September - October 2011

A Joint Publication for U.S. Artillery Professionals

Fires

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Maintain an agile Fires force

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September–October

On the Cover: SGT Adam Phillips, from 82nd Airborne Division's 3rd Battalion, 319th Airborne Field Artillery Regiment, tosses an empty canister during platoon evaluations. (Photo by SGT Michael J. MacLeod, U.S. 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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Make the Fires force the strength of the Army

By MG David D. Halverson
Commanding General of the Fires Center of Excellence

Military leadership is always greater than its interpreters, yet one truth is certain. Victory in battle can only be assured by leaders who are skilled in the art and science of war — tactically and technically competent. To this end, we must set, achieve, and sustain high standards of training in all areas central to soldiering. American military history and biography testify as nothing else can to the demand for the mastery of professional skills and knowledge, solidly grounded and tirelessly accumulated.

-GEN William Richardson
TRADOC Commander, 1983-1986

In the first week of September, we commemorated the 10-year anniversary of the 9/11 attacks on the United States. While it is important that we reflect, it is also imperative that we take lessons from the last 10 years of war. If we do so effectively, we avoid repeating past mistakes and capitalize on the knowledge gained from a decade of conflict. In the past decade, we have grown a Fires force that is agile and responsive, full of leaders who embrace operations at the lowest level. We have also groomed Fires Soldiers who can accomplish a multitude of non-standard mission sets. At the same time, we have fostered a climate that rewards Soldiers and leaders who stay in the fight, at the expense of professional military education, or PME. Our mission in Iraq is ending, and we are witnessing initial reductions of troop levels in Afghanistan. Let there be no doubt that our first priority is to win the current fights.

However, we can ill afford to lose hard-earned lessons due to a climate that overlooks the importance of PME. We must look forward. Our greatest challenge is to balance current requirements with future-focused force development and training. This includes force structure as well as systems requirements. The U.S. Field Artillery and Air Defense Artillery schools' focus is growing the Fires force of 2020. Our top priority is to give our nation the best Fires force in the world, with leaders who understand situations in depth and can adapt to seize and retain the initiative in support of full spectrum operations. These leaders must be able to employ both offensive and defensive Fires and understand how to integrate them into the joint and combined battle space. This is a significant responsibility that requires engaged leaders at all levels who embrace a professional education and compel their junior leaders to remain engaged in their own professional development.

In the coming months the Army will publish a new version of our capstone warfighting doctrine, Field Manual 3-0, *Unified Land Operations*. A change in title is an indicator that this is a fundamentally changed doctrine that embraces the lesson that the Army never fights alone. We can expect that future conflicts will require joint knowledge, and we must adapt our mode of thinking to reflect and embrace this reality. *Unified Land Operations* incorporates specific lessons from the last 10 years of war with broader lessons from history. Upon publication, I challenge every Fires leader to study this doctrine through a lens of your Fires profession.

There are invaluable lessons to be taken away from the last decade of war. Our professional responsibility is to integrate those lessons into forward-looking force development and training. Our success will continue to make the Fires force the strength of the Army, and the Army the strength of the nation.

Fit to Fight—Fires Strong!

Growing a new field artillery: Agile, smart, deadly

By BG Thomas S. Vandal

As we look to the future of the U.S. Field Artillery, the Fires Center of Excellence, and the Army, we must take a hard look; assessing deficiencies, forging new doctrine, and charging ahead with a renewed confidence in the strength of our field artillery units, leaders and Soldiers.

All of the changes we are making across the Army (recruiting efforts, retention programs and new doctrine, adaptability through mission command, and tactically smaller units) are leading us to the Army of tomorrow.

We are maintaining a level of readiness expected of the field artillery by producing a well-rounded, functional and effective Fires force. We are accomplishing this through several means. Recruiting is our first objective. Knowing how important it is to place just the right Soldiers into the right job within the Fires force could not be more critical. This simple concept has been, and needs to continually be applied to both the enlisted and officer corps. Instilling discipline and professionalism in our officers and Soldiers begins at Basic Officer Leadership Course and Advanced Individual Training and will ensure their core competencies as field artillerymen will continue when they arrive into the operating force. Revising our program of instruction to meet the needs of the operating force with the technical skills required to perform our core competency mission is an ongoing process and a priority. Additionally, we are placing emphasis on leader development to assist with creating a professional Soldier, non-commissioned officer or officer. Developing the effective leaders required to continue to move our branch forward will also be essential to maintaining our readiness as a Fires force.

In accordance with *Army Learning Concept 2015*, we are not only changing what we are teaching but how we are doing it. First, we must dedicate training resources, time, and leadership to reestablish our core competencies as fire supporters. Our ability to "shoot, move, and communicate" in full spectrum operations, particularly in a combined arms and maneuver environment, has atrophied after 10 years of war, repetitive non-standard missions, and short 'dwell' time between deployments. As a result, we must dedicate ourselves to recapture our ability to apply the five elements of accurate predictive fire, to integrate Fires with maneuver, and to improve our ability to shoot and move in a safe and controlled environment. This must be our first priority to reestablish our preeminence as the *King of Battle* for our maneuver brothers. The strict adherence to gunnery principles as a strength of our branch must be reestablished and combined with the understanding of the scheme of maneuver by our fire support Soldiers.

The FCOE is working vigorously to create and maintain our joint capabilities through the joint and combined doctrine, as well as training with allied nations. Not only are we partnering with the air defense artillery, we look to our joint and coalition allies as well. With joint

exercises and foreign liaisons, we can utilize the professional exchange of ideas to strengthen, teach and expose new officers to different ideas and problem-solving solutions.

The FCOE is making joint Fires training a priority to develop young officers, at the BOLC and Captains Career Courses, as well as our 13F NCOs, at Advnaced Leadership Course/Senior Leadership Course, and Targeting Warrant Officers at Warrant Officer Basic Course/ Warrant Officer Career Course. We are emphasizing the joint aspects of fire support. In fact, beginning with the BOLC-B class that will graduate in January 2012, we are adding instruction and follow on certification as a joint Fires observer, precision Fires and increased fire support emphasis to ensure each is competent as joint Fires Soldiers before they ever get to their brigade combat teams. Similarly, we are teaching precision Fires and collateral damage estimates in our training for targeting warrant officers and the 13F NCOs.

Another renewed focus, is to address the challenges in the level of professionalism across the force that have been created by shortened professional military education for Warrior Leadership Course/ALC/ SLC, a lack of dwell time to teach basic garrison skills/leadership, and the impact of 10 years of war. GEN Martin E. Dempsey, chairman of the Joint Chiefs of Staff, has established the Profession of Arms Campaign to address this critical need. This is a great initiative, and has been well received across the force. The Army needed to take a look in the mirror and ask: what makes a professional? When do we become a professional, and what makes the Army such a unique profession that it is held in such high regard by the American people? With that question came training, doctrine and an exchange of ideas to support and strengthen the idea of being a Soldier and a field artillery *Redleg*, a true calling and life-long profession. The Profession of Arms Campaign encourages reflection and discussions within units and the school regarding what are the values, standards and unique aspects that distinguish the Army as a profession, including moral and ethical dilemmas one may face. Our Fires Soldiers graduating from Basic Combat Training and entering the officer corps are 'aspiring' professionals. AIT and BOLC-B is only the first phase of educating them on becoming true professionals.

Each Soldier, regardless of military occupation specialty, must continue to learn and grow daily. Every *Redleg* must 'study' their profession, from AIT/BOLC-B courses to correspondence courses, as well as through the NCO education system and PME for our officers and improving opportunities to pursue degrees in higher-level education programs.

Over the last decade of war, our NCOs and officers have gained incredible combat skills and have become an amazingly experienced force. We need to continue to develop those leaders, leverage that knowledge and experience; molding the next generation of the field artillery force. These professionals will be instrumental in shaping the FA and the Army of the future, as well as the leaders of tomorrow. The professionalism these leaders will provide the Army with the glue that will bind us together as we experience an era of persistent conflict in the resource-constrained environment of the future.

We are also doing everything we can to utilize current technology to assist in our teaching process. From programs, such as Danger Close, the use of L-V-C training methodologies, and simulators we can more effectively develop a well-rounded, experienced professional and leader. These technologies also allow for mistakes to be made in a safe, controlled environment while exposing Soldiers to scenarios they may encounter in combat, developing a more flexible and agile force and leader. These technologies encourage a broader experience; allowing officers from all branches to step into the shoes of their NCOs and vice versa. Simulations also allow more FA Soldiers to train on combined arms maneuver and wide area support. This approach is strengthening and building confidence for our new professionals; producing a flexible, adaptive and agile Fires force with strong decision making skills and confidence in support of their maneuver commanders and within the joint fight.

With these new confident and successful leaders, the FA force can fully implement mission command in accordance with Field Manual 6-0, *Mission Command: Command and Control of Army Forces*. Understanding the commander's intent and knowing the right and left limits, subordinate leaders can make situational decisions within the commander's intent and taking the initiative is the strength of the U.S. Army. Through mission command, there will be greater empowerment of subordinate commands and better decisions made based on situational awareness at the lowest levels. With all the changes the Army, Training and Doctorate Command and the U.S. Field Artillery is making to prepare for the future, the most important building block will always be the basics. Preventing atrophy in our basic gunnery skills must remain a priority.

We must return 'back to basics' to prepare new Soldiers, maintain our core competencies as field artillerymen, and develop young leaders. The FA branch along with the Fires Center of Excellence is committed to maintaining our exceptional force and advancing the force of tomorrow, through basic principles, new learning concepts and adaptability to the changing joint fight.

Commitments of the US Air Defense Artillery

By COL Daniel Karbler

Col. Daniel Karbler speaks during his chief of staff reveille ceremony Aug. 17, 2010, in front of McNair Hall, Fort Sill, Okla. Karbler became the new chief of staff for Fort Sill and the U.S. Army Fires Center of Excellence. (Photo by James Brabenec, U.S. Army)

I have been in the saddle for about a month now as the U.S. Air Defense Artillery commandant and wanted to share some of my thoughts with you, especially as we go through the summer transition. I am going to forgo using the words 'strategy,' 'campaign plan,' or 'vision' and just tell you what I am going to focus on.

First, I have asked myself about the relevancy of air defense. With cuts to the medium extended air defense systems and surface launched advanced medium range air to air missile, one has to wonder, what is our relevance to the Army? And, as I thought about it, the word 'relevancy,' when used by an air defender, started to take on an air of desperation.

Like the kid who was raising his hand saying, "Pick me! Pick me!" when sides were chosen during a kickball game and he wasn't picked yet. So, you will find me using the phrase, 'ADA commitment' instead of 'relevancy.' What does ADA commitment mean?

ADA commitment to the fight. The principles of the 2010 Quadrennial Defense Review are 'prevent and deter conflict,' 'prevail,' 'prepare,' and 'preserve' -- otherwise referred to as the 'four P's.' While there are examples of how the air defense force is linked to each of the "P's", I want to focus on 'prevail in today's wars' and 'prevent and deter conflict,' as they strongly resonate with what we are doing today with respect to the ADA commitment to the fight. Our deployed ADA Soldiers conducting the counter-rocket, artillery and mortar mission demonstrate how we 'prevail in today's wars.' Our Soldiers work with intercept batteries and sense-and-warn radars to provide active defense and early warning to multiple assets throughout Iraq. Without C-RAM, Soldiers and the key infrastructure would be left open to rocket, artillery and mortar attacks. We 'prevail' against these attacks, through intercept and early warning, thus allowing our Soldiers freedom of action within our defended assets. The ADA officer, NCO and Soldier have shown their true adaptability, agility and flexibility as we've rapidly fielded the disparate elements of C-RAM into a cohesive capability – really no different than when we fielded the first PAC-2 systems on the eve of Desert Storm, providing a capability that had been heretofore untested.

The global deployment of PATRIOT battalions demonstrates how we 'prevent and deter conflict.' While some may see the 'prevent' principle as too expensive, we know the Army must continue its forward presence, as the U.S. military continues to bear the burden of deployments. With our forward presence, air defenders provide a deterrent capability against both regional and cross-area of responsibility threats.

The ADA commitment to the fight ensures the U.S. military has the requisite joint operational access into those countries where we remain engaged. The ADA force, with nearly 50 percent deployed and forward-stationed, remain committed to the principle of 'prevent and deter conflict.'

In Korea, Japan, Germany and Southwest Asia, our air defenders contribute significantly to our allied partners. We defend their critical assets; we build partner capacity through security cooperation activities such as joint air defense exercises, on-going training and leader development of their air defense forces. As our coalition partners continue to procure air defense systems, we will see further examples of building partner capacity as our coalition air defenders come to Fort Sill, Okla. for training on those systems.

The ADA commitment to the fight must also include how we support the maneuver force, especially during combined training center rotations. The brigade combat teams do not have organic air defense capability. During the most recent full spectrum operations rotation at the Joint Readiness Training Center, Fort Polk, La., enemy unmanned aerial systems flew without impunity against friendly forces, broadcasting pictures of assembly areas, convoys and other activities, which clearly showed the location and scope of the Blue Force's main effort. We must provide air defense to our BCTs. This fall, 5th Battalion, 5th Air Defense Artillery will provide air defense to one of the Joint Base Lewis-McChord Stryker BCTs as it undergoes its full spectrum operations rotation. The ADA commitment to the fight leverages our air defense airspace management cells and their leadership to support these rotations, to include the planning, coordination, and execution.

ADA commitment to the force. The second tenet is ADA commitment to the force. This starts with accessions, ensuring we are attracting and recruiting the right Soldier into ADA. Work in our branch is challenging, whether it be from a technological or operational viewpoint. The complexities involved in the hardware and software of our systems, the communications architectures and the dynamics of employing and defending maneuver; joint and coalition assets require a smart, articulate, technologically savvy and responsible air defense Soldier.

An air defender must be adaptable across all weapons systems, from C-RAM to Avenger, from PATRIOT to Terminal High Altitude Area Defense, as well as agile and flexible in understanding the nuances of employing and fighting with their system, as performance dynamics or software upgrades will change the way the mission is done…sometimes on the fly. So, accessing a Soldier with the right skills -- such as engineering, mathematics, and other hard sciences -- is paramount, whether it is an initial entry Soldier, future warrant officer or Officer Candidate School/Reserve Officer Training Corps/West Point second lieutenant. Air defense is committed to the best and brightest. Air defense artillery commitment

PFC Dustin Clark, from Battery E, 4th Battalion, 5th Air Defense Artillery Regiment, out of Fort Hood, Texas, calibrates the sights on a C-RAM on Contingency Operating Base Basra, Iraq. (Photo by PFC J. Princeville Lawrence, U.S. Army)

to the force extends to our leader development, as well. This starts with ensuring we have only the top officers and NCO's filling instructor positions in 6th Brigade, and we will accept nothing less than the best. In the ADA commitment to the force, I ask for the close cooperation and coordination between commanders and command sergeants major in the field, Human Resources Command, and the schoolhouse to ensure only the best fill our instructor positions.

The ADA commitment to the force ensures, with quality instructors comes quality instruction. We are currently undergoing a program of instruction review by the Training and Doctrine Command to look at our Advanced Individual Training, Basic Officer Leaders Course and the Captains Career Courses—their content, duration, and applicability to the warfighting units in the field, Army Learning Concept 2015, Army Leader Development System and the Profession of Arms. We need input from commanders and command sergeants major—tell us what we need to do, to improve the quality of Soldiers and officers you are receiving in the field.

The commitment also means maintaining our functional training courses (which are courses that do not produce a military occupational specialty, but provide required training) such as Avenger Master Gunner, PATRIOT Master Gunner and PATRIOT Top Gun, to name a few. The Fires Center of Excellence has thus far succeeded in keeping them above TRADOC's cut line, albeit at reduced capacity in some instances. Additionally, we have to ensure the development of instruction for future courses, such as terminal high altitude area defense and integrated air and missile defense battle command system is coordinated across the Directorate of Training and Doctrine, program managers and the field.

Finally, the commitment ensures career progression paths are understood, to include timelines, assignments and requirements. As a small branch, we cannot afford to be fractured or disjointed in our approach to assignments. Coordination and communication must take place among senior ADA leaders.

Commitment to the future. The ADA's commitment to the future includes our resolve, ensuring the air defense force remains committed to maintaining and improving capabilities into the future, even in the face of reduced force structure and declining budgets. Recently, the chief of staff of the Army talked strategy in its basic tenets—"ends," "ways" and "means". Put 'strategy' into the perspective of the ADA commitment to the future. First, we see our 'ends' not changing. The American public, civilian leadership and combatant commanders will expect its air defense force to continue protecting Soldiers, joint partners and geopolitical assets. As a matter of fact, we will see an increase in expectations -- the 'ends' -- as we field THAAD systems. The 'means' by which we operate will shrink. Though we will grow additional THAAD batteries, we will also be called upon to find force structure cuts and fiscal savings as our 'means' decrease. This leaves the 'ways' – herein lie the opportunities "to be clever," (as the CSA put it) to help ourselves.

The ADA commitments to the future are opportunities for both cost savings and places we can make smart, force structure reductions. For example, increased development and use of digital applications, technology and simulations can drive down training costs. Resource informed mission analysis should drive every decision, and we must learn to make do with the systems we have, employing them in manners maximizing their capability to support the warfighter. As an example, with the cancellation of surfaced-launched advanced medium range air-to-air missile, we must continue to employ Stinger/Avenger/Sentinal coverage to our maneuver forces. However, do it in a manner that still defeats aerial

PFC Trevor Gaston, of the 2nd Battalion, 263rd Air Defense Artillery, demonstrates an FIM-92 Stinger Man-Portable Air-Defense System at Bolling Air Force Base, Washington D.C. (Photo by SPC Darron Salzer, U.S. Army)

threats far enough out so enemy threat effects (aerial surveillance or aerial attack) do not impact operations. Leaders will have to get back to the basics of survivability, intelligence preparation of the battlefield, defense in depth and integration into the commander's scheme of maneuver.

As stated, we must make do with the systems we have. The termin-ation of MEADS and SLAMRAAM resulted in the reinvestment of funding to improve both PATRIOT and C-RAM. The time for hand-wringing over these decisions is long past; it is time now to focus on continual improvement on our current systems, while still fielding new systems like THAAD and Integrated Air and Missile Defense Battle Command System. PAC-3 improvements are funded and forthcoming, to include radar upgrades and modernized man stations, as well as forecasted improvements in communications and the delivery of the missile segment-enhanced missile.

C-RAM improvements in both mobility and radars are also forthcoming, and the Army acquisition executive recently approved the Acquisition Decision Memorandum for the follow-on to C-RAM, the Indirect Fire Protection Capability Increment 2. Fielding and training of our THAAD batteries continues at Fort Bliss, Texas, as we strive to meet combatant commanders' requests around the globe.

The linchpin for our future is the development and fielding of the Integrated Air and Missile Defense Battle Command System. This system will give the air defense Soldier mission command commonality in tactical operation centers, engagement operation/force operation nodes and ADAM cells. The IBCS must allow us to overcome the sectored limitations of PATRIOT and give us a 360-degree engagement capability on the Integrated Fire Control Net. It will allow the air defender to conduct preferential engagements whereby the best weapons-target pairing occurs, optimizing the sensor and shooter selection against the in-bound threat, destroying it as far from the asset as possible. As budgets and resources shrink, as we field new systems and train new Soldiers, and as air defense missions grow even more complex, we must continue to show the ADA commitment – to the fight, to the force and to the future. One final thought – always keep in mind another area of ADA commitment, namely, ADA commitment to the Fires community. With our move to Fort Sill complete, we see our ties between the air defense artillery and field artillery branches become tighter than ever. Combined Pre-Command Courses, increased cooperation between Area Air and Missile Defense Command's deployed brigades, and BCD's, C-RAM operations that bring together elements from both branches, and the fusing of officer and NCO talent at the Fires Center of Excellence staff and directorates, have made for a richer and broader development experience for both. I challenge you to find your Fires brethren wherever you are and share experiences – all under the watchful eye of Saint Barbara!

SSG Jessica Ray sights in a stinger missile on virtual enemy aircraft at the Joint Fires Multipurpose Dome, Fort Sill, Okla., as SSG John Anderson points out targets and helps her fire accurately. Ray became the first woman to graduate from the Avenger Master Gunner course. (Photo by James Brabenec, U.S. Army)

Fires change of command ceremonies

September 2011

III CORPS Chief of Staff
Incoming commander: COL Michael Bowers

Sept. 1, 2011

4th Battalion, 42nd Field Artillery Regiment
Outgoing commander: LTC Craig Berryman
Incoming commander: LTC Dave Chiarenza

Sept. 21, 2011

108th Air Defense Artillery Brigade
Outgoing commander: COL Christopher Spillman
Incoming commander: COL Sean Gainey

Sept. 30, 2011

1st Battalion, 76th Field Artillery Regiment
Outgoing commander: LTC Ryan Laporte
Incoming commander: LTC Lee Overby

Oct. 5, 2011

4th Battlefield Coordination Detachment
Outgoing commander: COL Thomas Kelly
Incoming commander: COL Ben Matthews

Oct. 5, 2011

2nd Battalion, 20th Field Artillery Regiment
Outgoing commander: LTC Brian Hammer
Incoming commander: LTC Ernest (EJ) Karlberg

November 2011

4th Battalion, 5th Air Defense Artillery Regiment
Outgoing commander: LTC Douglas White
Incoming commander: LTC William McKnight

December 2011

3rd Battalion, 43rd Air Defense Artillery Regiment
Outgoing commander: LTC Douglas Waddingham
Incoming commander: LTC Joshua Moon

December 2011

4th Battalion, 320th Field Artillery Regiment
Outgoing commander: LTC Andrew Rendon
Incoming commander: LTC John Bowman

Dec. 6, 2011

5th Battalion, 82nd Field Artillery Regiment
Outgoing commander: LTC Robert Magee
Incoming commander: LTC William Johnson

Change to the 2011 Fires Bulletin Photo Contest: The deadline for photo submissions has been extended to Oct. 14, 2011. Voting will begin on Oct. 15, 2011 through Nov. 1, 2011 and be held on the Fires Center of Excellence Facebook page: https://www.facebook.com/FiresCenterofExcellence

Correction: Fires Bulletin July-August 2011, page 70 misidentified the second and third place photos. The captions should have read, "bottom left, second place, actual combat, photo taken by 1LT Mattew Spartz, and bottom left, third place, actual combat, photo taken by SPC Joseph Gallegos."

(Photo by Jason Kelly, U.S. Army)

Fort Sill remembers GEN Shalikashvili as Fires warrior

By Kevin Young

When you look back at a Soldier's service record, it seems to march forward like a unit in parade. While the records seem built of similar assignments and duties, each of those biographies takes a unique route as the Soldier marches on. The career path comes to reflect the qualities of the person behind the uniform.

In looking at the life of John Malchase David Shalikashvili, the retired Army general who died July 2011, you get the sense he was a man ahead of his time. Though he was forged in the furnace of the Cold War, his career 'quirks' helped make it unique and worthy of emulation by the modern Fires warrior.

GEN John M. Shalikashvili, then-chairman of the Joint Chiefs of Staff, is surrounded by Soldiers operating on Sword Base, Mogadishu, Somalia, Dec. 19, 1993, during his tour of United Nations Operations in Somalia II operations. (Photo courtesy of the U.S. Army)

"GEN Shali," as he was known throughout the military, was born in Poland in 1936. His father, a Georgian cavalry officer, fought in a World War II ethnic Georgian Legion, commanded by the Waffen SS, to liberate Poland from the Russians. When the advancing Russian army threatened Warsaw, the family was relocated to a small Bavarian village in Germany to live with wealthy relatives. In 1952, the family emigrated to Peoria, Illinois.

The younger son, John, who was fluent in Polish, German and Russian, was enrolled at Central High School and had to learn English on the fly. Reportedly, he improved his English by watching John Wayne films and westerns. Officially a 'stateless person,' he was proud of the fact that he was solely a citizen of the United States of America. In 1958, he graduated from Bradley University with a degree in mechanical engineering. He was drafted into the Army that year and was chosen to attend Artillery Officer Candidate School at Robinson Barracks at Fort Sill, Okla.

GEN Shali went on to hold many assignments that were the norm for a successful field artillery officer of the Cold War era (this list does not include all his assignments):

- Forward observer and platoon commander, Mortar Battery, 1st Brigade, 9th Infantry Division, Alaska
- Senior advisor, Trieu Phong district, U.S. Military Assistance Command, Vietnam
- Commander, 1st Battalion, 84th Field Artillery, Fort Lewis, Wash.
- Commander, Division Artillery, 1st Armored Division, Germany
- Commanding general, 9th Infantry Division, Fort Lewis, Wash.
- Supreme Allied Commander-Europe, Mons, Belgium
- His last assignment was as chairman of the Joint Chiefs of Staff, Washington, D.C., appointed by President Bill Clinton in 1993. He served as the chairman until his retirement in 1997.

And yet, this was a unique man who would come to personify the modern Fires warrior before that mold was even conceived by Army planners. His career path included assignment as an instructor and staff officer at the U.S. Air Defense Artillery School at Fort Bliss, Texas, in the 1960s. Though the ADA did not exist as a separate branch until after he left the school, the two 'artillery branches' definitely had their separate ways and officers might move from one side of the coin to the other, but still retained their field artillery or air defense artillery mind sets.

He next traveled to Germany to serve as a battery commander and operations officer with the 32nd Army Air Defense Command until 1967. After attending the Naval War College and a tour as a military advisor in Vietnam, he returned to the field artillery.

His ability to move from one artillery branch to another reflected his ability to see things outside of his specialty - the 'big picture.' It was one of the ways that GEN John Shalikashvili made an indelible and unique imprint upon the Army, the Fires community and the individual American Soldier.

GEN Raymond Odierno becomes the US Army Chief of Staff

By Army News Service

Secretary of the Army John McHugh administers the oath to GEN Raymond Odierno during a change of responsibility ceremony at Joint Base Myer-Henderson Hall, Va., as Odierno's wife Linda looks on, Sept. 7, 2011. Upon completion of the oath, Odierno became the Army's 38th chief of staff. (Photo courtesy of the U.S. Army)

GEN Raymond Odierno was sworn in Sept. 7, 2011, as the Army's 38th chief of staff during a ceremony on Joint Base Myer-Henderson Hall, Va., near the Pentagon.

"I am humbled and honored to serve as the 38th chief of staff of the Army," Odierno told the crowd assembled in Conmy Hall.

