

Fires



Leadership: Building on Lessons Learned

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Fires

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On the cover:

Lance Cpl. John R. Chiri, left, and Cpl. John J. Stubbs ram a 155 mm high-explosive round into the breech of an M777A2 155 mm lightweight howitzer at the Combined Arms Training Center Camp Fuji, Oct. 2 as part of Artillery Relocation Training Program 13-3. Ramming the round is a two-man job, according to Stubbs. It takes a lot of strength and, through teamwork, Stubbs and Chiri are able to load the howitzer quickly. Chiri and Stubbs are Field Artillery cannoneers with the unit. (Photo by Lance Cpl. Henry J. Antenor, USMC)

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Administrative Assistant to the Major General, United States Army Secretary of the Army, 1333702 Commanding General, Fort Sill, Okla. **PURPOSE:** Originally founded in 1911 as the *Field Artillery Journal*, *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 the Army, joint and combined forces, and our nation. **REPRINTS:** *Fires* is pleased to grant permission to reprint; please credit *Fires*, the author(s) and photographers.

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POSTMASTER: *Fires* (USPS 309-010) (ISSN 1935-4096) is published bimonthly; periodical postage paid by Department of the Army at Lawton, OK 73501 and an additional mailing post office. Send address changes to *Fires*, P.O. Box 33311, Fort Sill, OK 73503-0311. **SUBMISSIONS:** E-mail to the Editor, *Fires*, at fires.bulletin@us.army.mil; mail to P.O. Box 33311, Fort Sill, OK 73503-0311; overnight to 455 McNair Road, Room 105, Fort Sill, OK 73503-7102; or call at DSN 639-5121/1090 or commercial (580) 442-5121/1090.

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The Constant in a Changing Environment

By MG Mark McDonald

Commanding General of the Fires Center of Excellence and Fort Sill, Okla.

May started off with a 'bang' as we fired the Paladin Integrated Management (PIM) M109A7 howitzer for the first time outside of a test environment and on Fort Sill ahead of the Fires Conference. Our annual conference ran May 5-7 and was joined by more than 500 attendees present physically and virtually via Defense Connect Online. Briefers from the Field Artillery, Air Defense Artillery, and DoD science and technology community presented the Deep Future of Fires to conceptually lay the path that will take the Fires Force to 2025 and beyond. Those able to observe or join the discussion came away with a greater understanding of the challenges and opportunities that await us in the years ahead. One of the key takeaways from the conference centered on the principle that, regardless of the technology selected to maintain our edge, our troops will require adaptive leaders to command them effectively. Leader development cannot be left to chance and remains as important as the choices made toward acquiring leap-ahead technology.

Leaders of competence, character, and commitment will inherit a leaner, more lethal and expeditionary force in the future. They will face adversaries that are increasingly connected, empowered and agile. To win the contest of wills, leaders must rely on their training and experience to assess and leverage the human factors surrounding each engagement. Providing them that experience through institutional, operational and self-directed development requires innovation of its own. As this issue of the *Fires Bulletin* reveals, current leaders display the initiative and creative resourcefulness that will drive training and development in the future.

CPT Joshua Urness' article on "Audience Focused Training" highlights a battery commander's efforts toward adapting training to the various learning styles of his young Soldiers. Urness captures the spirit of the Army Learning Concept for 2015 in TRADOC Pam 525-8-2 through using a continuously adaptive learning model to develop Soldier competencies. His battery overcame the inertia of 'old ways' of training by achieving Soldier buy-in and collaboration on structuring the training. In the article, COL John B. Richardson IV refers to this approach to training as an example of 'real leadership' that involves convincing others to assess their situation and make the necessary "change to their values, habit, practices, and priorities in order to deal with the real threat or opportunity the group faces."

With adversary capabilities continuing trending upward and fiscal resources of our own increasingly constrained, some junior leaders express concern for how to lead during austerity. 1LT William Garza interviews BG Daniel Karbler and asked how a leader fosters a desirable command climate in such an environment. Karbler empha-



sizes the interpersonal relationships between a leader and the led and rejects the correlation between leadership and the level of funding available. Making do with fewer resources including ammunition, fuel, and supplies places a premium on the resource of thinking and creativity that is free. He cites the Army Chief of Staff GEN Martin Dempsey's call for leaders who "aspire to have adaptability" and notes that no other community matches Fires leaders in this capacity.

This is the last *Fires Bulletin* forward that I will write as the commanding general of the Fires Center of Excellence and Fort Sill, Okla. Reflecting on my experience leading the Fires Force leaves me with confidence in the quality and resilience of our Soldiers, Marines, and their leadership. I take this opportunity to thank every Fires warrior and their Family for their dedication and support of our mission: to provide the United States and our partner nations with the most competent and proficient Fires Force possible. As I leave for my next command, I challenge you to display to MG John Rossi the same strength of leadership you have shown during my tenure. Best of luck to each of you and may all your Fires be effective.

Fires Strong!



Top: Marines with Golf Battery, 2nd Battalion, 10th Marine Regiment fire a M-777 howitzer during Rolling Thunder, a biannual training exercise at Fort Bragg, N.C., May 9, 2014. Marines from various units within the 2nd Marine Logistics Group attached to 2nd Maintenance Battalion, Combat Logistics Regiment 25, 2nd MLG to provide logistical support to 10th Marines for the duration of the exercise. (Photo by Lance Cpl. Sullivan Laramie, USMC)

Right: A Soldier performs an Australian rappel off a tower during training between Soldiers with the 32nd Army Air and Missile Defense Command and 11th Air Defense Artillery Brigade. (Photo by SGT Kyle Wagoner, U.S. Army)

Bottom: Soldiers of A Battery, 1st Battalion, 82nd Field Artillery, 1st Brigade Combat Team, 1st Cavalry Division conduct operations in a M109A6 Paladin howitzer during exercise Combined Resolve II at the Joint Multinational Readiness Center in Hohenfels, Germany, May 28, 2014. Combined Resolve II is a multinational decisive action training environment exercise occurring at the Joint Multinational Training Command's Hohenfels and Grafenwoehr Training Areas that involves more than 4,000 participants from 15 partner nations. (Photo by SPC Brian Chaney, U.S. Army)





BG Daniel Karbler, the commander of 94th Army Air and Missile Defense Command, briefs senior leaders and audience members at The Association of the United States Army Institute of Land Warfare LANPAC Symposium and Exposition in order to better understand and visualize the impact and role of Integrated Air and Missile Defense in the Pacific Region and its effects on joint and multinational operations. (Photo courtesy of 94th AAMDC)

Leadership and Ethical Decision Making

By ILT William D. Garza

Last week I had the pleasure of sitting down with **BG Daniel L. Karbler**, commander of the 94th Army Air and Missile Defense Command. Karbler, who graduated from The United States Military Academy in 1987, has had and continues to have a successful career in Air Defense Artillery. His recent visit to the 1st Battalion, 1st ADA Regiment in Okinawa, Japan, allowed him to get verbal and visual confirmation on the state of the battalion, our relationships with the Japan Air Self-Defense Force and the U.S. Air Force's 18th Wing.

As a second lieutenant, this was my first opportunity to speak one-on-one with a commanding general, so understandably I was a bit nervous. That anxiety quickly abated within the first five minutes of speaking with Karbler. His positive attitude and candid persona encouraged an open conversation on leadership and ethical decision making for future leaders in today's military.

What are some major ethical dilemmas officers can expect to face during their careers?

Some tough dilemmas you're going to have are the case of a high performing Soldier who does everything right and then they go and mess something up, they go get into a fight, or maybe show up late to formation. So what do you do with that superstar? Do you immediately give them that max punishment or do you take into account mitigating circumstances and take it easy on them? To me, good leaders are the ones who look at the whole body of work of the Soldier and don't just immediately jump to a conclusion of, let's hammer them. The Army's getting smaller, so let's just throw everybody out. Punishment has to be proportionate with the level of misconduct that happened. In a scenario where two Soldiers have a conflict, a good commander is going to sit those two folks down and iron it out right there and maybe issue a negative counseling. I have a rule of 45 when making ethical decisions. You can take 45 seconds to handle something, confront what was wrong, apologize or correct it, depending on the situation. If you let that thing slide because you don't want to get involved or you're not quick to take initiative, then it's going to take 45 days to resolve. It might take 45 days because a complaint gets filed, possibly an equal opportunity complaint or a congressional and now you're dealing with something for 45 days where leaders are involved, investigating officers, all sorts of things. If you would have just done the right thing and taken 45 seconds out of your life to correct something on the spot you would have saved yourself a lot of time.

In regards to ethical decision making, what are some of the habits, routines, and or practices that a leader should have in place to aid them in being a successful officer?

I'll tell you one that might be surprising: go to church. Whatever your faith is, practice it faithfully and religiously, and go to church. The next thing is to always act beyond reproach, go beyond question. This means don't skirt the line; don't swim in the grey area. That way if your integrity or your ethical behavior is ever in question everybody around you will be able to say, "You know what, that guy is a straight arrow dude and there is no way that he acted that way." Be very transparent and candid in your conversations with people. If you nuance things or conditionalize how you talk about stuff, then

that leaves room for interpretation. Going back to the rule of 45, in 45 seconds you make it very clear, black and white, in letting someone know how you are going to handle a situation. It doesn't mean that everyone will agree with you, but if you're frank and upfront at least they will know where you are coming from.

Have you noticed a difference in the number of moral decisions made earlier in your career versus the number you've made further in your career.

You know earlier on in my career it was some of the things we talked about where you question how you deal with good performing Soldiers who might have messed up. Also questions about how you deal with poorly performing Soldiers who continue to perform poorly and how many chances do you give them? They might have a family of three or four, do you throw them out on the street, and now the family doesn't have a job? So, that's an ethical dilemma that a leader has to take on, but readiness, welfare, good order and discipline of the unit need to be taken into account as well. So, you think about those things at all levels, but at the level that I'm at now you are under so much more scrutiny about how you spend resources. For instance, I won't bring my wife with me on any travel—it doesn't matter if the lawyer says it's justified, or if the unit has spouse events planned that are totally within the joint ethics travel regulation. I don't bring my wife because I don't want it to be called into question. It goes back to that beyond reproach that I was talking about before.

This question is geared toward younger officers. What would you say to a new leader arriving at a unit who has ethical challenges or an unsavory way of accomplishing the mission? Let's say that it's a young officer taking command for the first time.

Well, first thing to consider would be that the previous battery commander got relieved and that's why the new commander is coming in to take command. You need to know all the circumstances, but my direction to that new leader... is to sit down with the first sergeant, platoon leaders and platoon sergeants immediately. You give them what your red lines are with respect to veracity in reporting and make it part of their initial counseling.

Are there ever exceptions to the rule, and I am referring to grey ar-

eas in ethics where rules may need to be bent or altered?

The rules should never bend. The rules are the rules, and the regulations are the regulations. When it comes to the punishments though ... the nice thing about the UCMJ [Uniformed Code of Military Justice] as a commander, is you do have a broad range of options on how you punish someone – from an oral reprimand to a court martial and/or a bad conduct discharge. So let there never be a mistake about bending the rules, we don't bend the rules, but we have flexibility in how we hand out punishments.

Who are some of the most influential leaders you've worked with and what have you taken from each of them that has aided in your success, i.e. quotes, statements or actions that have stuck with you?

My second battery commander, he taught me about standards and discipline, maintaining those high standards and maintaining discipline. My first battalion commander as a lieutenant, he taught me about the importance of tactical and technical proficiency. As a field grade officer my brigade commander taught me about how to be a gentleman, and as an aide-de-camp I was taught about community relations and how to run a large organization. Another important lesson that I learned, back when I was a colonel, and you think you stop learning but you don't, the G8 of the Army at the time was my boss and he took the time to call me up personally and inform me about the medal I was receiving. It meant a lot to me that the G8 of the Army was taking the time to call me up and inform me that he was the one approving the award that I would receive.

When changing assignments do you find the need to alter your leadership style to fit the unit or different personalities within the unit?

Leadership techniques change, you can call it style, but my leadership techniques will change. For instance, I went out and checked on some RSOP [reconnaissance, selection and occupation of position] teams when I was in Korea last week, versus if I'm talking to field grade officers. What should never change is your personality. So leadership techniques can change, but who you are as a person, your personality has got to remain rock solid. Sometimes that is where confusion might come in. If your personality changes then that could cause confusion within the ranks.



BG Daniel Karbler, commander of the 94th Army Air and Missile Defense Command speaks during a foreign delegate's visit. (Photo by SSG John H. Johnson III, U.S. Army)

How do you foster a desirable command climate given the current financial constraints that the military is facing?

We certainly are in some fiscal constraints. You've got to get out and communicate, you've got to be personable, you have to know something about those you serve and show a genuine interest in who they are and what jobs they do. You cannot be a curmudgeon. Someone told me once that when you make general officer you're not allowed to have a bad day. So I make sure to always stay upbeat and positive – realistic, but always upbeat and positive. You can be a glass half full or glass half empty kind of guy, and I always try and see the positive in things. I believe success breeds success, and I want my organizations to follow the same.

Every commander can have challenges in motivating his men or motivating his troops to perform at their peak. What would you say is the most effective way to meet that challenge?

First is to accentuate the positive, you know every cloud has a silver lining and you have to find that silver lining. Then again you have to understand the context for whatever it might be causing, whatever problem might be out there. You have to fix the problem, obviously. You need to encourage frank and candid discussion; you cannot just slam someone's idea when they give them to you. So you have to be a good listener, and being a good listener doesn't mean that you have to agree with what somebody's telling you. You can tell a subordinate, "I appreciate you point; however, here is what's wrong with it, or here is where you and I might differ in our opinions," without slamming them so they shut up and don't ever want to talk to you again, because they think, "well I'm not going to talk with the colonel anymore because all he does is slam me".

As you progress within your career you undoubtedly become more consumed by your duty to serve those

you lead. How do you balance your duty for an entire command and the duty to your family and succeed at both?

You've got to have family buy in. You know the military becomes a way of life for the family. My wife and I had an understanding right up front, and we don't do a lot of hand wringing about deployments. I have been on the road now for almost two months and I have had about two days to see my family, but we don't do a lot of hand wringing about it, it just becomes an expectation instead of agonizing over, "Dad's not going to be home," or "I'm going to miss this." You know I just missed my son's 11th birthday a couple weeks ago, but we don't agonize over it. We just come up with a plan for how we'll solve that problem, maybe do a birthday party when I get home. When I do get home I make sure to carve out time for balance in activities, not just sitting at home, but doing things with the kids and doing things that the kids like to do. So the next time I get caught up in a two month long TDY [temporary duty] they know when dad gets home we're going to do things. Also communication is key, like skypeing, text, emails, whatever the case is. That's part of that balance, making sure that you're communicating with your family when you're gone and taking full advantage.

In regards to the same question, what about those Soldiers who don't have a spouse or kids and are being told by their chain of command that they need to leave the office by a certain time, but still want to be successful in their duties?

A lot of times you throw Soldiers out of the motor pool or the office and you have to find out what their hobbies are and what their likes are and offer up those opportunities for them to take up those hobbies or sports. Sports are a big one. Unit level sports is a huge thing, sports competition, sports practice can have a time box in there, "so hey at 1700 there is a flag football game and everyone has to get out of the motor pool by 1615 so they can get changed or make the game on time." Also when you go through the barracks on your leadership walkthrough and you see the same guy who's in his room all the time and he's just watching TV or playing video games, then that's when you've got to get engaged as a leader and get involved in people's lives. A lot of times leaders don't want to get involved in people's lives, but it is okay to get involved in someone's life, because that's when you make a difference. Like I said earlier, you show a genuine interest in someone and not just a cursory kind of superficial glossing over recognition, and sometimes they will take you up on your offer or recommendations to go out and do something different.

Shortly after the interview Karbler attended a luncheon with all 1-1 ADA platoon leaders and executive officers allowing them to ask any questions they had. He revisited many questions covered in our interview regarding leadership and ethical concerns for officers. This allowed the other lieutenants to benefit from the experience and knowledge that Karbler has gained throughout his career. I feel very fortunate to have had the opportunity to speak with the general. His insight and wisdom are something I will carry with me for my entire life, on and off duty. I will pass this information on to my Soldiers and to those younger officers I work with later in my career.

1LT William D. Garza graduated from St. Mary's University in San Antonio, Texas, with a bachelor's in International Business and a minor in General Business. Garza commissioned through OCS in November of 2011. Beginning his overseas assignment with 1-1 ADA where he served as platoon leader and executive officer.



