaders are conducting precombat checks and inspections (PCCs/PCIs) with the personnel and equipment will also allow the battery leaders an opportunity to identify issues prior to arrival of the main body.

The FA squadron conducted all of its training in autonomous platoon-based operations as opposed to battery-based operations. This allowed the batteries to meet the commander's intent of maintaining firing capabilities at all times by bounding platoons forward and occupying prior to follow-on platoons displacing. The only issue that arose as a result of this during the DATE rotations was at battalion-level as they juggled maintaining the firing status of all six platoons during movement.

Degraded Emplacement Operations:

- Provide fire support, Army Universal Task List ART 3.2
- Integrate Fires, Army Universal Task List ART 3.1
- Execute troop leading procedures, Individual Task 061-C09-2033
- Conduct a non-Paladin occupation, Collective Task 06-2-3026

Reliance on the M777A2 155 mm howitzer's digital self-laying system is great...when it works! If it doesn't, the difference in the azimuth of lay by an out-of-tolerance aiming circle can be drastic. Incorporating the degraded check as a secondary or tertiary check upon emplacing in a position area is a step that should be included in the occupation and prevents having to cease firing during a mission in the case that the digital systems goes down later. This step should be added as either a time-based or a condition-based event when a position area is occupied for either an extended period of time in the case of offensive operations, or as part of the position improvement as required in defensive operations.

Furthermore, an important aspect of degraded operations is ensuring the manual equipment is properly prepared for use. This includes ensuring the aiming circles have been properly declinated and priorities of work are established into the routine that every section and platoon practices.

During the DATE rotation, one of the units were operating the howitzer platoons in the Paladin-style of operations, relying on the digital status of the howitzer for position location and verifying this location using a Defense Advanced Global Positioning System Receiver. This is certainly a hasty means of occupation, but units should consider verifying the status of the howitzer's position location by incorporating survey control points into their maneuver plans.

Commanders and platoon sergeants should be thinking about survey, declination stations, and manually laying a howitzer before every occupation in accordance with Field Manual 6-50,

Tactics, Techniques, and Procedures for the Field Artillery Cannon Battery, Dec. 23, 1996, and Special Text (Draft) 3-09.71, *Tactics, Techniques, and Procedures for the M777A2 Lightweight 155 mm Howitzer Battalion, Battery, Platoon, and Section*, January 2009.

Manual Gunnery/Troubleshooting:

- Execute Troop Leading Procedures, Individual Task 061-C09-2033
- Conduct Battle Tracking, Collective Task 06-6-1079
- Establish Operations Center, Collective Task 06-2-1063
- Determine Firing Data, Collective Task 06-2-5016

Manual gunnery is a skill that deteriorates with time, and is arguably the most important aspect of the FA training regimen. Manual gunnery requires leaders to understand 'the how, the why, and the way' of solving the prob-

Figure 2. Tracking chart for the Five Requirements for Accurate Predicted Fire. (Information provided by CPT Joseph R. Power)

#	Item	Red	Amber	Green
Target Loacation				
1	Current OBCOs and Target List	No	N/A	Yes
2	6400 MIL Capability and Able to Engage all Targets	N/A	PRI AOF	1 left/1 right
Accurate FU Location				
3	Directional Control Method (errors?)	M2 Compass	DEC A/C	PADS/GLPS
4	Positional Control Method (errors?)	Map Spot	GLPS/DAGGER	PADS
5	AFATDS/TADPOLE vs. Actual Location	Inaccurate	N/A	Accurate
6	Aiming Circles Declinated	No	N/A	BN DEC/GLPS
7	BN DEC Station Established	No	N/A	Yes
8	BN Master Station Established	No	N/A	Yes
9	Number of GDU-Rs in Use	None	Between 1-5 Okay	All 6
10	Crew Drill Issues	Significant	N/A	Good
11	Manual Chart Laid	No	N/A	Yes
Weapons and Ammunition Information				
12	MVV Book on Hand	No	N/A	Yes
13	MVV or Standard Velocity in AFATDS	None	One Lot	MVV Applied
14	MVV or Inference Possible (Correct Computation?)	No	N/A	Yes
15	Calibration Conducted or In-progress	No	N/A	Yes
16	Powder Temperature Accurate	No	N/A	Yes
17	Ammunition Lots Correct in AFATDS/TADPOLE vs. Gun-line	No	N/A	Yes
18	Ammunition Handling IAW FM 6-0	No	N/A	Yes
MET				
19	DTG of MET in AFATDS/TADPOLE (Did FDO Verify?)	STD MDET	Old MET	Current Met
20	How was MET Recieved?		Voice/E-mail	Digital
Computational Procedures				
21	GFT Settings Computed for Primary AOF and Charge	N/A	PRI AOF	1 left/1 right
22	GFT Settings Computed Correctly	No	N/A	Yes
23	TGPCs Computed/Applied Correctly	No	N/A	Yes
24	Five Requirements for Accurate Predicted Fires Posted for FDC	No	N/A	Yes

Acronyms

AFATDS - Advanced Field Artillery Tactical Data Systems
AOF - Azimuth Office of Fire
DAGGER - Defense Advanced GPC Receiver
DEC - Declination
DTG - Date Time Group
FDC/FDO - Fire Direction Center/Officer
FU - Firing Unit
GFT - Graphic Firing Table
GLPS - Gun Laying and Positioning System
GDU-R - Gun Display Unit Replacement
IAW - In Accordance With
MET - Meteorology
MVV - Muzzle Velocity Variation
OBCO - Observer Location
PADS - Position and Azimuth Determining System
TGPC - Terrain Gun Position Correction

lem sets associated with indirect-fire. Maintaining functioning Centaurs and Advanced Field Artillery Tactical Data Systems (AFATDS) in each FDC is imperative in order to establish digital communication with the M777s and provide secondary independent checks of each other. It is equally important during occupation or shortly thereafter, for sections to inherently begin to set up tertiary means of computing data; manual backups must be included in the priorities of work for an FDC and must be trained regularly to ensure every Soldier is proficient in fully determining firing data. Similar to the degraded verification of lay for the gun line, there are certain aspects of fire control and gunnery that can and should be maintained in an FDC. The manual chart is an ideal tool to simultaneously maintain each Soldier's personal abilities while explaining the 'how and why' to the firing solutions achieved on a Centaurs or AFATDS. Rotating the Soldiers through the separate positions in the FDC enables each team to build a better base of knowledge, to assist each other in troubleshooting, and to decrease complacency stemming from the monotony of repeatedly conducting the same jobs.

Moreover, physically displaying battle tracking charts and capturing the status of the elusive five requirements for accurate predicted Fires (5RFAPF) enables many collective tasks to be accomplished; these tracking charts increase the situational awareness of both the friendly and the enemy situations and operations; they provide an initial starting point for trouble-shooting inaccurate Fires; and they serve an obvious reminder to strive for the most precise data within the platoon, battery, and squadron. A proven tool and TTP for platoons, batteries, and battalions is a five-requirements tracker.

A standardized five-requirements tracker serves as a base level for elements to individually track the status and precision of their collection of their accurate and predicted fire capabilities, see Figure 2. The tracker can be modified with red/amber/green quantifications that can be adjusted depending on the unit's mission and equipment. The tracker can be incorporated into the entire brigade's fire support structure, placing the onus on the delivery and observation mechanisms. Tailoring this tracker, or a similar product, will enable units at every level in the chain to be on the same page regarding expectations and intent on delivery of all indirect fire assets. Maintaining standardization is key to the Field Artillery, and ensuring units are operating alike will allow the higher organizations a better glimpse at 'seeing themselves.'

During the DATE rotation, firing batteries were spread throughout the regiment's area of operations, sometimes with limited or no communication to higher headquarters. At times, platoons functioned autonomously, and batteries were required to assume mission command from the main command post (CP)/tactical CP for the entire squadron. Maintaining similar products, standards, and requirements enables platoon-sized elements the ability to control a squadron's fight.

Notable strengths included air assault operations, base defense/fire base construction, and reconnaissance, selection, and occupation of positions (RSOP). After conducting several 'hot washes' with the batteries during the exercise, there were several noticeable improvements as a result that reaped huge benefits during the DATE rotation.

Air Assault Operations:

- Plan a Field Artillery air assault, Collective Task 06-1-1047
- Conduct an air assault artillery raid, Collective Task 06-2-5005
- Move by air, Army Universal Task List ART 4.1.3.2

Two batteries conducted air assault gun raids during the squadron's train-up DART with the assistance of German CH-53 helicopters. Headquarters and Headquarters Battery provided the pick-up zone control and, in one case, a maneuver squadron provided a maneuver platoon to act as the security element. This experience not only allowed the squadron to build a bench of Soldiers and NCOs with experience, but it provided them an opportunity to work on the fundamentals of any operation: rehearsals, troop leading procedures, and PCC/PCIs. Both batteries accomplished the task of moving Soldiers and howitzers in and out of the landing zone and leaders, at all levels, were able to identify how to make a good plan better. Although this task was not executed during the DATE rotation, the ability to perform it was established. This skill, which can often be overlooked, is vital to operations since air mobility is currently the number one method of movement in Afghanistan.

Base Defense/Fire Base Construction:

- Establish operational area security measures (formerly force protection), Individual Task 171-300-0045

The squadron coordinated for engineer assets to work with each battery to develop a fire base and subsequently deliver Fires from it. The most important lesson learned was in understanding the engineer's capabilities and prioritizing the dig assets projects, then focusing the artillerymen on requirements the engineers could not accomplish. Much like any regimental-level area defense, the realistic time limitations placed on the dig assets ultimately forced commanders to decide between constructing a full-up fire base or concentrating on individual berms around the individual gun positions. One battery used the assets to assist in the construction of individual fighting positions, while the other two focused the Soldiers on individual positions and allowed the engineers to work on the larger aspects of the plan. Additionally, the collocated Q-36 Radar during this phase provided commanders an additional asset to plan for and incorporate into the firebase design.

During the DATE rotation, however, engineer assets were not available for firebase construction; the firebase training plan executed during the DART allowed for success in both the defensive and offensive phases of the DATE because the batteries had a better understanding of what to look for when conducting RSOP. Batteries that had become fairly proficient at defense diagrams were able to select positions that were quicker to be displaced from, identified potential enemy avenues of approach, established a more aggressive posture and logical priorities of work upon emplacement, and had increased the sense of urgency in each Soldier as they maintained their defensive posture.

Reconnaissance, Selection, and Occupation of Positions:

- Perform reconnaissance operations for artillery positions, Collective Task 06-2-3005

- Execute troop leading procedures, Individual Task 061-C09-2033

Initially, batteries had some issues with the development of both the advanced party and main body movements to their next positions. The right people were being utilized and were very open to suggestions and different TTP. The patterns of success for both the DART and the DATE rotations were that the battery commanders and platoon gunnery sergeants conducted every advanced party movement. These leaders ensured the advanced party received a prepared convoy briefing and altered their initial occupation techniques as the situation demanded. The second two batteries executed the train-up and received a class from firing battery O/C-Ts on transferring survey. After emplacing in a new location, the gunnery sergeant would immediately reconnoiter the next position and transfer survey to the secondary and supplementary positions by conducting a simultaneous observation with the main body. This is a very perishable yet easy task to conduct that is often overlooked during operations. Units must train this method routinely in order to successfully employ it when required.

Allowing individual units to train and use the transfer of survey enables the survey team the ability to better service the regiment, establish declination stations, and verify target locations, obstacle coordinates, or other platoon assembly areas that are outside of the tolerance. During the DATE rotation, the three firing batteries combined conducted 149 separate emplacements in an area larger than 3,500 square kilometers (70 by 50 kilometers). These were conducted over the course of 16 days by six platoons with an average of nine moves per day across the squadron: transferring survey was critical to their success!

Each of the aforementioned tasks are relatively basic and should be routinely trained, tested, and incorporated into unit training plans at all levels. Working the details will provide a unit a top notch exercise, ensure the Soldiers are not relying solely on digital or technological advantages, and enable our branch to execute the core tasks, achieve our branch's goal, and complete the artillery's mission.★★

Captain Joseph R. Power's first assignment was to 1st Battalion, 321st Airborne Field Artillery Regiment, Fort Bragg, N.C., where he served as a fire direction officer, platoon leader, battery executive officer, assistant operations officer, and Headquarters and Headquarters Battery commander. He deployed to Operation Iraqi freedom (OIF) from October 05-October 06. He was reassigned to 3-321 FAR, where he commanded B Battery and deployed to Operation Enduring Freedom (OEF) from January 09-January 10. He is currently stationed at the Joint Multinational Readiness Center, Hohenfels, Germany, where he has served as Headquarters and Headquarters Battery primary observer, controller, trainer (OCT), the analyst OCT, and most recently the operations OCT.

U.S. Army Soldiers, with *Bulldog* Battery, Field Artillery Squadron, 2nd Cavalry Regiment, prepare for a fire mission on an M777A2 towed 155 mm howitzer during the regiment's mission readiness exercise at Grafenwoehr Training Area Germany, March 12, 2013. (Photo by Gertrud Zach, U.S. Army)

Joint Fires Training

By LTC Joe Hilbert

Over the past year, 17th Fires Brigade has supported two joint exercises, which have demonstrated how units can capitalize on currently existing exercises and opportunities to both meet internal training objectives, and provide opportunities to train leaders from across the joint force.

Over the past 10 years, we've learned that we will conduct operations jointly and often below the division level.

Unfortunately, most of the exercises available to Army units below the division are very 'Army centric' and rarely provide leaders with the opportunity to train in a joint environment. These two exercises, the U.S. Air Force (USAF) Weapons School's graduation exercise, Mission Execution and Virtual Flag, can help close the gap between single service and joint training.

Involvement in these exercises was the result of decentralized coordination at the action-officer level. This article will present both the advantages and disadvantages of this decentralized coordination and will propose an alternative, semi-formalized virtual joint training conference where units can coordinate for participation. The goal of the virtual training conference will be to retain the flexibility of decentralized coordination and, at the same time, expand knowledge of these opportunities in a semi-centralized environment. This provides individual units the opportunity to determine involvement and resourcing and ensure they continue through the after action report process (AAR), developing and improving, to best train all services involved.

USAF Weapons School Graduation Exercise: Mission Execution. Biannually, the USAF Weapons School at Nellis Air Force Base (AFB), Nev., teaches graduate-level instructor courses to approximately 80 graduates, who upon

Soldiers with C Battery, 2nd Battalion, 300th Field Artillery, simulate firing a rocket during a High Mobility Artillery Rocket System (HIMARS) mock run in Worland, Wyo. The Soldiers are training in preparation for their final shoot of the M142 HIMARS as a battery. (Photo by SPC Ashley L. Motley, U.S. Army)

Soldiers from 1st Battalion, 78th Field Artillery, fire a High Mobility Artillery Rocket System (HIMARS) during a live-fire training and demonstration May 3, 2013, at Contingency Operations Location Mow-Way at Fort Sill, Okla. The training also included firing an M777 155 mm howitzer, M109A6 Paladin howitzer, M119A2 105 mm light howitzer, Bradley Fire Support System and Multiple Launch Rocket System. (Photo by Jeff Crawley)

graduation are expert instructors on weapons, weapons systems, and air and space integration. Their graduation exercise, 'Mission Employment' happens twice a year in June and December. It involves roughly 50 participating units, 400 sorties, 100 aircraft, and 3,000 personnel, approximately half of which are from outside of Nellis AFB. The initial invitation from the Weapons School to the brigade was for a response cell, which could replicate a High Mobility Artillery Rocket System (HIMARS) battalion providing Army Tactical Missile System (ATACMS) Fires in support of the joint force air component commander (JFACC). This cell included four personnel: an liaison officer (LNO), a targeting officer, and two senior fire direction personnel. This cell provided subject matter expertise to the exercise Coalition Air and Space Operations Center (CAOC) and replicated Fires using a stand-alone Advanced Field Artillery Tactical Data System (AFATDS). Prior to the exercise, instructors from the school gave students a block of instruction on HIMARS capabilities.

During the AAR process for this exercise, both the Weapons School and the participants from the brigade identified areas for expansion, which included: (1) a HIMARS/MLRS family of munitions (MFOM) class taught by the battalion subject matter experts (SMEs) supporting the exercise, (2) a team from the brigade aviation element to interface between the HIMARS unit and the air-battle managers located either in the CAOC or on an airborne platform,(3) a liaison officer (LNO) cell from the supporting battalion, (4) a fire direction center (FDC), and (5) a launcher to better replicate fire mission processing times.

Additionally, the launcher provides opportunities for the HIMARS battalion and the C130, MC130, and C17 Weapons Schools to conduct HIMARS raids during the exercise execution. This exercise currently involves approximately 20-25 personnel from the brigade, and leaders from the brigade who are involved in the exercise and participate in the planning for different air operations, from offensive counter-air and special air operations to close air support (CAS) and dynamic targeting.

Furthermore, this exercise allowed the brigade to link its digital systems onto a joint network from the launcher through AFATDS, through the brigade's Tactical Airspace Integration System (TAIS) and onto the CAOC's Theater Battle Management Core Systems (TBMCS). This participation not only benefited the brigade's leaders, but also benefited the joint force, exposing students and other units supporting the exercise to Army surface Fires capabilities.

Because the participation of the exercise benefited both services, resourcing was jointly provided, albeit with the USAF providing the majority of the resources required including transportation to the training event and most of the temporary duty (TDY) funding for the participants. This resourcing was coordinated via action officers throughout the planning process with each determining what their service could resource based on their individual training objectives and by determining which training events would benefit the other service.

Coalition Virtual Flag 12-4, Davis-Monthan AFB, Ariz. A second ex-

ercise, with more robust participation from the brigade, was Coalition Virtual Flag. This simulation exercise involved 34 multinational units at 20 worldwide locations. The main training audience was the 612th Air Operations Center (ACO) at Davis-Monthan AFB, and at the beginning the USAF, through the 1st Battlefield Coordination Detachment (BCD), requested a Fires brigade to participate replicating a coalition force land component commander (CLFCC).

Working with the 1st BCD, the 17th Fires Brigade agreed to participate but elected to provide a battalion headquarters to replicate a Fires brigade, providing supporting Fires to the coalition force air component commander. The BCD would provide personnel to replicate the CFLCC and together both organizations would refine the tactics, techniques and procedures (TTPs) for providing responsive Army surface Fires in support of an air component. The Fires brigade provided a 50-man detachment, which included a battalion headquarters and personnel to man response cells replicating the brigade's battalions. The supporting battalion established their battalion tactical operations center in work spaces inside the 612th AOC on Davis-Monthan and used the exercise to refine their command and control systems.