"This weekend is the 10th anniversary of 9/11. And I would just say that over the last 10 years, our Army has proven itself. Inarguably, [in] the most difficult environment this nation has ever faced. Our leaders of every level have displayed unparalleled ingenuity, flexibility, and adaptability. Our Soldiers have displayed mental and physical toughness, but most importantly, courage under fire.

"They have transformed the Army into the most versatile, agile, rapidly deployable, sustainable, strategic land force the world has ever known. I am proud to be part of that army. And I am proud to have the opportunity to continue to serve with these great men and women -- the next greatest generation." Odierno now takes on responsibility for training, equipping, maintaining and sustaining an Army of more than half a million Soldiers.

A native of New Jersey, Odierno graduated from the U.S. Military Academy at West Point, N.Y., in 1976 with a commission in field artillery. During more than 34 years of service, he commanded units at every echelon, from platoon to corps, with duty in Germany, Albania, Kuwait, Iraq, and the United States.

Odierno served as commander, Multi-National Force-Iraq from September 2008 to December 2009. He then continued to serve as commander of the United States Forces-Iraq, from January 2010 to September 2010.

Most recently, he served as commander of U.S. Joint Forces Command, where he oversaw the organization's role in joint concept development and experimentation, joint capability development, joint training, and force provision and management. U.S. Joint Forces Command was disestablished Aug. 31, 2011. Odierno assumed responsibility for the Army from GEN Martin E. Dempsey, who after serving five months as the Army's chief of staff, will move on to assume new duties as the chairman of the Joint Chiefs of Staff following the Sept. 30, retirement of Adm. Mike Mullen.

While Dempsey's tenure as the chief of staff was short, he said he's proud to have served.

"My brief tenure as CSA has produced a lifetime of memories," Dempsey said. "I now have a vocabulary of abstract words brought to life. Courage, determination, and commitment brought to life in places like... well, actually, brought to life wherever you find Soldiers and their families."

Link to GEN Odierno's initial thoughts as the 38th U.S. Army Chief of Staff: http://usarmy.vo.llnwd.net/e2/c/downloads/219032.pdf

Targeting: A process for wizards or methodology for patriarchs?

Counterinsurgency vs. full spectrum operations: The fight within the fight

By CW3 Tommy S. Green

Soldiers from the 428th Field Artillery Brigade practice guiding air support to targets on the ground. They were inside the Urban Terrain Module as part of their training at the Joint Fires and Effects Trainer System, Dec. 2, 2009, in I-See-O Hall at Fort Sill, Okla. (Photo by Marie Berberea, U.S. Army)

Utter the word in military circles "targeting," and then ask someone to define it. You will get as many definitions as you have people in the target audience, no pun intended. While some may get close to the mark with their proffered definitions, most will be wrong. All will be influenced by their particular function and the perspective it offers them. Unfortunately, an inability to define targeting affects its usefulness and acceptance by the same audience. To compound the problem, the shifting from a military that was historically focused primarily on high-intensity conflicts to a more adaptable force that must achieve multiple operational end-states, continues to overcomplicate the meaning of targeting.

Our operations today certainly exacerbate this confusion. New generations of military officers and noncommissioned officers, as valuable and experienced as they are, have developed a vision of targeting and planning that is entirely counterinsurgency focused. This proves to be problematic at every staff level with the inevitable shift of our focus back to major combat operations. Furthermore, the current planning skill-set is inadequate at best. For field artillerymen in particular, 10-year groups of officers

have never planned, rehearsed, or executed, "echelonment of Fires," which leads to my next point that some believe targeting is 'old school,' the stuff patriarchs like to talk about in revered tones, and therefore of little application in today's environment and contemporary planning methodology. Some believe targeting is a process unto itself; one that is best divided between meat-eaters (lethal) and leaf-eaters (non-lethal) practitioners. Again, everyone is partially correct; all are equally wrong, but the sum of all the parts is rarely balanced. Targeting remains central to our planning, coordination, and synchronization of military operations, regardless of type. The Joint Readiness Training Center, Operations Group, Fire Support Division maintains basic targeting skills remain valid and relevant in current and future operations. Moreover, targeting is neither a realm solely for wizards peering into crystal balls, nor patriarchs longing for the comfort of a linear battlefield. Targeting is for you, the military officer and NCO, who has to identify a problem, make a decision, and then apply a solution; in essence, targeting is a doctrinal 'problem-solving process,' one that is complicated and three-dimensional.

Targeting and the military decision making process. Are the terms targeting and military decision making process synonymous or different? In the easiest of explanations, targeting is an extension of MDMP, not a separate or diametrically opposing process. If I throw a ball in the air, an opposing force, gravity works to pull it back to earth. This is not the case with MDMP and targeting, which work in unison (reciprocating the efforts of each) to achieve effects on the battle field; much like the camshaft and crankshaft work together in sequence to produce power in an engine (synchronous). Senior leader confusion about that fact, at the battalion and brigade, has muddied the waters when it comes to the targeting process. Some see targeting as a purely kinetic means of attacking enemy high value targets. Others, given their recent experiences, are in the manhunt mode: targeting to capture or kill high-value individuals.

To look at it from a non-lethal perspective, an example may be: identifying key leaders who must be engaged to collectively or individually influence or compel them to support the central or provincial government. Yet others, especially artillerymen, offer a more doctrinal answer like, "the targeting methodology is time-tested and is based on the, decide, detect, deliver, and assess function performed by the commander and staff in planning and executing targeting."

As I said in my opening, all are partially correct, and in sum; totally wrong unless viewed as a systematic approach to problem solving by combining lethal and non-lethal efforts against each target.

"It is important to understand that there are only TARGETS, all of which have lethal and non-lethal concerns; they must be at the forefront of our critical thinking process in order to ensure that we are achieving the DESIRED effects," said CW3 Tommy S. Green, JRTC Operations Group, Fire Support Division.

No wizards, no patriarch. Targeting applies the decisions arrived at during continuous MDMP. Offering definitions like those above implies targeting is a separate, distinct, and a quasi-mystical experience attended by a limited number of magically talented wizards with the necessary 'vision' to see the future: hardly.

If MDMP is continuous, so is targeting in one form or another. Targeting and the targeting process help:

- Support the commander's decisions
- Determine which targets to acquire and attack
- Determine lethal or non-lethal options
- Determine what assets to use and when
- Identify information requirements
- Determine results in combat assessment requirements

These points apply in COIN as well as major combat operations; especially the former, which requires immense assessments and the application of cerebral energy to determine success or failure. They are not, therefore, the sole purview of patriarchs or wizards. Targeting had the same role before 9/11 as it does today, and in all likelihood it will have the same role in 2020.

Regardless of the acronym of choice (D3A; Find, Fix, Exploit, Analyze, Disseminate F3EAD; Find, Fix, Track, Target, Engage, Assess F2T2EA), the variables (inputs/outputs) are different, but the process remains the same; the paradigm rests in the execution, not the process. The final result being a network based approach using center of gravity analysis to determine how, when, and where to apply the appropriate level of combat power and influence.

Modularity made changes. So, if targeting has not changed in its function, what has changed to increase the challenges of targeting effectively? Look no further than modularity, as in the days of the 'patriarchs,' the brigade combat team was tied by a logistical, intelligence and operational umbilical cord to its parent division. Even in linear conventional or force-on-force operations, the pre-modular BCT needed significant enhancements from the divisional pool of assets making it combat ready. When it actually received those assets, the pre-modular BCT staff was severely challenged in using and integrating them effectively.

Modularity answered some of the problems even as it created a new set. The umbilical cord has in some cases, been shortened or eliminated, but the planning challenges remain. A modular BCT has within its permanent structure an amazing array of enablers allow it to function as a pocket division. Theoretically, the modular BCT can use those fully integrated capabilities to synchronize joint operations across the operational environment.

The addition of these enablers

within the brigade means the staff must understand their capabilities and how to best use them to achieve their operational end state. Doing so meant increasing the size and complexity of the BCT staff and adding additional command and control capabilities inherent in an organic Fires battalion, an organic brigade support battalion and a brigade special troops battalion.

The four 'mores' of modularity. More assets, more staff, and more command and control do not necessarily mean better; synchronizing all of these enablers is where most of the friction lies. Targeting and planning allows the staff to visualize, allocate and synchronize these assets to affect operations and provide the assessments and feedback needed for future target development. Implied in those new found capabilities is the need for more communications to tie it all together. More, better, encore!

The Joint Readiness Training Center recently conducted the first, full spectrum operations rotation in eight years. It was, therefore, the very first FSO rotation for a modular BCT. This was the first time a modular BCT staff had to control, coordinate and synchronize a moving fight against a hybrid enemy, capable of challenging the BCT in a stand-up fight; as well as, having influence on the government, local population etc. It was also the first time the modular BCT used the integrated Army Battle Command Systems that were just emerging at the time of 9/11, and then adapted to the fights in Iraq and Afghanistan in a more mobile role.

The commander and the staff plan for the fight, and if they plan well, will use that plan to frame the fight against the enemy. Modularity and its four 'mores' (more assets, more staff, more C2, and more communications) made the BCT's ability to conduct sustained operations problematic. In particular the last 'more' was too much. The integrated ABCS architecture, so successful for low-intensity operations, proved less advantageous in an FSO fight. More communications became its own control issue for commanders and staffs already challenged to control more assets, more staff, and more command and control.

In the end, more does not automatically translate to enhanced unity of command, or a unity of effort. Determining which Army Battle Command Systems to integrate in the early stages of the operation required intense planning to ensure units could collaborate effectively and continue the fight. This was especially true in transitions between high-intensity operations to stability operations.

We found lack of planning in this critical realm disrupted the BCT's operations, particularly its ability to sustain the targeting effort from brigade to battalions within the ABCS structure. In other words, vertical collaboration became the 'Achilles heel' in efforts to synchronize operations and forced the staffs to become crafty to create a common operating picture across all echelons.

More to do, less time to do it. If the BCT had more to do, it had less time to do it in. Even as units struggled to bridge ABCS gaps with other units, the BCT as a whole never managed to get a suitable 24-hour targeting cycle in play, to facilitate planning and operations. Units were accustomed to operating in a one or two week targeting cycle currently in use in both current theaters of operations. Quite frankly, as trainer/mentors, we struggled with the same issue as we tried to assist the units in cementing an effective 24-hour cycle.

There were many lessons in this rotation, and targeting was at the forefront. It was not a clear cut case of shifting from COIN and steady-state operations in a mature theater, to full combat operations against a peer enemy; FSO meant operations against a hybrid threat. In essence, targeting an enemy that was disrupting operations, while maintaining COIN overtones to gain populace support, and to help build a legitimate government within a shorter time frame was a daunting task that will take precious time to evaluate; and comprise intelligible solutions to navigate this myriad of obstacles. What we found was this is not an easy task for anyone, especially since most of the recent operations are planned in cycles extending as far as two weeks. This type of concept had yet to be executed in today's Army and was a learning point for everyone. The lessons learned will be invaluable stepping stones for future FSO rotations and will provide valuable training mechanisms for operations of the future.

Filling the gaps. Our take away as trainer/mentors in all of this was the targeting methodology remains valid. The FSO rotation identified multiple gaps; the methodology — just like any process or plan — must be modified as necessary to meet such challenges. We continue to coach a standard model for staffs to use that will help facilitate their planning, and rely primarily on a four meeting model establishing the necessary vehicles for target development, refinement, and execution.

Within this concept we focus on the assessment working group as part of mission analysis, pre-targeting meeting in course of action development, targeting meeting as part of war gaming and commander's decision brief. Our concept is just a way to get, identify, and resource problem sets. Most units develop their own model and that is OK — as long as they are prepared to modify it in meeting operational needs.

We are omnivores. Some tactics, techniques, and procedures are less satisfactory. Remember my reference to meat-eaters and leaf eaters? Most units separate lethal and non-lethal targeting and the division is both artificial and self-limiting. Lethal targeting is not just for carnivores and non-lethal is not just for herbivores. The successful commander is an omnivore, who takes advantage of all opportunities, lethal or non-lethal, to achieve his desired end state. Separation of a staff into lethal and non-lethal working groups creates gaps within their operational framework and degrades their ability to synchronize their efforts. It essentially kills the

staff's ability to fuse efforts across all warfighting functions and wastes their time by duplicating processes. As targets migrate through the process through the various meetings and working groups, if we separate our staff too much, they lose visibility of how they are providing mutual support for each target.

"It only takes one bullet for a non-lethal event to become lethal," said MAJ Jason C. Foote, JRTC Operations Group, Fire Support Division. "So what have we done to prepare for this situation?" This concept is difficult for inexperienced staff members; separation is seductively attractive yet unfulfilling. Ultimately, it is dangerous as it de-synchs the unit's operations. If the BCT identifies an HVI that must be targeted to enforce security or eliminate a threat, the typical staff response is, this is a lethal target; give it to the carnivores. Such a response completely ignores the non-lethal aspects of the same target and does nothing to foster the network approach to targeting. How do you shape the target via non-lethal means, or how do you exploit the success after the mission? Fusion of lethal and non-lethal applies in FSO as well. Whether the mission calls for an attack or a defense, how do you address non-lethal concerns before, during, and after the mission is complete? The unit that does not fuse lethal and non-lethal planning in FSO is doomed to spend much time reacting to consequences rather than capitalizing on them.

Ask not who targets but whom and why. The question, "is the targeting process for wizards or a methodology for patriarchs?" can be answered with a simple — yes. As stated in the introduction, targeting is for everyone; it is as natural as problem solving. The real questions that need to be asked flows from mission analysis: "What is the mission? What are we targeting, and why?" Transformation aside, targeting remains nested within the framework of the command decision and planning cycle.

Field Manual 5-0, outlines planning as: "Planning is the process by which commanders (and the staff, if available) translate the commander's visualization into a specific course of action for preparation and execution, focusing on the expected results (FM 3-0). Put another way, planning is the art and science of understanding a situation, envisioning a desired future, and laying out an operational approach to achieve that future. Based on this understanding and operational approach, planning continues with the development of a fully synchronized operation plan or order that arranges potential actions in time, space and purpose to guide the force during execution. Planning is both a continuous and a cyclical activity of the operations process. While planning may start an iteration of the operations process, planning does not stop with production of an order. During preparation and execution, the plan is continuously refined as situational understanding improves. Subordinates and others provide feedback as to what is working, what is not working, and how the force can do things better. Planning may be highly structured involving commanders, staff, subordinate commanders, and others to develop a fully synchronized plan." Regardless of whether our Army finds itself storming the shores of Normandy, seizing an airfield in Panama, pushing an invading Iraq out of Kuwait, or taking on the challenge of rebuilding a government from ruins, the problem-solving process we have used for each of these dynamically different scenarios is a version of the decision making and targeting process. The end results are functions that are not mutually exclusive, but are complimentary and support the ability of the commander to make determinations throughout his decision cycle.

The JRTC fire support division approach to targeting. As Yates states in the lead quote of this article, "The targeting (or cyclical planning) process is nothing more than a way to focus limited resources at the right time and place." The above statement simplifies the definition of targeting and captures the JRTC Fire Support Division approach to targeting. It embraces the idea that decision cycles must be embedded to act on issues within a continuous planning cycle while identifying those key steps within any given network in which the application of force or influence is necessary. The problem-solving process is straight forward and requires identifying how, when and where we want to affect change within our operational environment, and how to achieve effects that cause change across the full spectrum of operations.

"A Spectrum of threats applied against each LOE focuses the targeting efforts. The enemy of today is not uniform and can NOT be easily identified. It is important to interdict the threats which can prevent accomplishment of our Commander's end state".

-CW4 Jimmy A. Gomez

The difficulties lay in determining if the effects of our decision making have helped or hurt us in achieving our end state. Doctrine, per Joint Publication 3-0 states, "Targeting is the process of selecting and prioritizing targets and matching the appropriate response to them, considering operational requirements and capabilities." That definition essentially stops at the point of execution, offering nothing about assessing the effects of the action taken, whether lethal, non-lethal or a combination thereof.

Assessments, not assumptions. Although the current model of decide, detect, deliver and assess does incorporate assessments and

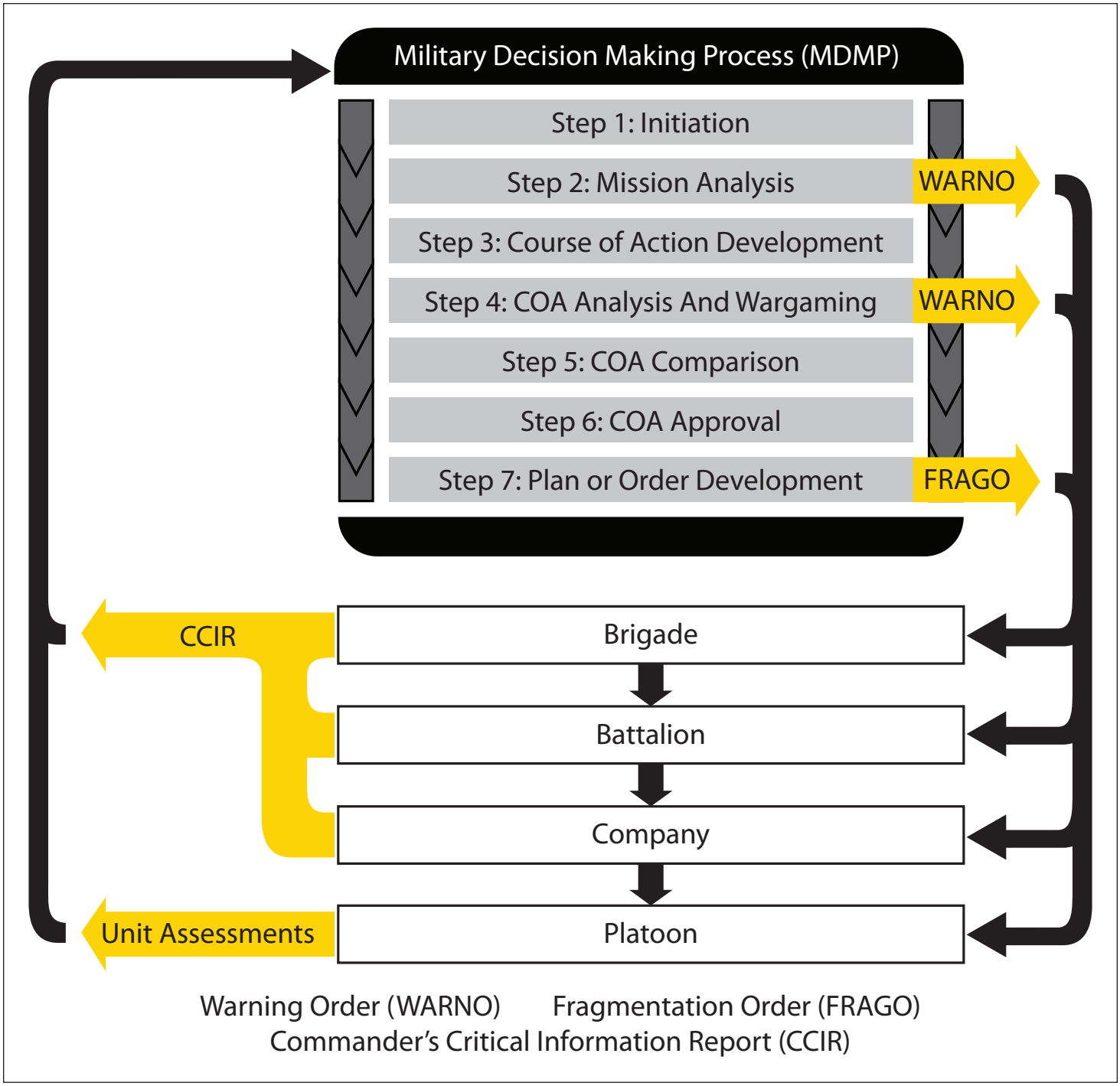

Figure 1: The logical cycle of the military decision making process.

feedback within the cycle itself, JP 3-0's definition doesn't necessarily lead us to the same result. That shortfall is critical; the old saying, "the job's not complete until the paperwork is done," applies. Targeting has many challenges, including locating, identifying and engaging the selected target. No commander, however, has unlimited assets, not even in our modular BCTs. Post strike/engagement assessments are critical in two aspects: the first is assessing effects to determine if the desired results were achieved; the second is to husband or mass resources as necessary based on the assessment.

Detailed guidance and planning, to include violent, surgical execution, helps prevent many of these complications and make the most of our combat power. To further define the current targeting model, the JRTC Fire Support Division uses the assessment working group to identify our problem sets and conduct a formal, mission analysis for a specified time period. Once we have identified our problem sets and where the critical vulnerabilities lay within a given network, the next steps are to develop courses of action

to allocate resources and war-game them in time and space against other competing targets, as well as enduring operations, which affect the same execution cycle.

According to the patriarchs, this was conducted over a 24-hour period in a conventional fight. Counterinsurgency allows a longer cycle of one to two weeks, depending on unit, mission, and theater. Full spectrum operations against a hybrid enemy may allow us to lengthen our planning timeline, 72-hours to two weeks, depending again on the mission, the enemy, and other factors of METT-TC. Longer cycles allow for a more robust analysis and allocation cycle, to ensure we are meeting the desired end state(s).

Figure 1 shows the logical cycle of the MDMP and how the commander's critical information requirements and lines of effort tie it all together. We use these as our roadmap throughout MDMP to guide us along our targeting objectives to ensure that when assessments are conducted, they are used to determine change along the campaign plan. The process may seem simple enough; however, vertical collaboration with our higher headquarters and subordinate units is critical. This collaboration enhances our ability to assess change and improve the targeting effort. More often than not, our collaboration piece of the fight is broken, preventing us from measuring success or failure. In the case of the FSO rotation, the disruption within the ABCS disrupted targeting.

Assessments and analysis are continuous. Assessments close the gaps between targeting cycles. They essentially help drive future target development and determine whether or not the actions we are taking as a force are appropriate for the desired end-state. Close collaboration, use of running estimates and careful analysis of the enemy situation synchronize our efforts in COA development and war gaming. They determine our ability to assess our operating environment.

We use assessments to predict change to our campaign plan, and to determine the appropriate matrix that support our targeting objectives. The forms most common are measures of effectiveness and measures of performance.

Each of these have quantifiable/quantitative indicators that, when used correctly, allow us to judge how we, as a force, are doing. Most BCTs struggle with this concept; they have difficulty articulating the outcome of previously executed targets and determining whether the outcome was successful or had a negative impact on the desired end state. That, in turn, limits their ability to make informed refinements to their targeting effort, particularly with regards to the commander's critical information requirements, targeting priorities, high-payoff targets, campaign plan and other aspects of the campaign plan.

Analysis to support assessments is an art. It provides the level of fidelity necessary to drive the targeting process. As depicted in Figure 1, assessments feed the decision-making cycle and keep us on course. The bottom line is, assessments provide the catalyst for the decision-making process at every step in the cycle. We have to ask ourselves whether we are aligned correctly with manpower and time in our battle rhythm. Key issues in question include:

- Does the battle rhythm support our ability to conduct solid assessments?
- Do we understand our duties and responsibilities?
- Who conducts assessments?
- Do we have a forum where we can share information with our subordinates? (Net Calls, Commander's Update Brief (CUB), BUA, rehearsals, etc.)
- Do our collaborative tools/platforms facilitate cross-talk and knowledge management?

These questions may seem simple; they are easy to wave off, however, if a unit really wants to 'see itself,' the answers are much less facile, as all of these areas play a critical role in determining success in achieving our desired effects. They become even more challenging to answer positively when the time to synchronize the four 'mores' is compressed by a shift from COIN to FSO.

The commander and the staff: no wizard, no crystal ball. The staff's abilities to take a holistic view of the past, the current situation and predict the future, enhance the commander's abilities to make sound decisions, give cogent guidance and establish realistic priorities. Staffs must, therefore, paint a clear picture for the commander. The first step is to understand the commander's priorities (lethal/non-lethal); that understanding should frame how the staff articulates what they want to target, in consonance with the campaign plan, the commander's critical information requirements, and established targeting objectives. This is how a staff achieves a common visualization of the overall fight.

Establish a common vision. Most BCT staffs struggle getting to this point. They never really understand how they are supporting the maneuver commanders. Measuring success or failure, (assessments) allows the staff to provide the predictive analysis necessary to drive future targeting, determine critical gaps in planning, and avoid friction points that will stifle operations. It starts with a common visualization of the operating environment, determined by the ability to achieve situational awareness and situational understanding. The staff must share and understand that visualization before planning can begin. They must determine the following, prior to moving forward in the planning process:

- Threat
- CCIR
- Operations
- Priorities
- Target nominations
- Campaign plan shifts
- Assessments

Adjust that vision constantly. At this stage, the commander should be able to provide clear, concise guidance to the staff. His guidance steers the staff's targeting against the campaign plan. In the AWG or mission analysis phase, the

staff defines the problem and seeks appropriate inputs from battalions that will ultimately feed the working groups. Once the staff has finished war gaming and have synchronized enablers against all the competing targets, it looks ahead and proposes certain questions pending target execution:

- What was our desired end-state?
- What was the outcome?
- Was the target fully exploited? If so, what does it mean?
- Did the action succeed or fail? Why?
- What measures are we using to assess? (MOE/MOP)
- How does the success or failure drive Decision Points (DPs)?

Front loading these questions before execution helps focus the staff on what they should gather to assess targeting along all lines of effort.

The warfighting function masters. The deputy commanding officer and/or executive officer, along with the fire support officer, intelligence officer and targeting officer play key roles in the targeting and planning process. They guide successful execution of targets and ensure subordinate units are primed for success prior to conducting operations.

This is not to say other staff officers are not important; they are. These particular staff officers, however, provide a WFF foundation for the planning staff. Any holes within these WFFs will reflect as gaps in the process, and below are excerpts of the vast span of duties and responsibilities of each.

Either the deputy to the commanding officer or the executive officer provides the command and control to organize the staff and make decisions on behalf of the commander. They enforce the commander's guidance and targeting priorities and manage the campaign plan to ensure the BCT is targeting in accordance with the commander's operational end state. Without this seat filled, the staff would lack the necessary direction and would be unable to make sensible recommendations for future targeting. The FSO is an equally important member of the planning staff. He is, essentially, the conduit between lethal and non-lethal Fires planning. His responsibilities go beyond that of just fire support; he ensures the staff, as a whole, understands all aspects of Fires planning, preparation, and execution for BCT operations. The FSO is the engagement and attack guidance manager for the commander, and guides the staff in targeting according to priorities set in the commander's fire support tasks. The FSTs establish the way ahead for task accomplishment for the various problem sets.