PFC James Barkley and SPC Kevin Olivier emplace the Patriot Antenna Mast Group during march-order and emplacement training in Tobin Wells, Fort Bliss, Texas. (Photo courtesy of CPT Joshua A. Urness)

Audience Focused Training

By CPT Joshua A. Urness

As members of the profession of arms, it is imperative that we develop a culture of academic professional development among our ranks. This is imperative in the Air Defense Artillery because of the technically arduous and precise nature of our mission. As a Patriot battery commander, I have experienced many challenges that have let me believe alternative leadership approaches are necessary to developing the new generation of Air Defense Soldiers. The ‘one size fits all’ approach to training does not necessarily meet the learning needs, and personal needs of the new generation of the ADA Soldier. This new approach can be characterized by changing the way that information is communicated, and how academic study is conducted; not what task is trained or key performance objectives met. The greatest challenge, in this process of identifying what I believe to be a potential solution, was overcoming my preconceived notion of how military training should be conducted; and the very transactional process of success or failure in a rapidly changing society and high op-tempo environment.



SPC Bryan Ducheneaux, a tactical control assistant for the Engagement Control Station, D Battery, 2nd Battalion, 43rd Air Defense Artillery, explains a tabular display to PV2 Nicholas Person while studying together one afternoon in the battery's conference room. Person is studying and training to become a member of one of the Engagement Control Station crews. (Photo courtesy of CPT Joshua A. Urness)

As the son of a former Marine Corps noncommissioned officer, I learned at a very young age the importance of work ethic and discipline. I was held accountable for my ability to perform. I was given tasks that, though I often didn't believe I could perform, pushed me beyond my self-perceived limitations. We were poor. We couldn't afford the Internet, and we didn't have cable TV. I was told to get a job at the age of 13, and had my first full time job by age 16. I was required to be in the Boy Scouts and would attain the rank of Eagle Scout. After all of this, I was told that I would get no money for college, and if I didn't move out by the age of 18, I would have to pay rent. There was no 'free chicken' in my childhood. It was thus, that I began my journey to become a productive member of society.

Surrounded by my peers, I often wondered what motivated them. Was it the same drive to succeed that was imposed on me by my parents? As a leader in the Army, and, now, battery commander, I still ponder the same question with regards to my Soldiers. The answer to this question seems almost dauntingly mysterious. My Soldiers, my greatest responsibility, are the next generation of the profession of arms. It is thus that the stakes are high. The answer to this question is quintessential to developing our force, especially in an academically rigorous field like Fires.

During the first few months of my command, I struggled with a feeling of disassociation from this 'next generation,' because they did not necessarily subscribe to what I perceived to be the virtues of my generation of work ethic and growth through adversity. I did not get a lot of positive affirmation during my development as an adult and leader, and I certainly never quit. What I realized through reading James Burns' book, "Leadership," was that there was an important difference between 'transactional leadership,' and 'transformational leadership.' Transactional leadership is a concept more focused on the leader-follower relationship and, in a way, could be considered compliance based leadership. Transformational leadership is more focused on meeting the needs and values of your followers, and is akin to the intent of the brief paragraph in ADP 6-22, *Army Leadership*, on situational leadership. As I perceived success in a transactional manner, I had neglected the needs and desires of my subordinates to consistently receive positive affirmation.

Furthermore, though I had initially seen this as a truth, I denied it because I was not willing to humble myself to reward what I perceived as quick wins, not long term gains. The result was a lack of buy-in to the vision that I was trying to establish, and an unwillingness to fully commit to the task

of developing expertise in their trade. They would learn because they had to.

What occurred to me was that this challenge required; first a compromise by both my leaders, and our Soldiers, and second, a cultural transformation that could bolster those virtues of goal setting and accomplishment, and would ultimately instill those values of work ethic and the 'never quit' attitude. Hence, I aspired to be a transformational leader. I began by placing great emphasis on understanding each, individual, Soldiers learning styles, strengths, and weaknesses. My intent was to identify a shot group of learning styles that would allow me to better understand how to train. We would not change what was trained, or the gunnery tables in any way; the key difference was how that information was communicated, how it was trained. What I found was that there was a common perception among many Soldiers that they were not capable of learning the technical and precise responsibilities that we were asking them to learn. The solution to this problem was to facilitate short term victories along a clear and published glide path for their development.

Additionally, we found that most of my Soldiers learned best in a group environment, whether through observing others in practical exercises or through group discussion/reflection about what they were instructed on. We began ensuring that there was adequate time during each block of discussion for focused and guided discussion.

After a short period of time, though these short term victories were building confidence and a vision within the Soldiers, they still lacked identity and ownership of their personal and professional development. The solution to this challenge was to enlist their support in building their training plan so that it was focused on their needs as operators, and where they perceived they needed the most growth. The platoon leaders and platoon sergeants were held responsible for ensuring that these plans, built at their level through disciplined initiative, were nested with my intent and training guidance.

A key consideration throughout this entire process, which is directly related to the concept of transformational and situational leadership, is attention span based learning. Through academic research, my first sergeant and I were able to determine that the average learning span for young adults lasts between 20 and 25 minutes. After that amount of time, the ability of a student to retain information is severely reduced. As such, we broke up blocks of instruction from the

standard hour to 25 minutes, with five-minute breaks and frequent checks on learning. The checks on learning were conducted both hourly and daily. Soldiers understood that they would be held accountable for their ability to perform during these checks on learning.

Attitudes have played a major role in the development of our academic program. As previously discussed, I believe poor attitudes were more a result of a fear of failure and a self-perceived limitation of their ability to learn the required skills to be successful. Furthermore, the transactional leadership approach of expectations of performance lest you be punished, conditioned the Soldiers to be immediately defensive. In this manner, it initiated 'fight or flight.' Those that sought to fight were going to learn the minimal amount of information possible to succeed, whereas, those experiencing 'flight' learned very slowly because they were physiologically limited in their ability to focus on the task at hand. The solution to this challenge was unwittingly played out in our transition to a more transformational and situational leadership style. As we honed in on the Soldiers' needs as learners, we observed a dynamic change in their willingness to try new tasks and maximize their potential in the learning process.

In the long run, my greatest challenge became the retention of knowledge and performance over a long period of time. What my

first sergeant and I had developed was a sort of 12-step program that required the demonstration of knowledge in order to advance to the next step, or gunnery table. What we did not take into consideration was whether or not the Soldiers would retain information required to be able to demonstrate this knowledge months after their 'graduation' assessment. The solution to this challenge was enacting a weekly general knowledge assessment for all battle rostered personnel. Each week, all battle rostered personnel are now required to perform at a standard level across the battery, and are held accountable for a lack of performance.

In compromise, we have transitioned to the 'bolstering' phase, the foundation of which was the work ethic that was so hotly desired by my first sergeant and I. The fruit of the compromise ultimately resulted in a shared identity and vision on the part of the entire battery. Through a structured learning environment, a culture of disciplined learning has been established. This structured learning environment has created stability in a high op-tempo, and has assisted in promoting our concept that an Air Defense Soldier must be a student, by trade. The establishment of accountability for a lack of performance has been communicated differently than I had originally expected. This is in the sense that in my previous experiences, being held accountable usually meant something

draconian that I would have to endure. When communicated within the context of, 'you have received sufficient training, resources and time to accomplish this task, and you failed to meet the standard,' and there is a buy-in to the vision, Soldiers understand the purpose of the corrective training and often willingly submit.

Finally, the greatest improvement that I would make on this entire process would be to do a better job of continually leading and assessing. If gunnery training is your battalion and battery center of gravity, then it requires that level of command emphasis and resources, on a continual basis. As a commander, it was easy to get pulled away for medial administrative tasks and operations. You must trust your subordinates, in this case battery executive officer, to take care of these tasks. Our battery had several key points of failure as a result of my inability to assess and make those little adjustments at the right place and time, because my focus had been drawn to something else that seemed more relevant. Never lose focus on the center of gravity. Cultural transformations require continuous involvement and support of the mission command process.

The key point of victory was that the work ethic and buy-in had been established, and has served as the foundation for a vision and identity in an organization that still has many more bridges to cross. The vision that I had originally designed as a new commander had been accomplished, yet the means of achieving that vision was much different than I had planned. Being open to different avenues of approach may be the solution to a battery with what could be perceived as stagnated development. This may require the denial of what you perceive to be some of the central concepts what military training should consist of; yet it may be essential to meeting the needs of a new generation. As I truly believe that everyone is capable of learning, my intent is to have all 14-series personnel in my battery basic gunnery certified. Train to your audience.

ILT Garrett Newsome, a tactical control officer for the Engagement Control Station, D Battery, 2nd Battalion, 43rd Air Defense Artillery, teaches SPC Bryan Ducheneaux, a tactical control assistant for the ECS, about tactical ballistic missile trajectories during an afternoon study session. (Photo courtesy of CPT Joshua A. Urness)



Captain Joshua Urness has served five years in the ADA. He is currently the commander of D Battery, 2nd Battalion 43rd ADA, 11th ADA, 32nd AAMDC. Prior to taking command, he served as a convoy security platoon leader in Helmand province, Afghanistan, for 2nd Battalion, 44th ADA, 108th Brigade, where he also served as an avenger platoon leader and battalion S4. Urness completed the ADA Officer Leadership Course and ADA Captains Career Course, and is a graduate of Washington State University with a Bachelor of Arts in International Politics. He also holds a Master of Arts in Political Science focused on Political Psychology and holds a Certificate of Expertise in Global Justice and Security Studies from Washington State University.

Standing in the Breach

By Mr. Jim Gleckler

“Adaptable leaders scan the environment, derive the key characteristics of the situation, and are aware of what it will take to perform in the changed environment. Leaders must be particularly observant for evidence that the environment has changed in unexpected ways. They recognize that they face highly adaptive adversaries, and operate within dynamic, ever-changing environments. Sometimes what happens in the same environment changes suddenly and unexpectedly from a calm, relatively safe operation to a direct fire situation.”

-FM 6-22, *Army Leadership*, 2006

One of the most compelling images for artillerymen to come from World War II is that of Lieutenant Stanley L. Torgerson, executive officer of B Battery, 189th Field Artillery, 45th Infantry Division, standing atop a stack of ammo boxes, in front of his firing battery, field glasses in hand. He was adjusting his 155 mm howitzers in direct fire against armored elements of the 29th Panzer Grenadier Division only 300 yards away. The German armor formations were trying to penetrate his position, split the Salerno beachhead, and drive the U.S. Fifth Army into the sea. Even with his six-foot three-inch frame, the battery XO wanted extra height to see through the smoke into the stream crossing from where wave after wave of panzers and enemy infantry kept attacking.

45th Infantry Division, Oklahoma National Guard

The invasion of Italy was the first allied penetration of the European mainland, “Fortress Europe.” It was one of the most costly and least appreciated campaigns of World War II. This was the night of Sept. 13-14, 1943, and already the 45th Infantry Division and Torgerson were veterans of an amphibious assault landing and month-long allied drive through Sicily. The division was made up of national guardsmen from Oklahoma, Colorado and New Mexico, and before the surrender of Nazi Germany, the 45th Infantry Division would spend an astounding 511 days ‘in the line.’ That night, all that stood in the way of the German panzer division and the rear of the Fifth Army was the 45th Division Artillery headquarters and two of its artillery battalions. Torgerson had adjusted his cannons against the oncoming enemy armor from 6:30 the previous evening. It was

now about 2:30 a.m. His is an example of courage and adaptability in the face of desperate circumstances. Sadly, some in the 189th FA battalion would not live to see morning.

Mobilization and Training. On Sept. 16, 1940, President Franklin D. Roosevelt signed an order mobilizing the 45th Infantry Division, Thunderbirds and three other National Guard divisions to federal service. This was 15 months before the U.S. entered World War II. The 45th Infantry Division had just participated in the first Louisiana maneuvers during the previous summer. The division was organized with three regiments of infantry, the 179th Infantry, the 157th Infantry, and the 180th Infantry. Each regiment had three infantry battalions. The Division Artillery had three light 105 mm direct support battalions. The fourth battalion was the 189th FA, Torgerson’s medium 155 mm howitzer battalion.

The division gathered to Fort Sill under the leadership of MG William S. Key, the division commander (for whom Key Gate at Fort Sill is named.) Key was an artilleryman and veteran of World War I. Since he held the highest rank when he arrived on post, Key became the Fort Sill commander while the 45th was training there. The division artillery commander was BG Raymond S. McLain, also a veteran

MG William S. Key, commander of the 45th Division and Fort Sill, Okla. Fort Sill’s Key Gate earned its name from him. (Photo courtesy of Jim Gleckler)

An aerial view of the 45th Division on Fort Sill, Okla., taken in 1940. Note the Artillery Bowl on the right center of the photograph. (Photo courtesy of Jim Gleckler)





LTG Raymond S. McLain. (Photo courtesy of U.S. Army)

of World War I. McLain, president of a banking trust company in Oklahoma City, would rise to the rank of Lieutenant General and command a U.S. corps in combat during World War II. In 1941, the 45th Infantry Division participated in the second Louisiana maneuvers receiving high marks for its defeat of active army divisions.

Artillery Officer Candidate Torgerson. In May 1942, a newly minted FA lieutenant, Stanley L. Torgerson, joined the division as it was moving to Fort Devens, Mass. Torgerson was born in rural Polk County, Wis., in 1914, the youngest of seven children. His father, John, had immigrated from Norway. Both parents had passed away by the time he graduated from high school. He grew up accustomed to strenuous farm work and was always active in sports. His older siblings helped raise Stanley, and made sure he had help affording a college education, even in depths of the Great Depression. At River Falls State College in Hammond, Wis., he played varsity basketball and football while majoring in science and mathematics. At six-foot three-inches, he was the tallest man on both teams, and made all-state guard in basketball in 1937. He graduated after four years in 1939.

The future lieutenant was teaching in the high school in Hammond when he enlisted in the Army in July, 1941, a full five months before the U.S. entered World War II. He could see that war for America was imminent. He wanted to serve his country, and be able to choose his schooling and branch in the military. He was sent to Fort Sill, Okla., for basic training, and then to Artillery Officer Candidate School. He graduated in Class 18-42 in late April 1942.

One thing is for certain: the OCS curriculum at Fort Sill did not cover how, with only a howitzer firing battery, to blunt and defeat a determined attack at night by a German panzer division. But that is

where courage, decisiveness, flexibility and adaptable leadership come in.

Deployment to Mediterranean Theater of Operations, Invasion of Sicily. After two years of state-side training and maneuvers, the 45th Infantry Division departed from Norfolk, Va., for North Africa on June 4, 1943, to join GEN George S. Patton's Seventh Army. By this time Key had been reassigned and MG Troy Middleton had assumed command of the 45th Infantry Division. For Torgerson and the 189th FA, there was no normal debarkation in Algiers. Although the campaign in North Africa had just finished, they waterproofed and off loaded all equipment into landing craft and climbed down nets into troop carriers. This was their first of a dozen practice amphibious assaults on the North Africa coast. The 45th Infantry Division, as well as the 1st and 3rd Infantry Divisions had been selected for the first wave of beach landings in Sicily.

In the pre-dawn hours of July 10, 1943, while being tossed on stormy seas, the 45th Infantry Division transferred to landing craft and hit the southern beaches of Sicily—their baptism in fire. The division captured two vital German airfields on D-day. What followed was a 38-day drive through Sicily's rugged center against the German Hermann Goering Division up to Palermo on the northern coast. Middleton maintained constant enemy contact in order to keep abreast of the allied divisions on the coastal plains to his right and left. GEN Omar Bradley wrote of the 45th Infantry Division, that Middleton attacked day and night "leapfrogging the regiment's one through another in one of the most persistent, nonstop battles of the Mediterranean war." This meant that Torgerson and B Battery, 189th FA, had to displace almost every day during the drive, sometimes more than once a day. The Hammond Wisconsin News published an article citing Torgerson's bravery in action during the Sicily campaign.