Additionally, the battalion's Forward Support Company conducted convoy training in simulators at Joint Base Lewis-McChord, Wash., and while they were unsuccessful in linking the simulations, they were able to incorporate the reporting requirements of the convoy training with the training at Davis-Monthan to better train in battalion logistical functions. Finally working with the BCD, the battalion was able to refine the brigade's ATACMS battle drill and the processes required for integration when supporting the CFACC.

Coordination and Planning. Both exercises were the product of decentralized coordination and planning. In each case, action officers at the captain and major level planned brigade-level involvement based on the brigade and battalion commanders' intent. This decentralized planning provided two major advantages: the ability to plan participation based on individual-unit training objectives and the ability to leverage resources from each service to meet individual unit objectives. When initially planning the exercise, action officers presented the brigade and battalion commanders with a mission analysis of the exercise, outlining both the objectives of the supported training audience and opportunities for expansion meeting the supporting unit's training objectives. The brigade and battalion commanders, in turn, provided their intent and vision for participation. Action officers then participated in a series of training conferences, in which they negotiated involvement based on planned training objectives and resources available. This ensured the exercise would both meet the supported unit's training objectives and allow for additional training for the supporting unit.

Furthermore, this joint negotiation allowed for a pooling of service resources to meet both service and joint training objectives. In each case, the majority of the fiscal resources were provided by the USAF as the supported training audience and based on their desire to have a training environment with joint participation. The brigade provided additional resources based on its training objectives.

For example, the USAF was able to provide transportation for equipment and TDY funding for up to 15 personnel to replicate the HIMARS portion of Mission Execution. The brigade, in turn, funded an instructor for the HIMARS/MFOM class and funds for brigade aviation element personnel to participate, accomplishing brigade training objectives, which included testing the digital linkage capability between the Army and Air Force systems.

Planners negotiated similar funding and resourcing agreements for Virtual Flag. From a brigade perspective resourcing these training events equated to an investment in leader education similar to professional military education.

This level of decentralized coordination is not without disadvantages. For example, because these opportunities are often the result of 'who-knows-whom' relationships or the personalities of the leaders involved, they are short-lived and do not survive the change of duty stations of the key individuals, who have coordinated and participated in the training.

Additionally, they rarely transferred to adjacent units or expanded beyond a limited level. Because of the relationship created directly between the supported and supporting units through the planning process, the supported training audience can become fixated on one supporting unit and may not realize other units with similar capabilities could benefit from the training event.

Finally, while the decentralized coordination provides maximum flexibility for participation, it lacks advertisement to a larger force and can become limited by the vision of the participating units. Expansion, to include other units, would naturally include a different commander's vision and intent and would therefore benefit the larger force with refinements of joint TTPs based on multiple unit participation and data points. The lack of advertisement to the larger force also means certain training exercises, which could benefit from joint involvement, remain single service venues due to the lack of individual connections between planners, action officers and their sister service counterparts.

The Virtual Joint Training Conference. A way to expand opportunities for joint training, and specifically joint Fires training below the division level, would be through the creation of a Virtual Joint Training Conference. A model for this would be the joint airborne/air transportability training (JA/ATT) conferences conducted quarterly between U.S. Air Force and Army units. Using the JA/ATT model, a similar conference structure could be forged between the Fires Center of Excellence (FCoE), the Fires brigades, the battlefield coordination detachments and units from the USAF Air Combat Command. Unlike the current JA/ATT conference model, this forum could be distance based, utilizing conferencing technology such as Adobe Connect.

Similar to the Fires Warfighter Forum, this joint training could be hosted by the FCoE and conducted quarterly or bi-monthly. The conference would begin with an AAR from a selected training event/exercise with the supported training audience presenting lessons learned and areas for improvement with future and similar events. Units would then present an overview of their long range training calendars and single slides detailing opportunities in their training/exercise plan for joint in-

Soldiers from B Battery, 1st Battalion, 38th Field Artillery Regiment, 210th Fires Brigade, 2nd Infantry Division, conduct a live-fire exercise with the M270A1 Multiple Rocket Launcher System at Rocket Valley, South Korea. Their mission was to qualify fire direction centers, launchers and ammunition crew members to enhance the battalion's readiness. (Photo by SSG Carlos R. Davis, U.S. Army)

tegration. Units could volunteer for participation in joint events based on their current training schedule. Once aligned with an exercise or training event, the two units – supporting and supported training audience – could coordinate participation in a decentralized manner as it has been done traditionally. This would preserve the flexibility of decentralized coordination while resolving its shortcomings.

Finally, other interested parties, such as the Forces Command (FORSCOM) Field Artillery operations integrator or corps and division fire support cells, could monitor for both situation awareness and involvement or expansion.

By better utilizing current service training venues, the joint Fires community has the ability to capture best practices and use these exercises to build upon the lessons learned from the past 10 years of persistent conflict.

Use of existing exercises will both maximize available opportunities and resources and will allow for expansion to better replicate contingency operations.

However, until a forum exists where all units can coordinate for participation and leverage multiple joint assets, these opportunities will remain limited to only those who have established a previous, informal relationship and benefits to the larger joint force will be solely dependent upon the dissemination of lessons learned through professional journals and articles, as opposed to experientially through actual leader participation.★★

Lieutenant Colonel Joe Hilbert is currently the deputy chief of staff for the 7th Infantry Division. Most recently he was the commander of 5th Battalion, 3rd Field Artillery Regiment (HIMARS). Prior to battalion command, he was the chief of operational Fires for the Aviation Tactics and Evaluation Group at Fort Bragg, N.C., and served as a brigade and battalion S3 in the 18th Fires Brigade (Airborne), also at Fort Bragg. He has deployment experience in Operation Enduring Freedom, Task Force Falcon in Kosovo, and Operation Restore Democracy in Haiti. He is an Olmsted Scholar with a Masters Degree in European Studies from the University of Leipzig, Germany.

It's Your Time to Shine!

Submit your unit's annual achievements prior to October 1, 2013, for the 2013 Red Book.

Submit your input by email to fires.bulletin@us.army.mil with Subject: "2013 Red Book Submission: UNIT NAME"

The Red Book is used to inform the Fires community of what our Fires Soldier have accomplished over the past year and what their future missions are. The annual Red Book highlights active duty, National Guard and Reserve U.S. Army Air Defense and Field Artillery, and U.S. Marine Corp Field Artillery brigade-level (and lower) units. The unit submissions capture significant unit-specific events, including deployments, training events, etc., over the past year, from 2012 through 2013.

The deadline for submissions is Oct. 1, 2013.

Submissions are published on a 'first-come, first-served' basis and are limited to 250 words per organization. Budget constraints limit our page count but we will do our best to publish every submission we receive.
Unit article submissions should be submitted using Microsoft Word file format (.doc). Higher-level organizations should facilitate their subordinate units' submissions when applicable. Please provide your unit's home duty station(s), nicknames, and websites/social media URLs to be included in the article in your submission.

We encourage you to submit photos along with your unit's Red Book submission. Please attach the photos as separate files. File formats JPG, PNG or GIF are acceptable. Photos embedded within a text document, specifically .doc format, are compressed and not high-resolution and cannot be printed in the *Fires Bulletin*. Photo resolution should be no less than 900 by 900 pixels, or 300dpi. Please include a written caption for each photo, i.e. who, what, when, where, why and include the photographer's name.

Additional information and guidance for submissions can be found on the *Fires Bulletin* website, http://sill-www.army.mil/firesbulletin. If you have any questions please email the *Fires Bulletin* staff at fires.bulletin@us.army.mil, or by phone at (580) 442-5121/6806, or DSN 639-5121/6806.

We look forward to hearing from you soon!

The G-1 Perspective

By Shirley Dismuke

The Greek philosopher, Heraclitus, is credited for the infamous quote, "Change is the only constant." At the 2013 Fires Seminar at Fort Sill, Okla., LTG Howard Bromberg, U.S. Army deputy chief of staff, G-1, underscored the absolute truth in this statement.

On May 8, 2013, Bromberg addressed the crowd of more than 400 attendees on the personnel and administrative issues at the Department of the Army G-1 level. The theme of 'change' was evident throughout the hour-long presentation. From changes in personnel strengths to modifications of the current evaluation systems, Bromberg provided the Fires Force with a small "snapshot of what's going on around the personnel community."

Among the topics on which Bromberg focused were the current drawdown and how non-deployable Soldiers fit into the overall picture, involuntary separations for both Soldiers and officers, women in the service, and benefits for same-sex partners, which are scheduled to be effective Aug. 1, 2013.

At the height of the 'surge,' in 2007-2008, the Army's strength was 574,000, and the goal for FY17 is about 490,000. All armies expand and contract based on strategic requirements, and the U.S. Army is no different. As mission needs increase, force authorizations also increase to meet the requirements and vice versa. Bromberg stated that we are currently in the 'decrease' phase, yet we must maintain readiness.

"We cannot break our readiness paradox. If you look at a brigade combat team today, they continuously run about 118-125 percent strength." He added that [in the past] the Army maintained overfill on the BCTs "to ensure they have maximum readiness as they go out the door [deploy]." Ensuring these deployable units had more than their authorized strength of medics and maintenance personnel has been routine business at the G-1; however, now (in a drawdown environment), adjustments must occur, and overfill will be an exception, not the rule.

LTG Howard Browmberg addressed senior leaders at the 2013 Fires Seminar held May 7-8 at Fort Sill, Okla. (Photo by Felix Sheil, U.S. Army)

During FY12-13, congress allocated 40,000 Soldiers above force structure authorizations, which included 10,000 to cover our wounded. Bromberg suggests that part of the problem with this is the junior leadership "thinks it [overfill] is normal," and they have a mindset of 100 percent authorized and assigned strength in their units. "What they may not realize is that those allocations have already been taken away, and we have gone from 574,000 to 530,000, which is 12,000 below the directed congressional cap."

Improvements in the integrated disability system are responsible for much of the strength reduction, while discipline within the force (doing more with less) has allowed for some reductions. Even with disability system improvements, there are still about 27,000 Soldiers in the current system, and processing takes time. While the Army has gone from averaging 400 days to about 295 days to get a Soldier through the process, significant improvements have been made to allow Soldiers to get their Veterans Administration (VA) disability checks within about 75 days of retirement or end term of service (ETS). This improvement is a result of the close work of the Army with the VA to take care of wounded Soldiers while they are still on the active duty roles, and the goal is to get this timeframe down to 30 days.

Keeping non-deployable Soldiers on the roles comes at a significant cost, not only in dollars but in overall readiness. Speeding up the processing time, without compromising the quality of care, is both the Army's and the VA's goal. Every installation now has a combined team which allows military doctors to share data and records with the VA, preventing Soldiers from duplicating medical exams upon departure and saving precious time. Bromberg stated the goal is to get Soldiers with permanent profiles processed and out of the Army,

if applicable, within 295 days, although some will be processed as quickly as 180 days. He also noted that for the first time ever, the Army has some active duty Soldiers working at VA centers to assist in the transitioning process to "work down the case backlog."

Even after considering the high number of Soldiers in the disability 'pool,' drawing down the force to 490,000 by FY17 puts the Army at a critical point in the normal attrition process. Managing normal succession into the Army has helped somewhat; however, attaining a minimum of around 60,000 new Soldiers and 4,500 new officers a year is necessary to keep the force viable. From a G-1 perspective, the next obvious step is to involuntarily separate those Soldiers and officers in over-strength career fields. Bromberg quickly added, "This is another culture change for us because we're in an environment now where we've grown the Army, had high promotion rates, and haven't had to tell people they can't stay in [the Army]." He doesn't expect this phase of downsizing to be like post-Desert Storm, because there are new policies and new authorities, such as the selective retirement board, which convenes in August 2013.

The specifics of the involuntary separation phase of the drawdown have not been released; however, it will affect virtually all ranks within the force. With overages of 500 colonels, 400 lieutenant colonels, and about 11,000 Soldiers, many totally 'qualified' Soldiers will be asked to leave the force, or possibly move into a shortage skill specialty. The G-1 understands the emotional nature of these personnel cuts; however, managing a fair and equitable system is the ultimate goal. Bromberg stated the hardest part of this reduction would be in the enlisted grades when commanders might have to tell fully qualified Soldiers they cannot re-enlist due to the limited needs of the Army. With the current force being the most highly educated ever, additional pressure will be on company commanders to keep only the Soldiers who meet the needs of the Army; so again, this is a cultural shift in routine operations.

Equally as difficult for the officer corps is the reduction in authorizations of captains. These young men and women came in at the height of the surge, have deployed as many as three and four times, and many of them were paid incentives to stay. Most of them "have never been block-checked on their officer evaluation report (OER), nor have they faced a cut." Bromberg went on to say that the senior leadership will be closely involved in this process and commanders must start talking openly and frankly with these captains to start shaping the future force. With 48 percent of all the defense budget dollars going to pay personnel related costs, these cuts will be the most advantageous for the future. G-1 also realizes the challenge of not creating a 'hallow force,' and maintaining the required skills balance must be a selective process.

One challenge the Army has already addressed in the drawdown is ensuring leader development is incorporated into doctrine and not overlooked. The renovation of the OER is encompassed in the doctrinal publication updates with the major components of change being in the areas of developmental, organization, and strategic planning. The changes were not necessarily driven by what most consider 'over inflated' ratings, but were an effort to incorporate the Army's new leadership doctrine into the rating system. The developmental piece of the OER targets captains and lieutenants and is based on the attributes of leadership and the characteristics of professionalism. These OERs will be maintained in the official file for 10 years.

Another change is that senior raters no longer evaluate performance but focus on the officer's potential service. Once officers achieve the rank of major, the OER changes focus to the strategic piece and performance at higher organizational levels. The Army is trying to achieve an overall view of each individual's skills and attributes throughout their career and how each can be best 'fitted' into assignments other than command. Bromberg noted that closeout OERs and profile changes are not required with the new system and that educating the force on the new OER is critical, even in the middle of the drawdown. Not only will it ensure the future strength of the Army, it establishes a clear path to the professional and leader development strategy of the future force.

Another 'hot topic' Bromberg touched on was the removal of the direct ground combat rule for assignment of women by the secretary of defense. This removal opened every military occupational skill (MOS) to women, and allowed the services two years to analyze the areas and by exception, close MOSs. By January 2016, the Army must complete their studies and present the results with the list of MOSs, if any, we want to remain closed. Bromberg was adamant that the change is not about lowering standards, but "it is about opening opportunities to all qualified Soldiers who meet the current standards." The chief of staff of the Army's guidance was to proceed in a methodical manner and not to set people up for failure but to encourage an environment with gender neutral occupational standards. Entrance exams are being developed to evaluate physical requirements for specific MOS, i.e., abilities to lift, pull levers, etc., which were never measured in the past, and they will provide a valid tool to determine the physical standards for each MOS. Other concerns will be addressed as these MOSs become fully gender integrated.

The last point of discussion was the same-sex partner benefits that will come into effect this summer. Three areas govern these benefits: the Defense of Marriage Act (governs items such as housing allowance and medical benefits that the Army cannot change), self-member designated benefits (disposition of remains and survivor benefits for insurance purposes), and the service proprietary benefits (who is authorized to use military facilities and possess identification (ID) cards, etc.). Application forms will become available in August for same-sex partners to apply for service proprietary benefits, including military dependent ID cards with limited access to facilities.

Much debate in the political arena is still ongoing regarding the issues discussed at the seminar; however, our mission in the Army is to move forward as guidance is provided. As regulations change, Bromberg and his staff are sure to get the word out in a timely manner to allow implementation as quickly as possible.

Change truly is the only constant in the current environment, and the future force of 2020 will stand ready regardless of its dynamic nature.★★

FIRES 2020: Land & Cyber

By Jennifer M. McFadden

The Fires Center of Excellence hosted LTG Rhett Hernandez, U.S. Army Cyber Command, at Fort Sill's Fires Seminar on Wednesday, May 8, 2013. The goal of Hernandez's presentation could not be more imperative in the ever-changing hostile environment and the climate of a digital threat.

"Our senior leaders are responsible for leading our Army into the future. Cyber should not be a niche; rather everyone should be concerned with the digital operating environment," stressed Hernandez.

On Oct. 1, 2010 the Army established U.S. Army Cyber Command/2nd Army. The Command is split-based with the Headquarters at Fort Belvoir, Virginia and select staff elements at Fort Meade, Maryland. U.S. Army Cyber Command is charged with synchronizing all Army forces operating in cyberspace.

Army Cyber Command's mission is to plan, coordinate, integrate, synchronize, direct and conduct network operations and defense of all Army networks; when directed, the unit conducts cyberspace operations in support of full spectrum operations to ensure U.S./allied freedom of action in cyberspace, and to deny the same to our adversaries.

Army Cyber has more than 21,000 Soldiers, civilians and contractors working across the globe and are funded through existing fiscal resources.

The Army Cyber Command and its supporting units are in action every day securing and defending Army networks and conducting cyberspace operations critical to Department of Defense (DOD) and Army missions.

"We are the Army leader in operating, maintaining, and defending the network."

Hernandez explained that cyber is not just a network. "We operate in a contested environment, which therefore makes it critical to improve our defense systems. Daily there are thousands of attempts to penetrate Army networks. Every time that Soldiers and Civilians enter the network, regardless of where they are, they must recognize they're in a contested environment. Everyone must be aware of the cyberspace threats and remain vigilant against them."

To meet the challenges of this future operational environment, the Army is transforming the way it thinks about cyberspace. In executing traditional operations, leaders must consider the implications of the contested cyberspace environment in which all military forces now operate routinely. This reliance on networks and cyberspace to conduct traditional military operations shows the importance of addressing the synergies between these operational domains, which requires unified 'land-cyber' operations—a unified force with land and cyber forces under a single commander to produce a combination of effects in both domains to achieve objectives. This cross-domain dynamic requires military leaders to think in a two-domain (landcyber) sense.

The Army continues to pursue three critical thresholds key to land and cyberspace operations: first, a full range of cyberspace capabilities integral in all Army operations; and Army Cyber Warriors integrated in joint cyber organizations and unit staffs. During planning and exercises cyberspace operations are routinely included to develop and practice achiev-

MG Rhett A. Hernandez assumed command of the U.S. Army Cyber Command from LTG Kevin T. Campbell, during an uncasing of the colors and change of command ceremony in front of the Nolan Building on Fort Belvoir, Va., Oct. 1, 2010. (Photo courtesy of the U.S. Army)

ing cyberspace effects. In the past year, Army Cyber Command executed an unprecedented level of realistic cyberspace play and Army cyberspace integration into major regional exercises.

Second, the Army will achieve cyberspace superiority -- a degree of dominance that allows the conduct of operations at a time and place of our choosing, in order to seize, retain, and exploit the initiative; achieving the same level of freedom to operate in the cyberspace domain that Army forces achieve in the land domain today.