The S2 manages the intelligence, surveillance and reconnaissance plan as the cornerstone for most operations. Without S2 involvement in the targeting and planning process, the 'decide and detect' portions of the targeting model suffers. Most information is funneled through the intelligence section; their ability to look through the enemies' eyes helps the commander determine decision points in target execution.

Lastly, the targeting officer is the binder for the planning staff. His span of involvement reaches across the entire staff, as well as to subordinate units. In simpler terms, he is the bridge between intelligence and operations. Doctrinally, the targeting officer works closely with the S2, to facilitate the exchange of information, but the duties and responsibilities have grown significantly. He may be involved in portions of information operations and civil military operations. The ability to multi-task and speak the language of all the WFFs, make this position on the staff crucial in helping solidify the staff's efforts and ensuring they are targeting along the C-Plan by adhering to the established targeting objectives.

These duties are only a sample of the vast responsibilities these key positions entail, but this snapshot shows the importance of these key individuals. The remaining staff members are equally important, but many times are not filled causing one of the mentioned WFFs to fill this role.

To take a final look at what targeting really is, it is tactical problem solving. Quite simply, it is the marriage of MDMP and targeting. This concept has not changed with the move from HIC to today's COIN fight, and will remain just as relevant in future FSOs. Targeting and MDMP together prevent staffs from falling into a 'fire and forget' mentality that plagues so many units by not assessing the outcome of all operations and target execution. All of this is called targeting, planning and cyclical MDMP. It integrates a holistic view of the targeting construct, integrated with intelligence preparation of the battlefield along all lines of effort. The solutions emerge in the various targeting meetings to align targeting and MDMP on the course the commander has set, to reach his desired operational end state, and more often than not, the problem lay not in the process itself, but the institutional understanding of doctrine.

Editor's Note: CW4 Scott McKnight, program manager, Warrant Officer Education System and CW4 Jimmy A. Gomez, 131A senior instructor/course manager, both from Fort Sill, Okla., contributed to this article.

Chief Warrant Officer 3 Thomas S. Green, U.S. Field Artillery, is the senior targeting observer/controller at the Joint Readiness Training Center, Fort Polk, La. Previously, he served as the targeting officer for the 2nd Brigade Combat Team, 1st Infantry Division, Fort Riley, Kan., and deployed in support of Operation Iraqi Freedom. He also served as the targeting officer for the 3rd Brigade Combat Team, 1st Armored Division, Fort Riley. Prior to his time in 3-1 AD, he was assigned as the Golf Battery executive officer, the brigade targeting officer for 1st Brigade Combat Team, 1st Infantry Division as part of the military transition team training mission. He deployed and was assigned as a target acquisition detachment commander as part of 18th Field Artillery Brigade, in support of OIF. Additionally, he served as the radar section leader, and then the brigade targeting officer for 1st Brigade Combat Team, 1st Infantry Division deployed, also in support of OIF.

Joint Fires observer:
Shouldn't be 'on the job' training

By Sharon McBride

PFC James Kelley, 3rd Squadron, 61st Cavalry Regiment, 4th Brigade Combat Team, scans the side of the mountain for any potential threats as SPC Andrew Ewart provides security in Nishagam village, Konar province, Afghanistan. (Photo by SPC Evan Marcy, U.S. Army)

In October 2009, 1LT Cason Shrode, Bravo Troop, 3rd Squadron, *Destroyers*, 61st Cavalry Regiment, located at Command Outpost Keating, Afghanistan, found himself in a vicious fire fight that claimed eight U.S. Soldiers lives, and wounded 21 others.

As the combat outpost's Fires support officer, Shrode was a certified joint Fires observer. Today he is a captain; currently the battery commander of Alpha Battery, 1st Battalion, 79th Field Artillery at Fort Sill, Okla. Looking back on that day, he said, earning a JFO certification prior to deployment is what made the difference in minimizing friendly and civilian casualties, despite facing hundreds of insurgents from multiple firing positions, and ultimately led to the neutralization of enemy forces.

"There's no doubt without the layers of air support we received it would have turned out quite differently," Shrode said. "Without our JFO training, we wouldn't have been able to handle the situation that day."

This situation and lessons learned from similar fire fights in Afghanistan, is the reason why BG Thomas S. Vandal, commandant, U.S. Army Field Artillery School, is currently working an initiative that will add JFO academics, including the JFO online course, to the Basic Officers Leader Course program of instruction. Additionally, with this initiative, every BOLC graduate with follow-on assignments to brigade combat teams will have the opportunity to complete JFO certification as an assignment oriented training course following graduation.

This pilot JFO AOT initiative is scheduled to begin in January 2012 with BOLC class 7-11. Currently, the JFO is offered as an additional skill identifier course (L7) for 13Fs

Two Soldiers from 3rd Squadron, 61st Cavalry Regiment, keep an eye out while performing guard duty in Afghanistan. (Photo by SSG Christopher W. Allison, U.S. Army)

or fire support specialists as well as for company fire support officers/NCOs, platoon forward observers, combat observation lasing teams and members of scout/reconnaissance organizations.

Typically, it is the U.S. Air Force joint terminal attack controllers who work alongside Soldiers to control precision air strikes, close air support and other offensive air operations. By the recently signed Army/Air Force liaison support memorandum of agreement, tactical air control parties are in direct support to each U.S. Army corps, division, brigade combat team and each BCT maneuver battalion. These TACPs will have a minimum of two JTACs for each corps, division, BCT and maneuver battalion. Additionally, the Air Force is to provide one JTAC at the maneuver company/troop level.

While current in-theater mission demands for JTACs are being met, the JFO is a significant force-multiplier, which has enhanced the maneuver commander's access to both joint and organic indirect Fires through the integration with the high demand/low density JTAC population and his inherent skill sets. Maintaining JFO training also costs less than JTAC training because 'live' exercises with sorties can be replaced with simulations for JFO certification training. The JFO extends the operational reach of the JTAC as his 'eyes forward' providing targeting data, to include coordinates for Type II and Type III CAS. JFOs, in conjunction with JTACs, are trained to assist maneuver commanders with the timely planning, synchronization, and responsive execution of close air support.

Shrode explained having several Soldiers, including himself, earn a JFO certification from Fort Sill, Okla., prior to deployment is what enabled his unit to turn the tide against hundreds of insurgents, who assaulted COP Keating, near the town of Kamdesh of Nuristan province in eastern Afghanistan, in 2009. The following is a brief synopsis of a firefight that lasted more than eight hours. The large coordinated attack began with rocket propelled grenade and machine gun fire at approximately 6 a.m., Shrode said. "The attack came from all sides. About 30 seconds into it, we knew it was bigger than a normal attack."

COP Keating was often the target of frequent, smaller attacks, he said.

"(The insurgents) watched how we fight – they monitored us for the first couple of months," he added. "They knew where our support was and our formations; they had us pinned down pretty good."

For the first 15 minutes, they were not able to return much fire, he said.

"As the fight continued to progress, they continued to pin us down," Shrode said. "The (Afghan National Army) who watched one side of

SPC Jacob P. Janowski, a squad designated marksman with 3rd Squadron, 61st Cavalry Regiment, Task Force Destroyer, pauses while returning fire against anti-Afghan forces with an automatic grenade launcher. The base, located in eastern Afghanistan's Kunar province, is often targeted by AAF in an unsuccessful campaign to drive Afghan National Security Forces and International Security Assistance Forces from the area. (Photo by SSG Gary A. Witte, U.S. Army)

the COP got skittish, and ended up taking off. Enemy forces started penetrating through that side."

Due to the heavy volume of fire, the entrance control point was breached as well. The ECP bore the brunt of the first wave of RPGs, he said.

"We had (insurgents) coming in from two different places; so we condensed down to one building," Shrode said.

So Shrode, in the alternate tactical operations center because the primary one was on fire, along with a fellow officer, got on the net and started coordinating indirect fire support as well as CAS with JTACs, who were located at a FOB more than 20 miles away.

"CAS showed up about 20 minutes into it," Shrode said.

Once a close air support 9-line went up, F-15E Strike Eagles rolled in and started taking care of business, Shrode said. Then the helicopters showed up. UH-64s wiped out more insurgents.

"With the help of the close-combat attack and the jets dropping bombs, we retook the COP," Shrode said. After more than eight hours of fighting on the ground and bombing and strafing from Air Force and Army air assets, nearly 100 militants were killed from the joint and combined response.

"JFO is by far the best training I've had in the military," Shrode said. "It made such a huge difference in combat."

The JFO program currently focuses on providing training that enables those who become certified to quickly and accurately provide the information necessary for JTACs to prosecute targets and avoid fratricide and unnecessary collateral damage.

For JFOs, knowing how to communicate to other services' air support is vital. It's not just about the English language but the specific JTAC terminology that goes along with close air support, Shrode said.

"The Air Force and their JTACS talk in a different language," Shrode said. "It's not really 'common sense' terms but very 'technical terms.'

"The two-week course, made me comfortable enough, so I knew what kind of information they were looking for, and I could use their terms in order to accurately relay information to neutralize the enemy," Shrode said.

Shrode provided additional lessons learned from the October 2009 fire fight.

Get JFO qualified. "It's good to have every FSO, FO – JFO qualified," Shrode said. "There might not be a JTAC on the ground. It's good to have people who understand the language, the system and how everything works together. Not only Air Force terminology, but Army terms as well. To get the kind of support you need in a jam, you have to be able to switch back and forth.

"As a JFO, you'll know what kind of information is needed, and the Air Force and Army can be a lot faster in dropping bombs and providing indirect/direct fire support," Shrode said.

Designate a net. "Keep a net designated to lead aircraft," Shrode said. "Initially we were trying to put indirect Fires and aircraft on

the same net. It made it too hard; keep them separated – designate a channel for each, it will streamline the process."

Better than a seven layer dip. When coordinated properly, a JFO in conjunction with a JTAC can coordinate several layers of air and ground support.

"We coordinated and relayed many air strikes with various aircraft at different levels," Shrode said. "We had so many assets in the air; we had eight layers. They were stacked on so many levels; we had everything we needed. It made a big difference that day."

Joint Fires observer certification minimizes collateral damages. Lessons learned from Afghanistan have shown those Soldiers with JFO certifications can turn the tide of minimizing collateral damage.

"The war we are fighting in Afghanistan – the difference is the JFO. They are highly utilized," Shrode said.

"Without a JTAC or a JFO on the ground it's extremely different for aircraft to drop bombs; its borderline impossible," he added. "A lot of the targets we are engaging now are close to friendly forces. It's important to have someone on the ground who can 'see' what the target area is; because technology often fails."

Gas up at different times. "When the (Air Force) would check in on the net as well as the Army, I made it a point to ask them about refueling," Shrode said. "Working with both jets and helicopters, we worked out a rotation on refueling (during the fight) – so that way they didn't have to refuel at the same time. We always had air coverage."

Preplanned CAS 9-lines. "On a stationary position – like a COP, it's good to have preplanned 9-lines on historic fighting positions," Shrode said.

In the Oct. 3, 2009, attack, insurgents were using positions they had previously attacked from, he added.

"So if we already had 'good-to-go' 9-lines set up for those positions, we could have had CAS sooner, and the fighting would have probably dropped off sooner," Shrode said.

JFO skills are adaptable. Joint Fires observers bring unique skill sets to the maneuver commander, are proficient at surface-to-surface call for Fires, naval surface call for Fires, AC-130 call for Fires, and close combat procedures – if he maintains his qualification. With this skill set, a JFO is truly a joint Fires observer.

"These skill sets are very flexible, and can easily be adapted to different operational environments. It is applicable for the Global War on Terrorism and it is good for any operational environment we may see in the future," Vandal said.

What does JFO training consist of? The JFO memorandum of agreement, that has been signed between the U.S. Joint Forces Command, deputy commander and U.S. Army, deputy chief of staff, G-3/5/7; U.S. Air Force deputy chief of staff for operations, plans, and requirements; U.S. Marine Corps deputy commandant for plans, policies and operations; U.S. Navy deputy chief of naval operations for information, plans, and strategy; U.S. Special Operations Command deputy commander; Joint staff, J8; chief of Air Force, Royal Australian air force; chief of Army, Australian army; and the director, Operations and Training Department, Ministry of Defence of Hungary, defines the JFO as: "A trained service member who can request, adjust, and control surface-to-surface Fires, provide targeting information in support of Type II and III CAS terminal attack controls, and perform autonomous terminal guidance operations." Other countries, like Canada, are currently looking at signing the MOA as well.

The Army JFO class is a 10-day course with nine days of classroom instruction and simulation, followed by one final day of field training.

The student is tested on the theater air control system, aircraft and weapons, fire support control measures, aviation and laser/night brevity terms, and aircraft munitions.

Each Soldier conducts seven simulations under the supervision of a joint terminal attack controller instructor. These simulations include: Type I control, Type II control with a JTAC, Type II control with a laser and a JTAC, a CCA and AC-130 call for fire, Type II control with JTAC and naval gunfire, and Type II control in an urban environment utilizing a grid reference graphic. Graduates are required to conduct semi-annual training to maintain their currency. To maintain their proficiency they must conduct six rotary or fixed wing events, six call for fire events, and one AC-130 call-for-fire. These events can be either simulated or live. JFOs are the eyes and ears of the JTACS on the battlefield, so that one JTAC can manage multiple fights from the tactical operations center. The ability to integrate every facet of air and surface support into one fight is crucial.

Types of close air support. To understand the employment of the JFO it is important to understand the three types of terminal control a JTAC/FAC uses to control CAS.

The first is Type I, which requires the controller to "visually acquire the attacking aircraft and the target for each attack."

Type II is the second method of terminal control, in which some or all the following conditions exist: "JTAC is unable to visually acquire the attacking aircraft at weapons release, JTAC is unable to visually acquire the target, or the attacking aircraft is unable to acquire the mark/target prior to weapons release."

It is during Type II CAS that the JFO becomes the eyes of the controller, providing the controller with the required information to successfully employ aviation ordnance.

The final method of terminal control is Type III. Type III provides, clearance for multiple attacks within a single engagement subject to specific attack restrictions. During Type III control, JTACs provide attacking aircraft targeting restrictions and then grant a "blanket" weapons release clearance (CLEARED TO ENGAGE). Type III control does not require the JTAC to visually acquire the aircraft or the target.


Target
during

acquisition systems Operation Enduring Freedom X

By CW2 Michael Rider

The 173rd Airborne Brigade Combat Team returned from their deployment to Afghanistan in support of Operation Enduring Freedom X, in November 2010. Their area of responsibility included both the Logar and Wardak provinces in Regional Command – East, covering an area spanning over 4,400 square miles. The current fight in Afghanistan is in support of counterinsurgency operations. The counter-fire fight is nonexistent if the following considerations are not immediately weighed; collateral damage and civilian casualty estimation. There are three target acquisition systems currently being utilized in support of operations; the AN/TPQ-48, V2, Lightweight Counter-Mortar Radar, the AN/TPQ-36, V8, and the AN/TPQ-37 Firefinder radars. These target acquisition systems proved to be great assets during the duration of the Sky Soldier's deployment.

A Soldier, from 1st Platoon, *Bulldog Troop*, 91st Cavalry Regiment, 173rd Airborne Brigade Combat Team, takes a tactical halt while on patrol in Charkh District, Logar province, Afghanistan. (Photo by SPC Lorenzo Ware, U.S. Army)

The employment of the LCMR in the rugged and austere terrain of Afghanistan is vital. When positioning the system, operators need to incorporate critical thinking, answering fundamental questions, such as, "If I can't see through that mountain, then the acquisition system can't see through the mountain." As the radar sensor manager for the 173rd Airborne Brigade Combat Team, during the OEF X, I utilized the Firefinder position analysis software to conduct line of site analysis without having to visit each separate forward operating base or combat out-post location throughout the battle space. This proved to be an invaluable tool when conducting both site and counter-fire analysis. One requirement users must keep in mind when utilizing this software program is the analysis captured is only as good as the imagery being utilized. Time tolerance continues to be the key to success for keeping imagery updated.

There are several other factors facilitating our success with the LCMR system; operators need to properly emplace the system, by ensuring the system is leveled properly on the tripod, the system is appropriately secured, utilizing the provided stakes and sandbags (additional support) on the tripod, in order to alleviate the system from traversing during windy conditions and finally, ensuring the far stake is located using a precision laying system and is boresighted by utilizing the boresight telescope on the LCMR. Additional procedures assisting our operators were ensuring the Miltope computers, associated with the LCMRs, were restarted on a daily basis. This improved reliability of the Miltope and prevented the computers from freezing up, as well as mitigating the risk of software corruption. The *Sky* Soldiers, of the 173rd ABCT, incorporated these tasks daily, within their battle rhythm, which afforded minimal non-mission capable down time and loss of radar coverage throughout the deployment.

Mountainous terrain in some areas of Afghanistan restricted the capabilities of the LCMR. The system is primarily designed to acquire high angle fire, coinciding with enemy mortar systems.

One requirement users must keep in mind when utilizing this software program is the analysis captured is only as good as the imagery being utilized. Time tolerance continues to be the key to success for keeping imagery updated.

A certain amount of track time is associated to acquire indirect fire attacks accurately. Afghanistan's aggressive terrain had significant effects to the line of site of our radar systems, not allowing systems to operate to their full capability. During several attacks, operators believed the system was malfunctioning; however, it was the rugged Afghan terrain affecting the systems. The LCMRs performed well on some of the command outposts and forward operating bases the 173rd occupied, but not all of them. At locations where we experienced the most success, conditions were ideal for the capabilities/parameters of the LCMR as well as a diligently trained crew.

Understanding technology. Since the commencement of the Global War on Terrorism, technology has afforded U.S. Soldiers the ability to field and utilize the newest equipment available to fight the counterinsurgency. A systematic problem involves Soldiers receiving equipment they are not properly trained on or, do not have an understanding of the equipment's capabilities. Systems like the LCMR cannot be effectively employed unless units allow time for the proper training to occur; a difficult task to accomplish at times when units are deploying regularly and immediately following their deployments with an extensive reset period.

Units tend to lose their subject matter experts during these transitions. For the *Sky* Soldiers, there was a three day train up for the LCMR radar system prior to deployment in Bamberg, Germany (covering 173rd North) and Vicenza, Italy (covering 173rd South). The mobile training team, from Fort Sill, Okla., covered the basic maintenance of the system, set up procedures and operations. This training was a basic-level course. Upon arrival into the area of operations, Task Force Bayonet acquired an additional 12 LCMRs adding to the four organic systems the task force was fielded. Coordination with the Coalition Joint Task Force Command for Regional Command – East began immediately to receive additional training for these systems.

The trainers were at Bagram Air Field, so training had to be coordinated requesting specific slots and arranging all transportation from AO Bayonet (Logar and Wardak provinces) to Bagram. By executing this task, we had an additional 45 Soldiers conduct a five-day iteration of training covering the basic

PFC David Boucher, with 3rd Platoon, Alpha Company, 1st Battalion, 503rd Infantry, 173rd Airborne Brigade Combat Team, provides security in the Chak district, Wardak province, Afghanistan. (Photo by PFC Donald Watkins, U.S. Army)

operations and maintenance, with two days of advanced maintenance for the systems within the first 45 days of the deployment. These 45 Soldiers were essentially the 'first responders' when there were issues with the LCMR radar systems. Each system in operation was also nested with two 'first responders,' allowing a trained operator at each FOB and COP.

The highlights of this training included the ability to emplace a LCMR and the ability to see the system in operations in a combat environment. The support from CJTF and the civilian-contracted instructors was instrumental in the success of TF Bayonet's ability to maintain radar coverage throughout the area of operations for 90 percent of the 173rd ABCT's deployment.

Trouble shooting. Due to the locations of some COPs or locations we had LCMRs, we were unable to get the civilian, field-service representatives to visit when we had maintenance problems. We had to rely on the trained 'first responders' to troubleshoot and diagnose the problems. The technique we used most, was to send the system to the contractors in Bagram to fix them. Once the contractors had the issue resolved and the system tested good they immediately sent them back to us so we could get the systems back into operation. This was a logistical nightmare, having to utilize rotary-wing assets to move systems back and forth multiple times, did not always prove valuable.The weather also affected these operations and at times this did not allow execution until a number of days passed.

In order to alleviate some of the loss of coverage we assumed to lose radar coverage at locations where the indirect fire threat was not as high as other locations and moved those systems to locations where we had a non-mission capable system in order to maintain as much coverage as possible. This process worked on numerous occasions and turned into lateral transfers on the property book. Once the NMC was fixed from the contractors and returned, the system would be emplaced where the units had to remove the LCMR radar coverage from. We had worked with the contractors and CJTF so much we had the process down to a period of less than two weeks of the systems downtime. We started with five of 16 LCMRs fully mission capable when we first arrived and within two months TF Bayonet was at 100 percent operational for all target acquisition sensors in the AO.

One of the major concerns I had as a sensor manager was the LCMRs were not in the Army logistical system, and we were unable to order or keep a stock of spare parts at each location. I know each system had a spare parts kit, however the majority of the problems we had were related to parts not included in the kit or the contractors had to fix on site in Bagram. I had made a recommendation to CJTF about having a FSR for each TF area of operation. TF Bayonet however, was

the only AO not to have a dedicated FSR. We managed to maintain the systems we had to the best of our ability and were commended by CJTF for our 'should hit vs. did hit' data.

Tracking indirect fire. The 173rd ABCT Fires and effect coordination cell had many tasks to accomplish, on a daily basis throughout the 24 hour operations, in the tactical operations cell.

The current operations desk maintained an indirect fire analysis folder, which included the pattern analysis whiz wheel and story boards of each indirect fire attack within AO Bayonet. By doing this, we were able to analyze and try to make predictions on the enemy's next attack based from patterns we established. Task Force Bayonet's intelligence and fire supporters worked together closely to establish patterns of life by day of the week and the times in which we expected to receive indirect fire. These events sometimes correlated with other activities in the AO, such as ambushes and protests with the local population. Sometimes, the occurrences were complete surprises and we had no supporting intelligence before the attack. We did not establish many patterns until after the first 90 days into our deployment. This was due to the winter season and the low activity during this time of year.

Significant activities began to increase around TF Bayonet's fourth month in country. The summer season had the most activity for indirect fire attacks against the Sky Soldiers throughout the entire area. Once some type of pattern was established the targeting team and intelligence surveillance teams requested for specific types of platforms to use against the enemy's indirect fire cells. Sometimes, we submitted training fire missions during the times we determined to be possible times for attacks so we could disrupt the thought process of the enemy and his ability to conduct operations against coalition forces. The platforms we requested and used were close air support, indirect fire support assets, including both artillery and mortars, and other aerial platforms. The following situation describes one of many incidents TF Bayonet had.

After this incident the local nationals respected the coalition forces more, and knew that we were there to create stability as they rebuild their homes and country for the future.

In May 2010, COP Jaghato (Southern Wardak province) had just been occupied by coalition forces, bringing more combat power to the area. The Jaghato district center was attacked with indirect fire on numerous occasions within the first 48-72 hours of the occupation. The LCMR was employed on top of a hard stand structure approximately 15 feet above the ground, by the fire support sergeant, SGT Joshua Smith, for the platoon and a day later by me. The COP was in a bowl and surrounded by mountains about three-seven km away, which allowed the system full line of site in the immediate area.

SGT Smith made this comment to me when we discussed employing the system, "Chief, the system works great when we have the standoff distance of at least two to three km away. This will be a great position for the LCMR." SGT Smith was correct in his assumption.

At this location, the LCMR had acquired both 107 mm rockets and 82 mm mortar rounds approximately 94 percent of all indirect fire attacks. The points of origin were tracked allowing the task force to analyze when and where the enemy was going to conduct their next indirect fire attack. By doing this, the task force planned for intelligence surveillance reconnaissance and close air support assets to be over head during the times of historic attacks in order to interdict or suppress the enemy.

During one occasion, the planning had succeeded and resulted in the recovery of one each 82 mm tube with multiple rounds, one machine gun with more than 1000 rounds, and three anti-Afghan force soldiers wounded in action. The sensor to shooter link was invaluable for this action to happen. The LCMR had acquired the point of origin during an indirect fire attack. The tactical operation center then passed the point of origin grid to an aerial platform above using its optics to focus on the point of origin grid. The unit had acquired positive identification on three to four personnel with the mortar tube and weapons. Close air support arrived on station shortly after.

The individuals got into a pre-positioned vehicle and left the area. The close air support followed the vehicle until we could engage the target without concerns for the local populace. The close air support aircraft engaged the target with a precision guided 2000-pound bomb. The vehicle was missed but was damaged enough to make it unserviceable. A maneuver element, consisting of the local Afghan police and Sky Soldiers, then moved to the vehicles location next to a Qulat and searched the premises. They had recovered the mortar tube, rounds and the machine gun at this location. This was a very successful day for TF Bayonet and the Sky Soldiers down near COP Jaghato.

Minimizing collateral damage. The insurgency operating in this area was known for the general lack of concern for civilian casualties. Insurgents, on a number of occasions, had launched rockets towards coalition forces at the new COP and missed, injuring the local civilians. The coalition forces, at the COP, rendered medical aid and attention to those civilians, creating a relationship with them and an agreement to get rid of the insurgency in order to protect the locals.

One of the platoon leaders at this location had also told me, "that after this incident the local nationals

U.S. Soldiers with 3rd Platoon, Alpha Company, 1st Battalion, 503rd Infantry Regiment, 173rd Airborne Brigade Combat Team, engage enemy combatants in the Chak district, Wardak province, Afghanistan. (PFC Donald Watkins, U.S. Army)

respected the coalition forces more, and knew that we were there to create stability as they rebuild their homes and country for the future."

In today's COIN fight, Soldiers are one of the most important sensors we have. The Soldiers on the ground see, sense, and know their area of operations very well and pick up on the smallest changes in their areas because they know how the local nationals interact with the environment. The daily engagements they conduct with the locals provide intelligence and feedback on insurgent activity and their feelings on the local Afghanistan government and what improvements they have noticed because of the government and programs they have implemented. The information Soldiers receive affects their focus for mission planning, day-to-day operations and are utilized by constantly improving our vision from our foxholes. There is always a need for site improvement in everything we do in combat. We establish historic data and information and use that to be proactive instead of reactive at times. The more we know on the ground, the more we can protect the locals and coalition forces in the Global War on Terrorism.

Editor's note: The author wants to acknowledge CW3 Andrew Murphy for the assistance in the production of this article, he was the 173rd ABCT targeting officer during OEF-X and we worked closely together throughout our 12-month deployment.