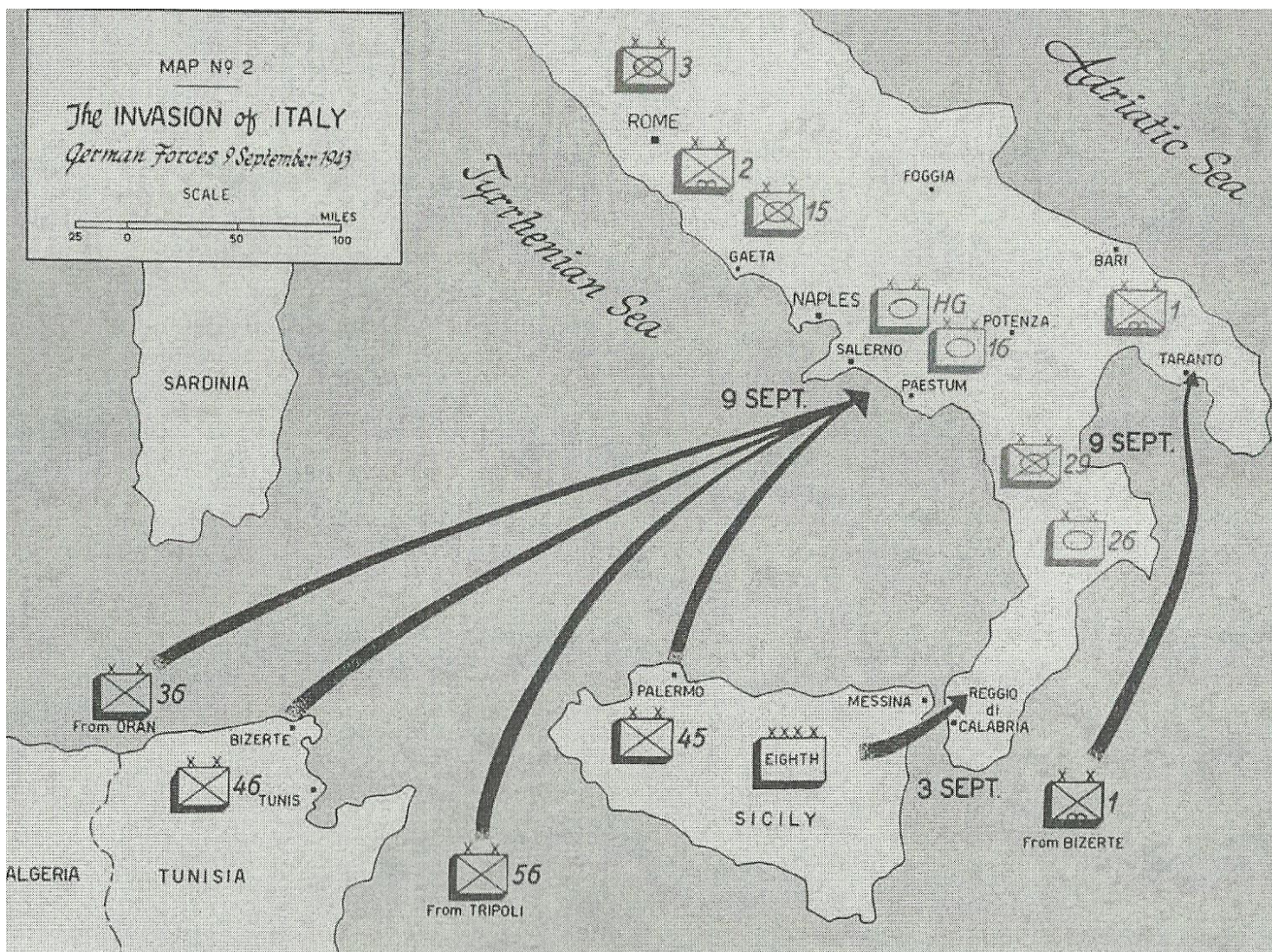
Unfortunately, the allies allowed much of the German 10th Army to escape from Sicily and cross the Strait of Messina into southern Italy. More than 100,000 enemy troops, most of their supplies and equipment intact, moved onto the Italian boot and began to augment the defenses in southern Italy.

Operation Avalanche. It was observed after the war by many senior leaders, from GEN George C. Marshall on down, that had the Army not learned how to assault beaches and fight the Germans in Italy, the Normandy invasion would have been a huge disaster. Thus, the Italian campaign was of crucial importance. Although very costly in both U.S. and British lives, the campaign was little appreciated after the war.

The plan for Operation Avalanche had the U.S. Fifth Army with 170,000 troops, commanded by GEN Mark Clark conducting the first invasion of mainland Europe along the sandy beaches south of the resort city of Salerno, Italy. (See Avalanche Map) The Fifth Army consisted of the 10th British Corps landing along the north beaches, and the U.S. VI Corps landing to their south. The Sele River was initially the corps boundary.

Field Marshal Albert Kesselring commanded all German forces in Southern Italy. General Heinrich von Vietinghoff, commander of the German 10th Army along with the XIV Panzer Corps, was in charge of defenses along Italy's west coast. The Fifth Army historical record reports, "To counter the Fifth Army invasion, the enemy could count on eight divisions."

The U.S. VI Corps under MG Ernest Dawley consisted of the untested 36th Infantry Division (Texas National Guard), which was to lead the landings, and the 45th Infantry Division, initially the floating corps reserve. Because of a shortage of sea transport, only two regiments of the 45th Infantry Division were to make the landings



Operation Avalanche, D-day, Sept. 9, 1943 (Photo courtesy of Jim Gleckler)

at Salerno. Torgerson and the 189th FA sailed with the first lift from Termini Imerese, Sicily on Sept. 8, 1943 (D-1).

D-day/D+1. The two Allied corps landed on their beaches in calm seas on schedule at H-hour, 5:30 a.m. on Sept. 9, 1943. They had been bombed and strafed by enemy aircraft even before they began moving toward shore. The German XIV Panzer Corps and 16th Panzer Division were waiting. There was little opposition until the allied invasion troops were held up in the mines and beach obstacles. That's when all hell broke loose.

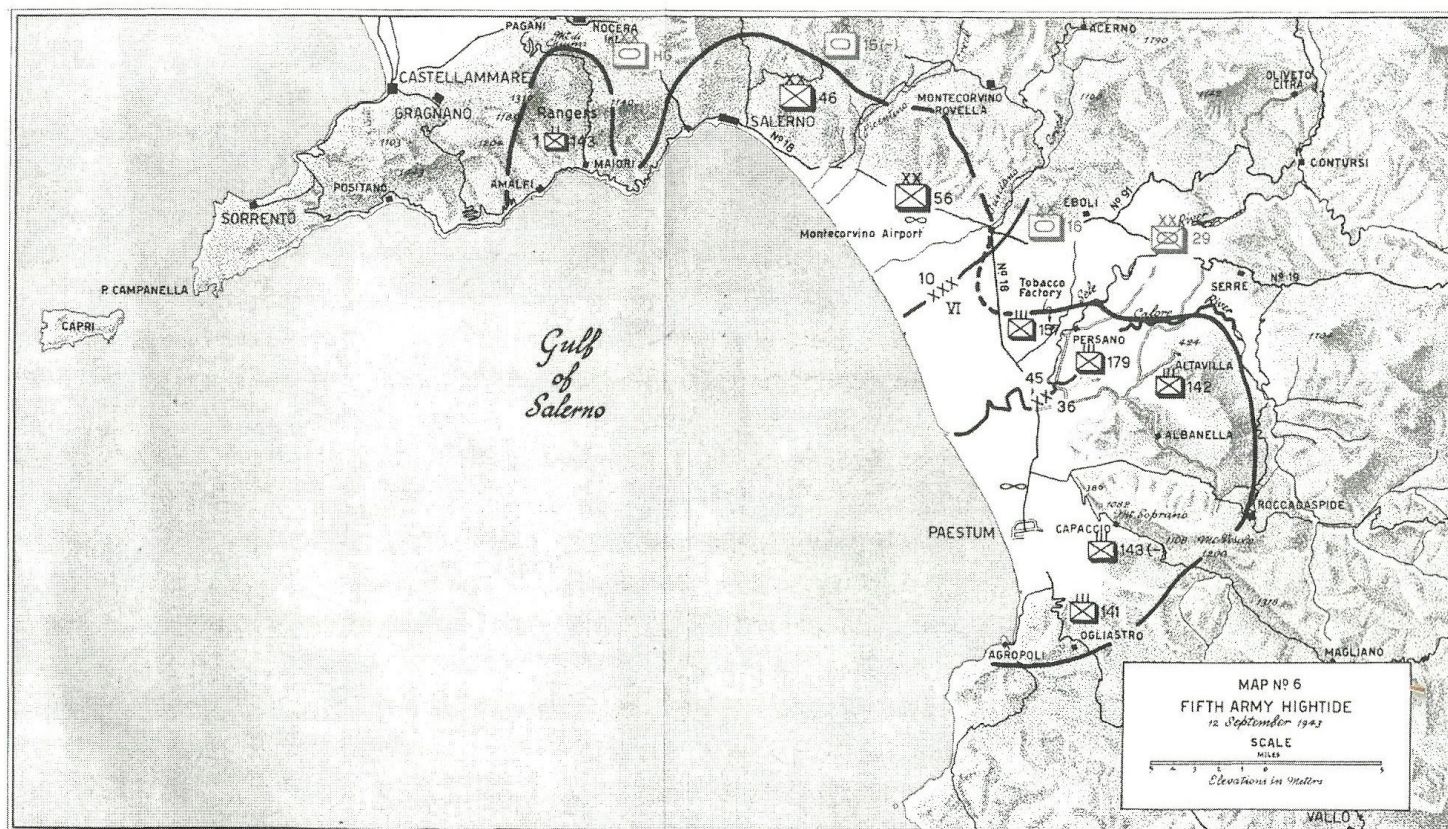
Past the coastal beaches were several miles of orchards and sandy farm fields, then came hills with olive groves, and behind the hills, mountains rose abruptly to more than 3,000 feet. The dominating terrain just beyond the beaches provided the Germans perfect observation of the allied beachhead, defilade for artillery batteries, and fields of fire for German 88 mm all-purpose guns. Artillery, mortars, 88s and machine guns opened up along the whole Fifth Army front. Enemy aircraft continued to bomb and strafe the troops on the beaches. In short order enemy tanks appeared, roving up and down the beach. The panzers took out many vehicles, until 36th Infantry Division 105 mm howitzers towed by DUKWs (2.5 ton amphibian truck) dropped trails, engaged and knocked out several of the tanks with direct fire. Despite immediate losses of equipment and person-

nel, the U.S. 36th Infantry Division and British 56th Division pushed off the beaches and into the orchards and farmlands. (See Salerno Beachhead Map)

The 36th Infantry Division objective was the hill town of Altavilla and adjacent Hill 434. The British 56th Division objective for D-day was Point Sele. The 36th Infantry Division reached their objective with heavy losses (more than 500 men), and were hanging on in Altavilla for dear life. The British 56th Division was pinned down with even heavier losses, well west of Point Sele. Late on D-day there was a 10-mile gap in the Fifth Army lines between the two corps! It was obvious that the 45th Infantry Division must attack into the gap, immediately.

The three infantry battalions of the 179th Regimental Combat Team, their direct support 160th FA and the two batteries of the 155 mm 189th FA landed on the Salerno beaches during the night of D-day/D+1. The 189th FA debarked under constant air attack, went through de-waterproofing, and moved to a position in the division assembly area. The howitzers had to be well dispersed because of the enemy bombers, but both batteries managed to register with an aerial observer, and fire several missions on concentrations of enemy tanks before dusk on D+1.

D+2. The 179th RCT was ordered to immediately attack up the



Fifth Army Beachhead, Sept. 12, 1943. (Photo courtesy of Jim Gleckler)

south side of the Sele River and capture the bridge and high ground at Point Sele. (See 45th Division G-3 Overlay) The 189th FA and Division Artillery headquarters repositioned that night to just below the confluence of the Sele and Calore Rivers. At the same time the 179th RCT along with their 105 mm battalion, the 160th FA, attacked east along the south side of the Sele River. The regiment met only light resistance moving through Persano. As they rushed forward, the regiment failed to secure the village and the all-important bridge over the Sele to the north. By afternoon the 3rd Battalion, 179th Infantry occupied high ground overlooking Point Sele, their objective. That's when they met elements of the 29th Panzer Grenadier Division head on and were driven back 1,000 yards.

At the same time, part of the 29th Panzer Grenadiers was sweeping west along the north side of the Sele meeting no resistance at all. When the Germans reached the bridge near the tobacco factory, they crossed over into the village of Persano and immediately attacked the flank elements of the 179th RCT still in march formation. This cut off the regiment from their armor and anti-tank assets as well as all of their supply trains. The panzers then turned left in Persano and attacked into the rear of the 179th RCT. After just a few hours on the move, the 179th RCT infantry and artillery were defending in all directions without armor support or more than their basic load of ammunition and supplies.

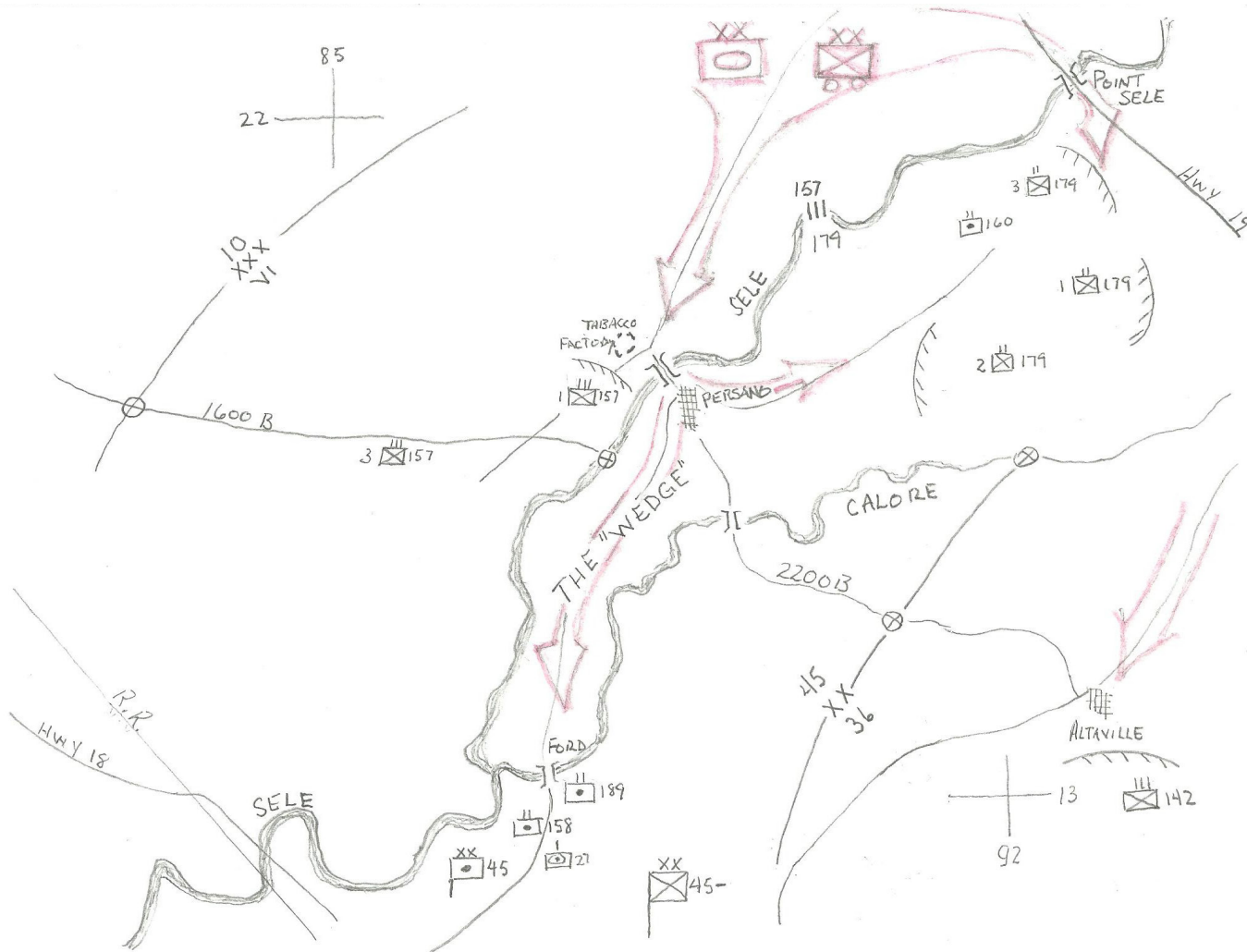
D+3. Over half of the 45th Infantry Division task force had been swallowed up, and the enemy commanders had discovered the gap in the Fifth Army lines. For the time being at least, little stood between them and the beaches. From their position at the confluence of the Sele and Calore, the 189th was firing furiously, day and night in support of the beleaguered 179th RCT. Most of the 179th RCT line

companies were without food or water. The 160th FA fired until each piece had only 10 rounds left, to be used only in direct fire against attacking enemy armor and infantry.

The way to defeat a beachhead is to find an exposed flank and attack. Failing that, try to find a seam, a gap, a breach in the invaders lines and attack there, creating weakened flanks and plunge into the invader's rear. On D+3, Sept. 12, 1943 that is just what the German 10th Army commander GEN Vietinghoff, intended to do. He rushed elements of the 16th Panzer Division down the north side of the Sele into the breach.