Third, the Army is moving beyond enabling command and control (what the U.S. military now calls "mission command") to ensuring it, in spite of cyberspace threat activities. Our world-class cyberspace 'opposing force' will continue to challenge and train units to operate in a contested and degraded environment. We must be able to conduct defensive, as well as, offensive cyberspace operations and our cyber brigade is ready to support commander's tactical and operational objectives in cyberspace.

Finally, all cyberspace-related activities, including information operations, electronic warfare, the electromagnetic spectrum, and space, must be integrated with cyberspace operations.

In the end, cyber warriors will help prevent conflict with credibility based on capacity, readiness and modernization; shape the environment by sustaining strong relationships with partners, and building capacity and capability; and support winning decisively with the conduct of cyberspace operations.

"Our adversaries are leveraging cyberspace with the potential to place the nation (and the Army) at mortal risk," said Hernandez. "We must turn this new domain to our operational advantage."

Cyberspace should be on the same level as other warfighting domains of land, sea, air and space. The land cyber vision integrates cyber constructs at every echelon to synchronize and deliver commander's effects, through all cyber organizations and unit staffs.

Army Cyber's area of responsibility spans all Army networks. From "hacktivists" to nation-states, these threats continue to attempt to penetrate our networks every day.

"Our enemies will seek to deny freedom of movement on our networks and use whatever they can from wherever in the world they are to gain advantage," he explained.

Cyberspace Operations = Build + Operate + Defend + Exploit + Attack.

The U.S. Army Cyber Command is responsible for training, organizing and equipping units, as well as educating, training and supporting leader development. The command is also in development of the future Army cyber force and doctrinal concepts for land cyber unified operations. The priorities include, creating a common operating picture (COP), increasing cyber capabilities and developing Army cyber requirements and resources, even as the fiscal climate is strained.

Bringing senior leaders into the Army of 2020 will make them 'cyber-enabled' commanders. With this education and resource, these commanders can come to expect a freedom to operate, defending and securing critical information while understanding the operation impact, risk and mitigation. Leaders must also embrace cyberspace as an operational domain, treating the network as a weapons system asset.

The leaders of the future will have a COP, enabling them to see themselves, the threat and the cyberspace terrain. Cyber effects are moving toward a synchronization of lethal and non-lethal Fires, which are tied to the commander's objectives. To create this, a single network as an operational platform is being developed, enabling cyberspace operations. However, "education, training, and leader development is key."

"Institutional and operational integration is ensured by knowing the threat - it's not random - protecting unit systems, information and personnel, while enforcing compliance of standards and discipline. The key to cyberspace operations is people, not technology," emphasized Hernandez.

Land and cyberspace operations; creates a unified force (land and cyber) under a single commander. The full range of cyberspace operation partnered with integration of organizations and staffs with cyber warriors, allows cyberspace superiority, which affords the same level of operational freedom that the Army achieves in the land domain.

This unified operation model also ensures 'mission command,' by cyberspace capabilities integrating a construct for cyber-related operations and capabilities.

"Cyber capabilities and effects are instantaneous, and planning is resource and time intensive," said Hernandez.

The goal for targeting in cyberspace is the integration of cyber Fires with the joint Fires process, allowing for the five 'Ds,' disrupt, degrade, delay, deny and destroy. Target system analysis is essential to targeting in cyberspace. Maximum flexibility and agility to keep pace with the dynamic operational environment are also imperative to the targeting process.

Hernandez explained that a "single, secure, standards-based, versatile infrastructure is needed to enable cyber operations for the Army of 2020 and beyond."

"The convergence of 'threat and capability' will define the next decade… we must be ready," Hernandez explained. "We are protecting critical infrastructure; defending the nation and the Army; making the U.S. Army 'Second to None' in cyberspace."★★

A 2nd Brigade, 1st Armored Division Soldier uses the new chat feature of the Joint Capabilities Release of Force XXI Battle Command Brigade and Below/Blue Force Tracking during NIE 12.1 in November. Joint Capabilities Release Chat works like an online chat room within FBCB2, allowing users to instant-message in real time over the BFT 2 satellite network. Joint Capabilities Release is part of Capability Set 13. (Photo by Claire Schwerin; U.S. Army)

Confronting Digital Apathy

By CPT Michael Wentz

The persisting problem with using digital Fires systems in the U.S. Army is the ease and obstinacy with which Soldiers rely on the status quo. It is far simpler for the typical forward observer to pick up a hand-mic and request an inaccurate adjust fire mission, than it is to become proficient at utilizing a Pocket-Sized Forward Entry Device (PFED). Many fire support officers default to finger plotting a grid on a map and making a radio transmission, rather than training to digital proficiency enabling them to receive a mission on the Sensor Control Unit (SCU). Even though this method would allow them to mensurate the grid in Precision Strike Suite-Special Operations Forces (PSS-SOF), and send the extremely accurate grid directly to the Mortar Fire Control System (MFCS) or fire support element (FSE) with minimal error and little chance of human error. However, just because this is the way it has been done in the past, and it is the easiest way, does not justify the neglect of digital systems and digital training. These systems, when used properly, are quicker, more accurate, and minimize error from sensor to shooter. The issue is not with the equipment, although it does have flaws that require training to overcome, but with the stubbornness behind employing it. This article will relate to the Army Fires community a narrative of how 1st Squadron, 2nd Cavalry Regiment encountered and overcame digital apathy.

Before delving into the details of the digital

problem and solution, it is tremendously important to relate the fact that fielding teams do not teach all the details required to achieve digital proficiency. The PFED class for example was executed according to a script. The practical exercises included a cut sheet for internet protocol (IP) addresses and station ranks for each PFED, but there was no explanation of the numbers or their relation to each other. The class culminated with a two-wire (hard-line connection) communication exercise, a method of communication that the PFED is capable of, but has never, and will never be used in the field environment. There simply was not time allocated for an ASIP (Army SINCGARS Improvement Program Radio) digital communication exercise. The only way to use a PFED in the field is through an ASIP or another radio system, and there are several unique troubleshooting procedures when communicating through this radio system. Following the class, it required months of troubleshooting and research in order to solve communication problems.

The same types of initial training shortfalls were experienced with digital systems throughout the digital Fires spectrum. Attendees of courses in Advanced Field Artillery Tactical Data System (AFATDS), SCU, and MFCS systems have experienced the same lack of depth in their training. While skipping over the wave tops may suit a time-driven training model, it is wholly ineffective for producing knowledgeable and capable Soldiers who know how to use and incorporate digital systems into the Fires architecture of any unit. The argument is that there are more experienced Soldiers already in these units that can teach the depth of knowledge required, and fill in the gap of knowledge not covered through a command-driven training program. However, this is not always true because of a problem experienced across the Army: digital apathy.

In speaking with Soldiers from several other units, the story is identical, "we had PFEDs and SCUs, but no one knew how to use them, so they sat in the arms room just to be inventoried once a month." Several Soldiers made this comment about their initial impression of the SCU, "I thought that was a microwave!" It would appear very few Soldiers have taken the time to dive beneath the surface of digital Fires and teach themselves how to effectively use the systems. Without this type of knowledge, reading further into manuals, making phone calls to experts and product engineers, and troubleshooting for days and weeks, these systems will not work properly. Given the option between discovering how to make digital Fires work properly in the daily-constrained training environment, or continuing to use the time tested methods of voice communication, the obvious path of least resistance will be taken. In fact, it took roughly six months. Once all of this knowledge was gathered together, it had to be disseminated down to the user level to be implemented, enter the War Eagle Digital Standard Operating Procedure (DSOP).

Two factors were required for the evolution of the War Eagle DSOP. Pressure from higher; Squadron Commander LTC Kendric Robbins, made digital communications a priority for all 13-series Soldiers. This event drove the creation of a regimental Fires architecture created by a highly motivated warrant officer. The second was a specific tasking; the squadron targeting officer was provided the unrestricted time and motivation to delve into all the systems involved to create an easy to use DSOP. The DSOP format is a simple but powerful tool, laid out in slide format with title, screenshot or equipment picture and explanation. More often than not, the picture or screen shot is all the explanation necessary for the Soldier to execute the procedures properly. The War Eagle DSOP covers all systems involved from sensor-to-shooter, PFED, SCU, AFATDS, and MFCS. If followed exactly in conjunction with the regimental Fires digital communications diagram, which details IP addresses and station ranks, successful digital communications will be achieved. Further information on the DSOP and helpful details from lessons learned can be found at the end of this article.

The Events that Drove Success. Following the creation of the DSOP and the digital communications network diagram, the task now fell on all levels of leadership to train and enforce the use of digital systems on a regular basis. This process began with the dreaded PowerPoint presentation. During a consolidated fire support team (FIST) training period, a day was set aside for digital sustainment. Although the previous standard was to conduct weekly motorpool digital sustainment at the troop and squadron level, it was difficult to identify all of the individual problems that each system was experiencing. Full communications between every digital system was not occurring. With everyone in the same room however, it was possible to brief the entire DSOP and the reasoning behind why all the digital systems were not properly communicating.

Following the classroom instruction, every member of the squadron FIST staged in the motor pool with all of their digital equipment. Through an intensive troubleshooting process, we achieved complete success. Missions were initiated in the PFED, sent through the SCU for approval, and then to the AFATDS for distribution and clearance with regiment. After regiment assigned a weapon system to the firing solution, message to observer, shot and splash were transmitted transparently back through all systems down to the PFED. The message was transmitted so quickly in fact that there was not enough time to explain the process to the squadron commander before the squadron mortars were rounds complete. Everything worked in this controlled environment, but would it work with live rounds in a field exercise?

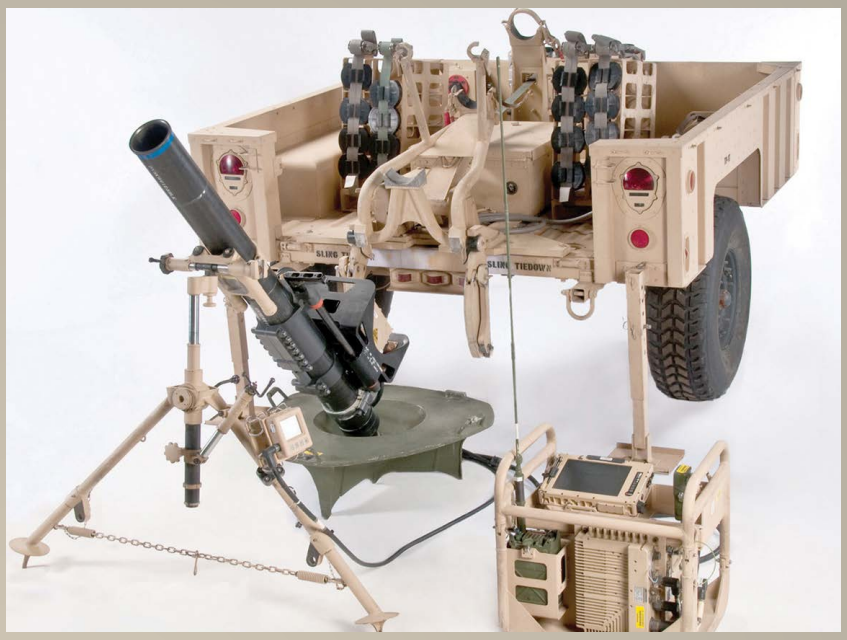
In preparation for a decisive action training exercise, (DATE) the War Eagle FIST and mortar teams conducted a live-fire certification. The difficulty inherent in this exercise was the coordination of four teams of observers and four teams of mortars firing into the same impact area in quick succession. The use of digital Fires simplified this problem set immensely. Using the AFATDS, the squadron FSE was able to receive fire missions from the observer SCUs, place them in que, and send them to the corresponding mortar FDC in a controlled and orderly fashion. There was no need for the confusion of voice chatter, and no ambiguity for the FDC.

The one issue discovered throughout the live-fire was the troop insistence on sending plain text messages instead of using fire mission and position update formats when sending data. More training is necessary to ensure the proper formats are utilized when sending digital messages, which ties back to the FSOs and fire support non-commissioned officers (FSNCOs) becoming comfortable with navigating their SCUs,

and being able to send the right data with the right format in a timely manner.

In every training event the *War Eagles* continue to prove the value of digital Fires. There are restrictions however. Distance and terrain limit the ability to effectively transmit messages, as with any FM transmission. One effective method to increase the range of these systems is to increase transmit and receive times within the program to at least 120 seconds. This allows the message more time to transmit before the system denies it. The other method is to use high frequency or satellite radio communications through a PRC-117G, which is the way that 2nd Battalion, 15th Field Artillery, 2nd Brigade Combat Team, 10th Mountain Division is working to accomplish digital Fires in Afghanistan right now.

The End of Digital Apathy. These digital systems are complex, and often times finicky. The only path to proficiency requires time and effort, gumption and troubleshooting. Through a combination of this article and the DSOP, I hope much of the frustration and troubleshooting can be avoided by other units and future users of digital Fires systems.



The digital fire control system offers Soldiers various benefits. (Photo courtesy of the U.S. Army)

Creation and enforcement of a DSOP is not enough to solve the digital problem. There must be a process of instruction, consistent and constant exercise of the systems, and sustainment to include instructing new Soldiers on the use and procedures involved with digital communications.

"Practice makes perfect," is how the saying goes, but in this case, practice makes Soldiers comfortable with using and troubleshooting the systems. Performing a digital communications exercise to include all digital systems on a weekly or bi-weekly basis if possible, is imperative to the ongoing successful resolution of digital apathy. Motor pool maintenance days are the perfect forum for this type of exercise. Once a base of knowledge is established, maintaining the capability is much easier and more feasible.

The last and most important piece of a sustainable digital Fires program is the requirement for using these systems in combat training centers. The use of digital systems must be required by commanders as a task for units attending these training events. In order to institute this type of grading requirement, digital systems must also be incorporated into every unit's FIST and FSE certification standards. Instituting a standard across the Army that forces fire supporters to learn, use, and integrate these systems into their standard operating procedures is the only way to create an environment of accountability for the application of digital systems. Systems that the Army has invested so much in, and yet remain mostly untouched. From a standpoint of fiscal responsibility, the choice is clear. Furthermore, these systems provide so much more accuracy and capability to fire support teams that it defies common sense not use them.

The same problems encountered with the current digital systems and training will be experienced with new systems as they are fielded. The temptation will be to maintain the status quo once more. Although initial training may prioritize the use of digital systems, as opposed to voice call for fire, without buy-in and accountability from battalion commanders and above, these systems will invariably be placed in storage once more. Digital systems are not as tangible to a commander as hearing information on the radio, however ironic as it sounds, digital communications are silent and give the impression of a lack of communication to a commander, who is used to hearing a flurry of information. A deep understanding, of the value and integration of digital systems, must be communicated to commanders at all levels. Once commanders are involved with the use of digital systems, then accountability for their consistent use will follow. Accountability is the piece missing right now, and with accountability, apathy will be replaced by training and proficiency.★★

***Please feel** free to contact me via email at Michael.s.wentz.mil@mail.mil for further details and a copy of the DSOP. The DSOP is currently in editing for publication with the Center for Army Lessons Learned. Ultimately the goal is to publish a consolidated digital handbook sponsored by USAFAS for use and distribution throughout the Fires community. It is my hope that digital Fires can be used more effectively and simply throughout the Army, and I will do my best to help anyone achieve that end state.*

Captain Michael Wentz is currently serving as a project and engagement officer in the Field Artillery Proponent Office. His previous assignments were squadron fire support officer for 1st Squadron, 2nd Cavalry Regiment, where he worked to develop and implement the digital standard operating procedures and training for 1st Squadron and the Regiment, targeting officer for 1/2D CR, company fire support officer for A Troop 1/2D CR, platoon leader and fire direction officer for B Battery 5/2 CR. He deployed to Afghanistan in 2010-11 with 1/2D CR, serving as a fire base OIC in the Baghtu Valley, and Company FSO in Uruzgan, Dand, and Panjway provinces. Credit for assistance in the development of this article and the Digital SOP is given to 1LT Dominic Masuda, currently serving with 5/2D CR.

Soldiers from A Battery, 1st Battalion, 1st Air Defense Artillery, couple the radar trailer to its truck during operations on Kwajalein Atoll. The Soldiers participated in Flight Test Integrated-01, the largest integrated live-fire missile defense test in history from August to November 2012. (Photo by PFC Lumphon Keomalavong, U.S. Army)

Flight Test Integrated-01

By 1LT David M. Wren

A Battery, 1st Battalion, 1st Air Defense Artillery, located on Kadena Air Base, Okinawa, Japan, participated in the largest and most complex, integrated, multi-tier ballistic missile defense exercise in history, known as Flight Test Integrated-01 (FTI-01), from August to November 2012. This joint enterprise, between the U.S. Army, Air Force, Navy and the Missile Defense Agency, demonstrated the capability of regional Ballistic Missile Defense Systems' abilities to defeat a raid of up to five simultaneous threats. In August, Patriot PAC-3, Aegis Warfighters and Terminal High Altitude Area Defense (THAAD) units deployed to the Reagan Missile Test Site, on the Kwajalein Atoll in the Republic of the Marshall Islands, to coordinate for the actual live-fire in November. In preparation for this historic mission, Soldiers from A Battery deployed a minimum engagement package consisting of one Engagement Control Station (ECS), one Electronic Power Plant III, two AN/MPQ-53 Patriot Radars, one battery command post, two Enhanced Launcher Electronics System, PAC-3 launching stations and additional support equipment. Soldiers from Headquarters and Headquarters Battery and E Company accompanied A Battery to support the mission by providing logistical and mechanical support.

Several exercises led up to the execution of FTI-01. First, hardware-in-the-loop (HWIL) was conducted at Redstone Arsenal, Huntsville, Ala., which provided an opportunity for both the primary ECS crew and the information coordination central crew to define and establish the local tactics, techniques and procedures (TTPs). Additionally, HWIL provided the crews the opportunity to validate link architecture and conduct multiple simulation engagement scenarios of the

targets. Once emplaced on Kwajalein, link exercises, countdown exercises, as well as the dry and dress rehearsals were conducted in order to refine TTPs. These exercises culminated in successfully validating the link architecture.