Chief Warrant Officer 2 Michael Rider's previous assignments include; Headquarters and Headquarters Battery, 1st Battalion, 17th Field Artillery, Alpha Battery, 1st Battalion, 17th Field Artillery, Fort Sill, Okla., Headquarters and Headquarters Battery, DIVARTY, 82nd Airborne Division at Fort Bragg, N.C., Alpha Company, 2nd Battalion, 504th Parachute Infantry Regiment, Headquarters and Headquarters Company, 2nd Battalion, 504th Parachute Infantry Regiment, and Headquarters and Headquarters Company, 1st Brigade Combat Team at Fort Bragg, Upon the completion of the Warrant Officer Candidate School and 131A Warrant Officer Basic Course in March 2009; he was assigned to Headquarters and Headquarters Battery, 4th Battalion, 319th Airborne Field Artillery Regiment as the target acquisition platoon leader. He is currently serving as the battalion targeting officer. His operational deployments include Operation Enduring Freedom II, Operation Iraqi Freedom I, Operation Iraqi Freedom II, Operation Enduring Freedom VI, Operation Iraqi Freedom 07-09 and most recently Operation Enduring Freedom X. CW2 Rider has obtained 50 credit hours towards a General Education Degree with Central Texas College.

CPT Andrew Fleagle, fire support officer for 1st Battalion, 12th Infantry Regiment, observes illumination rounds fired over the Kandahar province. The illumination rounds were fired from M777 howitzers and are used to illuminate areas the Soldiers need to see. (Photo by Staff Sgt. Justin Weaver, U.S. Air Force)

Training for mission command in full spectrum operations:

The 4E framework

By COL Tom Guthrie and MAJ Matt Dennis

The current Army training doctrine is in a state of transformation. After more than 10 years of war against an adaptive enemy, our training doctrine is beginning to catch up to the reality of the current complex environment. The term 'learning organization,' referenced in GEN David Petraus', "Counterinsurgency Training Guidance," is used frequently to describe how our units must behave. Too often, this term is used without acknowledging it is a proper name for a well defined concept comprised of five disciplines, developed by Peter Senge in, "The Fifth Discipline, the art and Practice of the Learning Organization." Nonetheless, our doctrine is beginning to capture the essence of Senge's concept. The result is a blend of old and new thoughts creating a cognitive dissonance for practitioners and relies on a laundry list of principles that is hard to remember and, in some cases, cliché.

The description of the requirement is clear in FM 7-0 where it states, "They [units] employ synchronized action — lethal and nonlethal — proportional to the mission and informed by a thorough understanding of all variables of the operational environment." Mission command, it says, is how leaders will convey understanding of the environment and adapt as required. Later, mission command is defined as, "…the exercise of authority and direction by the commander using mission orders to enable initiative within the commander's intent and to empower agile and adaptive leaders in the conduct of full spectrum operations." For a commander to effectively employ mission command, he must have a developed and cohesive unit that understands his intent and is comfortable making decisions in the absence of orders. FM 7-0 reinforces this idea by stating, "Training assists Soldiers and leaders in developing mutual trust through a shared understanding of the units' strengths and weaknesses."

Cognitive dissonance. Most readers with combat experience from the last 10 years will understand the picture being painted in chapter one. The discussion, however, in paragraph 2-2 is reminiscent of the assembly line process of old. "Commanders select a few tasks their units will train…" These few tasks are compiled into the mission essential task list. Clear descriptions of these tasks are found in the *Army Universal Task List* (FM 7-15), and then broken down into sub-tasks all the way down to the individual level. Evaluations for successful completion of the tasks are in checklist form and therefore encourage Soldiers and leaders to learn the checklist in order to get a favorable 'go' for the task.

The Army Training and Evaluation Program, and Soldier training publication manuals are valuable for a stepping stone approach to training, but have limited utility in training evaluations. Army training and education is theoretically rooted in Benjamin S. Bloom's "Taxonomy of Educational Objectives." At the lowest level is the psycho-motor domain. This, as the name implies, is about learning physical, motor-skill based tasks. In this domain, we learn safe handling and physical manipulation of our equipment. Soldier skill manuals and ARTEP manuals are good tools for the basic psycho-motor level training required to establish a foundation, but we must get beyond the psycho-motor domain in order to achieve adaptability.

The next level is the cognitive domain. At this level we begin to understand how our equipment works, why we perform tasks, and recognize the conditions in which a particular task may be appropriate. Dialogue and discussion are required for this level of understanding and must be encouraged in our training.

Last is the affective domain, also called synthesis. In this domain, we are able to combine information from our knowledge of tasks, the surrounding environment, differing perspectives, and our experience to create new knowledge. This is where improvisation and adaptation are born. This is where we are trying to get our units. Following the checklist will not get you there.

As mentioned above, FM 7-0 identifies 11 training principles. While these principles make sense when reading the manual as a text, they are hard to remember off-hand, therefore may be less useful in guiding a leader to the true goal of training — adaptive units capable of mission command in combat. Perhaps a simpler set of principles are in order, easy to remember, that guide leaders to develop learning organizations.

We propose units focus training based on creating understanding in four categories, the 4Es. These categories are consistent with the 11 principles found in FM 7-0. The 4Es, allow a leader to 'chunk' the 11 principles into easy-to-remember and easy-to-recall categories. Finally, the 4Es are intended to help bridge all three of Bloom's domains in a relatively seamless and transparent fashion. Regardless of whether the unit is an infantry squad, artillery platoon, or plans shop in a Corps headquarters, training should be focused on understanding equipment, each other, the environment, and the desired end state.

Equipment. Equipment is simply 'stuff' that allows us to reach solutions more easily. We should not be confused and believe that equipment is the solution. No amount of skill on the use of equipment can substitute for understanding the problem at hand. That said, in an environment where innovation and adaptability are required, it is paramount we master the tools we use. Mastery begins with training on the basics by blending psycho-motor and cognitive goals. Full knowledge of our equipment includes knowing how and why it functions, gaining proficiency in its physical manipulation, and knowing its capabilities and limitations. Understanding equipment should span all three learning domains over time and with increased experience. Armed with this knowledge a Soldier can masterfully employ his equipment for its intended purpose as well as improvise when conditions are appropriate. Once basic understanding is reached, Soldiers should be encouraged to improvise and be presented with problems that allow them to develop these skills along with the confidence to do so.

Each other. The foundation of our units is our small teams. Each small team is made up of individuals, who come from varied backgrounds and experiences. More often than not, in FSO, it is our life experience and/or expertise outside of traditional military training that leads us to understanding and problem solving. Training should encourage the implementation of these skills as well as skills related to military doctrine to arrive at acceptable solutions to training problems. Just as we strive for full knowledge of our equipment, full knowledge of the capabilities resident in each other also expand the range of possible solutions to any given problem. As teams realize the capabilities each of their members

have, they become closer and form bonds. These teams establish standards all members acknowledge. The pride and ownership that result; mean training to the lowest common denominator is no longer tolerated. The team pulls together to ensure each member meets the collective expectations of each other. Leaders hold small teams accountable. At the collective level, teams of teams cooperate to achieve the unit mission. The cohesiveness and esprit de corps found in these small teams, and teams of teams, make them a formidable fighting force, infinitely stronger and more resilient than the sum of the individuals. Each shared hardship and challenge makes the team stronger.

Environment. We must also understand the environment we are operating in if we are to be successful in the end. Mission, enemy, terrain and weather, troops and support available, time available, civil considerations, or METT-TC, is a good tool for initially understanding the physical environment, but we need to have a deeper understanding. What are the effects of each of components of METT-TC relative to our opponents? If operating in a COIN environment, what is the population's opinion of us? How will they perceive our actions? Leaders ensure collective understanding of the environment prior to a mission. Decisions made during the mission should account for environmental impact and the leader should be able to articulate why. Cultural and atmospheric ignorance is unacceptable. Subordinates should be encouraged to provide observations to leaders during the mission, when appropriate. Leaders must be empowered to recognize when their action or inaction can lead to an advantage, and be confident enough to make decisions accordingly.

In the CONUS training environment, leaders must be encouraged to make decisions and be allowed to follow through with them. Using the resources of the installation, adjacent units, and the community (where legal and applicable), small units and leaders should be encouraged to build relationships, network, collaborate and be creative with training. This mirrors the creative environment deployed units thrive in; we should replicate it in training. When planning training, we should use the same terminology we use while deployed. Knowing that we will have garrison obligations, and school commitments, we should speak in terms of main effort, supporting effort, economy of force, etc. Training with these terms, used correctly, reinforces our doctrinal knowledge base.

When a unit is designated as the main effort (green cycle in most units), why not replicate the deployed environment? Do we have the flexibility to replicate a day in combat while in garrison? Can we assign units tactical tasks in the form of missions to complete during the day, and allow them to figure out how maintenance, PT and meals get worked in? Why not? With the proper mind-set, and command climate, this is possible.

End state. Commanders are responsible for describing the end state to subordinates, and assigning missions designed to accomplish this end state. This description is based on information available to the commander. This information may be incomplete and certainly may change in a dynamic environment. Feedback from subordinates and observations made by the commander are what allows modification dialogue, discussion and direction must be understood and employed appropriately. Dialogue is open exchange of information among all present. Discussion is aimed at making a decision and is normally driven by the leader.

Finally, direction is the transmission of instructions after the decision is made. Adaptive units, through practice, must be comfortable with these forms of communication. Blindly following orders to accomplish a mission is negligent when factors become apparent to a subordinate leader that may change the situation. When conditions are clearly not consistent with assumptions used in planning, it is appropriate to re-enter dialogue. It is imperative we understand the end state. During the course of a mission, leaders must evaluate their environment and always ask themselves if accomplishing the mission, as directed, will contribute to the end state.

Cases may exist where a leader makes minor modifications to assigned tasks. Other cases may exist where it becomes apparent accomplishing a particular mission is actually detrimental to the commander's end state due to a change in the environment or a bad assumption. If leaders are unable to report and obtain a decision, they must have the confidence to make the appropriate decision on their own. Abort criteria are a useful planning tool, but will not account for unforeseen circumstances. Mission Command must be practiced in training if we are to successfully employ it in combat. For a given unit with subordinate elements, functional responsibilities may be different but the overall end state is the same.

Having all sub-units contributing to the overall movement of the unit towards the end state is captured by the term 'alignment' by Senge. Alignment is a pre-requisite for mission command. Without alignment, empowered and decentralized sub-units can drive in different directions. Alignment is the responsibility of the commander. Achieving alignment in the training environment will condition the teamwork and unity of effort required for successful combat operations.

Risk is present in everything we do. While planning and executing training, using the 4E construct otherwise, we must address risk. Leaders should not take risk lightly in training situations. The proper mind-set is required to avoid unintended consequences when mitigating risk. There is a fundamental difference in planning a safe training event and training in a way that creates safe execution. The ways we mitigate risk

in training must not contradict how we execute in combat.

Focusing on the 4Es, while planning and conducting training ,will help units build the trust and confidence required for execution of mission command in a combat environment when faced with ambiguous situations where tactical decisions can have strategic impact. Striving to incorporate psycho-motor through affective domain goals in the training environment conditions Soldiers for the expectations of the combat environment. Commanders should also create the conditions for mission command. Ensuring the entire unit holds the same shared vision and subordinates' actions are aligned, enables an environment of trust where leaders are free to make decisions and all Soldiers take ownership of results.

Colonel Tom Guthrie is an infantry officer serving in mostly light infantry and Ranger assignments. He commanded 2nd battalion, 27th Infantry and the 196th Infantry Brigade, both in Hawaii. He served as the 25th Infantry Division's chief of staff from 2008-2010, when the division deployed to Northern Iraq in support of Operation Iraqi Freedom 09-11. He is currently serving as the deputy CJ3 for International Security Assistance Force, Joint Command in Afghanistan and upon completion, will return to his position as the director, Center for Army Leadership, Fort Leavenworth, Kan.

Major Matt Dennis is a field artillery officer and has served in fire support positions from the troop to brigade combat team level. He commanded Bravo Battery, 5th Battalion, 3rd Field Artillery (MLRS) in Operation Iraqi Freedom I, and Headquarters, Headquarters Battery, 17th Field Artillery Brigade in OIF 05-07. He has served as an operations officer in the U.S. Army Asymmetric Warfare Group, graduated from ILE (Command and General Staff College) and School of Advanced Military Studies, and is currently serving as a plans officer in International Security Assistance Force, Joint Command in Kabul, Afghanistan.

SSG Lupe A. Irlas, a platoon sergeant for A Battery, 1st Battalion, 84th Field Artillery Regiment, 170th Infantry Brigade Combat Team, surveys the area.
(Photo by PFC Nathan Goodall, U.S. Army)

CPL Alyn Murray, with the *First Lightning,* 1st Battalion, 7th Field Artillery Regiment, 2nd Advise and Assist Brigade, 1st Infantry Division, mans an M-240B machine gun, while on guard duty in Baghdad, Iraq. (Photo by CPT Kai Gonsalves, U.S. Army)

Task Force Lightning operational framework for attacking the indirect fire network in Baghdad

By COL Paul T. Calvert, LTC Andrew C. Gainey, MAJ Kevin R. Taylor
and CPT Joshua J. Krause

The officers, noncommissioned officers and Soldiers of 1st Battalion, 7th Field Artillery, as part of the 2nd Advise and Assist Brigade, 1st Infantry Division, had the unique opportunity to serve as a partner with the 1st Federal Police Division, in Baghdad, Iraq during Operation New Dawn. The battalion, in support of OND, had several lessons learned as we partnered with Iraqi counterparts as Task Force Lighting, in an effort to defeat indirect fire networks throughout the 1st Federal Police area of operations.

The 1-7 FA was alerted for deployment to Iraq in the spring of 2010. The brigade was originally scheduled to deploy in February 2011. In June 2010, the brigade received notification the original deployment date was moved to the fall of 2010. This accelerated schedule had a significant impact on the training for the battalion as a whole. The 1-7 FA had just completed Artillery Table VI section certification and was ordered to transform into a maneuver battalion, in order to partner with an Iraqi division, in concert with the advise and assist brigade construct.

In June 2010, COL Paul Calvert, commander of the 2nd Advise and Assist Brigade, directed the transformation of 1-7 FA from an artillery battalion to a maneuver battalion in support of the brigade's upcoming deployment to Iraq. Calvert directed this transformation to provide flexibility for the brigade as it assumed its new deployment date. The ability of the 1-7 FA to complete this transformation would be critical in order to provide the necessary amount of partnered battalions for the Iraqi security force divisions operating throughout the area of operation.

The battalion began, in June 2010, the process of transitioning to fulfill a maneuver mission. The unit focused on individual and collective training tasks including individual and crew serve weapon ranges, virtual convoy training, at the Close Combat Tactical Trainer, drivers' training and convoy live-fire exercises at Fort Riley, Kan., prior to their Joint Readiness Training Center rotation, at Fort Polk, La., in August 2010. At JRTC, the battalion was able to exercise collective training objectives and truly exercise the unit's systems in preparation for the deployment to Iraq. The flexibility of the unit was tested through the transformation process, but the resolve of the officers, non-commissioned officers and Soldiers of the battalion proved to make the process more successful than first imagined.

While there were initial concerns about transitioning these skill sets in a constrained timeline, the performance of the unit during these various training events quelled any reservations we had from transitioning from artillery to maneuver. A significant contributing factor in enabling this transition was the fact that many of the key leaders in the battalion had already performed a maneuver mission in some fashion in a previous deployment.

The battalion performed brilliantly during the mounted gunnery tables at Fort Riley. With all crews receiving a first time 'go' on both day and night qualification tables. Thee further enhanced those skills through the realistic training environment provided during the JRTC rotation in preparation for deployment to Iraq.

The leadership of the 1-7 FA knew they had met the commander's intent when Calvert said, "You would never know this was an artillery battalion by the way you are currently conducting maneuver operations."

Upon deployment to Iraq, in the fall of 2010, the battalion began the transfer of authority process with the 1st battalion, 41st Field Artillery, who provided operational knowledge of the 1st Federal Police Division, as well as the history of their counter indirect fire operations. Shortly after arrival, the 1-7 FA completed the transfer of authority with 1-41 FA and began partnered operations with the 1st Federal Police Division, in Baghdad. The unit's goal was to maintain the partnership, established by 1-41 FA, with the 1st Federal Police, as well as ensured the advise, train and assist mission was executed to standard.

Indirect fire problem in area of operations. On the evening of the battalion's TOA, the unit received indirect fire on the joint security station. To date of this report, the unit had received 10 indirect fire attacks on location. Additionally, there were nine indirect fire attacks against the international zone inside the battalion's AO. After the TOA, we began to see an increased level of insurgent activity, in terms of indirect fire, in the 1st Federal Police's AO. Given the level of attacks focused on both the Iraqi government and on Iraqi and U.S. forces, the battalion leadership began to determine a way ahead, to mitigate the threat and disrupt the IDF networks operating in the AO. We determined this was not a problem we could solve unilaterally and turned to our Iraqi counterparts to assist in the fight.

Framework for attacking the IDF network. In order to begin the process of disrupting the indirect fire networks in the 1st Federal Police's AO, we had to ensure their leadership could see the problem through our eyes. Equally as important, was the necessity to concurrently share information, in order to leverage all combined assets, in the effort to eliminate the problem. We determined the first step in this process would be collaborative targeting efforts at the battalion level with the 1st Federal Police Division. Through combined efforts, we would ensure both organizations provided all resources available mitigating the threats facing Iraqi and U.S. forces within the AO.

Within the first 45 days of the rotation, the senior leadership of the 1st Federal Police Division and senior leadership, staff and stability transition team members from Task Force Lightning conducted the first combined-targeting meeting. The discussion included an operations and intelligence brief to MG Ali Ibrahim Daboon al Maksusi, commander of the 1st Federal Police Division, his primary staff, and his brigade commanders. This targeting meeting helped to align our targeting efforts with the priorities of the 1st Federal Police Division. Task Force Lightning made several recommendations on where and when to focus the 1st Federal Police's efforts, in mitigating the indirect fire threat, in the AO. Specifically, TF Lightning broke down these areas by brigade ensuring clarity for all units operating within the AO. Ali and his staff asked several questions during the briefing and shared their insight based on their experience in the area. The meeting was a great success in that it not only facilitated the flow of information between both organizations, but it

SFC Clay Rose, a platoon sergeant with 1st *(First Lightning)* Battalion, 7th Field Artillery Regiment, 2nd Advise and Assist Brigade, 1st Infantry Division, United States Division, gives instruction on range and weapons safety to senior noncommissioned officers with the 1st Iraqi Federal Police Division, at Joint Security Station Loyalty, Iraq. Each shurta, or police officer, who participated in the range had the opportunity to fire weapon systems used by U.S. forces in Iraq. (Photo by CPT Christopher Miles, U.S. Army)

also allowed Ali a chance to give both the 1st Federal Police Division and TF Lightning his guidance for future operations. Ali concurred with the recommendations and gave guidance to his brigade commanders. This was a breakthrough in the planning process for both organizations and would serve as a stepping stone taking the partnership to the next level.

Upon gaining Ali's support for the counter indirect fire operations in his AO, the cross-sharing of information between organizations increased significantly. Task Force Lightning's tactical operations center provided the 1st Federal Police G-3 and stability transition team G-3 operations advisor with a detailed C-IDF patrol schedule. The 1st Federal Police G-3 provided minor adjustments and immediately published the patrol schedule in an operations order for the brigades to execute. The TF S-2 intelligence shop, provided intelligence supporting the C-IDF operations to the 1st Federal Police G-2, who used this information in conjunction with his assets to provide even more focused areas for operations.

In addition to the 1st Federal Police and U.S. patrol sets focused on the C-IDF fight, TF Lightning requested the use of other brigade assets to help in the C-IDF fight. Task Force Lightning requested air weapons team support and intelligence, surveillance and reconnaissance assets ensuring all resources were brought to bear on the problem. The 2nd AAB readily provided these critical resources based on the indirect fire threat and provided additional analysis, from the brigade level, to assess the threat throughout the AO. These assets were synchronized with the patrols in an effort to maximize all resources to disrupt the indirect fire networks operating in the 1st Federal Police's AO.

Once the process was implemented by the 1st Federal Police Division, continued refinement of the areas became the focus of STT key leader engagements held with their Iraqi counterparts. These meetings, between the 1st Federal Police Division G-3 and the STT G-3 advisor, included analysis of the C-IDF patrol schedule and the planning of future operations. The task force S-2 continued to share intelligence related to the indirect fire threat, in the 1st Federal Police AO, and the 1st Federal Division G-2 reciprocated by providing information concerning the threat from their perspective. The focused efforts of the organizations working together, to solve the indirect fire threat facing both Iraqi and U.S. forces, began to take shape through these continued engagements.

After building a patrol schedule and synchronizing assets based on the combined analysis of the threat, TF Lightning leadership determined the next step in the targeting process would be to develop and attack the indirect fire networks operating within the 1st Federal Police AO. The TF S-2 developed a series of link diagrams depicting the indirect fire networks within the AO and he shared them with the 1st Federal Police Division G-2. Both organizations began to build a combined high value target list based on our mutual priorities and combined efforts. The 1st Federal Police Division and TF Lightning ensured the targeted individuals met the objectives of both organizations before nominating them for approval by both commanders.

To attack the network, the TF S-2 focused on what key functions, processes and resources a template terrorist/insurgent network of networks requires, to operate and survive. Pulling straight from the Feb. 1, 2006, circulation of the *National Military Strategic Plan for the War on Terrorism*, each network of networks is broken down in to nine critical facets - leadership, safe havens, finance, communications, movement (or

freedom of maneuver), intelligence, weapons, personnel, and ideology. In applying this doctrinal framework to how the enemy is situationally arrayed on the battlefield, the TF S-2 was able to identify key nodes to disrupt and/or defeat creating an over-reliance on the remaining nodes. By forcing the enemy to modify their tactics, techniques, and procedures, we created an exploitable gap to continue the targeting along this multi-faceted model.

After assessing, actioning, then re-assessing the enemy vulnerabilities, TF Lightning determined which assets, in terms of 1st Federal Police and U.S. forces, could be applied to continue the disruption of the network. The vast majority of the combat power applied was from the 1st Federal Police Division; supporting the concept of developing an enduring capability showing the 1st Federal Police Division could sustain upon completion of the U.S. military mission in Iraq.

The final piece in the fight against the indirect fire network operating in the 1st Federal Police Division AO, was the integration of our special operations forces in the targeting process. Task Force Lightning hosted a combined targeting meeting with the SOF team operating in the AO, establishing a partnership with our SOF counterparts.

The meeting was successful as both organizations were able to share intelligence from each perspective. The SOF team provided new perspectives on attacking the problem, which were immediately integrated into our targeting cycle and produced releasable information for our 1st Federal Police counterparts. This partnership with the SOF team will continue with meetings on a monthly basis to share information.

With the integration of 1st Federal Police patrols, U.S. patrols, air weapons teams, intelligence, surveillance and reconnaissance, and SOF operations, TF Lightning has established an integrated targeting process that will help disrupt the indirect fire network in the 1st Federal Police AO. Leveraging assets and providing a common operating picture for all organizations has given us the ability to meet the challenge of the indirect fire threat and begin the process of disrupting the network. By working side-by-side with the 1st Federal Police Division in this targeting process, we are confident the leadership of the division believes in the process and will continue these operations beyond the U.S. military involvement, in Iraq. This enduring capability will serve the 1st Federal Police Division well in their future operations as an organization.

While the challenge of targeting the indirect fire network in the 1st Federal Police AO is a work in progress, we believe our counterparts understand the threat and have taken ownership of this problem. With the assistance of TF Lightning and the STTs, the 1st Federal Police Division is better prepared to mitigate these threats through C-IDF patrols as well as intelligence operations. The goal of our partnership is to instill, in our counterparts, a capability they can use in future operations. Through these efforts, we believe we have met that intent. The officers, non-commissioned officers and Soldiers of TF Lightning can be proud of their efforts and know they have made history by enhancing the capability of their Iraqi counterparts.

Colonel Paul T. Calvert, U.S. Army Armor, currently serves as the brigade commander for the 2nd Advise and Assist Brigade, 1st Infantry Division, deployed to Baghdad, Iraq during Operation New Dawn. He has previously served with 3rd Squadron, 2nd Armored Cavalry Regiment in Amberg, Germany, as a tank and scout platoon leader, and as an executive officer, deployed in support of Operation Desert Shield/Storm. In 1992, he was assigned to the 3rd Armored Cavalry Regiment as the assistant regimental S4 supply, 2nd Squadron, S4 and commander of E Troop and the Regimental Headquarters and Headquarters Troop. In 2000, he was assigned to the 11th Armored Cavalry Regiment, Fort Irwin, Calif., where he served as the regimental training officer, 2nd Squadron (Infantry) operations officer and the regimental operations officer. Rejoining the 3rd Armored Cavalry Regiment, in September 2002, at Fort Carson, Colo., he served as the regimental operations officer and deployed in support of Operation Iraqi Freedom. In June 2006, he was assigned as the squadron commander of 2nd Squadron, 3rd Armored Cavalry Regiment and deployed in support of Operation Iraqi Freedom 07-09. In May 2010, he graduated from the U.S. Air War College.

Lieutenant Colonel Andrew C. Gainey, U.S. Army Field Artillery, currently serves as the task force commander for the 1st Battalion, 7th Field Artillery, deployed to Baghdad, Iraq, during Operation New Dawn. He has previously served with the 1st Armored Division Headquarters, Wiesbaden, Germany, as the division assistant fire support coordinator, and then subsequently deployed to Ramadi, Iraq, in 2006, as the 2nd Battalion, 3rd Field Artillery Regiment S3 operations. In 1992, he earned a Bachelor of Arts in Management from the University of South Carolina. Additionally, Gainey earned a Master of Science in 2004 from Kansas State University.

Major Kevin R. Taylor, U.S. Army Field Artillery, is currently serving as the task force operations officer for 1st Battalion, 7th Field Artillery, deployed to Baghdad, Iraq during Operation New Dawn. He has previously served as a battery commander for Alpha Battery, 1st Battalion, 377th Field Artillery (AASLT) deployed to Al Asad, Iraq, in support of Operation Iraqi Freedom 06-08. He has also been battery commander for Alpha Battery, 1st Battalion, 321st AFAR, Fort Bragg, N.C. In 1999, he earned a Bachelor of Science in Economics from the United States Military Academy, West Point, N.Y.