At the same time U.S. VI Corps commander MG Ernest J. Dawley ordered the 45th Infantry Division's 157th RCT, with only two battalions of infantry, east along the north side of the Sele. In order to support this action, the 157th RCT's direct support 158th FA positioned just below the 189th FA in front of the division artillery headquarters. As the 157th Infantry moved east, they ran head on into the German task force at the tobacco factory in a fierce meeting engagement. The tobacco factory became a focal point of the battle as it changed from a German to a U.S. and back to a German position over and over. The force controlling the tobacco factory had use of the nearby bridge over the Sele, which was key to the battle. For a time the 157th RCT held the tobacco factory and bridge which allowed the besieged 179th RCT infantry to withdraw from the Sele-Calore pocket as darkness settled in.

D+4/D+5. The XIV Panzer Corps Counter Attack. The next day, Monday, Sept. 13, 1943, saw the most determined attempts by the German defenders to push the allied beachhead into the sea. For a time, A Battery, 189th FA was positioned across the Calore in the 'wedge' between the two rivers to better support the 179th RCT.



The 'Breach,' 45th Division G-3 Overlay, Sept. 12-13, 1943, Sele-Calore Corridor. (Photo courtesy of Jim Gleckler)

Luckily, the division artillery commander, McLain, ordered it back behind B Battery, near his headquarters. Torgerson's firing battery was positioned on the high bank of the Calore River overlooking a crossing the Army engineers had built. From that position, he could see quite a distance up the road in the wedge of land toward Persano. Across the narrow stream was a lower bank with trees and brush. It is down this road from Persano that General Vietinghoff had ordered his panzer formations' main effort to drive for the beaches and the Fifth Army rear. With strong holding attacks against the 157th RCT on the left and the 36th Infantry Division on the right, enemy tanks, half tracks, and infantry made their way across the Sele bridge and into the wedge heading directly for the 189th Artillery's, B battery. German artillery batteries had set up in Persano to cover the enemy's advance. At that point, there were no allied maneuver elements between the enemy armor formations and the 189th artillery positions, and only 3,500 yards from there to the sea.

At about 6 p.m. an aerial observer in a cub plane reported a column of armor and infantry moving down the road from Persano toward the artillery positions. There was an American jeep and half-track in the lead and the observer could not identify the column as friendly or enemy. Was it a British unit, or part of the 36th Infantry Division? Alerted about the situation, the 189th commander, LTC Hal L. Muldrow and his executive officer crossed over the ford

in an attempt to identify the vehicles. They were met by a hail of machine gun fire that pinned them down in the brush on the far bank. Observing from B Battery, SGT Lester Snow and CPL Bruce Beck moved a .50 caliber machine gun and 37 mm anti-tank gun to high ground and provided covering fire, eventually allowing the two officers to escape.

At about 6:30 p.m. the enemy column moved down the road and into the crossing over the Calore. Just 300 yards to their front, the panzers came face-to-face with Torgerson and B Battery. The battery XO oriented his howitzers and they immediately took the German tanks, half-tracks, anti-tank guns and infantry under direct fire. The enemy column deployed from march formation and the battle began in earnest. German commanders knew they were very close to a break-through and total collapse of the beachhead, and they were determined to cross the Calore and into the corps rear.

As the 189th battalion commander and his executive officer adjusted A Battery and the 158th FA indirect fire missions, B Battery commander, CPT Glenn A. Smith and Torgerson continued direct fire and organized a defense on the stream bank just in front of the firing battery. The noise from outgoing and incoming fire was deafening. Before long, howitzer crews from both battalions were stripped to the minimum, and all available personnel and equipment from both battalions were moved to the front and began digging fighting



Troops of a Field Artillery battery emplace a 155 mm howitzer in France during World War II. (Photo courtesy of Jim Gleckler)

positions. Smoke and dust clouded the defensive line as well as the little stream gorge. Engineers with machine guns, M-1 rifles and 37 mm guns joined Snow, Beck and other Redlegs in firing into the ford and across the creek.

When GEN Mark Clark, Fifth Army commander, learned of the enemy armor and infantry penetrations in a thinly protected sector, he had his staff, on the evening of Sept. 13, 1943, prepare plans for the evacuation of all U.S. forces on the southern beachhead. So serious was the situation that he ordered the naval task force off shore to prepare for the evacuation. When VI Corps passed word of the Army commander's concern and contingency plan to the 45th Infantry Division command post, Middleton's response was to send word to the rear, "Put food and ammunition behind the 45th! We are going to stay here!" As darkness fell, enemy artillery began to land around the two U.S. FA battalions at the Sele-Calore confluence.

As the battle raged into the night, 45th Infantry Division Artillery officers organized and sent headquarters personnel, division band members, drivers, and mechanics into the defensive line. A battery of self-propelled howitzers from the 27th Armored FA, just unloaded from landing craft, also entered the fray. For a good part of the time, howitzers, from all batteries were firing well beyond the maximum sustained rate of fire in a desperate attempt to hold off attacking German armor and infantry.

As the aerial observers landed because of darkness, and the ability to adjust indirect fire on the moving targets became more difficult, Torgerson's acquisition of targets for direct fire from his howitzers became even more crucial. That is when he moved further forward and gathered several empty ammo and fuze boxes on which to stand to better see the attackers through the smoke, dust and debris. During the engagement, which lasted through the morning of Sept. 14, 1943, the six batteries defending the breach in the Salerno beachhead fired 10,637 rounds into the Sele-Calore wedge.

At about 3:40 in the morning of Sept. 14, 1943, two enemy salvos landed squarely in the lead firing battery of the 189th FA. Five Soldiers from B Battery were seriously hurt. Torgerson was fatally wounded as he stood on his observation post adjusting fire.

One of the most gripping images of a Redleg to come from World

War II combat is that of Torgerson, standing on fuze boxes, directing defensive Fires through the night. He is only one of the allied 1,769 killed, 6,901 wounded, and 3,548 missing in action in just 27 days while the Fifth Army secured the beachhead at Salerno. But his role, like that of his battery and battalion, was pivotal in the allied victory. The 189th FA received the Presidential Unit Citation for its action in securing the Salerno Beachhead.

Torgerson's bravery, adaptability, tenacity and stamina stem from his upbringing, his character, his education, love of sports, and from his training in OCS at Fort Sill. Torgerson was eventually laid to rest in the American Military Cemetery near Nettuno, Italy. His military awards consist simply of the Purple Heart Medal.

B Battery and the rest of the 45th Infantry Division successfully defended the beachhead at Salerno and broke out toward Naples. As the allied advance stalled at the Gustav Line, the 45th Infantry Division was pulled out and sent to fight ashore further north in the great 'meat-grinder' called Anzio. After a fourth combat assault on the beaches of Saint Maxime in France, the division fought north as a part of the Seventh Army in many bloody battles in the Vosges alongside the 3rd and 36th Infantry Divisions.

In March 1945, the 45th Infantry Division would swing east smashing through the Siegfried Line and across the Rhine with GEN Alexander M. Patch's Seventh Army, and attack across southern Germany liberating the infamous Dachau Concentration Camp along the way. The 45th Infantry Division conducted more combat amphibious landings than any other U.S. division, and was one of the top three U.S. divisions in days 'in the line,' fighting the enemy, during World War II.

Mr. Jim Gleckler is a EAST/BSEP instructor at the Truman Army Education Center, Fort Sill, Okla. He retired from the Army as a Field Artillery lieutenant colonel. He holds a bachelor's degree from the University of Tulsa, and master's and PhD degrees from Oklahoma State University. He is a graduate of Artillery Officer Candidate School at Fort Sill, and of resident CGSOC at the Command and General Staff College, Fort Leavenworth, Kan. Past military assignments include: forward observer, fire direction officer and battery executive officer, 3rd Battalion, 16 Field Artillery in Vietnam; commander, 3rd Missile Detachment, Special Ammunition Support Command, and G-2 staff at Central Army Group in Germany; and battalion commander, 319th Corps Support Battalion. His last military assignment was as a staff group leader, Combined Arms Services and Staff School, Command and General Staff College, Fort Leavenworth.

Soldiers from Task Force Viper, 3rd Combat Aviation Brigade prepare a UH-60L helicopter at FOB Wolverine with air hammer equipment. (Photo courtesy of MAJ Anthony J. Bianchi)



A Fire Support Officer in a Combat Aviation Brigade

By MAJ Anthony J. Bianchi



According to FM 3-09, *Fire Support*, “The brigade fire support officer is the senior Field Artillery staff officer responsible for all Fires planning and execution....responsible for advising the commander on the best use of available fire support resources, providing input to necessary orders, and developing and implementing the fire support plan.” This article will focus on my recommendations for becoming a successful FSO in a combat aviation brigade.



An AH-64D helicopter from Task Force Brawler flies over the mountainous terrain of Uruzgan province in Afghanistan during a repeater system destruction mission in February 2013. (Photo courtesy of MAJ Anthony J. Bianchi)

My first recommendation is the FSO must be a team player within the brigade staff. Next, a FSO must be willing to absorb and execute tasks and responsibilities not usually attributed to the position. Third, a FSO must understand the intended overall effects the CAB commander wants to achieve with any operation. My fourth recommendation is the FSO must understand the various capabilities within the Fires and effects coordination cell and how to integrate those assets into aviation operations. Finally, a FSO must never lose sight of the Field Artillery expertise that comes with that position.

A FSO must be a team player within the brigade staff. Teamwork is the cornerstone of success for any organization and the CAB is no exception. If a FSO can become part of the brigade team and accepted by peers on the brigade staff, then the FSO will have a much easier time integrating the various tools from the FECC in order to meet the commander's intent. Being part of a team also allows the FSO to gain insight on the commander's personality, which leads to a better understanding of intent and desired effects. The FSO can start this process by gaining the confidence of the brigade executive officer and the brigade operations officer. The FSO must understand his or her role on the team and accept every task assigned with vigor and excitement and never hide behind the excuse 'that's not my job.' Offering recommendations and executing tasks once the brigade XO and S3 make their decisions; will do much more for gaining acceptance and

confidence from the entire brigade staff than hiding behind a job scope.

A successful FSO must be willing to absorb and execute tasks and responsibilities not usually attributed to the position. I can explain this adaptability best by using examples from my own experience. My first example is when I became the officer-in-charge of the brigade deployment cell. As the OIC of the cell, I was responsible for writing the brigade deployment order, coordinating the mandatory theater specific individual readiness training, required medical screenings, coordinating the rapid fielding initiative equipment draw and establishing the block leave and movement schedules for personnel and equipment.

My second example occurred during our deployment when I became the single point of contact on the brigade staff for all things related to retrograde operations and base closure. Specifically, my CAB, 3rd CAB, was responsible for closing one tactical infrastructure, Forward Operating Base Wolverine during its deployment. Since the CAB is not a battle space owner, we did not have a brigade engineer on the brigade staff to handle engineer-specific tasks normally associated with closing a base. As the FSO, I filled that void on the brigade staff and became the sole point of information and resident expert within the brigade for all items regarding the FOB Wolverine closure. Most importantly, I represented Task Force Falcon (3rd CAB) at all Regional Command-South venues when discussing base closures and maintained

constant communication with the other staff sections within the brigade and with the subordinate task force on the ground at FOB Wolverine. Neither job had anything to do with training forward observers, integrating indirect fire assets or coordinating key leader engagements, but had everything to do with achieving the desired effects of the brigade commander. In both instances, the brigade commander needed internal and external resources coordinated, schedules synchronized and higher, adjacent and subordinate units informed in order to achieve his desired effects and end state. Essentially, as the FSO, I was able to achieve the desired effects of my brigade commander.

The primary job of a FSO is to understand the intended overall effects the commander wants to achieve as a result of an operation. Enemy repeater system engagements, retrograde operations and the closure of FOB Wolverine became three major areas during TF Falcon's deployment where the FSO needed to understand the commander's intent and desired effects. RC-S, TF Falcon's higher headquarters, operated on a 28-day targeting cycle. Each targeting cycle covered three lines of effort: security, governance and force posture. Only the security and force posture LoEs applied to TF Falcon. At the end of each targeting cycle, each battle space owner and TF Falcon would articulate to the commanding general their effects achieved for the previous targeting cycle and their effects focus for the upcoming cycle. In preparation for these monthly decision boards, the FSO collected data and assessed the brigade's ability to achieve critical events as part of certain decisive points that supported RC-S objectives. In essence, these CEs and DPs served as the brigade's measures of effectiveness and created a methodology to logically assess where the brigade stood with regard to achieving the brigade commander's desired effects and end state.

Based on these MOEs, the FSO would develop supporting tasks that would keep the brigade on track to achieve CEs and DPs. To understand how the brigade performed in these tasks relative to meeting these CEs and DPs, the FSO needed certain data points to make an assessment. These data points served as measures of performance for each LoE respectively. The MOPs enabled the FSO to assess how the brigade's efforts with regard to achieving CEs in support of DPs to meet RC-S objectives. Some examples of MOPs for the security LoE were the number of reconnaissance and security missions flown, number of repeater systems destroyed

or disrupted and number of deliberate operations supported. Some examples of MOPs force posture LoE were the number of Central Command material recovery element enablers used, number of re-locatable buildings and force protection barriers removed, status of engineer de-scoping efforts, number of pieces of rolling and non-rolling stock and containers turned in for retrograde and the removal of personnel and equipment off FOB Wolverine. Defining these MoPs and MoEs created a quantitative way for the FSO to logically assess the brigade's progress and provide insightful recommendations to the brigade leadership on the integration of resources and capabilities and foresee issues that may hinder progress in either LoE. In order to integrate capabilities, the FSO must understand what capabilities are at their disposal.

Understanding the various capabilities within the FECC and how to integrate those capabilities into aviation operations is the fourth recommendation for success as a FSO. One of the biggest challenges for a CAB FSO is overcoming the learning curve associated with the various pieces of equipment within the FECC. Four separate cells comprise the FECC: Fires, Air Defense, electronic warfare, and information operations. The first three cells have their own specialized equipment and each cell provides a unique capability to the fight. The Fires cell has an Advanced Field Artillery Tactical Database System, which tracks fire

support coordination measures, howitzer locations and ranges and can control indirect firing elements if needed. The CAB does not normally use the AFATDS because a CAB usually does not have any radar or Field Artillery units assigned as direct support to the CAB.

However, the CAB does track friendly Field Artillery gun locations and their respective ranges. The Air Defense and airspace management cell has the tactical airspace integration system which effectively manages the airspace, tracks aircraft and deconflicts restricted operations zones. The TAIS is a critical piece of equipment in the CAB TOC due to its ability to establish and monitor ROZs, track rotary wing, fixed wing and unmanned aircraft in flight and deconflict air space. The electronic warfare section understands how to use signal detection and jamming equipment in order to find enemy repeater systems through frequency searches and disrupt frequencies or destroy repeater systems. Knowing how to best use FECC equipment for mission command at the brigade level enhances combat effectiveness of all rotary- and fixed-wing platforms under the control of the CAB. Therefore, the FSO must be the subject matter expert on all things related to integrating lethal and non-lethal capabilities and their effects as part of any operation.

Finally, a FSO should never lose sight of the Field Artillery expertise that he or she brings to the fight. As mentioned earlier,

the FSO must understand the commander's intent in order to achieve the desired effects of an operation. In a CAB the FSO may not ever provide recommendations to the commander on the positioning of howitzers, pre-planned targets or key leader engagements. However, the brigade S3 may query the brigade FSO on rules of engagement, theater-specific constraints for coordinating close air support, minimum requirements for being the ground force commander or the use of the aerial response force to exploit potential cache sites.

Because the CAB served in a general support role to RC-S during our recent deployment, most of our aviation missions and repeater system engagements came from higher as a direct order and prioritized. However, we had two ground platoons that served as the ARF for RC-S. These platoons were an RC-S asset, but served in a direct support role for the CAB when not actively used as the ARF. RC-S gave the CAB authority to select 'low-risk' targets, such as cache sites and spotter network locations for exploitation with our ARF platoons. Implementation of this exploitation required a targeting process within the brigade which the FSO was able to establish. The process captured effects and nested targets with operations within RC-S and assorted BSOs.

My recommendations are purely my opinion and allowed me to be successful during my time a FSO for TF Falcon during our recent deployment to Afghanistan. Being a team player and willing to do anything to make the unit better will allow a FSO to succeed in any organization. A FSO with a teamwork mentality and flexible mindset will better understand a commander's desired effects and adapt to new technology found within the various elements of the FECC. Finally, a FSO must never lose sight of the Field Artillery expertise that he or she brings to the fight.