This test provided opportunities for combatant commands to develop and exercise operational concepts of working together in responding to scenarios projected for the regional ballistic missile threat. An Army/Navy Transportable Radar Surveillance and Control (AN/TPY-2) Forward Based Mode radar-controlled via command control battle management and communications provided cueing to all of the missile systems during the test. For FTI-01, the engagement scenario consisted of Patriot and Aegis engaging two targets apiece, a cruise missile and a short-range ballistic missile, while THAAD engaged its first medium-range ballistic missile (MRBM) in a developmental test prior to an operational test. The centralized command delegated five engagements to Aegis, Patriot, and THAAD, which near-simultaneously fired interceptors at their respective targets. The exercise was deemed a success, with four of the five missiles engaging as planned. Using the 'hit-to-kill' technology of PAC-3 interceptors, A Battery successfully near-simultaneously engaged two targets. The first target, a MQM-107, is a drone powered by a turbojet engine representing a cruise missile threat. The second target, a foreign military acquisition, is a short-range ballistic missile (SRBM) that utilizes a single-stage, liquid propellant launched from a mobile launch platform.

For the Patriot system in this mission, two key test objectives were identified and successfully executed. First, this test incorporated the first PAC-3 engagement of a low-flying cruise missile over water. For combatant commanders, this proved vital to demonstrating capability for the defense of assets in vulnerable locations. Next, FTI-01 utilized upper-tier debris mitigation and was able to successfully detect, track and distinguish the warhead. Finally, A Battery engaged the SRBM target with a second PAC-3 interceptor without increasing the radar's load. Patriot's upper-tier debris mitigation diminishes excessive radar load and potential missile waste caused from upper-tier intercept debris. This upper-tier debris mitigation is essential to a layered, multi-tier defense in a regional-based defense design with THAAD and Aegis.

The most notable challenge that A Battery faced on Kwajalein was maintaining and sustaining the equipment. Elements of E Company supported the test execution by constantly providing service and support via the intermediate support element, conventional wheel mechanics and generator mechanics. Due to the high operating tempo and low manning levels, preventive maintenance checks, services, and corrosion prevention were ongoing. Layers of sea salt worked itself onto the equipment, resulting in weakened and fatigued metal potentially adding years of wear and tear in mere months. However, Soldiers received training prior to deployment on the proper use of corrosion prevention equipment, and through their diligence and hard work, they were able to combat the corrosion effectively. Daily maintenance, corrosion prevention and system validations were vital to ensuring equipment readiness and maintaining a daily rhythm.

FTI-01 was an exciting success that demonstrates the U.S.' ability to defeat a multi-tier ballistic missile and air-breathing threat in a theater-regional Ballistic Missile Defense System scenario. While the ballistic missile threat continues to grow and evolve, the U.S. military continues to implement and adapt an integrated missile defense system to defend the nation and our allies. Along with Aegis and THAAD units, the 1st Battalion, 1st Air Defense Artillery proved once again that it is at the forefront in deterring the escalating global threat of tactical ballistic missiles. 'First Among Equals!' ★★

1st Lieutenant David M. Wren is the battery executive officer for A Battery, 1st Battalion, 1st Air Defense Artillery, stationed on Kadena Air Base, Okinawa, Japan. His previous assignments include launcher platoon leader for B Battery, 1-1 ADA. He holds a Bachelor of Science in Applied Mathematics from Baylor University.

The launcher crew for A Battery, 1st Battalion, 1st Air Defense Artillery, conducts a live missile reload on Omelek Island in the Marshall Atoll in support of Flight Test-Integrated-01. (Photo by SGT Matthew Brougher, U.S. Army)

COL David C. Hill, director of the Fires Center of Excellence (FCOE) Capabilities Development and Integratoin Directorate (CDID), listens to comments from the audience during his presentation at the 2013 Fires Seminar. (Photo by Rick Paape, Jr., U.S. Army)

Fires Force Future Concepts

By Paul E. Jiron

On Wednesday, May 8, 2013, the Fires Center of Excellence Director of the Capabilities Development and Integration Directorate (CDID), COL David C. Hill, addressed Fort Sill's Fires Seminar attendees on the topic of the Fires Force "Future Concepts." The purpose of Hill's presentation was twofold: first, to inform the Fires community of the role the CDID's Concepts Development Division (CDD) plays in meeting future Army requirements; and to introduce the community to the updated and draft concepts that will be driving capabilities development in our warfighting function in the not-so-distant future.

CDID's primary mission is to develop Fires related concepts and requirements and conduct experiments to validate doctrine, organization, training, materiel, leadership and education, personnel and facilities (DOTMLPF)-integrated combined arms capabilities that complement Unified Action Partner (UAP) capabilities. Field Artillery (FA) and Air Defense Artillery (ADA) staff officers and TRADOC capabilities managers (TCMs) will continue to provide expertise when required for branch-specific projects.

Hill explained exactly what is meant by 'concepts.' In the context of the Department of Defense (DOD) process, Joint Capabilities Integration and Development System (JCIDS), which identifies requirements, 'concepts' has a very specific definition: it is the series of documents that define and explain the Army's broad operational requirements within the framework of the predicted future operation environment (OE). These documents are referred to collectively as the Army Concept Framework (ACF).

Concepts are a 'top-down' driven process that starts with the operational environment (OE) and its impact on the future force. Changes in the OE drive changes in the strategic guidance documents, such as the National Defense Strategy and the National Military Strategy. These strategies provide

the over-arching guidance of how the force will operate in the future. Concept writers take key information from these documents, and in turn develop joint and Army concepts.

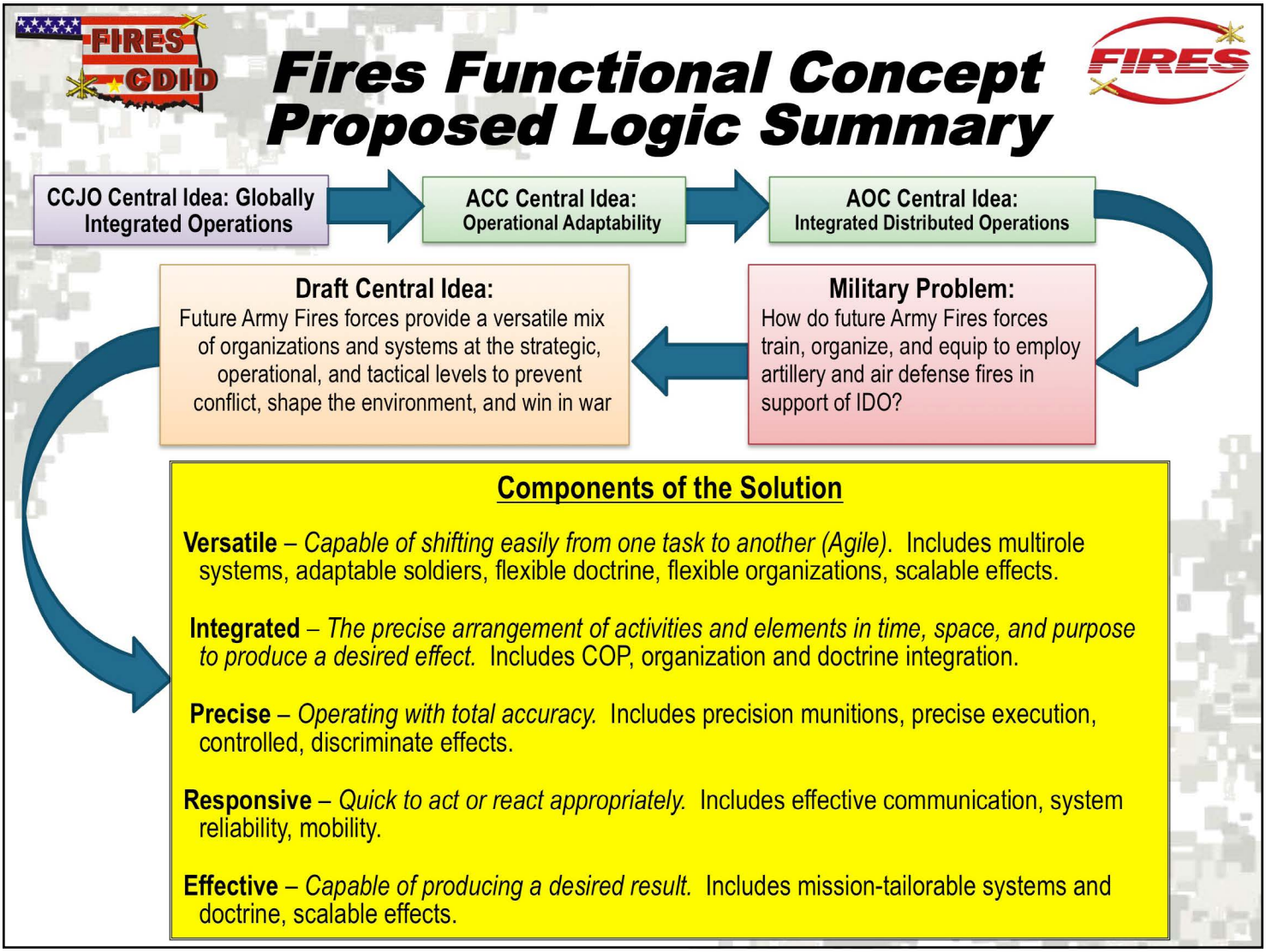
For concepts to fit into the acquisition timeline, they must be written for implementation to begin six to seven years after publication, and support future concepts as far as 17 to 18 years in advance. Among other things, concept writers use this timeframe to continuously evaluate the OE and anticipated technology readiness levels in the future.

Capstone documents start with the chairman of the Joint Chiefs of Staff document, The Capstone Concept for Joint Operations (CCJO). This document explains how the joint force will fight and outlines in the broadest terms what the joint force must do in order to succeed in the future OE. The CCJO offers few solutions; instead, it provides all service branches with areas of emphasis that drive their own concept documents. The central idea of the CCJO is globally integrated operations (GIO). GIO's primary focus is on integrating UAP's capabilities to provide an adaptable and effective joint force. For the Fires Force, two specific tasks are identified: provide a fire support capability that integrates all Fires, including cyber Fires; and improve capabilities to defeat anti-access and area denial threats. These two tasks form the foundation for every Fires concept document produced. In the joint world, air and missile defense (AMD) falls under the 'protection' task which identifies another key task for Fires: the integration of missile defense systems. These three key tasks from the CCJO provide focus for the Fires Function Concept of the future.

The CCJO feeds the Army Capstone Concept (ACC) and the Army Operating Concept (AOC). The ACC's central idea is operational adaptability, or "the ability of Army leaders, Soldiers and civilians, to shape conditions and respond effectively to a broad range of missions in changing threats to situations with appropriate, flexible and responsive capabilities," Hill stated. One of the major changes between 2010 and now is the addition of operational adaptability, which requires flexible organizations and institutions. In the ACC, there are two key tasks for Fires: integrate Fires and deliver Fires.

Hill stated that the AOC is currently under revision and its central idea is integrated distributed operations (IDO), defined as "agile, responsive and adaptive Army units that are globally engaged, overcome challenges, deter

Figure 1: Fires functional concept proposed logic summary. (Illustration provided by COL David C. Hill)



adversaries and rapidly defeat enemies in the future OE through the informed use of physical separation or co-locating mutually supporting integrated actions."

The Fires functional concepts are nested directly under the AOC. Every warfighting function has its own functional concept which describes in broad operational terms, what the warfighting function must do to support the AOC, the ACC, the CCJO and ultimately the top-level strategic guidance documents.

The Army Concept Framework is updated on two-year cycles. Hill noted, "We are running a little behind, but that's okay because the OE and some concepts have changed and caused us to go back and re-look some of the higher-level capstone documents, feeders for our functional concept." CDID has been working very aggressively, in conjunction with the other warfighting functions, to be positioned to complete the Army Functional Concept (AFC) for Fires as soon as the AOC is completed. The first draft of the functional concept may be out to the field as early as the end of the summer, with the anticipation that it will probably be published sometime early next year. The draft version will be sent to every O6 (colonel) and above with the intent of receiving their feedback prior to final publication.

CDID gives careful consideration to all of the warfighting functions when developing the Fires Functional Concept. This document is currently in a very early draft stage with no published task order; however, the main points have been vetted through the Fires Center of Excellence (FCoE) leadership. The challenge is: "How do future Army Fires Forces train, organize and equip to employ artillery and air defense Fires in support of integrated distributed operations (IDO)?" The concept document must address and answer this question, which is simply written, but is fairly complex (see Figure 1). From this basis, a central idea is formed: the future Army Fires Force provides a versatile mix of organizations and systems at the strategic, operational and tactical levels to prevent conflict, shape the environment and win in war.

Next, a solution is drafted. The components of the solution are:

1. **Versatile.** Capable of shifting easily from one task to another (agile). Includes multi-role systems, adaptable Soldiers, flexible doctrine, flexible organizations and scalable effects.
2. **Integrated.** The precise arrangement of activities and elements in time, space and purpose to produce a desired effect. This includes common operating picture (COP), organization and doctrine integration.
3. **Precise.** Operating with total accuracy. This includes precision munitions, precise execution, controlled and discriminated effects.
4. **Responsive.** Quick to act appropriately. This includes effective communication, system reliability and mobility.
5. **Effective.** Capable of producing the desired result. This includes mission-tailorable systems and doctrine with scalable effects.

Hill noted that CDID cannot develop an accurate, comprehensive document in a vacuum, and input from the Fires Force is crucial in getting the answers right the first time. He asked attendees to consider the following questions and discuss the issues at hand: "Do we have the military problem right, and are these the right words: versatile, integrated, precise, responsive and effective?" With these five components as the key to the Fires Functional Concept, getting them right 'shoots the azimuth' for all that follows.

The FCoE Commandering General, MG Mark McDonald, reiterated the importance of feedback and challenged all attendees, even those on Defense Connect Online (DCO), to put some thought into the functional concept to ensure all of the "t's are crossed and the i's are dotted."

The group discussed several components of the concept, including integrating Fires. The concept of integrating Fires among all forces (Army, Air Force, Navy, Marines and allied partners) is not new; however, a common system of communications is needed for this to happen. Communications must be integrated, not only among the people in different organizations, but among the different weapon systems as well. Hill used the example of having a common operational picture and the ability to share that picture.

"If we have an Aegis ship that's out at sea and it detects a target, but can't shoot it, they could pass that target (in a truly integrated system)…over to a Patriot organization who could shoot it down, or vice versa."

When compiling information to formulate the functional concepts, leaders must consider all factors in the equation. Deployments, force structure and organizational roles must be closely reviewed. In Hill's opinion, an inordinate amount of stress has been placed on the shoulders of the AMD force, due to their ongoing role in shaping (phase zero and phase one) operations, coupled with the mobility issues of the AMD weapons systems. With ongoing discussions regarding the shift in the 'forward stationed Army,' to a force that is more CONUS-based and expeditionary, future systems and formations must be designed to meet this guidance for a more mobile force.

The new functional concept will also see a change in terminology that has been approved by McDonald. The 2010 AFC-Fires used the terms 'offensive Fires' and 'defensive Fires.' These terms were presented as a 'bridge' during the formation of the Fires Center of Excellence, and it allowed for both the FA and ADA branches to maintain their own identities while combining Fires capabilities. Under the new concept, offensive and defensive Fires will be replaced with 'Fires in support of offensive and defensive tasks.'

CDID has put a significant amount of time and 'brain power' into this updated Army Functional Concept for Fires. Although there is still a lot of work to do before finalization, the group has developed several 'supporting ideas' for the foundation of the document.

Theater Joint Fires Command. This command is envisioned to be the answer to, "Who is the 'central clearinghouse' at the higher level for Fires, and is it possible to combine our battlefield coordination detachment (BCDs), AAMDCs and the theater Fires cell to form some kind of an organization under one command to execute all the Fires functions in support of the COCOM commanders?" This concept would eliminate redundancies and increase efficiencies in Fires Force operations, combining all Fires capabilities into one unit, headed by an Army general officer, under the direct control of the theater commander.

The concept of a Theater Joint Fires Command is just that -- a concept, and

still in the developmental stage. For every positive point made for the concept, additional challenges are identified. BCDs for example, are multi-functional organizations with an operational-level liaison and requirements to support all six warfighting functions. The Theater Joint Fires Command will be required to manage these responsibilities.

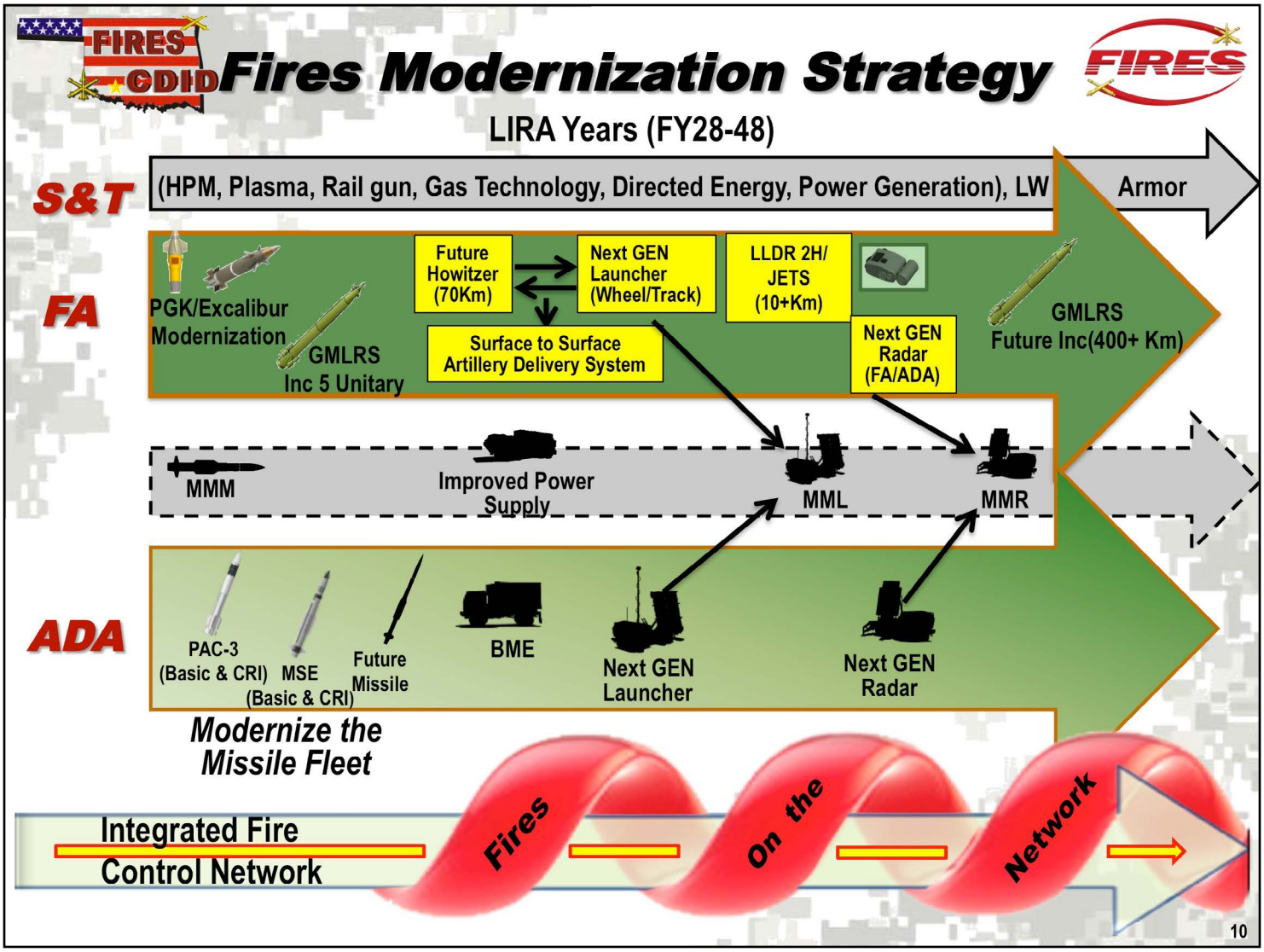
Many of the same issues exist from an AAMDC perspective, with the AAMDC for example, providing three functions in Europe: deputy area air defense commander; civil air defense commander for United States Army Europe (USAREUR); and the Theater Air and Missile Defense Coordinator (TAMDCOORD) for USAREUR. Finding opportunities to gain efficiency during force reductions will benefit everyone in the future; however, Hill added, "if we can't do it and we have to take it off the table, then at least we've given due diligence to it [the Theater Joint Fires Command]…we'll be going to the AAMDC commanders and the BCD commanders looking for their input. This is going to help us shape this idea and if it doesn't work out, then clearly we are going to take it off the table."