Captain Joshua J. Krause, U.S. Army Military Intelligence, currently serves as the task force intelligence officer, deployed to Baghdad, Iraq during Operation New Dawn. Previously, he has served as the 2nd Battalion, 1st Infantry Division, counter-improved explosive device officer in charge, the 1st Battalion, 41st Infantry Regiment S2, 1st Battalion, 18th Infantry Regiment battlefield intelligence command and control officer, and the 2nd Brigade Special Troops Battalion, 1st Infantry Division, signal intelligence platoon leader. He also deployed to Baghdad, Iraq, in support of Operation Iraqi Freedom 08-09. In 2007, he earned a Bachelor of Science in Environmental Science from the United Stated Military Academy, West Point, N.Y.

Resetting the field artillery skills of the 2-18th Field Artillery

By Samuel R. Young

Soldiers, from a joint combat search and rescue team with 4th Platoon, Bravo Battery, 2nd Battalion, 18th Field Artillery Regiment, undergo sling-load training on Chabelley Air Field in Djibouti. (Photo by Staff Sgt. Samuel Rogers, U.S. Air Force)

For almost two years, mid-2007 to mid-2009, 2nd Battalion, 18th Field Artillery Soldiers were committed to training for and deploying to the Horn of Africa with an in lieu of field artillery mission. The battalion's Forward Support Company, during this period, was deployed on a separate mission as a convoy security company in Iraq. The battalion's four field artillery batteries were reconfigured and served as two infantry companies with approximately 20 personnel on the battalion staff. These Soldiers' pre-deployment training had transitioned them from being a mission capable and combat ready field artillery battalion to being a mission capable battalion that executed foreign military training, force protection for civil military projects, joint combat search and rescue, and camp security for Camp Lemonier, Djibouti.

In the fall of 2009, following its redeployment from the Horn of Africa, 2-18th FA Soldiers resumed training to reset their multiple launch rocket system delivered lethal munitions capabilities. LTC Stephen Wertz was the commander who led the 2-18 FA from its ILO mission through its subsequent return to field artillery. The following interview addresses how Wertz reset the lethal field artillery skills of his Multiple Launch Rocket System Soldiers.

Personnel stability. The stability of personnel within the battalion, its individual batteries, and the forward support company was critical to resetting the lethal field artillery skills of the 2-18th FA's Soldiers. Fortunately, it did not lose a lot of Soldiers and never dropped below 80 percent of its authorized manning level. However, it did lose some key leaders, to include all battery commanders and first sergeants, but it did gain many new Soldiers, fresh out of their initial entry training, who had received training in the basic lethal field artillery skills.

Since the 2-18th FA was a subordinate battalion of the 75th Fires Brigade, it did not face the challenges field artillery battalions aligned with maneuver brigades must endure. The field artillery gunnery and fire support skill sets, to include the people possessing those skill sets, frequently are focused by their maneuver brigades on other requirements and taskers to the detriment of lethal field artillery focus.

To facilitate the availability of non-commissioned officer personnel once the 2-18th FA was ready to enter the initial reset training of the Army Force Generation cycle, the battalion 'front loaded' its NCOs into the NCO education system schools on their return from post-redeployment block leave. Personnel stability was also vital to the reorganization of the 2-18th, FA from a two company sized infantry battalion with a very small battalion staff back to its pre-deployment configuration of a headquarters and headquarters battery, three firing batteries, and a forward support company. Once this action was completed in September 2009, the 2-18th FA was ready to focus on equipment and training.

Equipment. In order to properly reset the skill sets of his field artillerymen and other military occupation specialty Soldiers, Wertz had to have sufficient operational equipment with which to train.

Fortunately, his battalion had no property or equipment issues on its return. All 2-18th FA equipment left behind when the battalion deployed had been adequately maintained by the equipment entity who signed for it.

Wertz said that a key to his unit's successful training program was the importance of properly maintained equipment being available. He was not upset with the field artillery mission essential equipment regained when the 2-18th FA returned from its ILO FA mission deployment.

Training. Following its September 2009 reorganization, the 2-18th FA commenced its reset training in October with an 'out-of-norm' training program: an MLRS academy led by experienced MLRS subject matter experts in a classroom/motor pool environment for two weeks, then in the field every day for three weeks. The 2-18th FA received assistance from several U.S. Army Field Artillery School MLRS subject matter experts and trainers. The battalion went from no experienced MLRS Soldiers to being able to do battalion level missions in five weeks.

Simultaneously, 2-18th FA was also building the 15th Transportation Company for deployment. In addition to overseeing and participating in MLRS training and the pre-deployment training for the 15th TC, the 2-18th FA staff prepared for and successfully completed a 1st Infantry Division command inspection.

Following the MLRS academy training, the 2-18th FA conducted multi-echelon training with no live fire missions for six weeks. It was 'gearing-up' for its first live fire, conducted with the 75th Fires Brigade, as part of the Combined-Arms Live-Fire Exercise 2010. When the 2-18th FA commenced 'putting steel' on targets, three months after its reorganization, 2-18th FA Soldiers proved they wanted to be FA mission capable and combat ready, and were willing to devote the necessary time to do so. Keys to the 2-18th FA's success in training:

- Trained every day with a unit mind-set focused on being the best battalion.
- Many FA leaders/Soldiers rely on FA firing tables to set training; 2-18th FA batteries and battalion did multi-echelon training from the start.

In 2010, less than a year following its redeployment, the battalion conducted four weeks of '24/7' tactical training at Fort McCoy, Wis., including two weeks of live-fire missions.

Its Fires brigade commander was very supportive of this major training event and gave the 2-18th FA money and extra ammunition for the training. The 15th TC, as part of its pre-deployment training, transported much of 2-18th's equipment to and from Fort McCoy.

2nd Battalion, 18th Field Artillery Regiment, fires over Wisconsin. The 2nd Battalion, 18th Field Artillery Regiment packed all of its Soldiers and equipment for a deployment exercise to Fort McCoy, where they conducted multiple rocket launch system fire missions, deployment operations, and ran the 15th Transportation Company through a mission-readiness exercise in preparation for its deployment. The 46,000 acres of training area in northern Wisconsin was home to more than 450 'mission ready' Soldiers and required the two units to operate strictly as if they were deployed and self sufficient. But that was not the only reason for the unit to make the 960-mile journey to the northern United States.

"What we can do at Fort McCoy that can't be done at a lot of places is actually exercise MLRS tactics, where our launchers can hide in the trees, receive a fire mission and then roll out into this big wide open area and shoot rounds," said Lt. Col. Stephen Wertz, 2-18 FAR commander. "I like coming here and I wouldn't have come if I didn't think it was going to be good."

During the month-long exercise, the battalion conducted MLRS missions to maintain vital skills. "We are trying to get back into our field artillery mission because in the deployments they have not been artillery," said CPT Matthew Bender, A Battery, 2-18 FAR commander. "In field artillery these skills are perishable and they are important. When you do this job you have to be spot on. We have to make sure we can fire our missions in support of the guys in the fight."

But the exercise was not just about training up for field artillery missions. It was also to assist in preparing members of the battalion's transportation company for its upcoming deployment. "We have been helping them train and run them through their qualification exercises. They actually convoyed from Fort Sill to Fort McCoy carrying some of our vehicles much like they will do in Iraq," said Wertz.

Being away from home for a month can be trying for a Soldier, but fortunately members of the 2-18 FAR, use their unit pride as motivation to drive them through the days until they can return to their families.

"There is nothing better than mission ready soldiers, they think they are good because they are," said Wertz. "We have instilled a sense of excellence in them and they know they are the best."

Mr. Samuel R. Young is a Department of the Army civilian and currently serves as a senior military analyst on the Center for Army Lessons Learned Fires Team. He is a retired Indiana U.S. Army National Guard colonel, having served in Honest John Rocket, and 155 mm, as well as 8 inch howitzer battalions. As a full time guardsman, he served in 3rd Battalion, 139th Field Artillery and 2nd Battalion, 150th Field Artillery and the United States Property & Fiscal Office for Indiana. He commanded a finance battalion during Operation Desert Storm and served as the senior National Guard Bureau representative at Fort Jackson, S.C., prior to his retirement. Prior to arriving at CALL, he spent 15 months in Kabul, Afghanistan as a contractor with duties as the senior financial management advisor to the Afghan Minister of Defense. He is a graduate from the Citadel.

Soldiers assigned to 4th Battalion, 319th Field Artillery Regiment, 173rd Airborne Brigade, fire an M119 105 mm howitzer, while conducting observers training April 11, 2008, at Forward Operating Base Fortress in the Nangahar province of Afghanistan, during Operation Enduring Freedom. (Photo by SGT Johnny R. Aragon, U.S. Army)

Over the top: Kill all they send

By CSM Dennis J. Woods

Artillery 'Killer Junior' direct fire used in base defense: optimizing artillery's use in the current fight. The phrase "over the top" has many meanings. When used in discussions of past battles, it usually brings to mind images of a war that took place more than 90 years ago. For me, it's World War I with images of trench warfare in the fields of France. Images where men rose in mass from covered trenches to assault over open ground. In that space men faced fragments from artillery strikes; rifle fire, and what was then termed, "the devils paint brush" machinegun fire. In the fields of Afghanistan on the night of June 21, 2010, men once again rushed uphill in a fortified trench to answer the call, "over the top."

Describing the scene. In the year 167 the Roman Emperor, Marcus Aurelius said, "of everything ask, what is it, what does it do?" Applying this thought process to the terrain surrounding an outpost of the 173rd Airborne; historical similarities with the past wars of the U.S. abounded. The surrounding terrain featured; sunken roadways, terraced fields, and deep thick walled irrigation systems. Taken together they formed a trench network that afforded cover and concealment on three sides of the outpost. These terrain features resembled battle fields from the American Civil War, World War I and Vietnam. Viewing these scenes as something the enemy would use, defenses were adjusted accordingly.

The situation. 1st Section, 1st Platoon of Bravo Battery, 4th Battalion, 319th Airborne Field Artillery Battalion, was assigned to C Troop, 1st Squadron, 91st Airborne Cavalry Regiment to provide artillery support. As a dual certified M119A2 105 mm, and M777A2 155 mm unit, each section was assigned a 105 mm and a 155 mm system per position. Taking into account the surrounding terrain, the smaller, faster thermal sighted 105 mm was positioned to deliver indirect and direct Fires in support of the CAV outpost.

During normal operations, as the paratroopers of C Troop, 1-91 CAV conducted patrols, 1st Section provided artillery support. On June 21, 2010, artillerymen covered their movement with a 155 mm cannon. During the course of their extended patrol, day turned to night, and an enemy ground attack developed against the isolated combat outpost.

Actions on contact. The battle that night began as others had, only instead of harassing fire the enemy intended to destroy the artillery, and overrun the COP. Using civilians as a human shield, insurgents slipped from crowded mud houses into the trench system. The Taliban's last night attack on the outpost, directed at the front gate, had taken place almost a month prior. That attack was crushed with 18 rounds of direct fire delivered by a thermal sighted 105 mm cannon. Learning from that experience, the Taliban began their assault by suppressing the artillery position first with machinegun and rocket fire.

As the ground assault increased in intensity, artillerymen hurriedly ran uphill to use the elevated cannon as a large-bore, crew-served, direct-fire weapon. As they moved up hill, enemy fighters using the high-walled trenches and sunken roads approached within 460 meters. From defilade positions they used light automatic machinegun fire and rocket-propelled grenades against the gun position. As the U.S. Soldiers raced up the hill, they entered a covered trench, shielding them from the grazing fire overhead. In the dark confines of the trench, men were sent to man machineguns, and the cannon gun pit. With the sections forward-heavy machinegun now added to that of the adjacent guard tower; small-arms fire was directed at the closest enemy position.

Overhead in the gun pit, rounds could be heard skipping off of the howitzer. As bullets continued to zip over the trench; an unidentified fragmentation device detonated inside the gun position. As the cavalry troops 1st sergeant and commander organized the defense, the machinegun fire's inability to penetrate or suppress the enemy's position was realized. Using the forward guard tower and local camera array as observers, artillery support was requested.

A combination technique. Based on the need to avoid civilian casualties and limit collateral damage, a combination approach was employed. The combination of techniques best suited for this situation was; a 'Killer Junior' direct fire mission, coupled with indirect fire control measures. This combination technique allowed for traditional clearance of Fires through brigade, as well as company level command and control of its effects.

Definitions. 'Killer Junior' by definition is an analog direct fire technique that results in an artillery high explosive airburst over a given target. The round detonates, sending thousands of searing hot, ripped metal fragments, raining down on the enemy.

Standard cannon direct fire using glass and iron sights is basically an analog fire control system. In conventional direct fire mode a cannon is almost always on line with its target. The challenge in direct fire is in achieving the correct elevation for range. In our combination technique, a digital fire direction center was used to calculate the time and elevation, as well as clearing the area for collateral damage. Using this combination of techniques the rules of engagement were met.

As a learning point. Using a digital aid to support an analog fire control system, fewer artillery rounds are required to achieve effects. Optimizing artillery's effects to fit the current fight limits, collateral damage supports the mission.

Also, according to 1SG Frank Luedtke, "Pre-identifying all targets on the direct fire range cards provides data needed to compute direct-fire and 'Killer Junior' missions and reduces the time required to determine distance to target and further increases artillery responsiveness." Using organic survey instruments to measure range and vertical angel also increases accuracy while reducing the number of rounds required to achieve results. While the fire direction center computed for range and time, paratroopers assembled in the covered trench as if on a parachute jump; once clearance to fire was given a command from the past was heard, "over the top, fire mission." With rounds zipping through the night air, tracers seemed as if they were only inches away.

As men entered the open ground to face the devils paint brush, the tainted smell of a fragmentation burst hung in the air. As soon as the gun was oriented on the enemy, crew drill began. As ammunition was prepared the gunner activated his AN/PAS-13 thermal weapon sight on the M913 GELON mount. In line behind the thermal optic was a boresighted PAQ -2 laser aiming device. The aiming

The interior of the trenches used for cover as paratroopers advanced uphill toward the gun pit. (Photo courtesy of CSM Dennis Woods)

laser was used to zero on the target. Searching for his target through the thermal optic, the gunner observed previously undetected enemy soldiers repositioning forward on the sunken road.

Using the firing solution provided by the FDC, the cannons elevation was set as directional control and was gained through the thermal optic. Having mounted a thermal sight and a laser aiming device, platoon and troop leadership could confirm the gunner's target with the laser dot. The gunner and section chiefs' priority of work for this night engagement remained the same as an indirect fire mission sight-bubble-sight. As the cannon tube was elevated for range, line of sight needed to be restored. This was accomplished with the GELON mount.

With the section now cleared to fire, the 'Killer Junior' mission began. Within seconds of the first shell burst ,the volume of enemy fire placed on the outpost was reduced. For this mission a total of five rounds from 'Killer Junior' were fired. A second direct fire mission; with indirect fire control, was directed by the Cav troop leadership when movement was reported north of the position. This second mission required an additional three rounds of high explosive rounds air bursting over the enemy.

According to the 1st sergeant of C Troop, 1-91 Calvary, 173rd Airborne Brigade Combat Team, "cannon fire broke the attack." On this engagement unlike others where survivors remove the dead and dying; this time no one was left. Controlled artillery strikes had done an ugly job in a crude manner. Enemy groups not under cannon fire quickly withdrew.

What we learned:

- Don't mess with the airborne CAV.
- Use the largest weapon available at the greatest range possible.
- Adjust your defense to fit the terrain "always a good idea."
- Interior defensive works are a good thing.
- Adopting weapons control and effects to the rules of engagement instead of fighting the rules of engagement yielded limited collateral damage, ethically supportable engagement decisions. Reduced the possibility of civilian casualties.
- Using a cannon as a large-bore, crew-served, direct-fire weapon, allowed for a defense that started at the far ridge line, as opposed to one that starts at the far tree line.
- Employing the fire direction center as a digital aid for an analog direct fire control system, reduced the number of rounds fired. Reduced potential CIV-CAS.
- Combining indirect and direct fire procedures optimized artillery's effects for the current fight. Reduced potential civilian casualties. It also countered the enemy's avoidance technique of using civilians and structures as human shields. The effects of artillery strikes were tailored to fit local conditions.
- When possible; use large-bore weapons on your enemy "it's just more sincere."

What we did: killed all they sent.

Editor's Note. This account was written using the personal statements from Soldiers assigned to 1st section, 1st Platoon, Bravo Battery, 4-319th AFAR and C Troop, 1-91 CAV during OIF-X Afghanistan.

Command Sergeant Major Dennis J. Woods is slated on the CSL List as the future command sergeant major for 3rd Battaliont, 16th Field Artillery, 4th Infantry Division. He is currently serving as the brigade operations sergeant major (Future Operations). His most recent deployment was as the battalion command sergeant major for 4th Battalion, 319th Airborne Field Artillery Regiment, 173rd Airborne Brigade in OIF X. He deployed to Grenada in 1983 with Alpha Battery, 1st Battalion, 319th Airborne Field Artillery Regiment, 82nd Airborne Division, as well as Desert Shield/Desert Storm with Charlie Battery, 2nd Battalion, 319th Airborne Field Artillery Regiment, 82nd Airborne Division. He deployed in support of Operation Enduring Freedom with the 82nd Airborne Division Artillery before it was deactivated in January 2006. He also served in Operation Iraqi Freedom 1 and 6 with Bravo Battery, 2nd Battalion, 3rd Field Artillery, 1st Armored Division. In 1998 was deployed in Operation Desert Fox with Alpha Battery 3-319th AFAR. CSM Woods is also credited by the U.S. Army Suggestion Program as the inventor of the 105 mm howitzer night sight mount, the M198 155 mm howitzer night sight mount, the dual optic Multiple Integrated Laser Engagement System laser, and the PALADIN urban assault kit. Woods is also the first recipient of the U.S. Field Artillery's Gruber Award for his invention of the GELON night sight mount.

The US Army is failing to assimilate electronic warfare

By CPT Kyle Borne

In the years since the Army has identified a need for organic electronic warfare support, it has failed to properly assert and emphasize the importance of EW as a force multiplier. Like a novice gardener, who plants a seed with all the good intentions of raising a healthy crop, which later dies, the Army has not taken the additional steps continuing to feed, water and monitor the progress of its EW program. This essay will argue the causes and effects of neglecting EW. It will explore lack of 'boots on the ground' application, lack of training emphasis and lack of resources.

More than ever before, the wars of the 21st century have proven to be reliant on the electromagnetic spectrum. Iraq and Afghanistan have given our enemies a long term testing ground to integrate the spectrum into command and control, lethal effects and possibly even for intelligence purposes.

In the face of these threats, the Army identified the need to provide its own electronic warriors to combat the threat. It first relied on borrowed manpower and knowledge from the U.S. Navy and Air Force. Now it has its own trained EW Soldiers, schoolhouses, doctrine and some equipment. However, once these systems were put in place, they have gone largely neglected by major subordinate commands. This negligence has resulted in knowledge loss, lack of understanding and ultimately the possible loss of lives and property. The overriding issue is the lack of emphasis by major subordinate commands. Combat units do not use anything that does not go boom, whether it is using their information operations to spread propaganda or their electronic warfare officers to disrupt enemy command and control. When Soldiers

are asked what they know about EW, if anything, the recurrent response by far is, "It's that box in the back of the truck with the antenna." This is not all that EW does and can do. When commanders do not emphasize incorporating their organic EWOs into their military decision making process for missions, the omission cuts out any chance to leverage those assets for maximizing our effect on the enemy. Training exercises emphasize the basics of maneuver, such as platoon or company-sized attacks. These rarely include using multiple resources, such as signal intelligence, close air support or indirect Fires. Leaving out these key force multipliers reinforces not using them in combat. Electronic warfare needs to be included in every operation, training, and combat, in order to properly reinforce how to leverage the assets for victory over the enemy. However, training in garrison is proving to be difficult if not impossible. In order to properly train for EW missions, EW Soldiers need to have equipment to train with. Currently, it is illegal to jam any signal within the U.S. The Federal Communications Act of 1934, established electromagnetic spectrum frequencies as property, therefore making it tantamount to stealing, for anyone to disrupt those frequencies.

However, the U.S. government owns several sections of the electromagnetic spectrum within the United States, and it could remedy this legality by, A) passing a bill in congress exempting the military from jamming on special frequencies and B) creating training equipment that only operated on special frequencies and jamming only those frequencies. This has not occurred as of the writing of this essay. Not training Soldiers on the equipment they are going to use or employ in combat until they are already in combat is irresponsible. It equates to an infantryman not training on his rifle, and not having it at all until he is already taking fire. Without equipment and systems to train with in a garrison environment, we are taking away our EWO's weapons. This also causes those electronic warfare officers, who are in garrison, to lose their knowledge due to atrophy, as they are being used to fulfill other training objectives, such as being the equal opportunity representative, the school's NCO or being used as another assistant S3 operations officer.

Electronic warfare officers are highly trained specialists in the integration and implementation of EW concepts. It is not an issue of the Army not training the EWOs; it is an issue of not training its basic branch leaders and Soldiers about what EW can do. If captains, in their Captains Career Course, do not learn about EW and all the wonderful things it can do for them, they will never know it can be used to gain a tactical advantage against the enemy. Junior Soldiers who aren't taught how to identify faults and operate CREW systems in their convoy training, will not be taught, if at all, until they are in combat. Out of sight out of mind applies here, like not training on how to use a radio before you need to use it. If leaders are not introduced to EW, they will not know it is even an option to employ. Electronic warfare has to be incorporated into all levels of training or it will never reach its full potential.

When Soldiers are asked what they know about electronic warfare, if anything, the recurrent response by far is, "It's that box in the back of the truck with the antenna."

The creation of an EW program within the Army was an essential first step. The Army now needs to follow up that foundation with some walls, flooring and a ceiling. The Army has trained the EWOs how to employ their craft; now it needs to enable them by providing training resources and educating their leaders on how to use them. Planning processes need to have a niche for EW inclusion to help enforce its application in mission planning. The Army uses several techniques to teach Soldiers basic skills. For example, there are training circulars, pamphlets, and other types of visual guides that are mass distributed. In Iraq, we created a basic CREW smart card that we handed out everywhere we went, It contained information such as how to turn on a CREW system, how to Tell if it was functioning, what a fault looks like, and who to contact in the event of a malfunction.

As a part of a base operations order, every staff section creates an annex or appendix to establish basic operations procedures for their section. So along those lines, when the S3 (plans/operations) receives an order, they need to think of all the assets available to the commander – this includes EW. So, in theory, as a part of a Fires appendix and information operations appendix, EW should be leveraged for optimal mission accomplishment. This doesn't always happened, and as a result EW is commonly overlooked.

As a Soldier, who has been doing EW for the last two years in the Army, I offer these observations on why EW is not being properly integrated and applied. The lack of equipment and command emphasis are the two largest and most crippling factors fettering the EW mission. Once the Army steps up and corrects these deficiencies, the acceptance of EW will be more complete, and it will have a greater chance of saving lives and equipment in combat.

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The relevance of technology in Afghanistan

By COL (Ret) Victor M. Rosello, Col. (Ret) David Shunk and COL Michael D. Winstead

Afghanistan, in many ways poses an even more complex and difficult long term challenge than Iraq—one that, despite a large international effort, will require a significant U.S. military and economic commitment for some time.

-Robert M. Gates, Secretary of Defense

It will be a long campaign, a campaign of knives at night, rather than cruise missiles during the day.

-Maj. Gen. (Ret) Lewis McKenzie, Canadian army

Left to right, U.S. Marine Corps Cpl. Liji Sui, Sgt. Richard West and Lance Cpl. Kirby Salmans, from Battalion Landing Team 3/8, 26th Marine Expeditionary Unit, Regimental Combat Team 8, prepare to fire a 120 mm mortar at Combat Outpost Ouellette, Helmand province, Afghanistan, March 6, 2011. This was the first time the new Advanced Field Artillery Tactical Data System's Ballistic Computer 11 software was used in the field. The 26th Marine Expeditionary Unit is deployed to Afghanistan in support of the International Security Assistance Force. (Photo by Gunnery Sgt. Bryce Piper, U.S. Marine Corps)

With the U.S. Army's renewed focus on Afghanistan, it looks at creating conditions to more effectively bring stability to a country that historically has had little stability. Conventional wisdom posits that to have any chance of success, a 'surge' similar to the one in Iraq is needed in Afghanistan. After all, quantity has a certain innate quality all its own, particularly when numbers are essential to securing vast areas under insurgent control. To its credit, quantity can also be accompanied by innovative technological advances that enhance the existing quality of the deployed force. But, can technologically lethal advancements profoundly influence success?

As the U.S. Army fields new and more advanced technologies in the application of lethal force in Afghanistan, this question is at the center of much debate. But perhaps, the answer is staring directly at us in the form of previous lessons and the cold, stark reality of the Afghan strategic landscape. Success may hinge on the ability to learn from the past and to properly address the effects of this landscape.

First and foremost, it is prudent to define the U.S. strategy for Afghanistan. After all, technology is a means to enhance success, not an end to itself. But, as all military professionals know, defining success is arguably one of the more challenging endeavors for a national command authority, particularly the task of matching national security interests with the ends, ways, and means of applying military force. On Dec. 2, 2009, President Barack Obama announced his strategy for Afghanistan. Basically, this strategy (or plan) is threefold. First, the U.S. and allies will maintain pressure on Al Qaeda along the Afghan-Pakistan border. Secondly, the Taliban effort will be countered by sending 30,000 additional U.S. Soldiers to Afghanistan. And third, the goal of training and growing the size of the Afghan military and police forces, along with respective civilian institutions, will be maintained. Nine years later, disrupting, dismantling, or even defeating al Qaeda in Pakistan has been a largely unfinished task. According to an Afghanistan-Pakistan white paper, doing the same to the Taliban in Afghanistan or preventing their return has been equally challenging. Bringing stability and security to this country by expanding, training, and equipping Afghan military and police forces is also time consuming and labor intensive in itself.

Bringing rule of law, while creating a sustainable market economy, remains a formidable objective. Unfortunately, the war in Afghanistan continues to challenge the U.S. Army with a wide array of issues unique to Afghanistan and having no precedence nor equal in Iraq. Even with an articulated strategy, the work would still be challenging and difficult, in light of the differences between the two countries. Applying critical variables of the contemporary operational environment assists in identifying these differences.

SSG Jess Mckinney looks at evidence found during a mission in Bowri Tana in Khost province, Afghanistan, July 17, 2011. McKinney is assigned to the 1st Infantry Division's 1st Battalion, 6th Field Artillery Regiment, 3rd Brigade Combat Team. (Photo by SGT Joseph Watson, U.S. Army)

Strategic Comparison.

Afghanistan presents a unique set of problems: a rural-based insurgency, an enemy sanctuary in neighboring Pakistan, the chronic weakness of the Afghan government, a thriving narcotics trade, poorly developed infrastructure, and forbidding terrain.