MAJ Bianchi (Right) and CPT Fogarty, Regional Command-South MEDEVAC planner pose for a picture during their visit to Forward Operating Base Wolverine in December 2012. (Photo courtesy of MAJ Anthony J. Bianchi)



Major Anthony J. Bianchi is the battalion S3 for 1-76 Field Artillery, 4th Infantry Brigade Combat Team at Fort Stewart, Ga. Prior to joining 1-76 FA he was the brigade Fire Support Officer for the 3rd Combat Aviation Brigade and deployed in support of Operation Enduring Freedom XIII. Before 3rd CAB, Bianchi taught in the Department of Systems Engineering at the United States Military Academy at West Point, N.Y. Bianchi commanded Headquarters and Headquarters Battery, 214th Fires Brigade, during Operation Iraqi Freedom VIII and commanded A Battery, 2-4 FA at Fort Sill, Okla. He served as the battalion S4 and assistant S3 for 2-31 Airborne Field Artillery Regiment, Fort Bragg, N.C. and as platoon leader, operations officer and battalion fire direction officer for 1-12 FA (MLRS) at Fort Sill. He holds a Master's of Science in Systems Engineering from George Mason University, Va., and is a graduate of the Command and General Staff College.

BRIGHT SHINY OBJECTS

By Capt. Daniel Grazier, USMC

Fixation applied to the proper objective can be a useful attribute. But far too often, it is applied in the wrong direction. In military matters, a fixation on the wrong objective leads to missed opportunities or worse; finding oneself on the wrong side of tactical surprise and defeat. Military leaders all too often become fixated on the most obvious targets presented on the battlefield. These 'shiny objects' are generally the most lethal enemy weapons systems; artillery pieces, infantry fighting vehicles, and especially tanks. This focus is a hold-over from the military's past attrition-based doctrine and is completely at odds with the principle of Manoeuvre. I have chosen the British spelling 'Manoeuvre' to indicate a difference between maneuver warfare and tactical maneuver, as B.H. Liddell Hart set forth in his work "Strategy: The Indirect Approach." To be truly effective in future conflicts, leaders and planners must adjust their mindset to focus tactical maneuver against the most profitable enemy targets. These are rarely the most obvious objects on the battlefield.




During a small-scale exercise aboard the Marine Corps air ground combat center in February 2013, an artillery battalion spent three days battling a simulated enemy mechanized regiment. At the combined arms rehearsal, a very motivated second lieutenant serving as a forward observer stood up to describe his mission. He would be calling artillery fire onto moving tanks as they assaulted towards the friendly defensive positions. He stated his desired effects as, ‘neutralizing six-of-ten tanks.’

This young officer had graduated from artillery school just a few weeks prior, so his inexperience was easily explained. It does demonstrate a flaw in our collective mindset however. He had been conditioned to believe he could neutralize enemy tanks by calling artillery fire on them. According to MCRP 5-2A, *Operational Terms and Graphics*, to neutralize is to “render an object ineffective or unusable.” Just what artillery

rounds can physically do to a tank to accomplish such a task, the lieutenant did not explain.

Let us consider the physical effects of artillery fire on a moving tank formation. Upon the first indication of an indirect fire attack, the commander will order his Soldiers to close hatches, or ‘button up’ against shrapnel. The tactical task affected is suppression. Fields of view are narrowed and ‘manoeuvring’ becomes more difficult with hatches closed. A wise commander with well-trained Soldiers will not be suppressed for long as they will push through the impact area quickly. In the event a round actually causes physical damage to an armored vehicle, the most likely outcome would be a mobility kill. This would be a destruction mission.



Marines fire an M777A2 155 mm howitzer during a demonstration for local government officials and media at the North Fuji Maneuver Area, Shizuoka prefecture, Japan, November 13. The demonstration allowed Marines to showcase their proficiency to visitors attending the event as part of Artillery Relocation Training Program 12-3. M Battery is currently assigned to 3rd Battalion, 12th Marine Regiment, 3rd Marine Division, III Marine Expeditionary Force. (Photo by Lance Cpl. Katelyn Hunter, U.S. Marine Corps)

Even if an artillery mission were to catch an armored unit completely unaware with crewmen in the open, the resulting deaths would also count as destruction. The bottom line: there is no way to neutralize an armored unit by firing artillery at the tanks.

When asked for an explanation, the officer had clearly never considered that flaw in his plan. Further, he obviously had never thought to target any other part of the enemy's system. Consider this; which is a better target for artillery, a tank or a fuel truck? The refueler is clearly more vulnerable to artillery fire, particularly during the shaping phase of operations. But no one had ever thought to allow the tanks to pass without shooting at them and instead wait for the enemy's logistics trains to come into range. Everyone involved in developing the plan had simply believed it proper to fire upon the first shiny object presented.

How had we arrived at such a state of affairs? Think back to every indirect Fires class or call-for-fire simulation in which you have participated. How often was a tank used as the target? The call-for-fire class taught to second lieutenants at The Basic School in 2005 used a graphic of a tank to explain bracketing. So from the very first moment of combined arms training, Marines and Soldiers are being conditioned to fire artillery at tanks.

Nearly every service member, who has ever performed a call-for-fire mission in training has said, "tank platoon in the open" at some point. The targets arrayed on nearly every impact area on every base are tank hulks. The mere fact these same vehicle hulks have been fired upon for decades demonstrates the futility of artillery against armored vehicles. But rarely are the realistic effects of artillery against a tank ever taken into consideration. Artillery can only be marginally effective against a tank. But because tanks are the bright shiny objects on the battlefield, we perpetuate the mindset of striking straight at the enemy's least vulnerable position while ignoring his weak points.

The goal in Manoeuvre warfare is to defeat the enemy by collapsing his military system and rendering him incapable of effectively resisting our will. This is in stark contrast to a doctrine of attrition where the enemy's physical destruction is the goal. Under the principle of attrition, it makes sense to destroy as many of the enemy's tanks as possible. The more tanks you destroy, the better the war is going by that standard. A truly successful engagement under the principle of Manoeuvre would avoid contact with the enemy's tanks completely. A commander who can defeat the enemy without firing upon the enemy's tanks has mastered the art of war.

The way to do this is fairly simple, but it does require a different mindset. Imagine this scenario: a commander and his staff begin planning an operation against a mechanized force. The commander steers his intelligence staff by stating simply, "I am interested in the location of the enemy's tanks. But I am fascinated to know where he positioned his logistics." That simple directive would adjust the mindset of the entire staff from the obvious targets, the tanks, and direct it towards the more vulnerable fuel trucks, ammunition resupply vehicles, et cetera.

The larger lesson to be drawn is to practice what is so often preached in the Army and the Marine Corps. All Marine officers learn at The Basic School, after reading Marine Corps Doctrinal Publication 1, *Warfighting*, to avoid enemy surfaces and strike at enemy gaps. "We avoid enemy strength and focus our efforts against enemy weakness with the object of penetrating the enemy system since pitting strength against weakness reduces casualties and is more likely to yield decisive results." This is quite elegantly written in MCDP 1, but rarely applied in practice. Army officers learn to use manoeuvre to "create and expose enemy vulnerabilities" to friendly combat power.

The tendency to focus attention on shiny battlefield objects, like tanks, is an institutional failure to bridge the gap between doctrine and practice. It is not enough to simply tell Marines to read MCDP 1 and Soldiers to read FM 3-90 and then believe the philosophy contained within has been internalized. The warfighting philosophy of manoeuvre must be reinforced in all aspects of our education and training. Students at formal schools should not be told to avoid surfaces and seek gaps in the classroom one day only to be forced to attack straight into the enemy's strongest point during a field exercise the next.

Remember the bracketing lesson using the tank as the example target. As a method of emphasizing a key point of our warfighting philosophy, the tank should be changed to a more appropriate target like a fuel truck. It seems simplistic to change a graphic on a PowerPoint slide. But history has shown such subtle changes can render dramatic results.

LTC Dave Grossman, wrote extensively about 'nonfirers' on the battlefield throughout history in "On Combat." He references studies showing more than 80 percent of American riflemen in World War II not firing their weapons at the enemy. Post-war Army leadership cast about for a solution. They realized that using bulls-eye targets during marksmanship training was not properly conditioning Soldiers to shoot at human beings. Soon, Soldiers practiced marksmanship by firing at man-shaped silhouette targets and later the 'crazy Ivan' targets which fall when struck. Any troops who bother to think about current methods probably assume it is simply to provide instant feedback on the range. But the real purpose is to condition them to shoot at a human being. The results are impressive. By Vietnam, 95 percent of riflemen fired at the enemy.

Only through proper conditioning, will commanders and planners instinctually apply the concept of surfaces and gaps in future operations. At the present time, to propose such an idea during a planning session often invites a roomful of puzzled looks. This is what happened with the artillery battalion during that small-scale exercise in February 2013. The battalion fire support coordinator had never considered anything but attacking the enemy tanks. He did not even know where to look for the enemy's logistic trains. This is not meant as criticism for this particular individual. He is simply a product of the current system.

Herein lies the biggest challenge of all. Such thinking should be second nature, especially in the officer ranks. Our goal should be to foster a leader's *fingerspitzengefühl*, or his finger tip feel of the battlefield. This most basic concept was one which Col. John Boyd, the innovator of Manoeuvre warfare doctrine, viewed as one of the most vital characteristics of a military leader. An officer's *fingerspitzengefühl* should orient him to seek gaps and avoiding surfaces. But years of talking Manoeuvre and training attrition has created a situation in which our leaders' orientation is on the wrong azimuth.

The solutions to this problem seems simple in theory, but are difficult in practice. First, all Soldiers and Marines need to fully understand the philosophy of Manoeuvre. This would require better periods of instruction for all student officers, beginning with Basic Officer Leaders Courses and The Basic School. Fires training must be updated to reflect Manoeuvre doctrine. Students attending Fires training should be presented targets other than tanks and armored vehicles.

The second change is by far the more difficult of the two. This is the requirement to integrate these ideas into field training. For Marines, the most obvious starting point is the Tactical Training Exercise Control Group, and the Integrated Training Exercise. This would



Artillery operators, Sgt. Ramon Calleros, left, and Cpl. Ivan Medramo, assigned to III Marine Expeditionary Force, gather information in preparation to fire reduced range practice rockets from a High Mobility Artillery Rocket System during joint combined live-fire exercise as part of Sang Yong 2014. This is the first time HIMARS have been deployed and fired within the Republic of Korea. Exercise Ssang Yong is conducted annually to enhance interoperability between U.S. and ROK forces by performing a full spectrum of amphibious operations while showcasing sea-based power projection in the Pacific. (Photo by Cpl. Lauren Whitney, U.S. Marine Corps)

require significant revisions to the training scenarios and retraining the exercise controllers. Currently, the enemy paints provided to the training units are only combat vehicles. Similar adjustments would be required at the National Training Center, Fort Irwin, Calif.

An example of such a scenario would proceed like this: A battalion in the defense establishes both a main engagement area and a forward engagement area. It positions sniper teams and forward observers deep for the shaping phase of operations. Controllers provide paints to them of a mechanized force attacking in the direction of the friendly engagement areas. The observers report the enemy's size, speed, and direction of travel, but do not call for fire on the combat elements. The controllers would then paint the movement of the enemy's logistics trains. In an ideal situation, the battalion would have positioned its observers in such a way to observe the enemy's trains at the same time his lead combat elements come into direct fire contact inside the forward engagement area.

Such a single battle concept scenario would present a very difficult problem for any commander and staff to effectively execute. While this is not the type of combined arms dilemma described in MCDP 1, which applies to a single enemy position, it does present such a dilemma on a larger scale. It is important to bear in mind this is only one technique and not the only way to solve this tactical problem. But it does represent the type of mindset which should be encouraged at all levels of command.

The bright, shiny objects on the battlefield do present alluring targets. It is only natural to focus attention on the most deadly weapon system. To do otherwise seems contrary to common sense. This is

not to suggest such weapon systems should be ignored completely. For only by knowing where the enemy's tanks are it is possible to determine where he positioned his logistics. Commanders and planners must be conditioned properly to prevent tunnel vision and avoid missing the larger picture; only by doing so will the most profitable battlefield opportunities be realized.

Tactical patience is a learned skill. Not firing upon the first target presented demonstrates a mastery of this skill. It is necessary to establish the proper mindset from the outset of a military leader's service. Habits, once established can be nearly impossible to break. Leaders at all levels must be conditioned properly in every aspect of their training to establish good habits. Otherwise, our continued dominance on the battlefield could be squandered.

Captain Daniel R. Grazier, USMC, is a graduate of Virginia Commonwealth University and was commissioned as a second lieutenant in March 2005. Following The Basic School, he was assigned as an armor officer and attended the U.S. Army Mounted Officer Basic Course at Fort Knox, Ky. He reported for duty to 2d Tank Battalion, 2d Marine Division in Camp Lejeune, N.C., in April 2006, where he served as a tank platoon commander. He deployed in April 2007, to Al Anbar province, Iraq, in support of Operation Iraqi Freedom (OIF). Upon his return, he served as the AT-TOW platoon commander. In July 2008, Grazier returned to Fort Knox, where he was first assigned as operations officer for the Marine Corps Detachment. In July 2009, he assumed command of the Marine Training Company. His next assignment was as a tactics officer in Hawk Troop, 2/16 Cavalry teaching armor tactics to newly commissioned officers. Grazier was selected for career-level school and was subsequently assigned as a student at Expeditionary Warfare School in Quantico, Va. Following graduation, he was assigned to 1st Tank Battalion where he has served in a variety of billets including Headquarters Company commander, B Company commander, and assistant S-4. He deployed to Helmand province, Afghanistan in May 2013, for service with Regimental Combat Team 7 as senior watch officer in support of Operation Enduring Freedom. Grazier's personal decorations include: Army Commendation Medal, Navy and Marine Corps Achievement Medal, and NATO/ISAF Medal.

Challenges for Field Artillery in the Decisive Action Training Environment

By MAJ Rod McClain, CPT Norm Brem, CPT Trenin Spencer, and ILT Don Gillilan

Army Doctrine Publication 6.0, *Mission Command*, specifies that commanders at every level must establish a mission command system - the arrangement of personnel, networks, information systems, processes and procedures, and facilities and equipment that enable commanders to conduct operations. Recently, 1st Battalion, 7th Field Artillery Regiment, 2nd Armored Brigade Combat Team, 1st Infantry Division tested its mission command system in the decisive action training environment at the National Training Center, Fort Irwin, Calif. The rotation stressed our MC system, identifying many gaps in our preparation and approach to the problem set. In retrospect, training at home station was unable to replicate the amount of friction that the battalion's MC system would endure in the DATE. Of the exercises developed to train the battalion's MC system, i.e. our command post, we could not replicate an operational tempo that involved directing current operations simultaneous with planning, resourcing and rehearsing future operations all while providing security. Whether an internally driven exercise during the battalion's gunnery, a brigade level command post exercise orchestrated by the MC integration team or during the leader development program at NTC, the exercise design was such that we trained for a compartmentalized MC system. We planned, we rehearsed, we executed, and we conducted after action reviews. It was not until the DATE that we experienced the totality of MC, i.e. firing counter battery concurrently to conducting a FA technical rehearsal, repositioning the command post and receiving the warning order for the next operation. Our experience resulted in a reexamination of how we man and organize our CP to make it more functional and facilitate MC and the commander's decision making process.

Manning the direct support battalion CP. The design of a DS FA battalion staff remains inadequate for DATE as its module structure still favors a conventional, linear fight. It is built to execute the fire support plan developed by the fire support coordinator and brigade fire support officer as part of

the brigade order. For example, the Modified Table of Organization and Equipment authorizes only three total officers - the S3, chemical, biological, radiological, and nuclear officer, and assistant operations officer - in the operations section and a single fire direction officer for continuous and sustained combat operations. In reality, every DS FA battalion mitigates risk in its CP and builds a more robust capability allowing for parallel planning, MC of current operations, and security. Our initial design for our CP was to build additional capability in the fire direction center, current operations, and battle staff. (See Figure 1 for a comparison of MTOE, NTC Manning and Recommended CP Manning.)

FDO Number 2. As we entered our gunnery cycle we assigned a senior first lieutenant as battalion FDO Number 2. In garrison this officer served as an additional staff officer in the operations section. During field training exercises and the rotation, a second FDO at the battalion level provided us with the capability to split our FDC into two teams facilitating 24-hour operations, simultaneity of planning and current operations, and the critical ability to split the battalion CP into a main and mobile CP without losing firing capability or passing fire control to one of the battalion's four platoon FDCs.

Battle Captains, Battle Noncommissioned Officers, and Radio Telephone Operators. Experienced battle captains, NCOs, and trained RTOs, are critical to fulfilling the functions of a CP. The CP functions stressed at the NTC - receive information, distribute information, analyze information, recommend, integrate resources, and synchronize resources - cannot be carried out by inexperienced junior officers without extensive training and/or a detailed standard operating procedure. We assumed risk by regularly rotating the battle captain and battle NCO duties among junior officers and non-13 series NCOs respectively. While this was feasible during our home station training, it proved a limiting factor when providing fires in support of the brigade in the DATE. Without experience or FA expertise, the

officer or NCO often times did not appreciate the importance of the report received. Our CP routinely handled multiple events simultaneously - troops in contact, casualty evacuation, and counter-battery, all the while supporting a major operation with Fires. Thus, our RTOs needed to be better trained, more attentive, more aggressive, and possess the ability to take initiative when receiving situational, spot or routine reports. Too often we struggled with RTO procedures, inaccurate logs, and general inexperience.