Echelons Above Brigade (EAB) Fires Commands (Fires Brigades and Division Fires Commands). This concept discusses the establishment of Fires commands at the division level, primarily focused on FA operations, as well as aligning Fires brigades (FIBs) with corps. The division Fires command (DFC) will provide training and oversight for BCT Fires battalions, serve as the division Force Field Artillery (FFA) headquarters and allocate reinforcing Fires when external Fires battalions are attached. The FIB would provide the FFA and reinforcing Fires functions at the corps level, with all active duty echelons above brigade (EAB) FA BNs assigned to FIBs. The Army National Guard (ARNG) is crucial to providing flexibility to the active component, because all EAB cannon units and the majority of the FIBs will reside in the ARNG.

Land-Based Anti-Ship Fires. Many of our allied nations already have this capability of land-based, anti-ship Fires.

The concept addresses the question, "Is there a place in our future warfighting function to have land-based anti-ship Fires where artillery is on the shore, shooting and engaging ships at extended ranges?" The general consensus was an astounding, "Yes!" This concept would enable artillery forces to engage enemy naval forces near the shore

Figure 2: Fires Modernization Strategy FY28-48. (Illustration provided by COL David C. Hill)



from land-based platforms; in support of lodgment forces or Naval operations.

Extension of the AMD Joint Kill Chain at the Tactical Level. This idea discusses how indirect fire protection capability (IFPC)/Avenger, and future tactical AMD systems will be integrated into the joint kill chain through flexible Air Defense Artillery fire control officer (ADAFCO) elements, through the air defense airspace management/brigade aviation element (ADAM/BAE) or through the AMD battalion engagement operations centers (EOCs). It also deals with the problems and challenges of identification and engagement authority of counter-unmanned aerial systems (C-UAS). The capability exists; however, there remains a degree of uncertainty in regards to the sufficiency of coverage. Solutions will include doctrinal updates in addition to materiel changes in order to establish a common process for engagement authority.

Integration of AMD Mission Command Capabilities into the Fires Cell. How ADA and FA capabilities (i.e., clearance of Fires, airspace control, etc.) can best be integrated inside the Fires cell has been an ongoing debate. The joint air-ground integration center (JAGIC) concept, which brings Army Aviation, AMD, special operations forces and Air Force representatives together into one organization, is intended to alleviate these issues. Ongoing battle drills and experiments are exercising the JAGIC with scenarios to counter-UASs. Hill is convinced it is just a matter of "getting the right people with the right training in the right place" to clear Fires and engage. Gaining commanders' confidence is a huge hurdle the Fires Force must overcome to incorporate this function into approved doctrine. Leaders are very concerned about risks of fratricide and our ability to engage the right target. Confidence can be gained through accurate, demonstrated performance. Hill noted, "If commanders don't have confidence in the systems that fire for them on the battlefield, they're not going to employ them."

Unified Fires Mission Command Network Army Integrated Air and Missile Defense/ Integrated Battlefield Control System (AIAMD/IBCS) and Advanced Field Artillery Tactical Data System (AFATDS). The development of a single Fires network, which combines the capabilities of AIAMD and AFATDS into a single network entity, is crucial for the joint, integrated future Fires Force. This network would reduce redundancy in both manpower and equipment, increase cooperation between Fires forces, and would nest perfectly under the theater joint Fires command concept. A single system that could identify, track, pass information regarding incoming aerial threats, and at the same time pass information on where the launch originated, would allow the Fires Force to simultaneously counter the threat and the launch platform. This type of network would exponentially increase our capabilities, efficiency and accuracy and is critical for a truly joint and integrated force.

Multi-Mission Air Defense Capability (IFPC). This concept discusses the requirement for a mid-range air defense system to counter the UAS and cruise missile threats. It is more of a material issue regarding the development of a new 'multi-mission' air defense capability, and is in the conceptual stage as the next increment of the IFPC capability. The use of government-off-the-shelf (GOTS) systems and the AIAMD network will provide a much more effective, relatively low cost, intercept system to focus on countering UASs, cruise missiles, and rockets, artillery and mortars (RAM).

Develop and Integrate Electric Fires. This capability addresses the development and integration of new electromagnetic-based Fires technology that will provide us new opportunities and capabilities, perhaps with lasers, high power microwaves (HPM) or even rail guns.

Science and Technology: Research and development will continue to look electro-magnetic systems (EMS) that produce virtually unlimited firepower, dramatically reduce cost-per-intercept and reduce the size of the overall system footprint. CDID continues to push for enhanced, multipurpose, compact power generation and light-weight armor to improve strategic mobility.

Sensors. Although the accuracy and range of Joint Effects Targeting System (JETS) has improved, our future forward observer (FO) sensor systems should be combined into one system that achieves precision munitions accuracies beyond 10-kilometers and allows for both mounted and dismounted operations. The Fires Force will additionally work to acquire next generation radars with multi-mission and multi-role capability, usable for both FA and ADA missions.

Ammunition. With future Precision Guidance Kit (PGK)/Excalibur increments, the Fires Force will continue to increase capability in the areas of range and GPS denied environments, and ensure near-precision and precision Fires. The Fires Force will continue working on GMLRS Inc 4 (Extended range Unitary) while the recently funded ATACMS Service Life Extension Plan (SLEP) provides a bridge, while the variation of unitary and alternate warhead (AW), GMLRS Inc 5 Unitary, is developed to provide a significant range increase (over 300 km).

Future Howitzer. Work continues on developing a howitzer that achieves a range of 70+ kilometers and supports the future SBCT and IBCT formations with a single, possibly self-propelled, system with the adaptability to support some of the towed operations of the current M119-series and M777A2 systems.

Next Generation Launcher. Either wheeled or tracked, the next generation launcher may have the capability to replace both the HIMARS and the M270 family of launchers. True multi-mission launchers could have the potential to replace Patriot and THAAD launchers.

Although the amount of information covered by the CDID director was massive, Hill accomplished what he set out to do: inform the Fires community on the role that CDID's Concepts Development Division (CDD) plays in meeting future Army and Fires requirements, and introduce seminar attendees to the updated draft concepts that will be driving combat development in our warfighting functions for the future.★★

Editor's Note: *If after reading this article, you have concerns or want to comment on the Fires Functional Concept documents, please email the Fires Bulletin at fires.bulletin@us.army.mil, and we will get your comments to the CDID staff. Please put "Fires Function Concept" in the subject line of your email.*

Precision Fires, Rocket and Missile Systems Project Manager's Update

By COL Gary Stephens

It is a great pleasure to provide an update on the Precision Fires Rocket and Missile Systems (PFRMS) Project Management Office (PMO). As the material developer for Field Artillery rocket launchers and munitions, our team performs a vital role to providing capability to the user. We continually look for ways to improve our processes. One manifestation of this thought is our 'should cost' approach to business. We are challenging status quo and attempting to find a better value.

The PFRMS mission states, "Through effective program management and a professional workforce, develop, produce, field, and sustain the precision Fires family of launchers and munitions to fulfill the long-range artillery requirements of the U.S. warfighter and allies." In essence, support to the warfighter is our first priority. The purpose of this article is to provide insight to some of the efforts in process and to encourage an open dialogue with the user community.

We currently have United States Army and United States Marine Corps High Mobility Artillery Rocket System (HIMARS) launchers deployed to the Central Command (CENTCOM) area of operations.

Historically, our deployed assets maintain readiness rates above 99 percent. The United States Army, the Marine Corps, and the soldiers from the United Kingdom have fired more than 567 ATACMS and 2,615 GMLRS, unitary assets in support of combat operations.

The long-range Fires weapons continue to perform incredibly well when our armed forces prosecute pre-planned and troops in contact fire missions. This is the lens we choose to look through because it reminds us daily of who our customer is.

A brief review of some ongoing programs epitomizes how the Project Manager Office

(PMO) is actively engaged in efforts spanning the entire weapon system life cycle.

Last September, we marked the end of the M270A0 era in a system retirement ceremony at Redstone Arsenal, Ala. The ceremony commemorated 30-plus years of service and also highlighted the fact we were beginning the final year of fielding the HIMARS.

The HIMARS fielding team completed the 16th Total Package Fielding in February 2013, as they fielded 4th Battalion, 133rd Field Artillery, Texas Army National Guard at North Fort Hood, Texas.

In August, the final HIMARS launcher will come off the production line in Camden, Ark. As we wait for the Army force structure decisions to mature, the focus has transitioned to fielding 'Mike' tactical software to the force and the 'Big 3' (Long Range Communications, Blue Force Tracker, and Driver Vision Enhancement) modification work order (MWO) to the HIMARS fleet. The M270A1 'Big 3' MWO installations start on the 1st Battalion, 38th Field Artillery and 6th Battalion, 37the Field Artillery in September.

The 'Big 3' visits also serve as an opportunity to apply outstanding actions, such as the suspension lock out, second generation arm and pulley, improved electronic distribution box

cold start, primary generator ground arcing, and the auxiliary power unit modifications. We are attempting to leverage these touch points as much as possible and are continually looking for ways to improve the process.

There are many enabling events (modifications) like those mentioned that sustain the launchers through their economic useful life (EUL).

We expect the HIMARS and M270A1 to reach 20-25 years and 25-30 years of operational use respectively. The Vehicle Operational Life Extension Program (VOLEP) represents one of the best team efforts between the PMO and operational units. The unit provides work space and access to launchers while the VOLEP team executes a rigorous maintenance action that is centrally managed and funded by the PMO. Twenty-eight launchers have completed VOLEP with an average cost of $162,000.00 per launcher. The VOLEP is a great value and impact to launcher readiness.

Two launcher programs executed by PFRMS that carry great user interest are the Improved Armored Cab (IAC) and the Fire Control System Update (FCSU). The IAC program for the M270A1 launcher is in development and expected to deliver a 'first unit equipped in FY16.'

The IAC program will deliver increased crew survivability from small-arms fire, artillery fragmentation, and improvised explosive devices (IEDs). The new cab design provides up to 30 percent more internal volume in cab space and standardizes the crew configuration with HIMARS.

IAC changes are expected to provide synergies and savings from a tactics, techniques, and procedures (TTP) and training perspective. The contractor recently completed survivability testing and is preparing for the critical design review (CDR) in June.

The FCSU program will execute a preliminary design review in June 2013. The obsolescence mitigation effort exemplifies the best attributes of 'better buying power' as we leverage the existing Universal Fire Control System design and logistics footprint to provide capability at a fraction of the cost. The current approach is estimated to avoid $178,000,000.00 in cost. That is real value to the Army in a tough budget environment. The intent is to produce IAC and FCSU on a common production line and minimize the number of touch points to the user.

Our munitions programs are very active. The FY13 contract award for Guided Multiple Launch Rocket System (GMLRS) Unitary requirements is a success story. With the help of our defense industrial partner, we were able to modify an existing contract in order to procure the FY13 United States Army and United States Marine Corps GMLRS Unitary requirements.

The result is real savings, exceeding $50,000,000.00, to the United States Army. The 'Should Cost' effort allowed us to

A launcher equiped with the GMLRS prepares to fire near the Sinjar Mountains, Iraq. (Photo by SGT Daniel W. Lucas, U.S. Army)

overcome sequestration impacts without trading off rocket requirements.

Another effort we are proud of is the GMLRS Alternative Warhead (AW) program. The Army Acquisition Executive (AAE) signed the updated Acquisition Strategy in January and completed the integration of our 'Should Cost' approach to the program. There is significant savings of $26,000,000.00 in the 'Should Cost' schedule, but more importantly we are moving the schedule to the left.

The AW development effort is on track for a full rate production decision in FY15, 18 months ahead of the original schedule. Recent successes in the design verification tests, arena tests, and the 1st engineering design test flight will allow us to execute the CDR in July 2013, continue to fully characterize the warhead performance, and mature the manufacturing processes.

Low Cost Reduced Range Practice Rockets (LCRRPR) are essential to training strategy. One of our 'Should Cost' initiatives is centered on an effort to procure training assets at a reduced cost. We have the expectation to save more than 20 pecent in cost through a partnering effort with the Letterkenny Munitions Center (LEMC).

Qualification of the LEMC production line is progressing very well. The final confirmation occurred with a successful production qualification test in May. We plan for the LEMC capability to begin LCRRPR production this year.

The PFRMS portfolio, launchers and munitions, will serve the Army well into the 2040s. Exciting as that is, we are very intrigued by what potential changes the future will entail. Our effort to outline the 30-year roadmap with the AAE highlighted three key efforts for the future that are nested within the Fires 2020 vision.

The Army Tactical Missile System (ATACMS) Alternative Warhead Service Life Extension Program represents an effort to leverage expiring ATACMS assets in order to provide a near-term gap filler.

Funding in FY14 begins the program that will provide an area ATACMS weapon compliant with the 2008 Cluster Munition and Unintended Harm to Civilians policy.

The second key effort is the GMLRS Increment IV program. The draft capabilities development document provides insight to what this weapon will provide. The material development scheduled for October 2013, will enable the Army to conduct an analysis of alternatives designed to help determine the requirements for the system. The GMLRS Increment IV program will serve as the long-term solution to the long-range Fires gap.

The third effort focuses on the solution to aging launcher fleets. Both launcher variants will reach their EUL in the 2020s.

Three 5th Battalion, 11th Marine Regiment batteries fired a combined 400 High Mobility Rocket Artillery System rounds during 2012 in Helmand province, Afghanistan, in support of Operation Enduring Freedom. "It's good to know that if we fire a rocket it's saving a Marine's life or helping someone out," said Cpl. Davis Frye, a 21-year-old Cumming, Ga., native and HIMARS chief. (Photo by Cpl. Daniel Blatter, U.S. Marine Corps)

Soldiers from B Battery, 1st Battalion, 14th Field Artillery, along with 40 people from Fort Sill, Okla., Redstone Arsenal, Ala., and Dallas, Texas, accompany a joint training mission April 27. Altus, Okla., Airmen partnered with their Army brethren for High Mobility Artillery Rocket System training as part of the culmination of a multi-year development effort to enhance the capability and utilization of the launcher on the battlefield. (Photo by Airman 1st Class Christopher Toon, 97th Air Mobility Wing Public Affairs, U.S. Air Force)

The average ages of the M270A1 and HIMARS fleets are 10.5 and 4.5 years respectively. What does a future launcher look like?

There are many unknowns at this point in time. The future Fires launcher has the potential to replace both variants with a common platform. We may even find synergies with the air and missile defense requirements. This is exciting work, and we look forward to working with the Fires Center of Excellence to codify the path forward on each of these programs.

The PFRMS team includes many members and stakeholders from different organizations. One thing is common though: People make the difference. This is a great team doing heroic efforts, and without the dedication and experience of our civilian, SETA, military, and industrial team members, we would not be able to carry out our mission. Always on target!★★

Colonel Gary D. Stephens graduated from Murray State University in 1988 as a Distinguished Military Graduate and was commissioned a Second Lieutenant, Aviation Branch. He is a graduate of the Aviation Officer Basic Course, Basic Airborne Course, Air Assault School, Initial Entry Rotary Wing Course, OH-58D Advance Qualification Course, Aviation Officer Advance Course, Combined Arms and Service Staff School, Army Command and General Staff College, Department of Defense Program Manager's Course and various Defense Acquisition courses. His civilian education includes a Bachelor of Science in Biology from Murray State University, a Master of Science in Acquisition and Contract Management from the Naval Postgraduate School, and a Master of Science in Strategic Studies from the United States Army War College. Stephens' assignments include service as platoon leader, 1st Squadron, 9th Cavalry Regiment, 9th Infantry Division, Fort Lewis, Wash.; executive officer, 1st Battalion, 101st Aviation Regiment, 101st Air Assault Division, Saudi Arabia; S4 and troop commander, 4th Squadron, 17th Cavalry Regiment, 18th Aviation Brigade, Fort Bragg, N.C.; troop commander, 4th Squadron, 2nd Armored Cavalry Regiment, 18th Aviation Brigade, Fort Bragg, N.C; troop commander, 1st Squadron, 4th Cavalry Regiment, 1st Infantry Division, Schweinfurt, Germany; observer/controller, Combat Maneuver Training Center, Hohenfels, Germany; assistant project manager, Program Executive Office for Tactical Missiles, Redstone Arsenal, Ala.; staff officer and executive officer, Office of the Assistant Secretary of the Army for Acquisition, Logistics, and Technology, Arlington, Va.; Product Manager for Air and Command Tactical Trainers and the Business Operations Executive, Program Executive Office for Simulation, Training, and Instrumentation in Orlando, Fla. He most recently graduated from the United States Army War College at Carlisle Barracks, Pa.

Aerostat/JLENS Distiction

By Anthony W. Allen

The purpose of this discussion is to give a detailed explanation of the differences between an Aerostat and the Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System, known as the JLENS Sensor System. Both of these systems provide a continuous aerial security solution to mitigate several airborne or ground based threats. Though they are very different in their individual configurations, they are similar in thought. Although manned aerial surveillance can decrease risk, the operational costs are too high for extended periods of use. To meet this threat more economically tethered aerostats were employed.