-Michael R. Gordon, NY Times Writer

From the standpoint of the nature and stability of the state, Iraq had (and still has) an established centralized rule, law, and statutes to govern, while Afghanistan relies on decentralized government, no centralized rule of law, and predominantly tribal and religious cleric rule. This impacts the ability of the occupying force and the host government to govern effectively from a centralized location in the capital or to represent the interests of all its citizens. Additionally, Iraq relies on a national taxation system, while Afghanistan has no federal system of taxation.

While Iraq has a strong national identity (the notion of an Iraqi), Afghans have regional and complex tribal and ethnic identities. A strong historic warrior figure dominates its culture with seasoned and highly motivated fighters who dislike foreigners. Again, the notion of Afghanistan as a nation or nation-state may have no relevance in the minds of the tribes and ethnic groups and affects the success of counterinsurgency programs or the creation of national campaign plans.

Regarding sociological demographics and with one exception (Kurds), Iraq possesses an overwhelming Arab culture with

SFC Andre Johnson uses a wall for cover as he stands guard near a wheat field in Malajat, Kandahar province, Afghanistan. Johnson is with the 511th Military Police Company, 91st Military Police Battalion, 10th Military Police Brigade. (Photo by SGT Canaan Radcliffe, U.S. Army)

to be growing in numbers and effectiveness. Unlike Iraq where the insurgents were primarily urban based, the Afghan insurgents operate predominantly out of the rural areas, making them more difficult to track, isolate, or engage. They operate from sanctuaries and base camps along the Afghan-Pakistani border and deep inside Pakistan. From these base camps they are able to infiltrate with relative impunity, thereby providing them with a sustainment capability difficult to neutralize. Overall, the terrain favors the insurgent, as it has for countless centuries.

Perhaps, from an overall strategic perspective, the physical environment may have the most impact on the success and failure of U.S. and coalition military operations. With a land size of 437,072 square kilometers, Iraq is about the size of the state of Idaho. With 647, 500 square kilometers, Afghanistan is about the size of the state of Texas. Bottom line, Afghanistan is 200,000 square kilometers or 50 percent larger than Iraq. For historical comparison, it is also five times larger than Vietnam. While Iraq has very hot summers and relatively mild winters, Afghanistan has dry hot summers and brutally cold winters. These temperature extremes not only affect the health and welfare of U.S. Army personnel, but also have an impact on maintenance of vehicles and aircraft. Iraq's terrain is generally flat or with rolling plains, while Afghanistan's is mountainous, rugged, and arid. The high mountainous elevations greatly limit the performance of rotary wing aircraft, as well as slowing down the movement of dismounted infantrymen. Compounding its extreme elevations and dry arid environment, Afghanistan's road system is tenuous at best and very limited in carrying capacity, quite a contrast to Iraq's more robust and dependable national road network and infrastructure. This also creates challenges for logistics and the movement of critical supplies. Although Iraq supports the movement of supplies from ports and over roads and rail networks, Afghanistan is basically landlocked with no railroads, few airfields, and roads.

Finally, regarding national will and time, time does not favor an occupying force. And in the case of Afghanistan, a national will of sorts, although decentralized, has withstood the test of time over the centuries. Like the Vietminh who fought against the French and the Viet Cong against U.S. forces, the Mujahedeen, fought the Soviet Union and now the Taliban fights

one primary language of its majority, the Arabic language with dialects within it. Afghanistan has no common language or unifying culture, but a series of languages that primarily include Pashtu, Dari, and Balochi. Again in this case the various languages create language barriers for effective communication across the nation. Adding to the challenges of communications, Iraq has a functioning educational system, while Afghanistan has a high illiteracy rate reaching 100 percent in rural areas. This marginal literacy rate affects the ability of the government to effectively communicate via normal communications media or means, particularly in the written language.

In regards to economics, Iraq has significant oil revenues to jump start its economy, while Afghanistan has a limited source of national income. Iraq's low to moderate standard of living far outweighs the very primitive standard of Afghan living where no electricity or running water is the norm. This austere patchwork reflects itself on the Afghan life expectancy of 44 years versus the 69 years of an Iraqi. Along with this, Iraq has only a limited problem with illegal narcotics production, while Afghanistan is the world's largest producer of opium. This poses a problem to nation building because this underground economy feeds and provides a livelihood for countless members of the population. Attempts at poppy eradication stress the sociological demographics and economics of a people that rely on subsistence agriculture for their livelihood. This issue further complicates any attempts at improving governance and law. It is a criminal problem, perhaps even larger or more potentially destabilizing than the insurgency itself, unless, of course, it is simply left alone, momentarily. This presents tough choices for any government or occupying force.

From the standpoint of military capabilities, while Iraq's military and police forces are becoming better trained and organized, the Afghanistan security equivalent is still in its infancy. Unfortunately, the Afghan insurgents appear

SFC Robert Russell crosses the Tarnek River in Qalat City, Afghanistan. Russell is a member of Provincial Reconstruction Team Zabul's security force. PRT Zabul is comprised of Air Force, Army, Department of State, U.S. Agency for International Development of Agriculture and U.S. Army Corps of Engineer personnel who work with the government of Afghanistan to improve governance, stability, and development throughout the province. (Senior Airman Grovert Fuentes-Contreras, U.S. Air Force)

the U.S. and its coalition partners. Unfortunately, they appear to be ready to continue their struggle against a foreign invasion force however long this may take. The strength and will of an adversary is certainly a combat multiplier to be reckoned with.

So, a comparison of the critical variables of the contemporary operational environment reveals that Afghanistan is larger, higher, colder, more austere, more ethnically diverse, more socially isolated, more illiterate, less developed, more infrastructure challenged, more rural based, more economically deprived, and has a less organized, but more difficult to impact insurgent mix. Each factor in itself has a bearing and direct impact on nation building through the conduct of military operations. Significant factors like this cannot be dismissed or waved off because they are ever present and will not go away. That is the reality of the Afghan strategic landscape.

SGT Cullen Wurzer, a cavalry scout with Troop B, 1st Squadron, 113th Cavalry Regiment, Task Force Redhorse, 2nd Brigade Combat Team, 34th Infantry Division, Task Force Red Bulls, uses a Long Range Acquisition System to scan his sector of fire while at Vehicle Patrol Base Dandar, Afghanistan. (Photo by SPC Kristina L. Gupton, U.S. Army)

The Soviet perspective. What lessons were learned in Afghanistan and how does technology impact on these? In an effort to glean from the past, the U.S. Army compiled lessons from the Soviet Army experience in Afghanistan. One of the most complete assessments of this experience was the book, "The other side of the mountain," by Lester W. Grau. The following summary from this book focuses on the one aspect of the importance of lines of communications and the use of ambushes:

The strategic struggle in Afghanistan was a fight to eliminate the other's logistics. In Lester W. Graus', "The Other Side of the Mountain, Mujaheden, Tactics in the Soviet-Afghan War," he states that the Mujahedeen targeted the Soviet lines of communication – the crucial road network over which the Soviet supplies had to travel. The Soviet lines of communication were a double lane highway network which wound through the Hindu Kush Mountains – some of the most inhospitable terrain on earth. Soviet military effectiveness depended on its ability to keep the roads open. Control of the road network became a main effort of Soviet combat. In that effort the Soviets lost more than 11,000 trucks. The Democratic Republic of Afghanistan truck losses were reportedly higher. Grau goes on to say that the Mujahedeen effectiveness in interdicting lines of communications was of utmost concern to the Soviets and effectively prevented them from maintaining a larger occupation force in Afghanistan.

Grau also said that security of the LOCs was a constant challenge facing the Soviet forces in Afghanistan. Security of the LOCs determined the amount of forces which the Soviet could deploy in Afghanistan and also determined the scale and frequency of offensive combat directed against the Afghan resistance forces. The Afghan terrain was not ideal for a mechanized force dependent on fire power, secure LOCs and high-technology. Although the popular image of a Mujahedeen combatant is a hardened warrior clutching a Kalashnikov assault rifle, the most important Mujahedeen weapon in the conflict was the RPG-7 anti-tank grenade launcher. The Soviet manufactured, short-range weapon allowed the Mujahedeen to damage tanks, trucks and, occasionally, helicopters. The RPG was a powerful and effective weapon in an ambush. Since the Mujahedeen were light infantry, heavier crew served weapons gave them more staying power in a fight. Mortars, rocket, recoilless rifles and heavy machine guns were essential to the force that intended to hold its ground for a time against mechanized Soviet and Democratic republic of Afghanistan forces. Mujahedeen did vary ambush positions in the same ambush site. Their primary concern was to hit the column where it was the weakest - usually in the middle or rear - unless the purpose was to bottle up the column. In most ambushes, a small number of highly-mobile Mujahedeen were able to move and attack with little logistic support, but were unable to conduct a sustained fight. To reiterate, the RPG-7 was probably the most effective weapon of the Mujahedeen. When used at close quarters, and with the element of surprise, it was devastating.

Mujahedeen success in inflicting heavy losses on the enemy was the result of elaborate planning, secrecy

U.S. Marine Corps Lance Cpl. Brock Wilki, with 1st Battalion, 5th Marine Regiment, scans the iris of an Afghan man at an Afghan National Police checkpoint in the Nawa district of the Helmand province of Afghanistan, to register the man into a computer system database. Wilki is deployed with Regimental Combat Team 3 to conduct counterinsurgency operations in partnership with the Afghan National Security Forces in southern Afghanistan. (Photo by Lance Cpl. Jeremy Harris, U.S. Marine Corps)

in movement, and coordinated action. This became possible through detailed information about the enemy including the size, direction of movement, and estimated time of arrival of the enemy convoy to ambush site. The Mujahedeen were quick to key on Soviet and DRA tactical patterns and procedures and actively exploited them. Unfortunately, the Soviets surrendered the initiative in movement control to the Mujahedeen and never regained it. Consequently, most of the Soviet actions in the area were reactive. In a guerrilla war, the loss of the initiative becomes decisive in the outcome of the tactical combat. Mujahedeen decisions to ambush a long convoy were usually driven by geography, intent and escape routes. If the terrain at the ambush site was very constricted, the guerrilla would want to attack the head of the convoy and block the route with a combination of a road block and burning vehicles. The Soviets had a set pattern of behavior which enabled the Mujahedeen to effectively ambush them. They used the same roads and paths regularly. Soviet combat troop behavior toward the villagers made the villagers willing accomplices in setting the ambushes and hiding the Mujahedeen and their weapons. The DRA had traveling propaganda/civil affairs teams which provided entertainment, medical treatment and pro-regime propaganda throughout Afghanistan. Their actions, however, did not offset the effects of insensitive behavior by Soviet combat forces.

In, "The Bear Went Over the Mountain: Soviet Combat Tactics in Afghanistan," by Grau, he asserts, "The Mujahedeen conducted ambushes for harassment or for spoils. Often, these were small-scale ambushes which would only fire a few rounds into the convoy to destroy or damage some vehicles. Then the ambushers would withdraw without attempting to loot the column before the convoy commander could react." Ambushes conducted for spoils (weapons, ammunition, food, clothing and other military supplies) were normally conducted by larger forces who could maintain their positions for up to an hour. Still, the ambush was a short-term action designed to capitalize on surprise and terrain.

Like their vehicular ambush protocol, the Mujahedeen learned to counter air assaults thorough planning, immediate action drills, an early warning system, and air defense ambushes. They learned to mine landing zones, employ

massed rocket propelled grenade Fires against hovering or landing helicopters, and to try and overrun a LZ before the air assault forces had an opportunity to get organized and oriented. They also learned to 'hug' Soviet forces so helicopter gunships could not fire at them.

One of the more successful Mujahedeen air defense ambushes, according to Grau, involved digging in heavy machine guns into caves in canyon walls. When the Soviet/DRA helicopters flew down a canyon, the machine guns would fire across the canyon filling the air with rounds. The helicopters could not attack the machine guns and were hard pressed to avoid the air defense Fires.

To continue this discussion, Grau's book reveals additional lessons from the Soviet experience in Afghanistan. Some of these are also worth noting:

Modern, mechanized forces are at a disadvantage against committed guerrillas in the middle of a civil war and in rugged terrain. The Soviet-Afghanistan war demonstrated that:

- A guerrilla war is not a war of technology against a poor and unsophisticated adversary. Rather, it is a contest of endurance and national will. The side with the greatest moral commitment (ideological, religious or patriotic) will most likely win the conflict. Battlefield victory can be almost irrelevant, since victory is often determined by morale, obstinacy and survival.
- Secure logistics and secure LOCs are essential for the both the guerrilla and non-guerrilla force. Security missions, however, can tie up most of a conventional force.
- Weapons systems, field gear, communications equipment and transportation which are designed for conventional wars most often work less effectively or fail totally in rugged terrain.
- Tactics for conventional war will not work against guerrillas. Forces need to be reequipped, restructured, and retrained for fighting guerrillas or for fighting as guerrillas. The most effective combatants are light infantry.
- Tanks are of limited utility for the counter-guerrilla force, but can serve as an effective reserve on more ideal terrain. Infantry fighting vehicles and helicopters can also play an important role in mobility and fire support. Mechanized forces usually fight effectively only when dismounted and when using their carriers for support or as a maneuver reserve. Ample engineer troops are essential for both sides.
- Journalists and television cameramen are key players in guerrilla warfare. The successful struggle can be effectively aided when championed by a significant portion of the world's press.
- Domination of the air is irrelevant unless airpower can be precisely targeted. Seizure of terrain can be advantageous, but is usually only of temporary value. Control of the cities can be a plus, but can also prove a detriment. Support of the population is essential for the winning side.

What does this all mean to the U.S. Army effort in Afghanistan today? At the heart of the Soviet experience is the central question: Why did the Soviets fail to achieve military victory in Afghanistan?

First, they were unable to seal the border with Pakistan and Iran to prevent the Mujahedeen resupply of their forces. Second, they were unable to bring enough force into the country due to public opinion (particularly in the third world) and their inability to provide the logistics support necessary with a larger force. Third, Afghanistan is a country of strong beliefs and traditions and the population opposed the Soviets and the hostile Communist ideology of the government of Afghanistan. The Communist ideology directly attacked the ethnic structure, community structure, and religious beliefs of the people and the people violently rejected this ideology. Fourth, the Soviets had little respect for the people of Afghanistan. They used the Afghan People's Army, Sarandoy, the Khad and the local militias ("Defenders of the Revolution") as cannon fodder. These demoralized and inefficient forces regained some of their lost respectability only when the Soviets left. Further, the Soviets conducted indiscriminate air and artillery attacks against the rural

2LT Jeffrey Buchheim, assigned to 1st Infantry Division, requests assistance from an explosive ordinance disposal team after finding an improvised explosive device in Jamal, Afghanistan. (Photo by SSG Andrew Guffey, U.S. Army)

population in order to force them out of the countryside and to dry up the Mujahedeen supply lines.

The Role of Technology in Afghanistan.

Despite the severity and challenges of the task at hand, experiences in both Iraq and Afghanistan indicate that advanced technology can enhance the combat effectiveness of Soldiers in four major areas. These are lethality, survivability, situational awareness, and mission command. It is important to note, though, that these enhancements assist Soldiers to more lethally engage the insurgent through improved military capabilities in a physical environment and do not necessarily improve nation building by helping counter other critical variables, such as the nature and stability of the state, sociological demographics, or the economics of Afghanistan. In other words, technological enhancements generally provide only a means to temporarily secure a country, but not necessarily permanently stabilize it. To begin the discussion, improving the lethality of the combat Soldier figures prominently in the following way:

Yet, technological superiority is not in and of itself a guarantee of success. Insight into our adversary's capabilities, tactics and motivation will provide the decisive edge.
-LTC (Ret) Lester W. Grau

Lethality. The ability to effectively and precisely destroy or close with the enemy by fire and maneuver and fire and movement is vital to a land power. New technologies focus on enhancing the Soldier's ability to deliver precise Fires on moving and stationary targets; better laser designation for targeting; and the ability to detect, track, designate, and engage enemy targets. Both man-portable and vertical take-off UAS provide greater visibility, surveillance, and target detection of the battlefield and would give Soldiers an edge in situational awareness, precision targeting, and engagement. Robotics enhance the agility and mobility of infantry units.

Precision munitions are needed in mountainous terrain and at a firing rate that makes them more lethal and effective. In Afghanistan the insurgents fight just below the ridge lines and jump over the ridge when attacked with direct or indirect Fires. A miss of greater than 50 meters would either go over the ridge and explode many hundreds of meters over, or explode under the ridge line—with the potential for killing or wounding non-combatants or U.S. forces and allies.

The abundance of poor and unusable roads, if they exist at all, and the rugged terrain of Afghanistan, hamper and limit the use of heavy combat vehicles. Light weight systems are vital for mountain operations. The heavy towed 155 mm artillery is limited in its ability to support and is generally restricted to forward operating bases. This limitation makes the 81 and 120 mm mortars the direct support artillery weapons of choice for infantry in contact, despite their smaller explosive yield. Dispersed units that have a greater range than the range of supporting Fires have to be able to protect themselves. However, it is important to note that even lightweight systems may still be affected by the same constraints heavy combat vehicles face, meaning the need to depend on roads, particularly along steep, narrow, and treacherous mountain roads and passes and the vulnerability to more lethal anti-armor weapons and IED's. Robotics are not road bound and will allow for pressing home the attacks on guerrilla forces.

Survivability. As important to delivering precise firepower is the ability for the Soldier to survive on the Afghan battlefield. Modular armor will allow upgrade platforms as armor technologies mature; and an active armor protection system that provides Soldiers additional survivability on a lighter platform against specific threats. Survivability systems are a difficult match. For one they must provide higher levels of protection to Soldier and vehicle, but they must be light enough to not adversely constrain mobility.

Security personnel from Provincial Reconstruction Team Zabul depart for the Zabul Provincial Hospital after an improvised explosive device detonated, injuring two civilian children. Both children were medically evacuated by helicopter for further medical care. (Photo by Staff Sgt. Brian Ferguson, U.S. Air Force)

SSG Derrik Browne and SGT Jason Andrade from 1st Cavalry Division, provide security during a visit by Army officials to Bala Hesar, a fortress in Gardez, Afghanistan. (Photo by SPC Adam L. Mathis, U.S. Army)

Undeniably, any improvements to existing systems through the use of advanced technologies will greatly enhance the mission and the force protection of Soldiers. Additionally, robots and UAS will expose Soldiers to less risk, thereby enhancing their survivability. Networks and robotics will provide the dismounted infantry the ability to identify and destroy antitank ambushes and IEDs.

Situational awareness. The conceptual framework of the 'Quality of Firsts' are qualities intended to address the ability of future Soldiers to operate inside the enemy's cycle of adaptation and to deny the enemy opportunities to take action to quickly regain the initiative. To 'see first', Soldiers must see the battle space in all dimensions. More importantly, they must understand what is important to see. Seeing first involves the exploitation and integration of a wide variety of organic and external information capabilities, the conduct of intelligence activities required to develop the situation in sufficient detail to support planning and decision-making. Improved thermal and optical imagery; layering of sensors for better target coverage; more accurate sensing, breaching, clearing of building and tunnels; remote and rapid alerts with images for small units to assist in clearing buildings; remote reconnaissance, detection, and neutralization of booby-traps, landmines, WMD, and other explosive threats; and the ability to monitor greater areas with fewer Soldiers. Successes in combat will deflate the high insurgent morale, win back the civilian support and negate the increasing military expertise of the insurgents. Supporting 'conflict among the people' and enhancing U.S. ability to maintain persistent surveillance to determine patterns of life or behavior will take the Army from awareness to understanding.

Of the four major areas of improvement, situational awareness or more accurately, 'situational understanding' plays the most critical role of any battlefield system. In Afghanistan, brigade combat teams are covering wide fronts and will be required to do a better job of dispersion and coverage. Achieving information superiority or dominance is a worthy goal, but it is not a realistic one. Good reconnaissance units fight for information because they often do not fight with information. Soldiers will need to monitor greater areas with fewer personnel. Because of the sheer size of Afghanistan, the magnitude of the problem, and the nature of rural insurgencies, situational awareness must provide more precise, accurate, and increased coverage. It is an essential element of the intelligence, surveillance, and reconnaissance process and the backbone of the intelligence collection effort. Man-portable and vertical take-off UAS are just one component of this intelligence effort, as are unattended ground sensors, more robust intelligence interactive

networks, and intelligence sharing systems.

Mission command. Effective communications over longer distances has always been the mainstay of quick reacting and quick responding modern armies. Improvements in Battle Command can be made through the following: the ability to command on the move inside the Joint Network; combat identification to help prevent fratricide; target identification and discrimination to reduce collateral damage; links to more sensors and shooters; and communications relays to extend ranges for operations over more complex terrain.

The greater the decentralized nature of deployed combat units, their physical dispersion, and the more complex the terrain, the more it is that units must rely on solid, dependable, and reliable communications. This is certainly a key factor in Afghanistan. One of the most important technological necessities for the Soldier is advanced communications systems capable of delivering digital voice and images over larger communications links. Multiple feeds from intelligence sensors also empower Soldiers and give them access to the common operating picture. Advanced networks will overcome poor intelligence and C2 limitations of the current force, and will support stability operations with networks that access NGO and other government entities.

Will technology provide an important tipping point for success? As a parting note, Les Grau provides a snapshot of one way to address this question:

The Soviets combat tested a lot of their new technology in Afghanistan. Traditionally, the new stuff first showed up in the Far East against China--the real threat. Then it went to NATO. They used Afghanistan to check a lot of their chemical weapons, new artillery systems, new sensors, new radios, new small arms and new aircraft. They introduced their AK-74 with its M-16 like bullet and found it was the wrong bullet for mountain combat. The RPO flame projector, fuel-air explosives, the SU-27 FROGFOOT close air support aircraft, the 2S4 and 2S9 artillery systems were all big winners in the combat test. They stuck with the old tanks, since the new tanks were improved for the tank-versus-tank role, not what they were up against. Afghanistan has anti-technology geography. Global positioning systems have a 500 meter circular error of probability in the mountains, vapor-clouds FAE don't form correctly… and radio communications are horrible without satellite.

The dust is like powdered emery. We are not willing to get the right technology to theater to make a difference. We still treat the Hummer as a combat vehicle--which it is not. French, Chinese and Russian helicopters fly higher than ours. We have real armored vehicles, but they stay at home. We rely on overhead imagery and predator when we need trained, well-equipped scouts on the ground.

Our infantry carries 85 pounds of light-weight gear. The Roman Legion carried less. So did the American doughboy of World War I--and he was not in the mountains. The American doughboy could also engage the enemy with rifle fire out to 1,200 yards. The M-4 reaches out to 300 meters, but is barely lethal at that range. The average fire fights in Afghanistan are at 20 meters or 800 meters. We rely on our crew-served weapons to respond. Remember the old "don't give away the location of your crew-served weapons" that we grew up with. We now do it when the first round is fired. We say we "own the night" with our night vision devices, but we don't go out at night. We hunker down in forts and wait for the dawn. We travel the same roads where the improvised explosive devices are waiting and we do not take measures to obscure the gunner's vision (smoke, travel at night, and get off road). We are a "one-size fits all" army. We need artillery forward for direct fire in the mountains. That isn't a 155 mm. It should be son of the Pack 75 mm.

Regarding lethality, the authors of this paper agree with Grau.

SGT Richard Toon, with Delta Company, 2nd Battalion, 506th Infantry Regiment, 4th Brigade Combat Team, 101st Airborne Division, provides security atop a mountain during Operation Oqab Behar VI in Paktika province, Afghanistan. (Photo by SPC George N. Hunt, U.S. Army)

Afghanistan's austere landscape presents a challenge to modern technology. From the high mountain elevations to the absence of viable road networks, all of these limit the ability of a modern army to maximize and exploit its technological advantages, particularly its mobility.

This may be more pronounced in the use of armored vehicles on poor roads or narrow and winding mountainous passes. Similarly, rotary wing aircraft are limited on their transport loads or how effectively they can provide close air support at extremely high mountain elevations. Granted that field artillery plays a decisive role in offensive operations, self-propelled artillery is also affected by the same mobility limitations of armored vehicles. However, these limitations are offset by the advantages of precision targeting and firepower of combat vehicles. Consequently, military planners may have to weigh the advantages and disadvantages of using combat vehicles under certain terrain conditions in their operations.

New technologies do provide significant advantages in the areas of survivability, situational understanding, and mission command. The greater use of robotics and drones affords a greater stand-off capability and allows unmanned systems to take on more dangerous tasks, thereby contributing to the survivability of Soldiers. The predominance of intelligence, surveillance and reconnaissance drones provides a tremendous combat multiplier and expanded coverage areas. This is particularly important to the wide territorial expanses present in Afghanistan. The ability to cover greater areas with sensors having greater target coverage, resolution, and that are network capable expands and improves situational understanding, one of the many areas necessary for combat units to achieve information superiority and dominance. Modern digital communication systems provide more responsive communications channels, having higher baud rates, and enhanced battlefield visualization down to platoon and in some cases, Soldier level. Designing a flat communication system which is capable of operating over longer distances is particularly effective in the decentralized nature of military operations in Afghanistan.

SPC Joseph Wilhelm of HHC Scouts, 502nd Infantry Regiment, 2nd Battalion, 101st Airborne Division, patrols through a grape vineyard during Operation Mountain Cougar, Char Shaka, Afghanistan. (Photo by PFC Justin A. Young, U.S. Army)

But will these technological advancements offset the many other challenges that the Afghan landscape presents? Using logic to address these questions, the most likely answer is probably not to the degree that will have a significant impact… for one simple reason. Unless the effects of the nature and stability of the state, national will, sociological demographics, the economy, the physical environment, and the factor of time are effectively countered, the application of advanced lethal technologies to establish security may not suffice.

This may present the military with the same obstacles that prevented previous invading forces from achieving military victory in Afghanistan. If history is any indicator, then the advent of advanced technology may contribute to tactical battlefield gains, but may not be sufficient to achieve strategic or ultimate victory in Afghanistan.