CBRN Officer and NCO. We fought through the NTC rotation with the CBRN officer serving as one of the battle captains and the CBRN NCO as a battle NCO. The CBRN officer is part of the battle staff and is capable of performing battle captain duties simultaneous with maintaining his staff estimate and participating in the planning process. The CBRN NCO however, has a larger role as the NCO in charge of the battalion's operational decontamination team. Although we escaped the rotation without a CBRN attack, we assess that the CBRN NCO would better serve as a battle NCO in the battalion's combat trains/administration and logistics operations center with his decontamination team to be more responsive in the event of a CBRN attack.

Target Acquisition Platoon Leadership. To account for a shortage of personnel, the task organization of the battalion's counter fire operations cell to the brigade CP and our home station training, we pulled the TA platoon leadership into the CP. The TA platoon leader assumed the role of the reconnaissance and survey officer and the platoon sergeant assumed duties as a battle NCO. By doctrine, the TA PL participates in the planning process recommending the employment of survey and TA radar sections. Ultimately this had no effect on the performance of the individual radar sections during the rotation. However, it proved ineffective from a staff perspective for the mere fact that we had not trained it prior to the rotation.

Command Post Security Element. The days where concertina wire and a built to

155 mm (SP) MTOE	1-7 FA DA NTC Rotation	Recommended Date
Operations		
Operations Officer	Operations Officer	Operations Officer
Assistant Operations Officer	Assistant Operations Officer	Assistant Operations Officer
CBRN Officer	CBRN Officer	CBRN Officer
Operations Sergeant	Battle Captain	Battle Captain
Master Gunner	Operations Sergeant	Operations Sergeant
Chief of Survey	TA Platoon Sergeant	Master Gunner
2 - CBRN NCOs	2 - CBRN NCOs	Chief of Survey
EW Sergeant	EW Sergeant	CBRN NCO
		EW Sergeant
Intelligence		
S2	S2	S2
Intelligence Sergeant (13Z50)	2 - Intelligence Sergeants	Intelligence Sergeant (13Z50)
Intelligence Sergeant	2 - Intel Analysts	Intelligence Sergeant
Intel Analyst		Intel Analyst
Fire Direction Center		
FDO	2 - FDOs	2 - FDOs
Chief of Fire Control Sergeant	Chief of Fire Control Sergeant	Chief of Fire Control Sergeant
2 - Fire Control Sergeants	2 - Fire Control Sergeants	2 - Fire Control Sergeants
Counterfire Operations		
Targeting Officer	TA Platoon Leader	Targeting Officer
Senior FA Targeting Officer		Senior FA Targeting Officer
2 - Targeting NCOs		2 - Targeting NCOs
C4 Operations		
S6	S6	S6
Section Chief	Section Chief	Section Chief
Senior Human Resources Sergeant	S1	Senior Human Resources Sergeant
S4	S4	S4
Security Element		
	Platoon Leader	Platoon Sergeant
	Platoon Sergeant	2 - Squad Leaders
	2 - Squad Leaders	

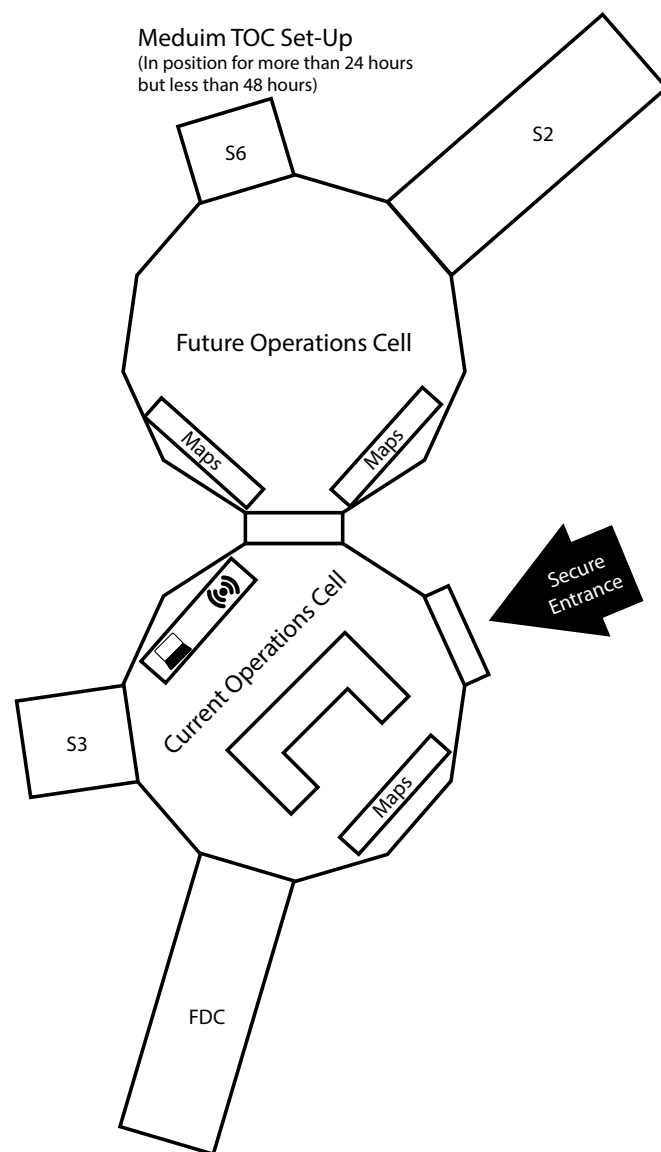
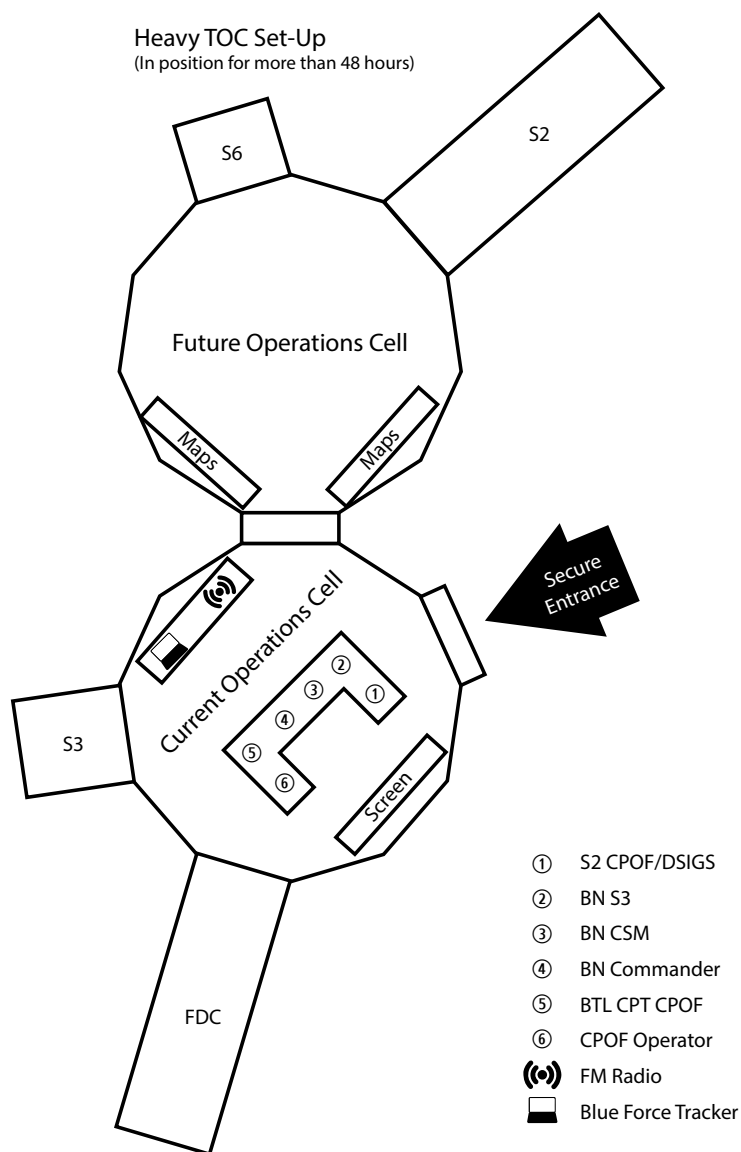
Figure I. MTOE, NTC Rotation and recommended CP manning. (Information provided by MAJ Rod McClain, CPT Norm Brem, CPT Trenin Spencer, and ILT Don Gillilan)

standard entry control point were enough to secure the DS battalion CP are forever gone. CPs must be secure, mobile, and ready for any threat. To secure our CP we resourced two gun truck sections (four trucks total), a tactic, technique, and procedure successfully used during a previous rotation for CP security. Effective, this means to secure our CP cost 16 personnel from the battalion's Headquarters and Headquarters Battery. The effect on the battle staff and CP personnel

was ultimately small CP shifts of longer duration. Although sustainable for the eight-day force-on-force portion of the rotation, this task organization would prove challenging for a longer operation.

Command Post and Mobile Command Posts Operations. Over the past 10 years DS battalions have become accustomed to operating from fixed sights with decentralized fire control and clearance of Fires. That is, battalion's CP occupied structures on vari-

ous levels of contingency operating stations, in most cases removed from fire control while platoon-sized fire direction centers conducted both tactical and technical fire direction. In addition, for units conducting MC from fixed sites, the Army introduced upper Tactical Internet and fielded systems; Command Post of the Future, Tactical Ground Reporting System (, etc. - forcing dependence on upper TI. Getting back to our core competencies of providing fire sup-



Light TOC Set-Up
(In position for less than 24 hours)

S2	S3	FDC
(FM)	(FM) Blue Force Tracker	(FM)

Figure 2. Pre-National Training Center Tactical Operations Standards of Operation Command Post configuration diagrams. 2a (top-left): The Heavy TOC set-up utilized when emplace for more than 48 hours. 2b (top-right): The Medium TOC set-up utilized when in a position for more than 24 hours but less than 48 hours. 2c (left): The Light TOC set-up utilized when in position for less than 24 hours. (Information provided by MAJ Rod McClain, CPT Norm Brem, CPT Trenin Spencer, and ILT Don Gillilan)

port in a DATE, our CPs are again mobile and focused on massing fires using tactical radios or combat net radio as our primary means to communicate with our subordinate formations and fire support elements. To enhance the battalion's MC system and provide the critical functions of the CP, the DS battalion must be light, functional and mobile.

Our SOP addressed three configurations - heavy, medium and light - based on the time that the CP would be in position. Initially, the main difference between the heavy and medium configurations was the level of TI, not necessary its size or organization. The CP consisted of two deployable rapid assembly shelter systems broken down into the main CP and a plans area. The brigade headquarters' reliance on upper TI dictated that battalions would establish upper TI if in position for more than six hours. Upper TI allows

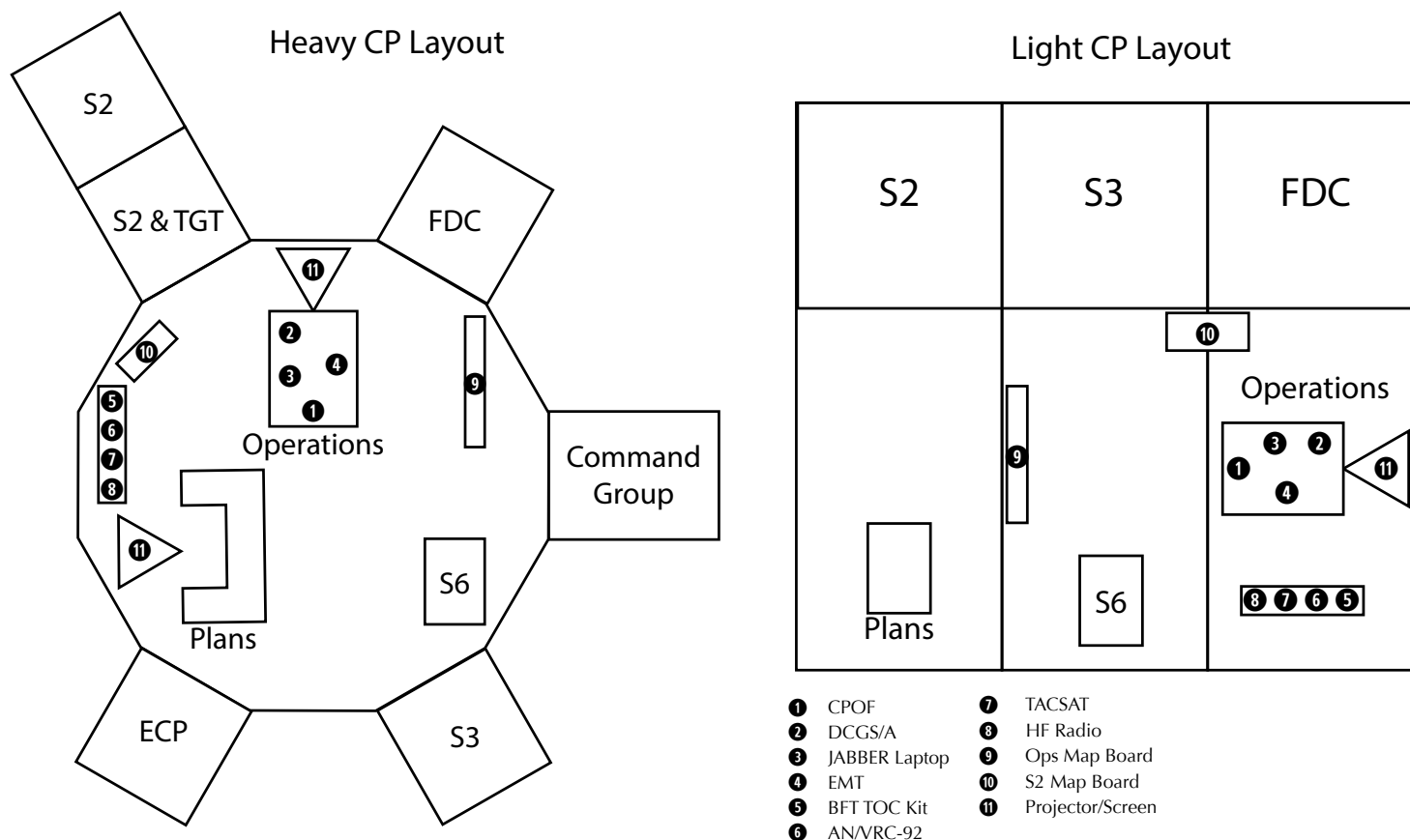


Figure 3. Post-National Training Center command post configurations. The Heavy CP Layout is utilized when the CP is in position for more than 24 hours, STT established NLT occupation plus six hours and the command group setup only if in position for 48 hours or more. Light CP configuration is utilized when the CP is in position for less than 24 hours. (Information provided by MAJ Rod McClain, CPT Norm Brem, CPT Trenin Spencer, and ILT Don Gillilan)

the brigade to disseminate large amounts information, both voice and digital at a faster rate with little to no effect by dead space on the battlefield. The disadvantage exists at the battalion level in the time it takes to establish connectivity and bring upper TI into operation. The sensitivity of the satellite transportable terminal to cross country movement and the time it takes to put the system into operation required that battalions rely on lower TI, primarily Blue Force Tracker, and combat net radios to communicate. We intended to fight as light a configuration as we could to maintain our mobility while at the NTC.

We discovered very quickly in the rotation that our CP design was not functional, designed more for stability operations than a DS battalion conducting unified land operations. We failed to anticipate and our home station training did not replicate simultaneity of operations or the challenges to our ability to communicate via combat net radio. During our transition from the offense to the defense we had to look at the functionality of our CP design. Consulting our observer, controller/trainers, and a pre- 9/11 DS FA

battalion tactical standard operating procedure, we redesigned the CP to account for function versus space. We first decreased the overall size of the CP for ease of setup given the decrease in CP manning. We repositioned the S2 from the planning side of the structure next to the FDC to facilitate the staff coordination of battle damage assessment and refined targeting data to generate the most accurate fire order possible when conducting fire missions. Finally, we accounted for the need to establish upper TI as quickly as possible to maintain communication with the brigade CP.