Aerostats in war. Balloons were first used in warfare by France on June 26, 1794, at the Battle of Fleurus. The French used captive balloons as observation platforms to learn locations of enemy troops and direct movements of French troops. The French use of the reconnaissance balloon, l'Entreprenant, marked the first military use of an aircraft that had decisive influence on the outcome of the battle.

During the American Civil War (1861 – 1865), a balloonist named Thaddeus Lowe organized and directed a balloon corps in the Union Army. At the end of 1861, the Federal forces had a total of seven observation balloons at their disposal, all built by Lowe. They were named Union, Constitution, Washington, United States, Intrepid, Eagle, and Excelsior, and varied in size from 15,000 to 32,000 cubic feet.

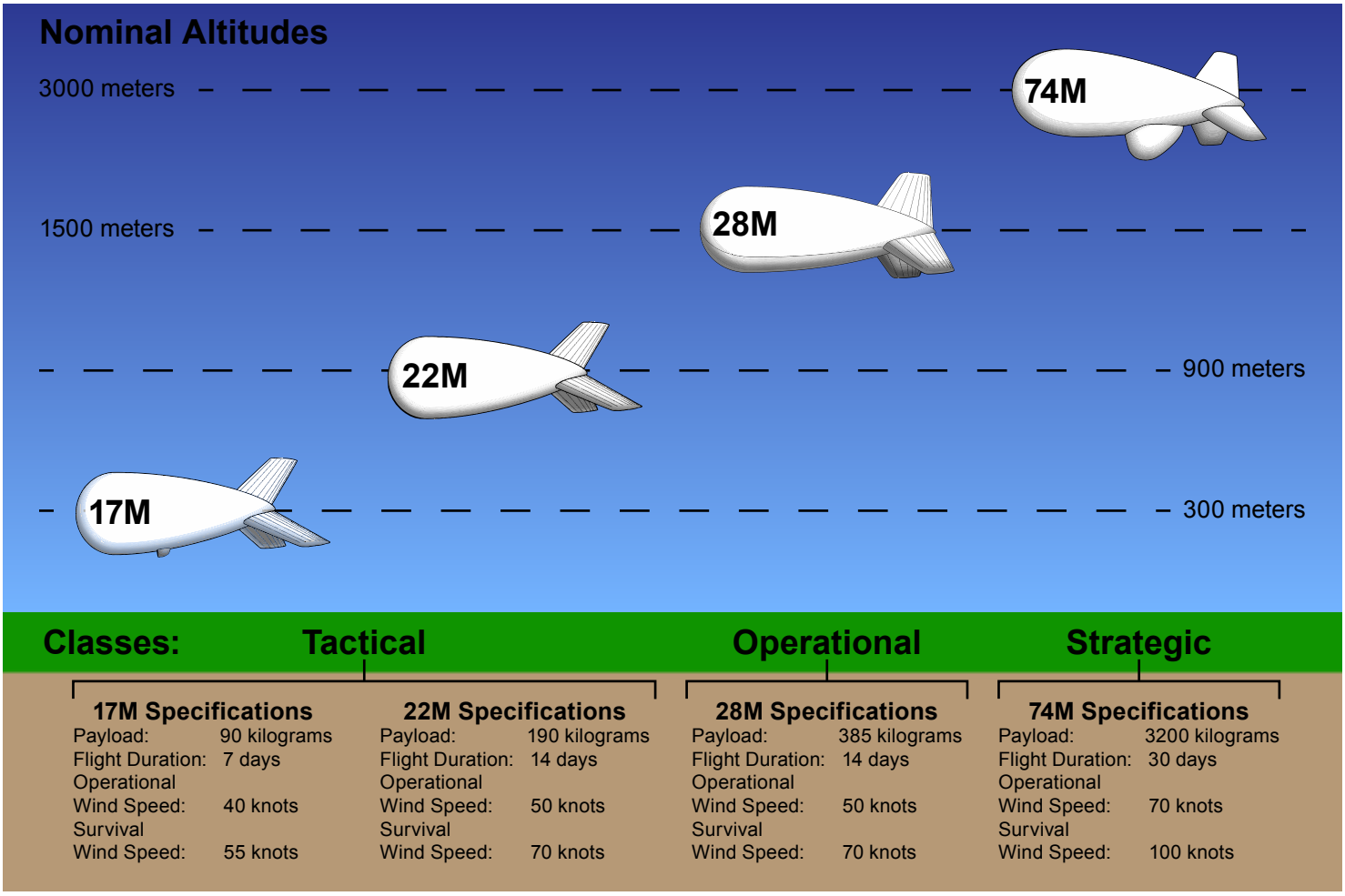
Left: The high speed vessel HSV-2 Swift gets underway with a tethered TIF-25K Aerostat in Key West, Fla., to conduct a series of capabilities tests to determine if the Aerostat could participate in Operation Martillo, a joint, interagency and multinational collaborative effort to deny transnational criminal organizations air and maritime access to the littoral regions of the Central American isthmus. (Photo by Lt. Cmdr. Corey Barker, U.S. Navy)

Generally, they operated at an altitude of up to 5,000 feet. No attempt was made to camouflage these balloons; they were brightly embellished with the colors of the American flag or with the insignia of the American eagle. Lowe also succeeded in developing equipment for the production of hydrogen, which was suitable for transportation and thereby provided a badly-needed mobility for the balloon units. The balloons serving with the Federal forces unquestionably restricted the hitherto unhampered mobility of the Confederate troops, who tried their best to destroy them without success. Twice, aerial observations saved the Federal forces from severe defeats, during the battles of Fair Oaks and Gaines's Mill in 1862. The Confederate attempts to establish a balloon section on their side were few and fairly feeble due to their lack of vital equipment.

Balloons had another use during the Franco-Prussian War (1870 – 1871), when German armies surrounded Paris. The people of Paris communicated with the outside world by means of balloons and carrier pigeons. During four months, 66 balloons left Paris, of which 54 were specially made by the administration of posts and telegraphs. Nine tons of dispatches, or 3,000,000 letters were successfully conveyed to their destinations, and 166 persons were carried over the Prussian lines. Three hundred and sixty pigeons were taken up; however, only 57 returned to Paris with 100,000 messages.

During World War I (1914 – 1918), captive observation balloons were widely used both by U.S. and allied Soldiers, including France, Britain, and Italy, and by the central powers, which included Germany and Austria-Hungary. Each U.S. balloon held two observers, who often accompanied the infantry to serve as an 'eye in the sky.' With the balloon attached to a vehicle below, the men could spot, from their vantage point at 3,500 feet, a man on the ground five miles away, a vehicle 10 miles away, and a train 30 miles away. The observers were tasked with reporting on enemy troop and supply movements, confirming the fall of artillery projectiles and numbers of downed enemy planes, and making general observations about the terrain and objects of interest.

Britain also introduced balloon barrages during war for protection against low-flying enemy airplanes. The barrages consisted of captive balloons from which steel cables were suspended. Enemy planes had to fly above balloons or risk being ripped apart by cables. The British set up a barrage 51 miles long around London. Italy, France, and Germany also used balloon barrages. Although the balloons were protected by men on the ground armed with machine guns or anti-aircraft guns, they were often the targets of enemy planes because of the important information a balloon could gather. In one region of France alone (between the Meuse and the Argonne Forest), Sep. 26 to Nov. 11, 1918, 21 balloons were destroyed by either enemy planes or shells.



A description of aerostat systems. (Information provided by Anthony W. Allen)

During the Iraq war (2003 – 2010), there were several 17-meter tethered aerostats emplaced to provide early detection of land-based and air threats. Though operated by a small crew with little or no logistical support, the tethered aerostats provided a considerable surveillance capability. This capability helped mitigate the threat of improvised explosive devices (IEDs) and insurgency with early detection and early warning. In theater, there were also two 71-meter Low Altitude Surveillance System (LASS), aerostats in use for mission command operations. The 71-meter LASS used a radar station and was capable of flying at 15,000 feet. The 17-meter aerostats with a camera system and Blue Force Tracker (BFT) normally flew from 600 to 1,000 feet.

Family of Aerostats. Currently, aerostats come in a vast arrangement of sizes with several different functions. Tethered aerostats are the most commonly used by U.S. and coalition forces. They can host various platforms or sensors to include weapons systems. An aerostat can either be tethered to the ground or piloted by a person. Whichever platform is used, they are very effective in delivering an airborne persistent solution.

The aerostat is a helium-filled, aerodynamically shaped balloon. The aerostat is made from a high-strength multi-layer fabric especially developed for all types of different aerostat platforms. It does not have rigid structural members internal to the fabric for shape or rigidity. Its shape is maintained by keeping its internal gas pressure slightly higher than the ambient atmospheric pressure outside. The lift capability of the aerostat is provided by both the helium contained within and its aerodynamic shape which produces lift from the wind. A streamlined, air-filled compartment (windscreen) attached beneath the aerostat is provided to shield the enclosed payloads from dust, wind and weather effects. An Aerostat is described as follows:

- The aerostat is a non-rigid, aerodynamically stable, air vehicle that is either tethered to a ground-based mobile mooring station or a non-tethered piloted airship, filled with helium and ambient air.
- A crew is required to launch, fly, and recover the aerostat.
- Buoyant lift of the aerostat is achieved from both the helium contained within and the aerodynamic shape of the flexible hull structure and ambient air in the ballonet.
- The buoyant lift supports the total weight of the payload, the aerostat, electronics, and the tether (if required).
- The flexible hull structure of the aerostat is constructed from an extremely strong, low maintenance, laminated fabric consisting of Tedlar, Mylar, and a Dacron Polyester cloth along with various adhesives.
- The aerostat is kept at constant differential pressure using fans to fill the internal ballonet with air and valves

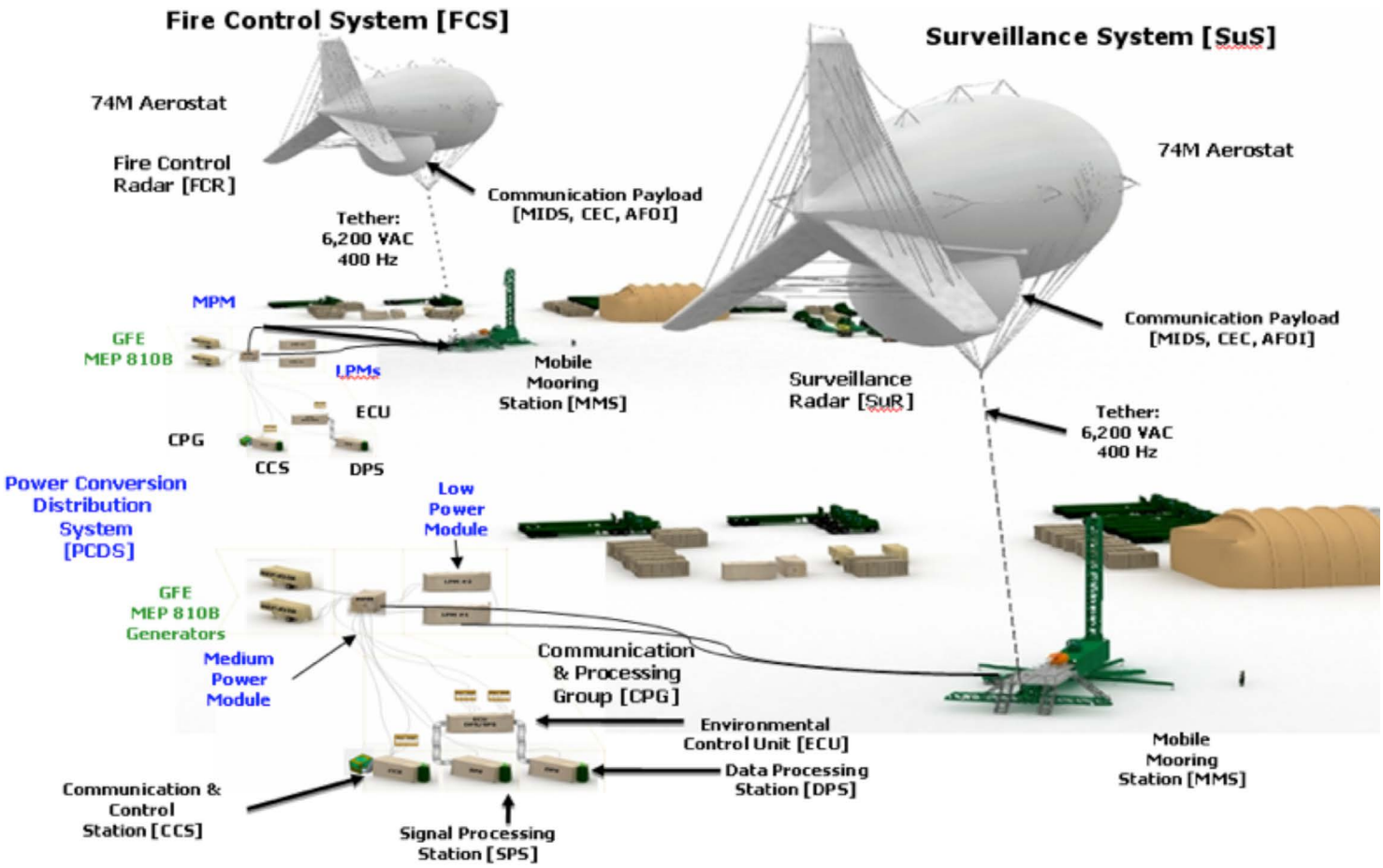
to allow the air to escape as the helium expands within the hull.

- The aerostat includes a windscreen, which provides environmental protection to the main payload and is constructed of material similar to the hull.
- Additional components of the aerostat structure include the various rigging lines; nose cone assembly, which provides the interface between the mooring tower and the aerostat; housekeeping rack, which provides the interface between the aerostat avionics and the hull; and main payload truss, which provides the interface between the lower main hull and the sensor payload.
- A wire lightning protection cage is mounted around the hull. These lightning protection wires provide an electrical path to the tether that carries the lightening induced currents to the ground.
- The aerostat also includes a power distribution system, a pressurization system, an aerostat telemetry system, and various mission command systems.
- The tethered aerostat also has an automatic rapid deflation device (ARD) and beacon transponder, which will deflate the aerostat in the event of a tether break away.

Rapid Aerostat Initial Deployment (RAID). The aerostats that most Soldiers have seen or operated, currently fielded in Iraq and Afghanistan, are RAID aerostats. The RAID system uses a 17-meter aerostat carrying a payload to an elevation of about 1,000 feet. Larger aerostat configurations are in development to support heavier payloads of up to 1,000 pounds at 'elevated to' altitudes of 2,500 feet. This aerostat platform was used for mission command operations using a FLIR camera system for both day and night operations.

RAID utilizes enhanced optics (EO)/infrared (IR) sensors, radars, flash and acoustic gunshot detectors, to provide persistent, panoramic surveillance of the covered area, providing timely warning of potential threats and other events val-

An aerostat is released to keep watch over and around Multinational Base Tarin Kot, Afghanistan. (Photo by CPL Christopher Dickson, U.S. Army)



The Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System (JLENS). (Illustration provided by Anthony W. Allen)

ued for intelligence purposes. The main sensor is an EO/IR payload, carrying a laser rangefinder, designator and target marker. In some configurations, radar, radio frequency (RF) signal interceptors or gunshot detectors are employed, providing a primary scanning sensor pointing the EO/IR payload to points of interest, where movement or suspicious actions are detected. Other sensors can cue the RAID as well, including counter-mortar radars such as the Lightweight Counter-Mortar Radar (LCMR), which detects mortar attacks and can cue the RAID in seconds. RAID sensor data is fed through tactical radio links to the RAID ground control system, also known as Persistent Surveillance and Dissemination System (PSDS2) and Enhanced Tactical Automated Security System (ETASS).

The system displays a comprehensive operational picture, depicting all participating friendly forces locations, and supporting such forces with live streaming video being broadcast on the military intranet as events unfold. This provides the quick-reaction forces and first responders at an event scene with live perspective on the operational area. Streaming video is automatically compressed to fit the capacity of each user's communication links.

PSDS2 uses an advanced efficient and intuitive interface to support operator's multi-tasking and focus. The visualization tools used enable the presentation of multiple video feeds as thumbnails, or ortho-rectified 'footprints' superimposed on a terrain map or satellite image, clearly depicting the sensor coverage and orientation. Three dimensional terrain features and building models are also displayed to improve orientation. This 'in-context,' perspective view shows the scene from any desirable viewing angle or elevation to optimize the employment of sensors, such as UAS ground observations.

PSDS2 data is also shared with a larger family of intelligence and mission command systems through the operational area.

Joint Land Attack Cruise Missile Defense Elevated Netted Sensor (JLENS). The JLENS system consists of four main elements: the aerostat, mobile mooring station (MMS), tether, and ground support equipment (GSE). The primary mission of JLENS is to provide an elevated, persistent, over-the-horizon (OTH) surveillance and added air and missile defense (AMD) protection capabilities to the U.S. and unified action partners, as well as critical geo-political assets from cruise missiles (CMs), unmanned aerial systems (UASs), tactical ballistic missiles (TBMs), large caliber rockets (LCRs), air breathing threats (ABTs), and surface moving targets (SMTs). The JLENS system also has a capability to detect and track SMTs, report the launch events of short-range TBMs or LCRs, while providing estimated launch points for munitions that enable counter fire support.

The JLENS platform will operate on two separate sites that makeup an orbit. In the JLENS system, an 'orbit' is comprised of two 74-meter class aerostat

Crews prepare a moored Aerostat balloon for launch at Multi National Base Tarin Kot, Afghanistan, Dec. 7. The Aerostat balloon is equipped with 24-hour surveillance and communication equipment and will be used to help stop insurgents from planting IEDs in the Uruzgan province. (Photo by SPC Jennifer Spardlin, U.S. Army)

platforms, two elevated sensor payloads (SuR and FCR), two communications payloads, and two processing stations. One aerostat elevates a SuR payload along with an identification friend or foe (IFF) and communications payload, the second aerostat a FCR payload along with IFF and a communications payload. The two payloads are capable of operating independently; however, full performance capability is not realized unless operating as a complete orbit.

The standard is to be fully mission capable in 72 hours after arrival of all equipment and necessary personnel at a prepared site. The emplacement of a JLENS platform within the 72 hour time frame requires many activities that must run concurrently. This assumes that all equipment is accounted for and prepositioned, the site is prepared in advance of arrival, and weather conditions are favorable for inflation.