Editors note: The Relevance of Technology in Afghanistan by Victor M. Rosello, David Shunk and Michael D. Winstead is reprinted from Small Wars Journal per the Creative Commons license granted upon its http://smallwarsjournal.com/blog/journal/docs-temp/459-rosello.pdf

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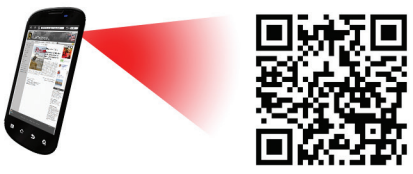


Continental US-optimized defense system against asymmetric ballistic, cruise missile attacks

By Howard Kleinberg

Analysts at the George C. Marshall Institute, Arlington, Va., produced, "The Cruise Missile Challenge: Designing a Defense Against Asymmetric Threats," written by Jeff Kueter and Howard Kleinberg, describing the technical nature, attack capabilities, and the growing scope and extent of the threat of cruise missiles worldwide and to the continental U.S. It also highlighted the threat that rogue states and terrorist organizations could easily pose by using commercial shipping to smuggle nuclear-armed cruise missiles, concealed inside the cargo holds of freighters, or even inside international standard cargo containers, to transport them to within firing range of the continental U.S., using the oceans off either U.S. coast as both hiding places and launching pads.

An illustration of the Club-K Missile System being transported by a cargo vessel. (Photo illustration courtesy of ConcernAgat)

This paper "finishes the job" started by "the Cruise Missile Challenge" and like papers, by briefly describing the threats involved, including both cruise and ballistic missiles, and then by conjoining the two weapon types into a single threat to be defended against with the same set of platforms and weapons, to provide ballistic and cruise missile defense. The crux of this paper is to evaluate the available alternatives for 'sensor' surveillance platforms and 'shooter' weapons and platforms, to determine the lowest-cost, highest-persistence, most effective, i.e., optimal means with which to perform the CONUS ballistic cruise missile defense mission.

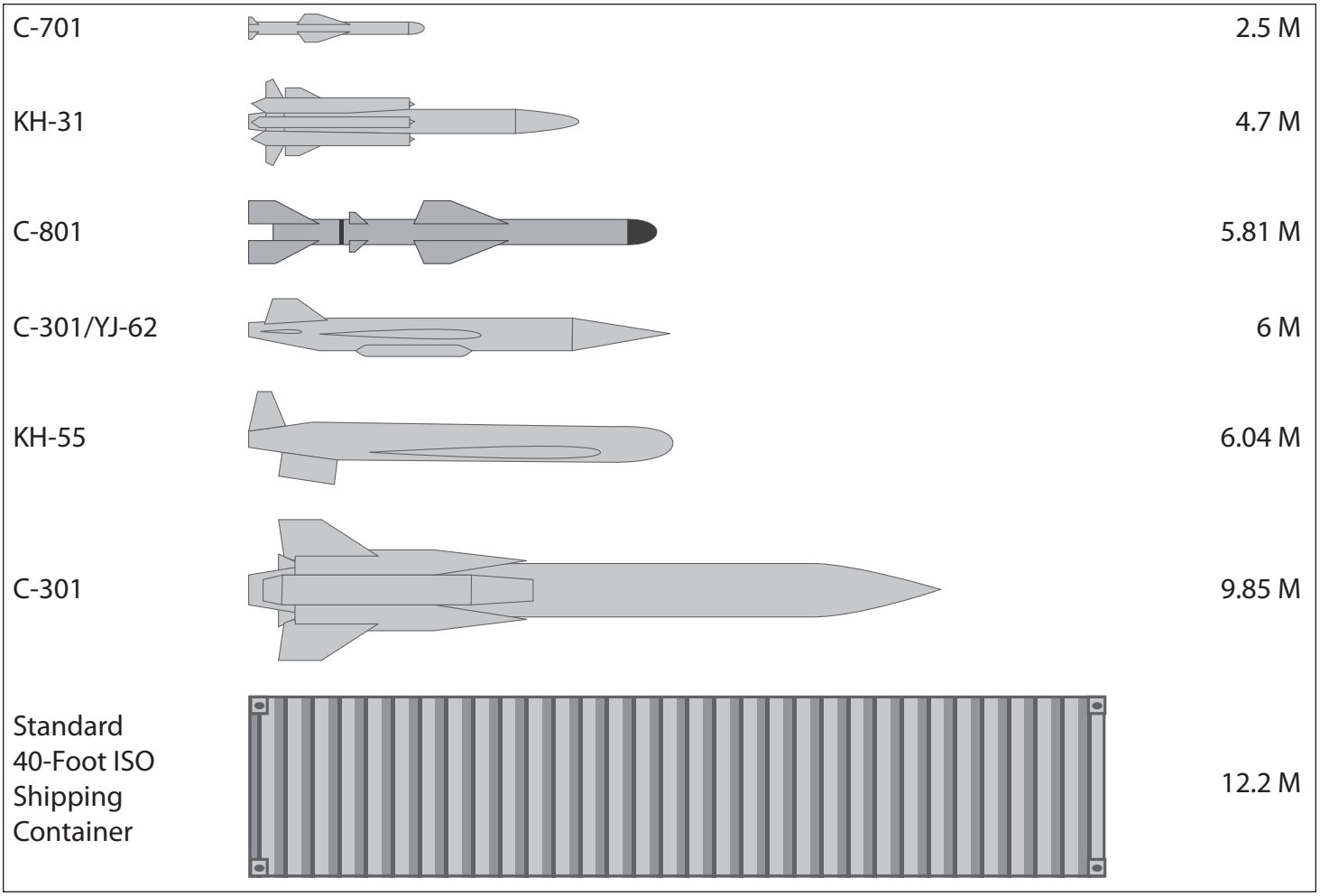
It is the conclusion of this report that, the most effective and cost-effective system for defending the U.S. against asymmetric ballistic and cruise missile attacks, draws upon three near-to-medium-term weapon types: firstly, the Integrated Sensor Is Structure, or ISIS, a very large, lighter-than-air unmanned air vehicle, for wide-ranging, high persistence, and long-range surveillance to be carried by; secondly, the High-Altitude Arsenal Airship, or HA3, a derivative of the ISIS, for carrying large quantities of interceptor missiles; and finally, the AMRAAM-NCADE, the single best weapon with which to intercept both ballistic and cruise missiles.

Asymmetric ballistic and cruise missile threats to the continental U.S.

Ballistic and cruise missiles can be hidden inside a standard shipping container, which can then be transported by ordinary cargo-vessels to within striking distance of U.S. shores. Hundreds of these standard shipping containers can be carried aboard any given freighter, of which there can be up to tens of thousands of such vessels off the U.S. coastlines at any given time. Thus, while an enemy may not have the overwhelming military and economic power of the United States, that enemy can nonetheless do tremendous damage to the U.S. by utilizing an 'asymmetric strategy,' which Kenneth McKenzie defines as, "leveraging inferior tactical or operational strength against the vulnerabilities of a superior opponent to achieve disproportionate effect, with the aim of undermining the opponent's will in order to achieve the asymmetric actor's strategic objectives."

Figure 1 illustrates a sampling of various cruise missile types, showing just how wide a variety of these weapons can be stored inside an ISO container. Similarly, the Club-K Missile System can be hidden inside

Figure 1: Comparison of Chinese and Russian made cruise missiles with an ISO Standard 40-foot shipping container.



Scenario: Hurricane Vlad, Washington, D.C., September 2017

The West's victory over Iran in the 2012, 'Battle of the Straits of Hormuz' was undeniable, even to the most ardently anti-American factions. It was also a devastating defeat and humiliation for several surviving elements of the Pasdaran (Revolutionary Guards) of the now-extinct Islamic Republic of Iran, a humiliation that compelled them to smuggle two of the original batch of six 2,200 mile-range, ex-Ukrainian AS-15 Kent strategic cruise-missiles out of the country as it fell. Somehow, the existence of these weapons was forgotten during the post-conflict stockpile-elimination of Iranian weapons of mass destruction and missile delivery systems. While the Islamic Republic failed to duplicate the Soviets' 200-kiloton thermonuclear warhead, they were able to arm the Kents with equally horrific 15-kiloton warheads, and modify them with booster-rockets for launch from ground- and sea-based platforms, all with covert help from China, Russia, Pakistan… the usual suspects. These Old Guards had fled the fall of Iran, blended in with the rest of the Pasdaran and Hezbollah remnants hiding in the Beka'a Valley of central Lebanon, and bided their time until they could make their move. They sought revenge against all those who had defeated and humiliated them, with the U.S. first and foremost of all. To this end, they had procured a legitimately-registered freighter, with room for hundreds of cargo containers, among which was to be one concealing the two Kents on their home-made erector-launchers.

The Atlantic hurricane season of 2017 was even worse than that of 1995, with over two dozen major storms brewing up throughout the Mid-Atlantic and Gulf of Mexico, and many of them sweeping consistently up along the Eastern Seaboard, causing damage and disruption every time. Evacuations had become something of a routine along the East Coast by August of that year, although freighters were managing to work their way in and out of ports despite the oft-disrupted schedules. As a result, in advance of any such oncoming storm, many freighters simply made their way in and out, off-schedule, and as and when they could. And as another result, Coast Guard ships would sometimes lose track of ships and schedules.

It was during Hurricane Vlad that the Old Guard saw their opportunity. Undertaking a legitimate cargo manifest, their freighter steamed from Liberia, took on 'cargo' in Beirut, and then left the Mediterranean Sea and set out across the Atlantic Ocean. Category 5 Hurricane Vlad tore its way across the Atlantic, then turned north-by-northwest to parallel the Eastern Seaboard towards the Virginia-DC-Maryland landfall, following in the track of several previous such storm-systems that season. When their ship ran into some of the strongest effects of Vlad, several hundred miles off the coast of Cape Hatteras, N.C., it was time. They opened "The Gift from Allah," activated and programmed the missiles, and fired them off into the heart of the hurricane beyond. The Kents, true to their heritage as the best of their Soviet-era-bred naval weapons engineering, flew on as if the day was calm and mild, oblivious to the storm all around them. They held to their programming, skimming fifty meters above the crest of the waves to avoid the worst of the sea swells, and without activating their radars, to avoid detection. When they arrived over the pre-programmed point at the southern end of the Chesapeake Bay, they switched on their digital scene-mapping radars, and began to home in on their final destination, the south lawn of the White House.

It had been years since the Battle of the Straits of Hormuz; everyone thought that the cruise-missile threat had passed with the demise of the Islamic Republic of Iran, and the end of the Global War on Terror. No one was watching for such a thing to happen, anymore; no intelligence had been obtained to indicate that any such plan was afoot; any military force with the power to thwart such things, had either been evacuated far away, or had simply hunkered down, waiting to assist in more mundane, post-hurricane emergency management and relief operations.

The Navy had evacuated its ships far afield, and the Air Force had similarly relocated its aircraft well inland to the nearest regional mid-Western states to avoid the storm. The Kents were very stealthy designs, and had an entire Category-5 hurricane for hundreds of miles around them to quickly and totally swallow what little signature they did have. The cruise-missiles struck the White House with their 15-kiloton warheads at 11:01 am, at precisely the same time of day as when the former Islamic Republic had signed the Armistice documents some two years previously.

an ISO cargo container; and the container can be quickly opened and the missile raised and readied for launch. Using these 'asymmetric' methods, both ballistic and cruise missiles could all too easily be smuggled aboard an innocuous looking cargo ship to within firing range of CONUS, to strike at U.S. targets with very little warning, and potentially even less chance for defense. And worst of all, with 75 percent of the U.S.' population living within 200 miles of the country's coastlines, these regions constitute very 'rich' targets, indeed.

The most blatant evidence for the technical reality of this threat, to date, comes from no less august a nation-state than the Russian Federation in the form of their recent announcement that they will be deliberately manufacturing just such a 'terror weapon', the Club-K Container Missile System, a cruise-missile launcher disguised as a standard shipping-container; worse

The Club-K Missile System is being transported by land using a semi-truck, while hidden inside an ISO cargo container. (Photo illustration courtesy of ConcernAgat)

this container can conceal, deploy, and fire not just one, but four cruise missiles in a matter of moments. Worst of all, these are among Russia's most sophisticated and thus most dangerous Club series of cruise missiles.

The fact that a nation of Russia's stature, a permanent member of the U.N. Security Council, the G8, and a purported 'friend' of the U.S., should produce (and advertise!) something as internationally irresponsible as the seemingly terrorist-market-oriented Club-K container, truly marks this aspect of Russian foreign policy, too, as "schizophrenic," as U.S. Secretary of Defense Robert Gates so aptly put it.

However, the Russians are neither unique nor even the first to build something this pernicious. As the 2009 report by the Interim Working Group (authors of "Missile Defense, the Space Relationship, and the Twenty-First Century") observed, "In August 2004, then Secretary of Defense, Donald Rumsfeld emphasized that, 'One of the nations in the Middle East had launched a ballistic missile from a cargo vessel. They had taken a short-range, probably Scud missile, put it on a transporter-erector launcher, lowered it in, taken the vessel out into the water, peeled back the top, erected it, fired it, lowered it, covered it up. And the ship they used was using a radar and electronic equipment that was no different than 50, 60, 100 other ships operating in the immediate area.' U.S. officials have suggested that Rumsfeld was referring to Iran, which tested a ship-launched missile in the late 1990s."

Conventional systems too costly for complete and sustained CONUS coverage.

The continental U.S. simply cannot be defended against asymmetric missile attacks on a continuous, full-coverage basis, by 'forests' of land-based defensive missile systems; the costs are simply too great. The same holds true for the costs to deploy and continuously operate manned air-combat defense systems, or that would be needed to line the coastlines for standing defenses verses BCMs, as was pointed out in, "The Cruise Missile Challenge:"

"While front-line combat aircraft are profoundly capable assets, they are not optimal resources on which to base an effective and cost-effective continuous defense against cruise missiles. Fighters are too expensive to operate and maintain and have very limited on-station endurance, regardless of whether they are based on land or aircraft carriers. Costs to operate a fleet of aircraft of sufficient size to patrol both U.S. coasts are prohibitive, in terms of materiel and especially in exhaustion of aircrews and support personnel, as was seen in the post-9/11 defensive Combat Air Patrols. For instance, the CAPs maintained over Washington and New York, in the wake of 9/11, costing the U.S. Air Force and Air National Guard some $30 million a week, and 'wreaking havoc on units.' CAPs can provide defenses against cruise missiles during times of high threat, but not on a permanent, sustained basis. Further, interception times and basing locations may not permit the interception of cruise missiles on short notice as might well be the result of surprise launches of cruise missiles from offshore cargo ships (or submarines.) Combat aircraft are best employed in in-theater warfighting, which is their primary function.

In, "The Collapse of the Soviet Union and Ronald Reagan," Ronald Hilton states it was arguably the deployment of a continent-spanning, highly complex, extensive (and expensive) integrated air defense system for defense against aircraft, and ironically, the then-newly-created cruise missiles that helped to break the financial back of the Soviet Union, thus ending the Cold War. This all-to-recent cautionary tale alone merits a more measured selection of an affordable, and yet

far more persistent architecture for surveilling and defending CONUS against asymmetric cruise and ballistic missile attacks in the current era.

The U.S. coastlines cannot be continuously patrolled and defended by U.S. naval missile defense assets. In, "Long-Range Ballistic Missile Defense in Europe," Steven A. Hildreth and Carl Elk, state that President Barak Obama's administration has chosen to eliminate land-based ballistic missile defense systems for Eastern European-based defense against Iranian threats, and to replace them with U.S. Navy Aegis warships. This new Eastern European mission-set, atop the existing East Asian and Middle-Eastern BMD overseas commitments, means that even fewer BMD ships would be available for CONUS defense during a time of overseas crises. And unfortunately this all but eliminates sea-based systems as the primary option for an affordable, full-time, continuous patrol and defense of CONUS against asymmetric threats, as well.

Additional threat: asymmetric suppression of CONUS air and missile defenses.

Yet another reason to be concerned about the effectiveness of fixed-site missile defenses is that a 'smart' asymmetric enemy might first launch attacks against CONUS defenses themselves, before launching its 'main' attacks, say, on U.S. cities. For instance, Iran recently revealed its 'Karrar' so-called 'bomber-drone,' in August 2010, which it claims to have a range of 1,000 kilometers, a service ceiling of 40,000 feet, and a payload of up to 1,000 pounds of bombs or precision-guided munitions. While the Karrar is no Reaper UAV, and it might 'merely' be capable of V1 'Buzz-Bomb'-style terror attacks on Western targets, whether launched from Iran or Iranian-controlled territories, it could similarly be used in asymmetric attacks from ships off the shores of Western nations. However, the authors of, "Karrar – Iran's New Jet-Powered Recce and Attack Drone," say this weapon appears to be a cross between a cruise missile and a UAV, leading some analysts to conclude its mission may indeed be BMD suppression.

Regardless of the type of weapon used, should an asymmetric enemy have the resources to first launch Suppression of Enemy Air Defense strikes against CONUS air- and missile-defense bases, in order to clear a path for the 'main' asymmetric BCM assault, the fact is that ground-based fixed-site CONUS BMD defenses are themselves vulnerable to attack, and thus cannot be counted on by themselves to protect the U.S. homeland. And since any one freighter can carry a great many cargo containers, the possibilities for a sophisticated, large-scale asymmetric missile "barrage" attack become all the more ominous. Greater in-depth defense is needed to counter this threat, as well.

Solution: Use lighter-than-air unmanned aerial vehicles for full-time CONUS defense.

Given the limitations of land- and sea-based BMD, and by implication, CMD, we must turn to the last remaining medium: namely, airpower-based missile defense. In, "The Role of Airpower in Active Missile Defense," Mike Corbett and Paul Zarchan describe the numerous advantages of airpower basing for missile defense, as follows: "Airpower enables a distributed operational concept that can engage the theatre ballistic missile threat during the boost, ascent (early mid-course), and terminal phases of flight by using common air-launched interceptors and a common aircraft-carried sensor. Airpower applied to missile defense provides more than simply a platform that can get close enough to the launch point to engage in the boost or ascent phase, or respond fast enough from ground alert to engage in the terminal phase. Airpower applied to missile defense allows a commander to focus defensive capability with the same speed and flexibility commonly associated with attack operations. Instead of utilizing a fixed defensive deployment tied to stationary radars, a commander could rapidly establish or reinforce a defensive posture, move aircraft forward to pursue boost or ascent engagements, or cover the movement of surface forces with a combat air patrol providing terminal defense."

Having established airpower as the best medium for BCMD, the next challenge is to determine which platform is the best (i.e. most effective and cost-effective) to perform this mission. From the previous analysis, manned aircraft are not the answer, for reasons of cost and aircrew exhaustion. Recall also that CONUS has an immense territory and corresponding airspace to survey, and this coverage must also be continuous to be effective. In addition, the U.S. needs to do so as cost effective as possible. Figure 2 lists the relative hourly costs of several representative air platform types.

> While front-line combat aircraft are profoundly capable assets, they are not optimal resources on which to base an effective and cost-effective continuous defense against cruise missiles.

From Figure 2 and per Michael C. Sirak's article, "Game Changers," lighter-than-air vehicles are easily the lowest-cost and, by far, the most persistent of the available surveillance platform technologies. No other platform can match the hourly operating costs of an LTA; nor can the others match the sheer persistence of an LTA, but specifically an unmanned LTA: instead of a handful or few score of hours, operating missions are measured in days to years.

There are other advantages to be had from operating LTAs in or near CONUS airspace. First and foremost, among these is that the CONUS air

environment is a highly benign one. No adversary is likely to challenge the U.S. for control of the air over its own home territory anytime soon, in which case, LTAs would be safe operating in this benign air environment.

Second, the mission itself permits the use of aircraft that needn't be capable of high-energy maneuvers to survive and win their engagements; rather, CONUS defense platforms can 'get away with' being as slow and large as necessary, in order to perform the ballistic and cruise missile defense surveillance and active defense mission. Only the interceptor weapon itself needs to be able to travel and maneuver rapidly, not the platform. Third, the performance factors, of practically continuous flight-operations and very low operating costs, are more important for this mission than sheer speed, so long as the air vehicle itself is mobile. Fourth, even if an adversary was able to attempt to take control of the air, even if only within a small zone and for a brief period of time, and was to attempt to down a defending LTA, the latter would prove to be very difficult for counter-air radars to find and track, and especially to shoot down.

As Lake observes, "…the extreme altitude (65,000 feet), low radar cross section and negligible velocity all make targeting an LTA extremely difficult task. Considering all the [SAM author] systems with enough reach, of these only the SA-2 and SA-5 have been exported in any great number. Should an attack occur, the LTAs' inherent ability to endure several small punctures from an exploding SAM warhead will allow for a gradual and controlled descent."

Finally, and vitally, Corbett and Zarchan point out that high launch-altitude is far more important for increasing the performance of interceptor missiles than is the speed of the launching platform, another factor playing to the strengths of LTAs: "…launching an interceptor missile above 12 kilometers altitude has a significant impact on its performance. Although a supersonic fighter may be traveling only 0.2 kilometers/sec, launching the interceptor missile at an altitude above 90 percent of the atmosphere has the effect of reducing aerodynamic drag on the missile, and may add over 1 kilometers/sec to the interceptor's burnout velocity."

All of these factors add up to one aircraft type already under advanced stages of development: the High-Altitude, Lighter-Than-Air, Unmanned Airship.

Lighter-than-air vehicles: combat-proven for more than 70 years, and counting.

Contrary to widespread belief in defense circles, not only are LTAs capable of serving in a modern armed conflict, but they, in fact, already have a very successful and ongoing history of combat operations. Their history began in World War II, ironically enough, with combat operations in defense of both of the U.S.' coastlines, and continues (albeit interrupted in the interim) in overseas combat operations today. The following excerpt from "Airships and Balloons in the World War II Period,' of the U.S. Centennial of Flight, describes the roots of this triumphant history: "The United States was the only power to use airships during World War II, and the airships played a small but important role.

The Navy used them for mine-sweeping, search and rescue, photographic reconnaissance, scouting, escorting convoys, and antisubmarine patrols. Airships accompanied many oceangoing ships, both military and civilian. Of the 89,000 ships escorted by airships during the war, not one was lost to enemy action."

These WWII airships also performed a powerfully similar role, and did so with great distinction: The Navy airships patrolled an area of over three million square miles (7.8 million square kilometers) over the Atlantic and Pacific oceans and the Mediterranean Sea during the war. They could look down on the ocean surface and spot a rising submarine and radio its position to the convoy's surface ships."

According to the article, "Army Deploys 300th RAID Tower, Supporting Forward Base Protection by Persistent Surveillance and Dissemination System PSDS2," unmanned LTA's are also in widespread use today in Afghanistan (and previously, in Iraq) where some 60 tethered, unmanned blimps, or 'aerostats,' are in use by the U.S. Army to survey vast swathes of territory for signs of enemy movement. Systems like the Rapid Aerostat Initial Deployment use a combination of 80 foot- or 107 foot-high towers, and 56 foot-long aerostats carrying 200-pound sensor payloads (EO/IR, radar, acoustic gunshot detectors, or radio frequency signal interception equipment) at altitudes of up to 1,000 feet, and according to, "The Curse of 24/7 Surveillance," from this altitude, the aerostat's radar can detect vehicles out to 125 miles. The combination of aerostats, towers, and supporting deployment and monitoring equipment goes by the

Figure 2: Cost per hour and persistence comparison for ISR platforms. (Information provided by the Naval Research Advisory Committee)

Platform	Cost/Flight Hour	Endurance (unrefueled)
AWACS	$20,000	11 hours
JSTARS	$20,000	11 hours
E-2C	$18,700	4.7 hours
Global Hawk	$26,500	35 hours
Predator	$5,000	40 hours
Airship (manned)	$1,800	'Few days.'
Lighter-Than-Air (unmanned)	$3,000	1 year; goal of 10.

Soldiers of Headquarters, Headquarters Troop, 1st Squadron, 152nd Cavalry, 76th Infantry Brigade Combat Team, Indiana U.S. Army National Guard, prepare to moor the Rapid Initial Aerial Deployment at Camp Liberty, Baghdad. (Photo by SSG James E. Brown, Jr., U.S. Army)

designation "Persistent Surveillance and Dissemination System," or PSDS2.

Use high-altitude airships for truly persistent aerial surveillance.

Lake writes the High Altitude Airship was originally proposed as a quasi-geostationary high altitude long endurance aircraft for the CONUS missile defense airborne early warning role. It would enable lower-cost, extremely persistent, longer-range detection and engagement than current alternatives.

Perhaps most of all, it would enable truly HALE sorties in weeks or months, far longer than any other air platform. It is a UAV that uses no fuel; provides geostationary on-station persistence and coverage; operates in the air-threat-free, 'benign' CONUS air environment; and its 70,000 feet altitude puts the radar horizon some 300 miles away, for a 750 mile-diameter surveillance area.

Integrated sensor is structure leads the way.

So, if HAAs are the optimal technology for CONUS BCMD, why aren't they already deployed? The answer is the technologies required to make them work truly effectively are still under development. Fortunately, at least one such vehicle, the HAA's specialist/descendent, the ISIS, for "Integrated Sensor Is Structure," is currently under advanced stages of development, to the tune of $400 million.

The ISIS makes the most of this large vehicle's internal volume to both carry a huge radar array, and to use that self-same huge radar array as part of the vehicle's internal structure. As Donna Miles reports, "A giant, unmanned airship capable of hovering at about 70,000 feet promises to give future warfighters an unprecedented eye on the battlefield… The Defense Advanced Research Projects Agency's, Integrated Sensor Is Structure program, ISIS for short, will provide a detailed, real-time picture of all movement on or above the battlefield, explained program manager Timothy Clark."

As envisioned, the ISIS airship will be able to track troop movements – friendly, as well as enemy - up to 180 miles away, and track the most advanced cruise missiles from about 370 miles away. It also will be able to watch ground targets through heavily forested areas, a capability not possible without the huge ultra-high-frequency antenna ISIS will provide.

"Operating outside of controlled

air space and out of the range of most surface-to-air missiles, Clark said, the system will bring a capability not possible with satellites: the ability to maintain watch over a huge, fixed position without blinking… ISIS is expected to have a 10-year lifespan, although engineers estimate it could last even longer. When it's no longer needed in one location, it can be moved to watch another. "We should be able to get it to anywhere the services would need it in about 10 days," Clark said…

"Since the program's inception in 2004, its focus has been on developing technologies needed to create extremely large, super-sensitive, but also super-lightweight phased-array radar antennas. That's been accomplished, with 6,000 square meters of X-band and UHF antenna condensed onto a 40-by-46-meter cylinder - about the size of a 15-story apartment building."

Meanwhile, the antenna's weight has been cut 90 percent, from 20 kilograms per meter to about two, according to Clark, "Powering the system so it can stay aloft was another challenge. Batteries were too heavy, so engineers tried something else. They opted to use solar rays during the daylight hours and to electrolyze water, storing the hydrogen and oxygen separately so they could be run through a hydrogen fuel cell at night."