In the DATE, mobility of a battalion's CP is critical. Unlike a combined arms battalion or reconnaissance squadron, the mobile CP is not as simple as the commander and S3's combat vehicles moving forward. It also isn't as simple as the S3 grabbing the S2 and FDO and moving forward in his High Mobility Multipurpose Wheeled Vehicle. For the DS battalion, the mobile CP must allow the S3 to transfer MC of the fight from a robust facility to one that is secure, functional, and mobile. To this end we organized our mobile

command post to provide for MC, fire control, and intelligence analysis. It consisted of the S3 HMMWV, FDC HMMWV, and the FDC 1068. We manned it with the S3, S2, FDO, FDNCO, fire control NCO, battle captain, and drivers. This left the battalion's executive officer to run the battalion CP with FDO number-two, operations sergeant and intelligence sergeant. This organization allowed us to be secure, functional and mobile. However, we failed to identify the most significant challenge to conducting a mobile CP, i.e. the trigger to pass MC from one element to the other. Given that we had to conduct a mobile CP for the first fight, a brigade movement to contact, we identified that we did not have a process or checklist to follow entering the rotation. As a result, we again consulted our OC/Ts for 'a way' to ensure we were ready to pass MC from the CP to the mobile CP. We tested this checklist during the transition from the offense to the defense with some success and added this checklist to our SOP for future use.

The DATE at the NTC challenged the battalion's MC system. These challenges

COMMAND POST OPERATIONS

MOBILE CP MC HANDOVER CHECKLIST

PURPOSE: To allow the S3 to confirm that the Main or Mobile Command Post (CP) has the situational awareness and communications in place to assume Mission Command (MC) of the fight. Upon completion, the CP assuming MC, to include fire control, will make a net call to all elements (both battalion and brigade).

Movement and Maneuver

- ☐ Friendly Unit Locations and Front Line Trace
Bde TOC, Bde TAC, 5-4 CAV, 1-18 IN, 1-63 AR, BSA, FLE and Adjacent Units
- ☐ Current Maneuver Graphics
Phase Lines, FLOT, FSCMs, ACAs and Unit Boundaries
- ☐ Scheme of Maneuver
Phase of the Operation, Critical Events and Decision Points
- ☐ MEDEVAC Status
Location of CCPs and AXPs
- ☐ ISR Status

Intelligence

- ☐ Current Enemy Situation
Enemy Scheme of Fires, Enemy Scheme of Maneuver, Confirmed/ Templated locations
- ☐ Brigades ISR Focus
- ☐ Status of Bde and Bn PIR
- ☐ Updates to the ISR Sync Matrix

Fires

- ☐ Status of Field Artillery Tasks (FAT)
- ☐ Battery Locations (DS and R) and Range Capability
- ☐ Battery Slant(DS and R)
- ☐ Pieces PGM Capable
- ☐ Ammunition Status (Gun line and Trains)
- ☐ Time of Last MET/Time of Next MET
- ☐ FSCM (FSCL, CFL, RFA, NFA)
- ☐ ACM
- ☐ Radar Locations/AOS
- ☐ Location of Survey

Protection

- ☐ Current MOPP Level
- ☐ Hasty, Deliberate and/or Operational Decon Locations
- ☐ SIGACTS pertaining to CBRN Threat

Communication

- ☐ Retrans location, Nets and Triggers to Move
- ☐ Changes in the Bde or Bn PACE
- ☐ Confirmed communications with Bde Cmnd, Bde Fires (V/D), Bn Cmnd and Bn Fires (V/D)

Figure 4. The Mission Command checklist developed as part of the 1st BN., 7th FA, TACSOP. (Information provided by MAJ Rod McClain, CPT Norm Brem, CPT Trenin Spencer, and ILT Don Gillilan)

forced us to question the assumptions that we entered the rotation with, as the training highlighted many of the gaps in our system. From the incredible training experience and the many lessons learned, we built security and redundancy into our CP manning, functionality into our CP organization, and developed procedures to ensure we can maintain MC without interruption.

Major Rodric McClain is the battalion executive officer for 1st Battalion, 7th FA, and served as the battalion S3 for the DATE NTC rotation. He previously served as the assistant fire support coordinator for 1st Infantry Division. McClain commanded the Field Artillery Captains Career Course, Headquarters

Cannon Battery, 1st Battalion, 22nd FA, and D Battery, 1st Battalion, 22nd FA at Fort Sill, Okla. He has deployed once to Iraq, in support of Operation Iraqi Freedom as the executive officer for the National Police Transition Team and once to Afghanistan in support of Operation Enduring Freedom as the deputy fire support coordinator for 1st Infantry Division.

Captain Norman Brem is the battalion fire direction officer for 1st Battalion, 7th FA, 2nd Armored Brigade Combat Team, 1st Infantry Division at Fort Riley, Kan. He previously served as the Headquarters and Headquarters Battery executive officer for 1st Battalion, 9th FA, company fire support officer for Charlie Company, 1st Battalion, 64th Armor, and as a platoon fire direction officer for A Battery, 1st Battalion, 9th FA, Fort Stewart, Ga. He has deployed once in support of Operations Iraqi Freedom and New Dawn as a platoon leader and company fire support officer.

Captain Trenin Spencer is the signal company commander for the 2nd Armored Brigade Combat Team, 1st Infantry Division at Fort Riley, Kan. He previously served as the communication's officer (S6) for the 1st Battalion, 7th FA, 2nd Armored Brigade Combat Team, 1st Infantry Division. Spencer also served as a squadron assistant operations officer, and reconnaissance, surveillance, and target acquisition platoon leader. He has deployed once to Iraq, in support of Operation Iraqi Freedom as a platoon leader and assistant operations officer.

1st Lieutenant Donald Gillilan is the assistant operations officer for 1st Battalion, 7th FA, 2nd Armored Brigade Combat Team, 1st Infantry Division, where he also served as a platoon leader. He deployed once to Iraq in support of Operation New Dawn as the battalion's personal security detachment platoon leader.

Techniques for the Adaptive, Agile Artilleryman

By CPT Westly T. LaFitte

The battalion fire direction officer is an integral member of the Field Artillery battalion team. He is faced with challenges during National Training Center Fort Irwin, Calif., rotations and other decisive action scenarios that exercise his cognitive abilities. The FDO is an enforcer, tactician, mathematician, scientist, and thinker. The FDO is the artillery battalion's factotum.

The decisive action training environment upon superficial inspection is an unfamiliar scenario for most contemporary artillerymen. Fortunately, principles of ingenuity learned from years of counterinsurgency apply seamlessly to the combined arms maneuver portion of the DA scenario. "Army doctrine has always stated that Army forces must be prepared to transition rapidly from one type of operation to another. A decade of sustained combat and deployments has refined that understanding. Army forces simultaneously and continuously combine offensive, defensive, and stability operations

through a blend of combined arms maneuver and wide area security." The DATE requires leaders that think quickly, are proactive, and react well to change as they transition between combined arms maneuver and wide area security. The fluid environment of the DATE requires agile and adaptive artillerymen to conduct more comprehensive and flexible artillery planning.

Rotational units are challenged with DA planning due to the rapid operations tempo. Plans continuously evolve causing frequent changes to the scheme of maneuver prior to and after crossing the line of departure. The DATE is a continuous scenario and that balance between combined arms maneuver and wide area security changes as quickly as the tempo. Thus, the operations process is stressed. The DATE is complex and requires multiple detailed plans and greater collaboration between current operations and future operations planners. Often the tempo is so quick, current opera-

2LT Taylor Cardosi, a fire direction officer, assigned to the A Battery, 1st Battalion, 37th Field Artillery Regiment, receives guidance from senior advisers during a training rotation at the National Training Center, Fort Irwin, Calif. Cardosi is the first female FDO in an M777A1 howitzer cannon unit. (Photo by SSG Chris McCullough, U.S. Army)



Step 1: Input desired UBL.	Step 2: Input percentage of round diversity.			Step 3: Input percentage of charges.				Step 4: Manually Count Fuzes based upon Rounds in Step 1.		
UBL	Pct.	Rnds.	Charge	Pct.	Inc.	Cans.	M577	1000		
5984	DPICM M483A1	60%	3590	M231 L	1	30%	1795	1646	M739	600
	HE M107	18%	1077		2	40%	4787		M782	400
	BBDPICM M864	10%	598	M232A1 H	3	20%	3590	1197	M732A2	600
	HE RAP M549A1	5%	299		4	10%	2394		M762	3000
	SMK WP M825A1	1%	60		5	0%	0		Step 5: Use UBL Worksheet to Assign to batteries.	
	RAAM-S M741A1	0%	0	100%						
	RAAM-L M718A1	2%	120	<div>Table I. Battalion Unit Basic Load Calculator calculates by percentage the shell, fuze, and propellant combinations the battalion needs to complete the Field Artillery tasks. (Information provided by CPT Westly T. LaFitte)</div> <div>Complexities of the FDO’s Role. FM 6-20-1, <i>Tactics, Techniques and Procedures for the Field Artillery Battalion</i> states: “The FDO supervises tactical and technical fire direction ...within the battalion. On the basis of guidance from the battalion commander and S3, the fire support coordinator and/or fire support officer ...the FDO decides where and how the battalion and any reinforcing units will fire.” The FDO, given guidance, acts on the commander’s intent and makes decisions within those bounds. The senior mission commander, which may or may not be the battalion commander, approves decisions and recommendations made by the FDO. The battalion commander also acts as the fire support coordinator for brigade combat teams. The dual role of the battalion commander may require that he is somewhere other than the battalion tactical operations center. It is imperative that the FDO makes full use of his limited presence to extract guidance and intent before his departure without wasting his</div>						
	ADAM-S M731	0%	0							
	ADAM-LM692E1	0%	0							
	ILLUM M485	2%	120							
	WP M110	2%	120							
	XM982 Excalibur	0%	0							
	TOTAL	100%	5984							
Note: Rounds may be one too high because of rounding. Do not manually adjust the “ROUNDS” column.										

Table I. Battalion Unit Basic Load Calculator calculates by percentage the shell, fuze, and propellant combinations the battalion needs to complete the Field Artillery tasks. (Information provided by CPT Westly T. LaFitte)

Complexities of the FDO's Role. FM 6-20-1, *Tactics, Techniques and Procedures for the Field Artillery Battalion* states: "The FDO supervises tactical and technical fire direction ...within the battalion. On the basis of guidance from the battalion commander and S3, the fire support coordinator and/or fire support officer ...the FDO decides where and how the battalion and any reinforcing units will fire." The FDO, given guidance, acts on the commander's intent and makes decisions within those bounds. The senior mission commander, which may or may not be the battalion commander, approves decisions and recommendations made by the FDO. The battalion commander also acts as the fire support coordinator for brigade combat teams. The dual role of the battalion commander may require that he is somewhere other than the battalion tactical operations center. It is imperative that the FDO makes full use of his limited presence to extract guidance and intent before his departure without wasting his time. Questions to the commander must be succinct and precise. The FDO must do his best to gain the intent and manner in which the commander will utilize Fires in order to perform fire direction.

With guidance, the FDO has the ability to expand his role within the unit and may greatly contribute to the success of the Fires battalion. The FDO becomes an individual that can affect multiple facets of the organization. The guidance allows the FDO to act with minimal delay in asking for approval. An FDO armed with guidance and intent can run fire direction, contribute to the counterfire fight, help battle track, and think about the overall situation. In return, the FDO effectively performs his duties and provides thoughtful analysis to allow his field grade supervisors to focus on broader issues. A field grade officer should not have to solve the FDO's problems.

The stressors involved in the DATE exacerbate the typical issues associated with a constrained training environment. For example, given the distances involved at NTC, it can be difficult to troubleshoot communications. The field grade officers should have enough trust in the FDO to understand the mission, enemy, terrain and weather,

tion elements must develop rapid fire plans with sensitivity to the secondary effect on preparatory activities and future plans. For the artilleryman, this means he will not complete his Fires plan until late in the planning process and will continue planning throughout the operation. The artilleryman will constantly struggle to keep up with the typical planning process, environmental changes of a continuous scenario in DATE, continuous intelligence, surveillance, reconnaissance, and enemy adaptations. Though most units parallel plan with maneuver units, this alone is not enough to keep pace with planning requirements. Constant change frames one of the essential problems artillery planners face in DA fights.

The FDO must overcome the issues presented during DA scenarios and present quick solutions to help keep the artillery battalion in the fight. Compounded with issues ubiquitous to all artillery situations, he must formulate sound recommendations to allow his chain of command to make informed decisions. To assist in making recommendations, the FDO must develop techniques and systems to promote the effectiveness of his unit.

troops, time available and civilian's variables involved with voice and digital communications while making recommendations for mission command node placement for redundant communications. The FDO in turn should exhaust all means to troubleshoot communications. He never presents a problem without analysis and a recommendation.

The battalion FDO acts as the first line of defense for the subordinate fire direction centers. During NTC rotations, typical products from fire support elements are incomplete due to the lack of time the fire supporter is allotted for planning Fires. Target refinement cut offs must be enforced. The FDO, S3, and the fire support elements must all check each other through dual independent checks. The platoon FDC must produce a technical solution and deliver munitions on time: therefore, the FDO demands proper technical information from the fire support element. The FDO must possess enough knowledge to know what information is lacking from plans, what questions need asking, and how to make the most of commander's intent when given a product lacking detail or accuracy.

The FDO is a voice for his unit, able to articulate to the fire support elements the unit's capabilities based upon their current operational environment. He must have the ability to identify issues in the plan on short notice and recommend solutions in order to execute the commander's intent. Prime examples are smoke screen and family of scatterable minefield employments. Smoke in arid and windy environments such as at NTC require more rounds to build and sustain. FASCAM minefields require intensive planning and contingencies. The FDO calculates multiple aimpoints, densities, and firing areas. Depending on the density, it may act as a slight deterrent to enemy movement but will not destroy many vehicles. Firing these missions takes significant time thus limiting the ability to service other missions: while the volume of fire required exposes the batteries to enemy counterfire. The FDO must be able to deliver this analysis so the fire supporter can help his commander make informed decisions.

The FDO conducts quality control of technical fire direction and the fire plan. He demands a thorough target description for two reasons. First, to pull information in order to ensure the intelligence officer can effectively paint a picture of the enemy's current situation. Therefore, the FDO acts as an intelligence conduit for the battalion. This information becomes critical when higher order intelligence, targeting data, or situational information is unavailable. For example, brigade may be operating on upper tactical internet while battalion may not have that capability due to lack of upper tactical internet at the battalion level. The FDO can help develop the current situation from communications traffic on the Fires networks. Secondly, it helps the FDO determine the fire order. A proper fire order facilitates ammunition management, proper target engagement, and proper tactical fire direction during counterfire fights.

Improper fire orders during combined arms maneuvers could lead to missed opportunities and violating the principle of combined arms maneuver, which is 'to seize and exploit the initiative.' For example during NTC rotation 13-02, a FDC received a call-for-fire from a fire support element lacking an accurate target description. The target description provided was, "vehicles in the open." The FDC sent a platoon two-round mission to service the target in accordance with the attack guidance matrix. Unbeknownst to the FDC, they were firing at an enemy battalion assembly area and could have severely crippled enemy forces prior to their crossing their line of departure. Had the fire support element passed an accurate target description, the FDC would have shot a large volley open sheaf at the target.

Ammunition Management. It is the battalion FDO's responsibility to manage artillery ammunition during DA operations. As such,

it is important for the FDO to have systems in place to conduct effective ammunition forecasting and management. The battalion FDO must closely control ammunition planning, allocation, and calibration for subordinate elements in order to ensure the Field Artillery battalion can effectively provide Fires in support of the maneuver mission.

Upon receipt of the fire support tasks from the brigade operation order, the FDO must immediately begin to look at the current ammunition availability. He should determine the battalion's ammunition load in percentages based upon those tasks, the type of environment, enemy situation template, and commander's intent. In order to allow subordinate units to focus on troop leading tasks and facilitate tactical control, the battalion FDO should build ammunition configurations down to the platoon and flat rack level. Furthermore, the FDO builds the ammunition down to the platoon level because he understands the overall Fires plan, he was involved in the orders process, and he understands the lots available better than the platoons. During war-game process, the FDO ensures each battery has enough of the same lots to service missions to avoid interruptions in rate of fire. For example, a battery has a six-volley mission. They should either have enough rounds to service the mission with one lot or understand ahead of time that they may have to shoot a segmented target. The ammunition build should account for every round on the guns, ammo carriers, in the combat trains, and field trains.

The FDO should create a menu of flat racks called combat configured loads based upon Field Artillery tasks and enemy situation to allow for a simpler ammo request process from the batteries. An example CCL would be 'tank killer long,' which includes 80 percent-base bleed dual-purpose improved conventional munitions, 10 percent high explosive rocket assisted projectile and 10 percent-DPICM and the required long-range charges.

Another example would be 'smoke' which includes two packages, of 10 minutes, of 400-meter length white phosphorous smoke and the rest of the space filled with high explosive, required fuzes, and charges. Build CCLs against expected missions or Field Artillery tasks.