The JLENS battery is an AMD organization that specifically supports integrated air and missile defense (IAMD) operations at the strategic and theater level and is a major contributor of situational understanding (SU). The JLENS battery is task organized under the Air Defense Artillery (ADA) brigade or battalion missions that specifically support IAMD operations and enhance operational awareness at the strategic and theater level. The JLENS System is described as follows:

- 74-meter aerostat, which elevates each payload, the surveillance radar (SuR) and fire control radar (FCR)
- A tether, which attaches the aerostat to the mobile mooring station (MMS) and provides power and communications
- MMS, which provides a docking station for the aerostat and anchors it to the ground
- Ground support equipment (GSE) including power generation and distribution, weather and flight monitoring equipment and software, and other assorted equipment such as helium storage, tether handling, test and repair equipment.

There are many different types of Aerostats, with various platforms used by the military and civilian organizations alike. The mission and payload of the Aerostat is how we differentiate JLENS vs. RAID.★★

Mr. Anthony W. Allen is currently a doctrine writer for the Fires Center of Excellence, Fort Sill, Okla., and is the lead action officer for JLENS. Allen served 20 years in the U.S. Army with 17 years as a 14T Patriot crewmember, and three years as a 13B cannon crewmember. While deployed to Iraq in 2009, he worked as a aerostat field service representative and rapid aerostat initial deployment (RAID) tower installer.

On Time On Target

By CPT Gregory Fassett, CPT Walter Kruse and CPT Blake Wallick

Younger generations of officers and NCOs have never known a world before the brigade combat team (BCT) based modular force. All commissioning sources and other Training & Doctrine (TRADOC) classrooms prepare young leaders for their role within a BCT. The Army's modularization process phased out divisional units and formulated brigade sized elements with the ability to deploy and self sustain with significant internal combat power, Fires, and logistical support. This solution provides flexibility to an Army which has continually reshaped itself to meet complex force regenerative requirements over the last decade of war. Standard unit structures and functions save time, effort and energy by allowing efficient battle handoffs between two similar BCTs during unified land operations (ULO).

Every BCT has a unit designated for internal support called a brigade support battalion (BSB). Typically a BSB provides a few core capabilities including distribution, maintenance, medical, and supply armored brigade combat teams (ABCT) contain combat maneuver battalions, each with a designated forward support company (FSC). Each FSC is task organized to provide internal logistical support to their respective battalion. This allows the battalion commander to directly control their own independent logistics assets to accomplish their mission across the battlefield. The FSC works together with the maneuver battalion S4, who then coordinates with the ABCT S4 to determine the aggregate support requirement and identify if external support is needed. Once requirements are defined, the brigade S4 coordinates with the brigade support operations (SPO) office located within the BSB to establish a concept of support to meet the needs of the maneuver battalions.

Depending on the type and mission of each modular brigade, there is variance in the size and capabilities of the BSB attached to support. For instance, at 100 percent strength in personnel and equipment, Fires brigade (FiB) BSBs have limited capabilities compared to BSBs that support a Stryker BCT or an ABCT. One of the most notable omissions of the FiB BSB is the lack of a brigade support medical company (BSMC), found in most other BSBs, which is responsible for planning and executing the brigade's medical support in a combat environment.

In the current structure of the FiB, the organic distribution and transportation assets of the BSB have neither the personnel nor the equipment to independently support the brigade in its entirety for required classes of supply. Attempts to fill in the capabilities gap, through lateral transfers and equipment request documents are typically denied due to current Modified Table of Organization and Equipment (MTOE) authorizations.

History, origin and design of the BSB of a Fires brigade. To understand the FiB BSB, we must first understand modular brigades and the structure of FiBs. During the transition to a modular force, units that did not fit into the new BCT structure were reorganized into a variety of functional brigades. In the article "The Fires Brigade, Not Your Daddy's FFA HQs" that was published in the November-December edition of the Field Artillery Journal, LTC Samuel R. White Jr., wrote about this transition, stating;

"It is clear that a new Fires organization had to be developed for the modular land force—one built around versatile combat power units and staffs that are more self-contained, sustainable and organized with capabilities for the full range of missions"…. "The Fires brigade was developed to fill this need."

During the same era of modularization, logistics units were re-designated to sustainment brigades (SB). An SB supports multiple BCTs over large geographical areas with logistical capabilities that are tailored to the needs of their customer units. For instance, an individual petroleum company has massive fuel distribution and storage capabilities, but is not mobile enough to fit inside the organic structure of one BCT.

Multiple BCTs can potentially require several hundred, thousand gallons of fuel per day across a large operational environment (OE). This requirement can be met through coordination between the customer BSBs and the SB to utilize their high density of fuel storage and distribution assets.

The world of combined Fires has a similar charge; to serve multiple BCTs across a large geographical area. Prior to modularization, Field Artillery regiments (FAR) across the Army would host larger quantities and capabilities of Field Artillery (FA) platforms. The division artillery (DIVARTY) cannon battalions became organic to the BCTs while DIVARTY Multiple Launch Rocket System (MLRS) battalions and FAR battalions were reassigned to FiBs. Modern rocket artillery assets such as the M142 High Mobility Artillery Rocket System (HIMARS) can engage and destroy the enemy's FA, trucks, personnel carriers, et cetera while retaining the mobility to effectively evade enemy counter-fire. The FiB's purpose has a much wider scope than the focused efforts of a BCT. A single BCT commander who has expended his internal artillery

SPC Palo Gonzalez, a petroleum supply specialist (left), SGT Billy Taylor a motor transport operator (center) and SSG Eric Barnett also a petroleum supply specialist, all assigned to Company A, 115th, *Muleskinner*, Brigade Support Battalion, 1st *Ironhorse* Brigade Combat Team, 1st Cavalry Division, attach a water blivet and cargo net to a CH-47 Chinook helicopter while conducting sling load training during the Brigade Support Area exercise June 1, at Fort Hood, Texas. (Photo by SSG John Couffer, 1st BCT Public Affairs, 1st CAV)

assets will require the additional kinetic impact to be delivered by a FiB. The FiB can support a vast land mass; normally the size of a corps or division OE. Between the organic BCT artillery assets along with augmentation from a FiB, the combat power is equal to or greater than the former FA battalions, with greatly increased mobility and control.

Sustainment force structure orientation for the Fires brigade BSB. Throughout Forces Command (FORSCOM), every duty station where a corps headquarters is located, there is an active duty FiB. While doctrinally not organic to a corps, FiBs are capable of supporting divisions, corps, or joint task forces; their collocation at bases across the United States is by design.

The comparison of several active component FiB BSB MTOEs indicate the intended sustainment functions to be provided by the FiB BSB. It would be assumed that each FiB BSB's capabilities would be tailored to match the size and types of artillery assets within their brigade. However, all FiB BSB MTOEs are virtually identical. The most important functions of the BSB are the supply and distribution of class I (CL), CL III bulk, and CL V. The equipment and personnel assets provided to support these classes of supply are identical throughout all BSBs to include the MTOEs of the FSCs as well. Headquarters Department of the Army (HQDA) creates MTOEs to match the ideal authorized type and quantity of equipment and personnel for a specified unit's mission.

The stated purpose of standardizing BSB structural authorization is to reduce conflict between sister units and reduce arguments about why one FiB BSB has more authorized assets than another. However, this is based on the false assumption that every FiB has identical task organization. FM 3-09, *Fire Support*, states Each FiB must have at least one organic rocket battalion of HIMARS or MLRS, a BSB, a headquarters and headquarters battery, a signal network support company, and a target acquisition battery. Additionally, FiBs may have from one to five additional rocket and/or tube battalions. Regardless of the differences between FiBs, the BSBs' MTOE authorizations do not change to scale with the specific combination of rocket or tube battalions that are task organized under a given FiB. Logisticians will agree that an increase of supported personnel and equipment must be supplemented by an increase of authorized logistics assets. Given the non-standard composition from one FiB to another, the FiB logistic requirements

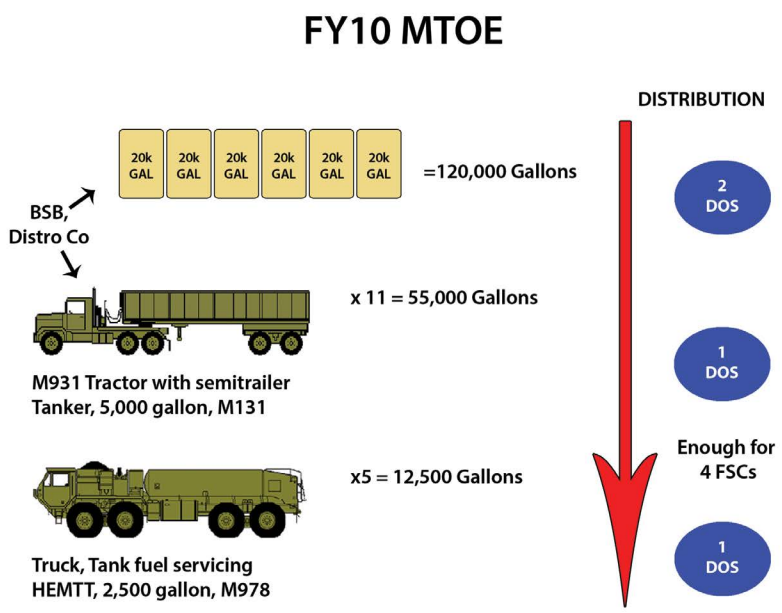


Figure 1: Example of fuel distribution on FY2010 MTOE

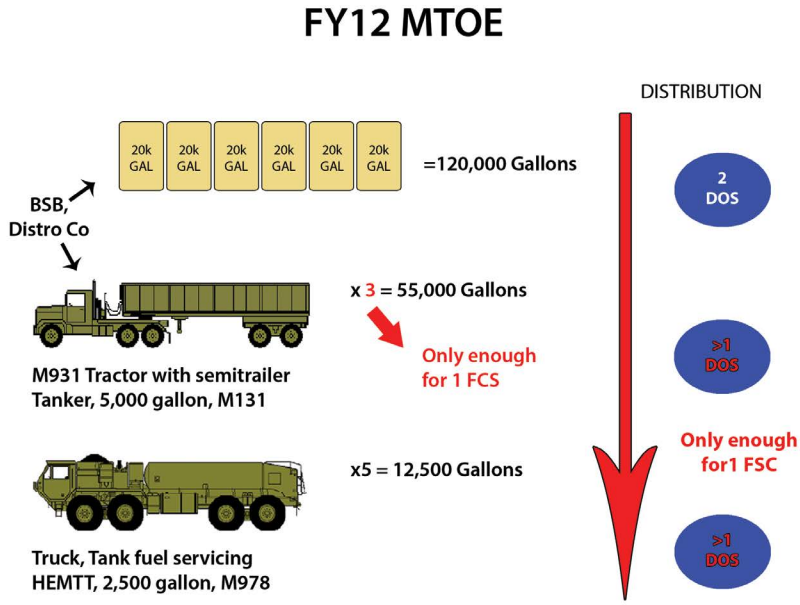


Figure 2- Example of fuel distribution under FY2012 MTOE

can easily exceed the BSB's authorized logistical capacity, thus creating a potential shortfall.

Did HQDA consider the varying sizes of FiBs when they constructed the MTOE of the FiB BSB? What evidence would prove that the BSB has ability to support multiple artillery battalions or even one battalion? Fuel requirements are a good common reference point to discuss (Ref. Figure 1). The FY10 MTOE authorizes the BSB's Distribution Company 11-5,000 gallon fuel tanker trailers and one primary mover for each tanker (totaling 55,000 gallons). These tankers can resupply four FSCs, each with a capacity of 12,500 gallons of fuel; five HEMTT fuelers with 2,500 gallon tanks. The BSB also has a fuel system supply point (FSSP) which can hold up to 120,000 gallons of fuel. A doctrinally standard mission can require the FSCs to deplete a max capacity fuel load during daily operations. Under these conditions, the BSB can hold two days of supply (DOS) at the FSSP and one DOS with the 5,000 gallon fuelers to support four FSCs as illustrated in Figure 1.

The above example shows that the FiB, under FY10 MTOE authorizations, can sufficiently support four artillery battalions through their assigned FSCs without requiring additional fuel assets from an SB. This enables compliance with standard sustainment requirements; two DOS retained at the BSB, one DOS with the FSC, and one DOS with the maneuver unit. Two noted limitations in this MTOE are that the BSB can only support four FSCs (rather than five, as are potentially authorized under a FiB) and that to use the FSSP instead of having sufficient 5,000 gallon fuelers constrains the BSBs agility and mobility.

These issues are even more pronounced in the FY12 MTOE which authorizes only three 5,000 gallon HEMTT fuelers. This reduction cripples the fuel distribution capability of the BSBs distribution company, rendering them only able to carry 1 DOS for 1 FSC.

Figure 2 is a graphic representation of the same scenario but with FY12 MTOE equipment authorizations.

Ammunition resupply is another area is where the current MTOE authorizations do not match requirements from the firing battalions. As stated in FM 3-09, by design each FiB has one organic rocket battalion. It is assumed that the BSB's capabilities should match the haul requirements for their supported ammunition. But, the BSB is not authorized M985 trucks and M989 trailers to crane lift and transport HIMARS ammunition pods. Currently, if a HIMARS battalion FSC requires ammunition resupply, the rockets are delivered directly via through-put from an SB. The BSB has no interaction outside of simply ordering the ammunition and coordinating delivery with the SB. This is a short term solution to a systemic issue with the design of the BSB.

Another critical deficit within our MTOE is the lack of a BSMC. Traditionally, the BSMC provides level I and II medical support to all BCT units operating within a BCT's OE. Commonly located within the brigade support area (BSA), the BSMC has several combat enablers to include treatment and evacua-

tion platoons who are indispensible on any battlefield.

Does this omission state that the FiB should never have to support themselves with medical assets? Does the subtraction of a BSMC imply that a FiB would never be a battlespace owner in an operational environment, thus never requiring the provision of area medical support? In his article, White identified the need for a "…level II/III medical support and evacuation from a theater medical brigade" as a critical enabler to support a FiB to perform in ULO. The addition of an organic BSMC would not provide level III care, but it would allow the FiB to rapidly provide level II support to their personnel without requiring evacuation or augmentation from another brigade.

Intent of current BSB design: What can we support? What are we designed to support? Presently, the FSCs are individually task organized and attached to each FA battalion. FSC MTOEs are tailored to support their supported battalion sufficiently. Each FSC has a greater quantity of equipment and personnel assets than any single subordinate company in the FiB BSB. The structure of a FiB BSB was developed during wartime conditions and its design indicates the ability to meet the needs of the time.

Over the last decade, the need for FA battalions to augment divisional support efforts was greater than the requirement for an entire FiB. In potential future conflicts, FA battalions must be able to move independently across the battlefield.

To do this, they need real-time logistics to enable them to deliver accurate, lethal Fires. Rocket battalions must also be highly mobile. For example a HIMARS wheeled chassis platform can move faster, farther and more efficiently than the MLRS track platform. The increased mobility and deployability of the HIMARS is an example of the shifting priorities of today's Army.

For the majority of the last 10 years, FA assets were placed in fixed locations such as forward operating bases (FOBs) or combat outposts (COPs). As the Army reshapes and prepares for conflicts within austere environments, remaining nimble on the battlefield is essential. The fighting style utilized in the past had an effect on the relationship between the BSB and the FiB because the FA battalions were spread far and wide across an OE and sometimes task organized under different units. So the firing battalions were rarely supported directly by the BSB.

Rather, the battalions were supported by the closest CSSB or KBR/FLUOR contract supporter. This practice worked in Iraq and Afghanistan to accomplish the mission set of each respective theater. However, the Army must now take a broader view of potential future wars,

SGT Shantelle Belk and PFC Eric Ramirez, fuel specialists with A Company, 2nd Brigade Support Battalion, 2nd Infantry Division, attach a transfer line from their fuel truck to a refuel station tank at the National Training Center, Fort Irwin, Calif., Nov. 8. (Photo by SGT Mark Miranda, U.S. Army)

U.S. Army Europe Soldiers with the Distribution Platoon, Echo Company, 3rd Battalion, 159th Aviation Regiment, 12th Combat Aviation Brigade prepare for refueling operations with an M978 tank fuel servicing heavy expanded mobility tactical truck during forward arming and refueling point training at the Oberdachstetten Local Training Area, Ansbach, Germany, April 22, 2013. (Photo by Georgios Moumoulidis, U.S. Army)

and reemphasize mobility to increase combat effectiveness under different conditions.

Transition to unified land operations. Preparation for ULO within budgetary limits throughout the Department of Defense (DoD), forces the Army to do less with less. Regardless of the budget, The BSB must continually prepare to provide sustainment support to the FiB in widely varied situations from peacekeeping to austere environment initial entry to joint operations. The BSB must restore our direct action proficiencies tasks and understand that bolstering our core functions is as essential for operations in the future as was our ability in the past to adapt to the logistical needs during the conflicts in Iraq and Afghanistan.

While preparing for the next battle, logisticians debate whether the FiB BSB was designed to be mobile. FM 3-09 states, "The BSB provides a materiel carrying capability that enables the brigades to conduct sustained operations for a finite period of time. For example the BCT and the FiB are organized with self-sustainment capability for up to 72-hours of combat." Another indicator of intended mobility is the number of authorized HEMTT fuelers. As stated earlier, ABCTs have many HEMTT fuelers to support heavy fuel consumption over long mission distance.

Appropriately, the fuel supply capacity of an ABCT scales with their consumption rate. The M1 Abrams tank can only go as far as the fuel supply will take them. So, to increase fuel carrying capacity, is to increase operational reach. An FiB's FSCs' fuel assets total 18 HEMTT fuelers to support three rocket battalions. An ABCT has 21 HEMTT fuelers, but does this necessarily imply that FiB is designed to maneuver as much as an ABCT? The ABCT has six-5,000 gallon trailers and a Fuel Supply System Point (FSSP). A FiB BSB is also authorized a FSSP, but with only three-5,000 gallon fuelers, it lacks the capability to transport the required DOS of fuel from the FSSP to the FSCs.

Rocket and cannon battalions may not be near each other on the battlefield, adding to the complex challenge of supporting them. Theoretically, utilizing the FSSP could meet the consumption needs of the FiB. However, in doing so, the BSB completely sacrifices mobility.

The fuel in the FSSP bags would have to be totally depleted before the BSA could echelon forward to maintain support operations. The currently authorized FSSP provides a good solution for supporting operations from a fixed location, but as mobility increases in importance, mobile resupply systems such as additional 5,000-gallon fuelers must take the place of the FSSP.

Within the constraints of our current authorizations, recent training exercises have highlighted the role that the BSB plays in a tactical environment. As the FiB transformed, the BSB developed a role utilizing a 'pass-back' support. What was intended to be a short term solution for our latest conflicts became the standard support plan for the brigade.