Vivid evidence of the relative efficiencies of ISIS compared with other surveillance platform types also comes from Tim Clark: "From 1991 to 2003, the United States maintained a no-fly zone over southern Iraq at a cost of $1.4 billion… If we had ISIS, we could have done both the northern and the southern no-fly zones for $30 million."

Additional sensor for ISIS: airborne infrared sensor system.

ISIS needn't depend solely on radar for its missile-detection capabilities; According to Amy Butler, author of "MDA Eyes Missile-Detecting Infrared Pod," the MDA is developing the Airborne Infrared sensor for Reaper UAVs, fitted within a small and easily attached pod, to enable them to spot ballistic missile launches from over 1,000 kilometers (620 miles) away. ISIS could also be fitted with ABIR, almost doubling its radar-based 350 miles detection range against boosting ballistic missile targets.

Proposed CONUS defense weapon: The High Altitude Arsenal Airship.

Given that ISIS arguably forms the single best detection platform with which to survey all of the U.S.' coastlines on a continuous and highly detailed basis, the next question arises: what is the best weapons platform with which to defend CONUS against the asymmetric CBM threat?

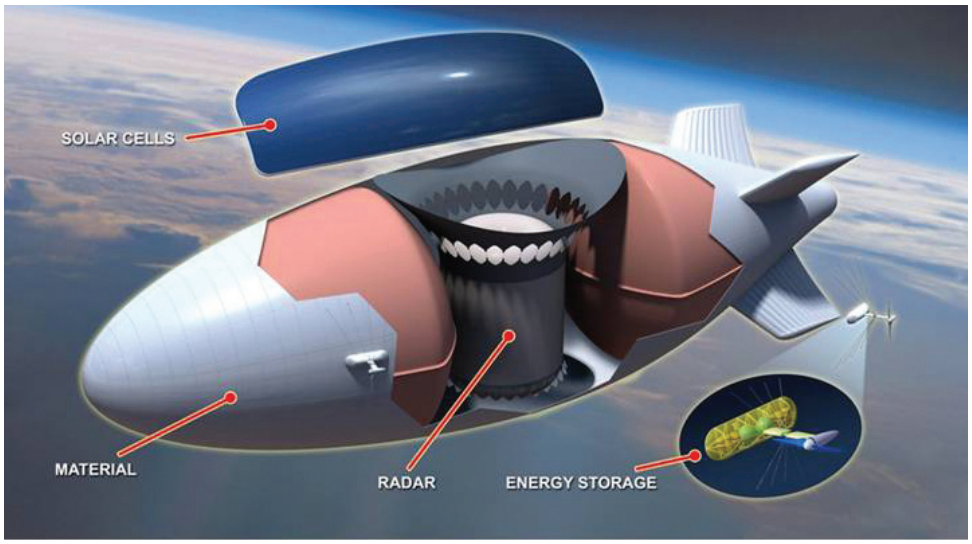
To solve this problem, this article proposes a weapon-carrying variant of the ISIS design, by taking it back to its High Altitude Airship roots: namely, a High-Altitude Arsenal Airship, or HA3. This proposed variant would supplement the 'sensor' ISIS with a 'shooter' version, bearing the same advantages of maximum-persistence, wide-area coverage at similarly minimum operating costs compared with either powered airborne or manned surface systems. It would also draw upon the original HAA's proposed 12,000-pound payload as the basis for a long-duration, high-altitude patrol point in near-space from which to cover and defend large areas. With such a large payload, HA3 would provide sufficient defensive firepower to cover CONUS and engage a volley of incoming ballistic and/or cruise missiles, or enough at least, to "hold the line" long enough for other defenses or countermeasures to come into play.

The HA3 would leverage ISIS' airframe, along with any of a number of BCMD-capable weapons either in existence, under development, or tailor-made to this mission-set. Economies of scale, standardized platforms, and greater mobility than ground-based systems, with far greater coverage due to its near-space operating altitude, are all advantages accruing to both the ISIS "sensor" and HA3 "shooter" versions.

Greater operating altitude minimizes the number of platforms needed to defend as well as monitor the greatest possible amount of territory and airspace per platform; it also provides greater range for air-to-air weapons.

Being airborne further means being able to patrol and redeploy to anywhere over CONUS, or the world, as may be needed. Finally, ISIS and HA3 missions could include Homeland Security, defense of fielded forces, friends and allies, and at-sea naval fleet defense.

A cut-away view of the Integrated Sensor Is Structure lighter than air unmanned aerial vehicle. (Photo illustration provided by Defense Advanced Research Projects Agency)



Weapon	Status	Mission	Weight (lbs)	Range (mi.)	Max. Load-out
Talon	Abandoned	BMD; CMD?; Anti-UAV?	~100	125	120
Patriot PAC-3	Operational, combat-proven	BMD, CMD, AA, Anti-UAV	700	12 (Note: Ground launched range	17
AMRAAM-NCADE	MDA Concept Development/Risk Reduction	BMD; CMD?	330	94	36
Stunner	Advanced development w. the Israeli MOD.	BMD, CMD, AA, Anti-UAV	450 (est.)	22 (Note: Ground launched range	26

Figure 3: High-Altitude Arsenal Airship weapons load-outs based on nominal 12,000-pound payload capacity. Note: ranges listed here are provisional; launching from an altitude of 70,000 feet yields a significant increase in range compared to those achievable via ground-launched or even most fighter-launched modes.
(Information provided by Howard Kleinberg)

Analysis of prospective HA3 BCMD weapons loadouts.

The next challenge lies in determining the weapons loadout to be carried in an HA3. Optimally, a single weapon type must be carried, so that the weapons carried would be equally effective against both ballistic and cruise missiles. In this way, regardless of the types and numbers of missiles launched in an actual attack, the in-situ loadout will be fully effective against any combination of either weapon type. Further, only air-carried BCMD-capable interceptor weapons are considered here, to maximize the possible numbers and efficiencies of the weapons carried aloft.

The Talon has arguably the greatest missile-defense potential, with primary capability against ballistic missiles that can also be applied against cruise missiles, alongside the greatest range, and by far the lightest weight. In, "Defending America From Offshore Missile Attack," Henry F. Cooper writes that this weapon was a derivative of "mature technology for building space-based kill vehicles," from the late-Cold-War-era Brilliant Pebbles missile-defense program. The primary drawback with this weapon is that it simply doesn't exist. It is truly unfortunate that its development was never completed; Talon would have been the best choice, on paper at least, given that it is the smallest, lightest, and longest-ranged of all the weapons available. Nonetheless, given its non-development, non-deployment status, alongside the current political and economic climate, it would be all but impossible to resurrect a program that was cancelled nearly two decades ago, and restart it virtually from scratch. All of these reasons eliminate Talon from practicable near-term consideration.

While the Stunner, a joint U.S.-Israeli next-generation missile-defense weapon, is doubtlessly to become a highly effective multirole interceptor once its development is complete, it, too, has drawbacks: Firstly it is essentially a foreign program, which would make it difficult to promote as a high-profile U.S. Homeland defense procurement item; it is most likely much heavier than all the other alternatives except the PATRIOT PAC-3, which the Stunner is to replace in Israeli inventories. Thirdly, and critically, it has no stated capabilities against boost-phase ballistic missiles, per se, being meant primarily for mid-course and terminal-phase interceptions. For all these reasons, then, it, too, is thus eliminated from further consideration.

Similarly, the PATRIOT PAC-3 is a surface-to-air missile, and is by far the heaviest of the weapons listed here; it also has the shortest range. For these reasons, it too is eliminated from further consideration.

And the winner is: AMRAAM-NCADE.

Fortunately, there is one remaining alternative solution for the problem of finding one interceptor weapon available at least in the medium-term; one that would be equally capable against both cruise and ballistic missiles, but especially against the latter in their boost-phase; one that isn't unduly heavy, to enable as many weapons to be carried by the HA3 as possible; one that is based on an existing, well-established weapon; and last but not least, one that is or would be readily available if given the minimal

NCADE is potentially several times faster than an AMRAAM, and can be employed from various platforms against stealthy cruise missiles, homing in on their jet engine exhaust with cueing from advanced infrared scanners and radars mounted on high-altitude aerostats or airships like JLENS or HAA/ISIS.

additional funding. This optimal weapon solution is the AMRAAM-NCADE, a two-stage, Boost-Phase-BMD-mission-specific derivative of the well-established AMRAAM air-to-air missile, currently under development.

AMRAAM-NCADE is the only air-launch-capable missile-defense weapon that is currently under MDA-funded Concept Development and Risk Reduction. It is also ultimately capable of cruise-missile defense, as will be explained later. First to the BMD mission: Corbett and Zarchan point out, "The Net Centric Airborne Defense Element is an interceptor roughly the size of today's advanced medium-range air-to-air missile. Similar in shape to an AMRAAM, the two-stage NCADE lacks a warhead but has an infrared seeker. The seeker guided on and hit a boost-phase target in December 2007; subsequent testing revealed significant capability in terminal intercepts as well. Due to its large fuel-to-mass ratio, two stages, and very light guidance system, NCADE is potentially several times faster than an AMRAAM. Such speed allows it to close rapidly with a boosting missile, giving it a maximum employment range of about 150 kilometers. However, that range depends upon the threat's aspect, acceleration, and distance into its flight when the interceptor launches. NCADE's proposed design also includes a lateral propulsive capability, which could enable some intercepts well above 35 kilometers altitude."

NCADE also lethal against stealthy cruise missiles.

NCADE would be lethal against cruise missiles and other air-breathing targets, in addition to fast-moving ballistic missiles, despite the lack of a warhead, due to its direct-impact homing and ultra-high velocity, also known as "hit-to-kill:" as Corbett and Zarchan point out, "NCADE is potentially several times faster than an AMRAAM," i.e., several times faster than Mach 4, meaning that NCADE would be traveling at speeds well into the hypersonic realm (Mach 5 or higher,) and thus, would have more than sufficient speed to achieve a kinetic-energy kill. As the staff of the Defense Industry Daily pointed out, "NCADE could be employed from various platforms against stealthy cruise missiles, homing in on their jet engine exhaust with cueing from advanced infrared scanners and radars mounted on high-altitude aerostats or airships like JLENS or HAA/ISIS. At just 330 pounds, its low weight makes it easy to lift by long-endurance aerial platforms… offering a persistent cruise missile defense option that cannot be matched by manned fighters alone."

Some experts say that NCADE would also be lethal against all varieties of air-breathing targets in addition to ballistic missiles, thanks to its use of the state-of-the-art Imaging Infra-Red Sensor and guidance technology, taken from the already-operational AIM-9X Sidewinder. The AIM-9X can be used against cruise missiles as well as aircraft; and since an RF datalink is already part of NCADE's guidance system, to provide it with in-flight updates to put it into position for its terminal homing phase against ballistic missiles, NCADE can thus also be used against cruise missiles, UAVs, UCAVs and aircraft, in addition to its primary Boost-Phase Ballistic Missile Defense mission.

Indeed, IIR-guided missiles are already combat-proven against UAVs. Peter La Franchi, writes in, "Iranian-made Ababil-T Hezbollah UAV shot down by Israeli fighter in Lebanon crisis," the Israeli Air Force using Python-5s fired from an F-16 fighter to down a Hezbollah-launched UAV during the 2006 Lebanon War.

As a result of its ability to conduct hypervelocity hit-to-kill intercepts of all types of airborne targets, alongside its other previously-cited advantages, AMRAAM-NCADE is thus the optimum choice as the single defense weapon type to be carried by the HA3 for use against all foreseeable asymmetric missile threats. In addition, NCADE should be ready

An illustration of the Club-K Missile System being transported by a cargo ship. (Photo illustration courtesy of ConcernAgat)

in a few years' time, about the same time as the ISIS and (hopefully not too much longer afterwards) an HA3 derivative to carry NCADEs.

Boosted-NCADEs for defense against EMP attacks.

Robert L. Pfaltzgraff Jr., and William R. Van Cleave, authors of, "Independent Working Group on Missile Defense, the Space Relationship, and the Twenty-First Century – 2009 Report," state that one of the cornerstone threats posed by asymmetric ballistic missile attacks is that they could be used to deliver a nuclear warhead to detonate in space over CONUS, at an altitude of anywhere from, "a few dozen kilometers," to 400 kilometers or higher; the effect of such a burst would be an extremely powerful electromagnetic pulse that would shut down virtually every form of electrical or electronic technology across the country, effectively destroying all of modern civilization in the U.S. in a mere moment, and with only one nuclear weapon. Figure 4 shows the area of the U.S. that would be affected by an EMP burst, with the area affected being a function of detonation altitude.

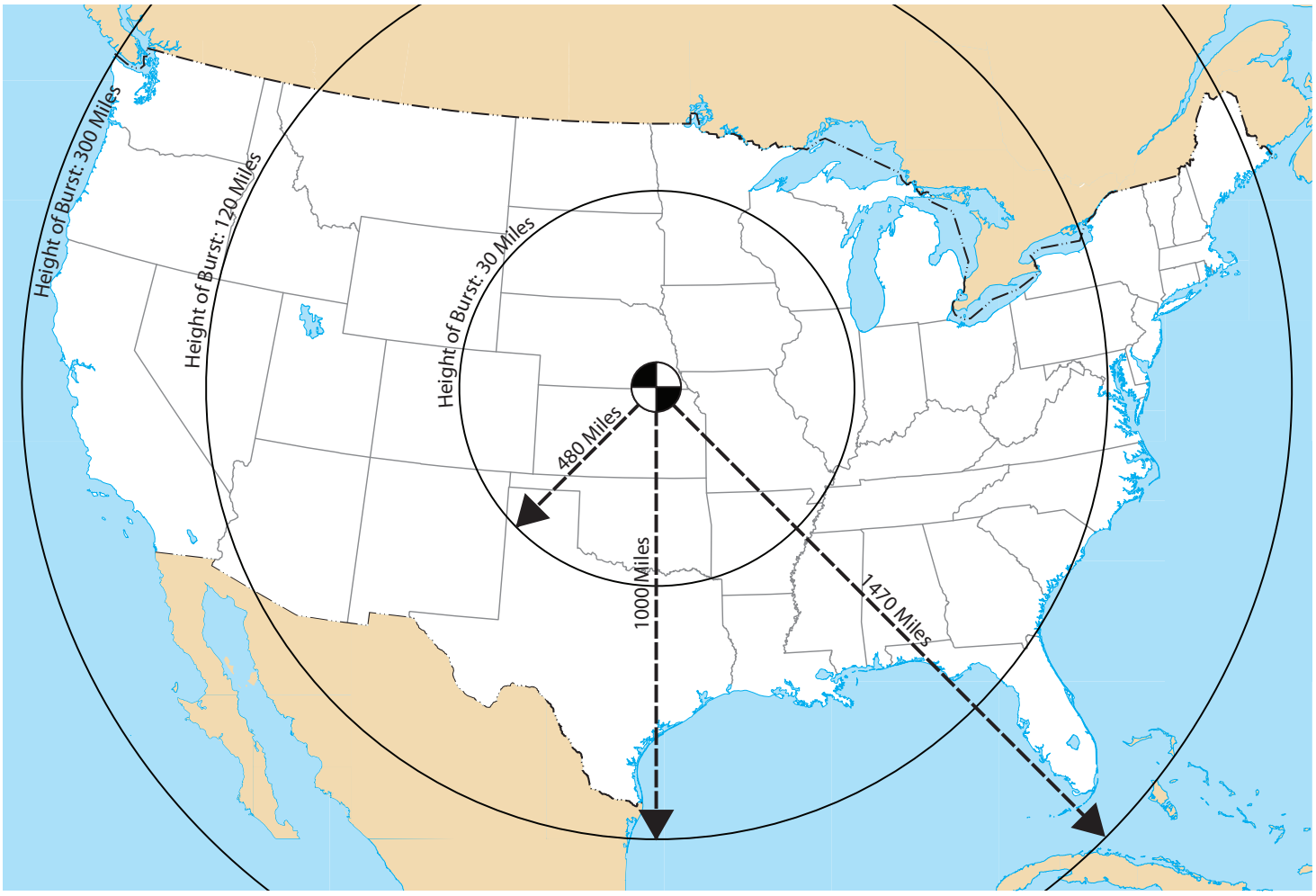
AMRAAM-NCADE-equipped HA3s could also have a role to play in defending CONUS against EMP attacks, not only against the offshore-launched boost-phase 'asymmetric' ballistic missile attacks that may propel such weapons into position over the U.S., but also against longer-ranged weapons that could also be used to this end.

However, NCADE may not be capable against such high-altitude targets in its current configuration, and may need the extra speed and near-vertical initial 'boost' of a high-performance fighter such as an F-15 to function as a launch-vehicle to reach such high (LEO) altitudes. Alternatively, this extra energy could be provided without having to have a high-performance fighter launch it; instead, the AMRAAM-NCADE could be equipped with an extra rocket booster stage, such as is used in the Israeli SAM version of its Derby air-to-air missile. Indeed, the Stunner, also essentially a surface-to-air missile, has just such a booster stage as 'standard.'

While further study would be required to determine whether or not an additional booster would truly be required to reach the altitudes in question, an HA3 carrying AMRAAM-NCADEs could also prove to be the most cost-effective answer to the EMP threat, as well as to asymmetric CBM attacks on CONUS.

Assuming that the Stunner's booster-stage weighs about 200

Figure 4: A depiction of the effected area from a electromagnetic pulse in correlation with the height of the blast. (Information provided by the House National Security Committee)



Scenario, Redux: Hurricane Vlad, Washington, D.C., September 2017

Two elongated elliptical silhouettes float silently, over 12 miles high up in the sky, far above the ocean, to the East of the Washington, D.C. zone, and well beyond the reach of the hurricane and its angry, tearing grasp. Dark, enormous, cigar-shaped, they are an ISIS-HA3 duo, patrolling the skies, watching and guarding over all that moves, so many miles below. Hurricane Vlad churns below, and reaches both far out to sea and far inland. All other defense systems, planes, and ships, have fled far afield to escape the hurricane's wrath, but not the airships; not the unmanned, automated, ever-vigilant protector airships.

For the past several days, the airships have monitored frantic air and sea activity, as all the myriad vehicles around the region, from aircraft, to shipping, trucks, trains and cars, all made their hasty exits. Now, things were quiet; at least, quiet in terms of the lack of traffic below.

At 4:43 am EST, the ISIS' enormous, nearly-double-a-football-field-sized internal radar detects two bogeys headed northwest through the east side of the hurricane; the objects are a few kilometers apart, skimming low over the waves, and traveling at some 500 knots. They fly about 50 meters above the seas, riding higher to avoid the worst of the storm-surging waves.

Processors aboard the ISIS identify the objects as probable cruise missiles, with no IFF 'squawk' return identifying signal. The objects, data, and tracks are fed in real-time via satellite down to NORAD, DHS, NORTHCOM, and on down to Langley AFB, VA; all are issued automatic alerts of the incoming bogeys. NORAD quickly confirms that they are cruise missiles, flying far too low and fast to be any kind of commercial or private aircraft, especially not in this storm; nor are they on any known or planned flight paths. However, the nearest air-station, Langley AFB, is powerless to do anything about the bogeys, having evacuated all of its F-22s the day before, and on lock-down for the hurricane.

Nonetheless, the order is given: engage the bogeys. Some 75 miles out to sea, a light flares up in the darkness at 70,000 feet,, as the spotter-ISIS' accompanying HA3 releases an AMRAAM-NCADE, followed seconds later by another, then two more, in rapid succession, two per bogey.

Four missiles streak away, lighting up the clouds, several miles below, first arcing up; then, the light falters for a moment, as the first stages burn out in rapid succession, followed by a lesser light with brief flashes as the kill-vehicles' thrusters fire. One by one, the four pinpoint lights disappear into the seemingly endless clouds below, now illuminated only by the waning moon.

The ISIS, being the only real-time 'eyes' on the targets, tracks the interceptors and their targets, automatically broadcasting targeting-updates to all the NCADES, even as the staffs of virtually every military and federal official office chain of command along the East Coast watch closely on their monitors in their various rooms and buildings, and the interceptors race down towards their targets from above.

Moments later, the ISIS' radar shows first one bogey replaced momentarily by a cloud of chaos over the sea, which fades into oblivion moments later; a few seconds after that, the second bogey flares and disappears the same way. Cold-War-era Kents are no match for 21st-Century missile defenses and robotic resurrections of coastal-defense airships from the Second World War. The nuclear nightmare is over, before it can even begin.

pounds, the resulting Boosted-NCADE weighs some 530 pounds, still more air-portable and less expensive than the 700-pound PAC-3. While the added booster means the HA3 would carry fewer missiles (22 vs. 36), it also means greater altitude, more coverage, range, and EMP defense capability.

Boosted-NCADE-equipped HA3s would have to be deployed inland, over territories with major cities and high-density population zones, and in regions with extensive electrical power-generation grids, primary targets of EMP bursts. On the assumption that the coastal-defense ISIS/HA3 deployments are the 'front lines', carrying standard-model NCADEs, the inland-deployed HA3s would carry Boosted-NCADEs to provide 'defense in depth,' against both BCMs and EMP warheads, the added expense of boosted-NCADEs is arguably an acceptable tradeoff, given the alternatives of manned interceptors and SAM networks to provide the needed defenses.

Inland ISIS and HA3 CONUS deployments for defense in depth.

Given the capability to smuggle BCMs inside ISO cargo containers, Caitlin Stier, who wrote, "Trains, planes and ships: smuggling nukes into the U.S.," writes, a variation of this nightmare scenario is one in which the container is successfully smuggled into the U.S. interior. In such an event, the 'package' could be transported by truck or train to any point in the CONUS, from which to launch its missiles.

In addition to defending against the EMP attack scenario, this threat also drives the need for an inland ISIS and HA3 deployments. A limited number of extra ISIS and HA3 platforms would be needed beyond those currently envisaged for coastal CONUS defense alone. For example, doubling the initially-planned coastal-defense fleet of 12 ISIS UAVs might well suffice to cover all of CONUS: higher-population areas, military bases, high-value infrastructure, interior and coastlines. Procuring a greater number of airships and weapons would also have the benefit of lowering their

unit costs via economics of scale. More detailed study would be needed to determine the numbers, as well as deployments and patrol areas required for optimal overall inland and offshore coverage.

Future ISIS upgrade: Plasma propulsion for increased mobility.

Edward H. Allen, author of, "The Case for Near Space," believes that using near-space for aircraft operations opens the door for other, ground-breaking possibilities. ISIS/HA3 would be a near-term achievable platform, if the development program goes according to schedule, and the program is allowed to proceed to production.

However, an airship would be dramatically more mobile if it could travel at higher speeds than currently planned. This could be achieved via plasma-propulsion, which accrues superior efficiency over that of propellers at high altitudes. The resultant all-electric, two-stage propulsion system comprised of propellers for lower altitude operations and plasma for high-altitude, high speed flights, would provide an LTA with far better overall performance than either propulsion technology alone could provide, endowing this '2nd-generation' LTA vehicle with a much higher sustainable cruising speed, in addition to all the other advantages already possible.

ISIS' electronic-warfare capability for self-defense.

One final note deserves mention regarding ISIS' survivability versus anti-air missiles: in addition to all of ISIS' previously-cited advantages of being difficult to detect and tough to shoot down, it may also have the means to actively defend itself against anti-air missiles, using its enormous radar systems. In addition to their prodigious detection capabilities, the sheer size of ISIS' S-Band and X-Band radar antennas may also endow it with electronic counter-measures capability that it could use for self-defense against SAMs. Current state of the art, Active Electronically-Scanned Array Radar Antenna systems, in addition to their similarly great detection capabilities, are also endowed with considerable potential for deception, jamming, and even destruction of electronic components in enemy radar systems. David A. Fulghum, author of, "Deception and Power," also states that combat aircraft such as the F/A-18E/F Super Hornet and F-22 Raptor can utilize AESA radar systems to jam or destroy the electronics inside the guidance system of cruise missiles. And while these systems are powered by aircraft with vastly greater electrical power-generation systems, they also focus their radio energy using antennas that are many orders of magnitude smaller than those planned for the ISIS, which also are to be AESA antennas. Thus, what the ISIS radar system lacks in outright power, its enormous antenna-area may compensate for with more focused, concentrated energy. J.C. Toomay and Paul J. Hannen, authors of, "Radar Principles for the Non-Specialist," write that the closer any incoming missile gets to ISIS, the greater the focused intensity, due to the inverse square law. In all, then, ISIS might very well prove to be incredibly difficult to shoot down, even if it is detected, and engaged with anti-air missiles.

Ballistic and cruise missiles alike pose a significant and growing threat in the international arena. Cruise missiles are small, low-flying, autonomous, aircraft-like, precision-guided, disposable strike aircraft that can apply their user highly-accurate striking power against all manner of high-value targets ranging in size and value from ships through cities. Ballistic missiles are fast- and high-flyers; in fact, they do most of their traveling outside the atmosphere, enabling them to strike their targets mere minutes after launch.

Both missile types can carry virtually every kind of destructive payload known to man, from high explosives to chemical and biological weapons, right up through thermonuclear warheads. And perhaps worst of all, both missile types can be concealed inside ordinary shipping containers, which can thusly be smuggled anywhere in the world, using virtually every form of transportation known to man.

Defending against these weapons requires an extensive deployment of sophisticated sensors and weapons. Recent concerns about the security of the continental U.S. against 'asymmetric' BCM attacks fired from seemingly ordinary ocean-going vessels, has driven the development of the ISIS autonomous radar platform LTA UAV to guard against this deadly threat.

However, ISIS is a sensor platform, not a weapons carrier. Problematically, all currently-deployed missile-defense-capable systems are battlefield-level, high-intensity combat-operations solutions, and are not suited for the wide-area, low-cost, continuous-coverage CONUS BCMD mission. Instead, the High-Altitude Arsenal Airship is recommended for this mission, in addition to its currently-planned ISIS AEW incarnation. Finally, the recommended weapon of choice for both the BMD and CMD missions is the AMRAAM-NCADE, a full three dozen of which can be carried by a single HA3 air-launch platform. This combination of nearly-alike LTA platforms and a single, common, easily-carried and highly effective interceptor weapon, together form arguably the optimal defense with which to shield the U.S. Homeland against the growing threats from ballistic and cruise missiles in the near future.

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Third Platoon, Bravo Battery, 2nd Battalion, 8th Field Artillery Regiment, lit up the Zabul province night by firing illumination from their M777A2, 155 mm howitzer at suspected enemy movements from FOB Pasab, Zharay District, Zabul province, Afghanistan, July 20. (Photo by SGT Christopher McCann, U.S. Army)

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