The paradigm of the BSB in a 'pass-back' role does not meet the needs of FA battalions because the FSCs outstrip the distribution and transportation capabilities of the BSB's distribution company. Thus, when the FSCs have exhausted their supply stocks, the BSB is unable to fully replenish them. In addition, with the lacking capability to transport rocket ammunition and sufficient fuel requirements, the BSB has been reduced to an administrative middleman between the FSCs and an SB in the support plan of the FiB. Given our current authorizations, a 'pass-back' model only minimally meets the CL III(B) requirements of training in preparation for ULO.

The maintenance function of the BSB provides a closer match to the necessary support required across the FiB. FSCs cannot repair all items, so the field maintenance company (FMC) of the BSB provides specialized maintenance when needed. The FMC can repair a broad range of items including communication equipment, night vision devices, weapons and welding/fabrication. The MTOE authorized maintenance assets of an FSC are typically able to fix vehicles and have some capability to repair weapons and electronics within their supported artillery battalion.

But when necessary, the FMC provides additional support from their base shop within the BSA, as well as via onsite field maintenance. The SB is typically only involved in cases of damaged CL VII equipment that requires evacuation and replacement. The obstacle of operating across a large geographical area to support all artillery battalions would still challenge maintenance operations to a degree.

However, the tiers of capability between the FSCs and the BSB's FMC make more sense in their design and operation than today's standard method of CL III and CL V distribution.

The way ahead. Without adaptive and agile service to the customer units of the BSB, the whole FiB loses maneuverability and is constrained by the short leash of limited services the supporter can currently provide. The progressive reduction and omission of mobile assets within the FiB BSB was seen by HQDA as an acceptable risk at the time of development.

The standard practice to address specific capability gaps through augmentation from an SB must be improved. The current authorized FiB BSB's structure forces them to rely heavily on an SB to perform some basic wartime transportation and resupply functions. In future ULO, an SB will always have a role in the theater-wide sustainment structure, but the BSB must be able to meet the everyday demands of their FiB.

To overcome the support capability shortfalls in the FiB, these authorization adjustments for CL III, CL V and medical support would make the FiB more effective.

- CL III: Replace the immobile fuel storage equipment (FSSP) with mobile fuelers and the appropriate personnel to operate the fuel hauling equipment.
- CL V: The addition of commensurate haul assets to store and transport a firing battalions basic load.
- Medical Support: The addition of a standard BSMC to provide advanced trauma management and emergency medical treatment to include resuscitative actions.

The changes to CL III and medical support could be made to all of the FiB BSBs to improve operations in any FiB, regardless of composition. The CL V transportation changes would have to be aligned to meet the needs of the specific firing battalions in the FiB. With these proposed changes to the current authorized structure a FiB BSB, the firing battalions would be more agile across the battlefield with additional mobile fuelers, shoot faster with reduced time between CL V resupply, and would be able to provide level II area medical support to the troops in the FiB OE, all without requiring further SB augmentation. Balancing equipment and personnel allocations across the Army is an extremely complex task, especially during an era of fiscal constraints. Even if the budget were stable, the challenges of adjusting MTOE authorizations remain: To add equipment and/or personnel to one organization requires a reduction from another unit.

Final decisions on these issues are those of carefully weighed priorities. As discussed in the January '12 White Paper "Defense Budget Priorities and Choices", the Army is moving from it's peak strength of 570,000 towards its target of 490,000 personnel by the end of 2017.

Although specific equipment and unit reductions have not yet been identified, we acknowledge that increasing FiB BSB end strength in personnel and equipment will be a difficult sell.

The major issue facing all FiBs is the progressive loss of sustainment capabilities, resulting in less maneuverable fire support. This problem negatively impacts the combat effectiveness of the FSC's customer units, the BSB, and the whole FiB. The current sustainment structure is not unfounded and has served the Army well for the past 10 years. However, the Army has not faced a force on force fight since the very beginning of Operation Iraqi Freedom and we must adapt for the hybrid conflicts of tomorrow. Uncertain requirements and shifting threats lie over the horizon.

Despite any future shortfalls, one thing will always remain: Army logisticians will solve these complex problems. *Redlegs,* rest assured, you will be sustained.★★

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Enduring Lessons from the Father of Modern Fires Planning

By MAJ Wilson C. Blythe

One of the most under-appreciated benefits about being stationed on an Army post known for its primary mission of training and education is having access to the branch library. These treasures contain forgotten gems that are of interest to both military professionals and historians.

Here at the United States Army Field Artillery School, the Morris Swett Technical Library, located in the basement of Snow Hall, is a rich resource. Among its many treasures are, "Artillery in the Attack in Position Warfare," and "The German Artillery in the Break-through Battles of the World War by German Field Artillery officer," by COL Georg Bruchmüller.

Bruchmüller's name should be familiar to all artilleryman. He played a critical role in the development of the modern techniques of fire support planning. His two books are especially pertinent during a period when both the Field Artillery branch and the U.S. Army seek to reaffirm core competencies related to combined arms maneuver.

Prior to the outbreak of World War I, there was nothing in Bruchmüller's career to indicate the profound influence he would have on artillery operations. He had been medically retired as a lieutenant colonel 10 months prior to the 'Great War' because of a nervous breakdown that resulted from a fall off a horse.

Upon being recalled to active service, Bruchmüller was placed in charge of the artillery of Kulm fortress and commanded the 2nd Foot Artillery Battalion of the Guard-Landwehr, which is similar to our National Guard.

However, this assignment did not last long; in November 1914, he assumed command of the 86th Infantry Division, located on the eastern front. From this position, Bruchmüller's natural genius for fire support planning would become famous on both sides of the fighting front.

During the course of the war, his skill elevated him from a Landwehr foot artillery battalion commander to the position of chief of artillery of the High Command.

His first book, "The German Artillery in the Break-through Battles of the World War," briefly details the pre-war state of the Second Reich's artillery and its evolution during the course of that conflict. It is a study in the evolution of the German's Field Artillery methods and as such is largely technical in character. Though Bruchmüller does compare mechanical aspects, such as the ballistics and mobility of French and German field pieces, the book is, at its heart, a thorough examination of how artillery was employed to facilitate the penetration of the enemy's defensive system.

This study of selected German offensives in positional warfare is by no means exhaustive; Bruchmüller's account only discusses the period he was with the units engaged. Despite this, his keen analysis of the artillery's performance in the break-through of an echeloned defense remains instructive to those contemplating the use of artillery against prepared defenses.

Bruchmüller's second book, "Artillery in the Attack in Position Warfare," recounts his role in planning numerous World War I operations. Translated into English from a French translation by 1LT Maxwell Taylor, a future chief of staff of the Army and chairman of the Joint Chiefs of Staff, it examines the artillery portion of six battles, from both the Eastern and Western fronts, during the period 1916-1918. While Bruchmüller's first book examines the development and principles of the German artillery, this book uses the six battles as case studies to illustrate the application of these principles and their refinement during the course of the war. Despite not being organized in a chronological manner, "Artillery in the Attack in Position Warfare," is easy to follow.

Bruchmüller uses a straightforward methodology for examining the selected operations. His approach is easily seen in the subdivisions of each chapter: the terrain, the preparations for the attack with a specific focus on the Field Artillery orders for various echelons, a description of the conduct of the attack, and finally a discussion of measures taken and their effectiveness. Because of its heavy reliance on artillery orders and regulations, "Artillery in the Attack in Position Warfare," is in a way, a summary of the artillery orders for the attacks involved.

Unfortunately, the maps and sketches referenced in the text are not included. However, each chapter contains enough information on the number and density of artillery and mortars along the front, and the Field Artillery organization by mission (direct support, counter-battery, or interdiction) to allow a clear understanding of the fire support plan outlined for each of these operations from the 'Great War.'

The long slog that was World War I was largely replaced in our institutional memory by our Army's more substantial role in World War II.

When we think of the German army, visions of dramatic Panzer attacks from Germany's last bid for global supremacy are likely to enter our minds.

However, the 'Great War' was above all else an artilleryman's war. In this conflict, Germany's artillery corps was unmatched in its effectiveness. Because of its greater abundance of heavy artillery, with its greater range and caliber, the German artillery allowed the infantry to effectively hold a much larger front than would have otherwise been possible.

Though Germany eventually lost the war against the allied powers, the terrible effectiveness of its bombardments on enemy morale was beyond dispute and often testified to by prisoners.

Imitation is the sincerest form of flattery, and the reorganization of the artillery of the allied powers to emulate the Germans, along with its subsequent prohibition by the Peace Treaty of Versailles, are indicative of allied views about the effectiveness of German artillery.

The effectiveness of the German artillery in the 'Great War' was ultimately rooted in its peacetime training. Though it may seem odd, in retrospect, this training focused on the conduct of a war of movement and gave Germany's *Redlegs* a great deal of experience in working in close cooperation with maneuver forces as part of a combined arms fight.

However, this training was not flawless; most German gunners had little or no experience with the use of firing charts or placing rounds on target at night or in fog.

From August 1914 on, constant evaluation of the results of combat actions spurred the creation and implementation of new ideas designed to make the fire support system more effective. This willingness to adapt, or what we might today call organizational agility, was critical to tackling the problem posed by deeply echeloned defensive positions.

It should serve as a reminder that no matter what we decide prior to the commencement of hostilities, that foremost we must ensure the creation of learning organizations that can adapt and refine in the face of the unexpected.

The need to create adaptable organizations and leaders should in no way diminish the importance of planning. Just as in Bruchmüller's day, effective planning must include proper reconnaissance and intelligence preparation of the battlefield (IPB).

The information gathered must be continuously fed into the targeting and planning processes so that the required adjustments can be made. Only then can we assure to the maximum extent possible that our efforts to achieve the commander's intent are not doomed to failure prior to the commencement of operations.

Effective fire plans must be logistically sustainable. A constant concern of Bruchmüller's was the need to control the consumption of ammunition in order to ensure there was enough to support the infantry throughout the attack.

To this end, he based his ammunition requests on the greatest permissible rate of fire for the time period covered in the schedule of fire and for a specified period of time before and after the assault. Whether or not modern fire supporters adopt Bruchmüller's method is moot; what is imperative is that fire support planning is conducted with a keen awareness of logistical constraints.

Even in a period devoid of unmanned aerial vehicles, satellite imagery, and units full of analysts, German officers had to remain conscious of the need to maintain operational security. Surprise and speed were critical if the attack was to achieve the goal of a break-through of the enemy's entire defensive system. Bruchmüller ordered that future battery positions were not to be reconnoitered during daylight hours except in the most general way.

Reconnaissance and movement to the front were conducted at night in an attempt to conceal their intentions from the enemy. Likewise, deception operations such as the reconnaissance of decoy positions were conducted in both the sector where the attack was to be launched and in others in order to deceive the enemy as to where the weight of the blow would fall.

Curiously though, Bruchmüller found that excessive secrecy was more hazardous than involving a greater number of officers. He felt that those who were informed were more discreet than those personnel who were merely speculating about future operations.

Concern about the need to achieve surprise also influenced the use of artillery. The length of the preparatory Fires conducted prior to the assault decreased under Bruchmüller's watch. This was because he found that "[our] artillery fire, even though continuing only a few hours before the attack, gave the enemy far too much time for counter-measures." The shortened bombardment made it imperative to obtain accurate target information and thus increased the importance of proper and continuous reconnaissance and IPB. The need for surprise also influenced German methods to obtain the five requirements of accurate predicted fire.

Early in the war, German batteries would conduct a calibration of their guns prior to the offensive. The expenditure of the vast amount of ammunition required to successfully calibrate the immense number of guns used to support an attack would serve a clear indication to the allies that a blow was about to fall.

Instead, Bruchmüller preferred the use of the "Pulkowski method," which artillerymen today would refer to as MET+VE, in order to ensure the accuracy of ballistic firing data prior to launching an attack. With the increased number of ways to collect information about our intentions, we must ensure we make greater efforts to surprise our enemies by integrating operational security and deception into our operations, yet still meet the five requirements of accurate, predicted fire.

The fire support officer (FSO) occupies a critical role as the integrator of fires and maneuver in the combined arms fight. Bruchmüller recognized that success operating at the intersection of maneuver and Fires required an exceptional officer: "[the] peculiar position of an artillery advisor, however, required a special personality.

One could make much of this position—could exert a great influence, an influence vital to the outcome of a battle action." In order to have the credibility to successfully advocate for the effective use of Fires, it is important that FSOs understand and can articulate the intricacies of the offensive and defensive tasks as put forth in the Army Doctrine Publication 3-0 and Army Doctrine Ref-

erence Publication 3-90 series of doctrinal manuals.

However, just as a competent FSO must comprehend maneuver doctrine and the supported unit's concept of the operation, they must also ensure that our maneuver brethren understand the use of Fires.

Prior to an attack, Bruchmüller delivered lectures and briefings to the infantry so they would understand how the artillery would support the offensive and thus increase their confidence in both the fire support plan and the success of the assault. Because of the nature of conflict today, we must start this process during training and long before we set foot on a battlefield. As the force reorients, renewed emphasis must be given to maneuver-shooter programs and other events that increase maneuver commanders' understanding of what Fires bring to the fight.

Additionally, we must guarantee that our officers are well-versed in the neglected art of fire support planning, to include the proper conduct of fire support rehearsals.

Until the spring of 1916, the German army did not conduct centralized fire direction and was unable to concentrate the Fires of more than one division's artillery. This inability severely hindered the artillery's capacity to effectively support the infantry since most artillery missions for a division or corps attack required the cooperation of neighboring unit's artillery and mortars.

The key to this was a headquarters responsible for ensuring the effective use of all indirect fire assets within range through integrated planning and fire direction.

Unfortunately, the small number of Fires brigades limits our capabilities in this area. The establishment of a Fires brigade headquarters aligned with each division as a force Field Artillery headquarters similar to that proposed in Colonel (P) Wilson A. Shoffner's 2011 White Paper "Fixing Fires: Adaption and Change in the Field Artillery," would result in better supervision of the training of Field Artillery tasks, mentorship of fire supporters, and during wartime an entity dedicated to ensuring Fires are used in the most effective manner possible.

Knowledge of the thoughts of a founding father of modern Fires planning may be of interest to those engaging in or following today's debates on the employment of fires or seeking to learn more about the use of indirect Fires in the conduct of offensive and defensive operations.

If familiarity with Bruchmüller's contributions to fire support fails to influence contemporary officers, we should at least take comfort in knowing that our current situation pales in comparison to the task of the generation of artillery officers that fought in the 'Great War.' Whereas they had to create the framework for modern Fires planning, we at least have examples from history to guide us on questions of doctrine and organization.

We may hope that despite whatever changes the future brings, at least one thing remains the same, that "[the] thanks of the infantry, in my opinion, must be treasured more by every artilleryman than all orders and citations."★★

Major Wilson C. Blythe, Jr. is currently a small group leader at the Field Artillery Captains Career Course. After graduating in 2001 from the University of Mississippi with a bachelor's degree in history, he was commissioned as a Field Artillery officer in the U.S. Army. His service includes deployments to Iraq and Afghanistan. He holds a master's degree in history from Eastern Michigan University. He is currently pursuing his Ph.D. in military history at the University of North Texas, where he is writing a dissertation on the development of Air-Land Battle.

Fires Changes of Command

July 1, 2013
69th ADA, Fort Hood, Texas (in Qatar)
Outgoing: COL Randall A. McIntire
Incoming: COL Brian Gibson

July 2, 2013
USA Garrison, Fort Sill, Okla.
Outgoing: COL Paul Hossenlopp
Incoming: COL Glenn Waters

July 2, 2013
212th Fires Brigade, Fort Bliss, Texas
Outgoing: COL David Hamilton
Incoming: COL Heyward Hutson

July 3, 2013
1st BN, 19th FA, Fort Sill, Okla.
Outgoing: LTC Marcus Jones
Incoming: LTC Steve Stasevich

July 8, 2013
3rd BN, 29th FA, Fort Carson, Co.
Outgoing: LTC Derek Knuffke
Incoming: LTC Cory Delger

July 9, 2013
18th Fires BDE, Fort Bragg, N.C.
Outgoing: COL Robert Morschauser
Incoming: COL Stephen Smith

July 10, 2013
10th AAMDC, Kaiserslautern, Germany
Outgoing: COL Stephen J. Richmond
Incoming: COL Gregory J. Brady

July 10, 2013
108th ADA BDE, Fort Bragg, N.C.
Outgoing: COL Sean A. Gainey
Incoming: COL Edward J. O'Neill IV

July 10, 2013
1st BN, 39th FAR, Korea
Outgoing: LTC Mark Bilafer
Incoming: LTC Donald Potoczny

July 11, 2013
6th BN, 37th FA, Korea
Outgoing: LTC Jay Gardner
Incoming: LTC Mark Brock

July 12, 2013
35th ADA BDE, Osan, Korea
Outgoing: COL Eric L. Sanchez
Incoming: COL Thomas Nguyen

July 12, 2013
2nd BN, 43rd ADA BDE, Fort Bliss, Texas
Outgoing: LTC Michael Solis
Incoming: LTC Robin S. Woody

July 12, 2013
17th Fires BDE, Joint Base Lewis-McChord, Wash.
Outgoing: COL Ken Kamper
Incoming:COL Tim Kehoe

July 16, 2013
1st BN, 41st FA, Fort Stewart, Ga.
Outgoing: LTC Thomas Hawn
Incoming: LTC Brett Forbes

July 16, 2013
1st BN, 320th FA, Fort Campbell, Ky.
Outgoing: LTC Tarpon Wiseman
Incoming: LTC Mark Sherkey

July 17, 2013
1st BN, 9th FA, Fort Stewart, Ga.
Outgoing: LTC Wayne Hertel
Incoming: LTC Jerome Marrison

July 30, 2013
3rd BN, 320th FA, Fort Campbell, Ky.
Outgoing: LTC Shanon Mosakowski
Incoming: LTC Brendan Raymond

July (TBD), 2013
1st BN, 62nd ADA, Fort Hood, Texas
Outgoing: LTC Shanon Mosakowski
Incoming: LTC Brendan Raymond

August 2, 2013
1st BN, 37th FA, Joint Base Lewis-McChord, Wash.
Outgoing: LTC Rory Crooks
Incoming: LTC Norberto Menendez

August 2, 2013
2nd BN, 44th ADA, Fort Campbell, Ky.
Outgoing: LTC Jared J. Galazin
Incoming: LTC Timothy R. Shaffer

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Soldiers, from A Battery, 2nd Battalion, 377th Field Artillery, Joint Base Elmendorf-Richardson, Alaska, conduct a 19-gun salute for the commissioning ceremony of the USS Anchorage. (Photo by Kirk Alkire, U.S. Army)

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