The platoons can use the CCL menu to rapidly request different ammunition if missions change. The CCL on the flat rack allows the platoon the flexibility to fire off the flat rack or conduct resupply at the position area through a flat rack exchange. CCLs on flat racks free up room inside the ammunition carriers; thus, the platoon can fire space consuming special munitions, such as FASCAM off the flat rack. The battalion FDO uses the CCL to coordinate ammunition drops based upon resupply triggers and expected missions. This enables the FDO to recommend quick adjustments to the ammunition load upon changes to the plan.

Plans change rapidly; a helpful tool is Microsoft Excel. Using an auto-calculating spreadsheet, the FDO can calculate the battalion's unit basic load and the amount of rounds in each location. He can tweak his spreadsheet and instantly have a new ammunition configuration for his unit if changes arise. The spreadsheet provides the FDO with an implement to rapidly conduct analysis and provide his commander with a sound recommendation in high tempo environments.

A way to create a Class V UBL workbook (see Tables 1 through 3) is to start with a sheet that calculates UBL for the battalion by percentage. Input a desired UBL based on carrying capacity or rounds on hand. Use percentages of the UBL to calculate space by round. Calculate charges by canister and increment based upon expected ranges to fire. Utilize reverse range arcs to determine charges needed to service targets. Calculate the fuze types based on round type, ene-

		A/4-42								
		GUNS	CATS	Rack 1	Rack 2 (SMK)	Rack 3	Rack 4 (FASCAM)	GUNS	CATS	I (FA
CAPACITIES		312	744	176	176	176	176	312	744	
PROJECTILES	DPICM M483A1	64	68	88	0	0	0	39	115	
	HE M107	13	29	0	0	0	0	27	32	
	BBDPICM M864	168	446	88	72	95	63	168	465	
	HE RAP M549A1	39	93	0	0	56	0	66	100	
	SMK WP M825A1	11	0	0	104	0	0	6	11	
	RAAM-S M741A1	0	84	0	0	0	84	0	0	
	RAAM-L M718A1	0	0	0	0	0	0	0	0	
	ADAM-S M731	0	24	0	0	0	24	0	0	
	ADAM-LM692E1	0	0	0	0	0	0	0	0	
	ILLUM M485	0	0	0	0	20	0	0	10	
	WP M110	17	0	0	0	0	0	6	11	
	XM982 Excalibur	0	0	0	0	5	5	0	0	
	DIFFERENCE/TOTAL	0	0	0	0	0	0	0	0	
FUZES	M577 MTSQ	243	622	176	176	115	171	213	601	
	M782 MOFA	52	122	0	0	56	0	93	132	
	M739 PD	17	0	0	0	0	0	6	11	
	M732A2	52	122	0	0	56	0	93	132	
PROP	M231 Canisters	0	30	0	0	0	0	0	30	
	M232 Canisters	248	584	141	141	141	141	248	584	
CALCULUS	M109A6 Fire Order: BTRY 4x DPICM MLRS Fire Order: 3x Rockets	33x DPICM Missions (BTRY 4x) FASCAM: 2x 800x200m, MED Density, Short (7x RAAM, 6x ADAM aimpoints) SMOKE: 5x 400m Length, 15min duration ILLUM: 40mins EXCALIBUR: 10x						37x DPICM Missions FASCAM: 1x 400x400, FASCAM: 1x 400x400 SMOKE: 3x 400m, 15min ILLUM: 42mins EXCALIBUR: 10x		
RESUPPLY		75% (Red) = 436x rds fired CAT pushes 4x Flatracks to BTRYs, flatrack transfer, pull dunnage FAT pushes 2x flatracks to CAT, flatrack transfer, pull dunnage						75% (Red) = 436x rds fired CAT pushes 4x Flatracks to FAT pushes 2x flatracks to		

Table 2. Ammunition by location with battle calculus and resupply triggers. (Information provided by CPT Westly T. LaFitte)

my posture, and collateral concerns. The first sheet acts as a summary of rounds on hand for the battalion.

On a second sheet, break down the round type by location. The second sheet acts as a calculator to ensure the platoons have the ammunition they need based on mission allocation. It helps the FDO ensure units efficiently utilize carrying capacities. Using this sheet the FDO can accurately analyze and feed information into the planning process.

The third sheet should have the menu of CCL's. The battalion FDO should disseminate the entire workbook to subordinate FDOs as a part of the Field Artillery support plan. Subordinate FDO's use the workbook to manage their loads and to request resupply using the CCL. Additionally, they can see other munitions available in the supply trains or adjacent units but not in CCL.

During missions, the platoon FDO should meticulously monitor the amount of rounds he has on hand. The battalion FDO should require battery ammunition tracking charts to display by tube all projectiles available for draw by square weight, charges by lot, and fuzes from UBL. It should also include battery and battalion requirements by Field Artillery task.

Periodically he should report his ammo count and tube strength up to the battalion FDC; if not, the battalion FDO should pull information from the platoon FDC's. FDO's both at battalion and battery level should monitor ammo levels to ensure platoons meet supply triggers and the battery can support upcoming missions.

Special Munitions. The FDO is required to plan special munitions employment for DA training environments. Therefore, the FDO should have basic knowledge on how the munitions operate

B/4-42							CAT				FAT
Rack 1 (ASCAM)	Rack 2	Rack 3	Rack 4	TOTALS at BTRY	TOTAL on ORDER	TO- TAL TO RACKS	RACK 1 (CCL 3)	RACK 2 (CCL 3)	RACK 3 (CCL 1)	RACK 4 (CCL 1)	BSA 10 Racks
176	176	176	176	3520			176	176	176	176	1760
0	0	0	72	446	744	298	0	0	0	0	298
0	0	0	0	101	248	147	0	0	0	0	147
47	94	94	104	1904	3236	1332	68	68	140	140	916
0	44	44	0	442	744	302	0	0	36	36	230
0	16	28	0	176	240	64	0	0	0	0	64
84	0	0	0	252	420	168	84	84	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	72	146	74	24	24	0	0	26
0	0	0	0	0	0	0	0	0	0	0	0
11	11	0	0	52	74	22	0	0	0	0	22
0	11	0	0	45	100	55	0	0	0	0	55
10	0	10	0	30	32	2	0	0	0	0	2
0	0	0	0	3520	5984	2464	0	0	0	0	0
166	121	122	176	2902	4860	1958	176	176	140	140	1326
0	44	44	0	543	992	449	0	0	36	36	377
0	11	0	0	45	100	55	0	0	0	0	55
0	44	44	0	543	992	449	0	0	36	36	377
0	0	0	0	60	60	0	0	0	0	0	0
141	141	141	141	2792	4740	1948	141	141	141	141	1384
(BTRY 4x) MED Density, Short MED Density, Long duration							CCL 3: FASCAM (1x 400x400m MED, Short) CCL 1: Killer Long (80% BBDPICM, 20% RAP)				
BTRYs, flatrack transfer, pull dunnage CAT, flatrack transfer, pull dunnage							CAT pushes 4x Flatracks to BTRYs, flatrack transfer, pull dunnage FAT pushes 2x flatracks to CAT, flatrack transfer, pull dunnage				

and their capabilities. Smoke and FASCAM require special considerations. Both take up considerable space in the carrying capacity for the smallest effects and require detailed calculations that can be time consuming.

Situations and terrain at NTC may dictate a high angle shot for special munitions employment. FDO's may have to force high angle fire due to the location of the battery in relation to mountainous terrain. Batteries can use the terrain as protection from counterfire, but the high angle shot degrades accuracy and special munition effects.

When fired at a high angle FASCAM must fire significantly more rounds to achieve similar effects to a low angle shot. Additionally, the unit's battery minefield angle will affect the round count for each aim point. These extra rounds will affect carrying capacities. The FDO must understand the commander's intent for the minefield and weigh options for recommended employment. Harassment minefields require a lower density than minefields covered by direct fire. The FDO communicates the capability to meet the commander's intent based

on ammunition available. He also communicates the risk to the formation and time to build the minefield in order to allow commanders to make an informed decision on employment.

Rehearsals with all elements are integral to the successful employment of special munitions. Lack of rehearsals will lead to confusions in execution. During a technical rehearsal, a unit's focus on special munitions will increase their ability to fire during operations as it will identify friction points with the mission. Since special munitions are sparsely used, units should conduct rehearsals from sensor to shooter. The rehearsal allows individuals unfamiliar with the application of the munition an ability to practice its usage prior to mission. Firing elements should calculate all technical data to include data for the gun line, time of flight, ballistic impact point if necessary, and maximum ordinate level. While the rehearsal is ongoing the FDO notes ancillary information such as time it takes for mission processing. He also records the amount of time required to fire, relaying this exposure time to the battalion S-3 so he can plan for alternate and supplementary

		Combat Configured Loads (CCLs)				
		CCL 1: Killer Long (80% BBDPICM / 20% RAP)	CCL 2: Killer Short (80% DPICM / 20% M107 HE)	CCL 3: FASCAM 1x 200x1000 MED, Short 1x 200x1000 MED, Short	CCL 4: Smoke (4x 400m 5mins)	CCL 5: ILLUM (2x hrs LLUM)
PROJECTILES	DPICM M483A1	0	140	68	124	0
	HE M107	0	36	0	0	0
	BBDPICM M864	140	0	0	0	80
	HE RAP M549A1	36	0	0	0	36
	SMK WP M825A1	0	0	0	50	0
	RAAM-S M741A1	0	0	84	0	0
	RAAM-L M718A1	0	0	0	0	0
	ADAM-S M731	0	0	24	0	0
	ADAM-LM692E1	0	0	0	0	0
	ILLUM M485	0	0	0	0	60
	WP M110	0	0	0	52	0
	XM982 Excalibur	0	0	0	0	0
FUZES	M577 MTSQ	36	36	0	52	0
	M782 MOFA	0	0	0	0	0
	M739 PD	0	0	0	0	0
	M732A2	0	0	0	0	0
	M762	140	140	176	176	176
PROP	M231	20	40	40	40	40
	M232	40	20	20	20	20

Table 3. Combat configured loads menu. (Information provided by CPT Westly T. LaFitte)

positions to limit counterfire. Elements must understand the employment of the munitions so they can identify issues early and develop solutions. The battalion FDO and his subordinate FDO's must be perceptive in the use of special munitions anticipating problems and providing recommendations to the battalion S-3.

For smoke, use the Pasquill Tables as a baseline. Understand the weather at the target area as it could be vastly different from on the gun line. Typically, for estimation purposes smoke in an arid environment like at NTC may require more rounds than the Pasquill tables suggest due to the wind and lack of humidity. Less than five aim points may leave a gap in the smoke screen. This may require the platoon to shoot segmented targets, apply more tubes, or accept an ineffective screen.

The FDO should check the altitude along the length of the target for each aim point if time permits. Significant changes in altitude will cause a round to shoot out of sheaf and degrade the effectiveness of the smoke screen. To mitigate this issue, apply a separate altitude for segments with significant altitude difference.

The FDO must understand what type of white phosphorous round he is firing. M825 and M825A1 may share the same Department of Defense identification code but produce different firing solutions. If not careful, the FDO could have a firing incident if he does not monitor the nomenclature and properly input the infor-

mation into the automated Advanced Field Artillery Tactical Data System. The M110 works differently from the M825. M110 bursts and the M825 is base ejecting. This has implications on the height of burst that the FDO inputs into AFATDS. The FDO inputs a target length and width into AFATDS; otherwise, the computer will default to a circular sheaf.

Counterfire, the Attack Guidance Matrix, and Target Selection Standards. Counterfire during DATE requires detailed thought and analysis. The enemy is constantly working to outwit friendly artillery with a desired endstate of rendering friendly artillery capabilities ineffective through inundation or destruction. As such, the enemy may attempt to prematurely lure friendly forces into a counterfire battle. It is important that members of the tactical operations center understand when it is appropriate to conduct counterfire.

The FDO in conjunction with the operations officer, targeting officer, and the intelligence officer must conduct analysis on the battle to understand how the counterfire fight will unfold. Initially the intelligence officer creates a detailed artillery order of battle, enemy situational template, and artillery most likely course of action. He must understand the size and strength of the enemy artillery, in what situations units will fire, and the capabilities of each system. As an example, an enemy with multiple rocket launcher capability will likely hold those munitions in reserve for high payoff targets. Certain

systems can shoot and move while others have longer emplacement and displacement times. The enemy may designate particular firing platforms for use against dismounts or reserve them for chemical munitions use in order to disrupt friendly decisive points. The intelligence officer must possess the ability to analyze enemy activity based on multiple variables to provide input to the team.

The targeting officer should assist in the intelligence officer's analysis and provide feedback on the type of munitions the enemy Fires. Based on radar cross sections and velocities, he aids the intelligence officer in developing the counterfire picture. The duo develops patterns of life and template the enemy artillery positions to confirm or deny the MLCOA.

The FDO provides analysis on the counterfire situation and recommends methods to attack the enemy artillery. The team (intelligence officer, targeting officer, and FDO) along with an operations representative makes recommendations on how to conduct the counterfire fight and they execute the counterfire plan. They are careful not to engage targets that do not meet the target selection standards. For example, friendly forces facing an enemy with superior artillery firepower such as at NTC would be unwise for friendly forces to attack limited cannon or mortar acquisitions early in the battle as this will reveal friendly artillery positions. Instead, the team should conduct analysis of radar acquisitions to template enemy artillery locations. Once the team identifies enemy locations that meet target selection standards, friendly artillery should destroy the enemy artillery or pass the information through maneuver channels so the target may be serviced by maneuver forces, unmanned aerial platform, or other assets. The FDO should be cautious in engaging targets that do not meet a strict target selection standard or else risk losing friendly artillery pieces to counterfire. If the FDO anticipates counterfire, he should recommend frequent survivability moves; therefore, he should plan multiple alternate and supplementary position areas. Once counterfire threats have decreased, the FDO can recommend lower target selection standards if the situation permits.

The target selection standards in a counterfire fight should be inherently restrictive due to the increased risk posed to friendly artillery from a conventional threat during combined arms maneuver. Thus, the FDO must closely monitor requests for mission processing. This requires the FDO to centralize Fires and set his AFATDS as an intervention point for all incoming fire missions. The FDO must make the difficult decision to deny missions that do not meet the target selection standards. In order to facilitate this decision, the FDO requires detailed target descriptions in the call-for-fire to facilitate analysis and application of the target selection standards and attack guidance matrix.

The FDO utilizes an attack guidance matrix to provide accurate guidance on engaging targets. In a counterfire fight, the FDO should consider reducing volleys or recommending a move following high volume missions if survivability movement criteria are too relaxed. Smoke and FASCAM missions require large volleys but are often tied to decisive actions. In the case of these high priority missions, reducing the volley may not be conducive to mission success; therefore increasing the number of tubes to cut down on rounds or survivability moves will help reduce the counterfire threat.

It is important to note that the FDO's role may vary by unit and is highly dependent on the strengths and weaknesses of other team members, available equipment (AFATDS, Effects Management Tool, and the Joint Automated Deep Operations Coordination System), and the location of the counterfire headquarters. In any case, he is a recommender to the senior mission commander. The amount of

decision making decentralized to the FDO or other team members is heavily dependent on the senior mission commander and the operational environment.

Maintaining Accurate Firing Unit Location. The M109A6 Paladin howitzer and other self-locating artillery pieces offer the advantage of accurately determining its location on the planet. However, the type of survey it used to initialize affects the accuracy of these pieces. The FDO should understand the orders of survey accuracy and what order of accuracy the survey team can achieve. The higher the survey order the team uses, the more accurate the survey team.

Often, the survey team deploys to locations and needs to establish a baseline survey from an established survey control point. Not all survey points are created equal. Therefore, if the Improved Position and Azimuth Determining System initialize off a low order survey and places survey points for the howitzers they will in turn have inaccuracies in location. Even if the platoon leader forces location off a figure of merit 1 Global Positioning System device, he introduces error to unit location since the GPS device is not likely on a common survey. The FDO must know what order of survey the team initialized on as it may introduce errors in achieving first round fire-for-effect.

Platoon FDOs must continuously update the battalion FDO on tube locations. The battalion FDO needs the information especially in a high tempo DA fight. With an extremely volatile forward line of troops, accurate unit location serves several purposes. First, it helps achieve the five requirements of accurate fire. Secondly, it enables the FDO to execute technical fire direction, assigning fire missions, and projecting recommended moves. He can also track unit locations versus required locations to service targets. Third, it helps identify battery locations in relation to the enemy to enable the battalion to predict future survivability moves. Reporting allows the FDO to help the operations section battle track. Finally, it helps the FDO recommend position areas to services Field Artillery tasks based on probable errors, intervening crests, and munitions available. The FDO must be aggressive in maintaining accurate center of battery locations.

Rehearsals for the Rehearsal of the Rehearsal. Leaders use rehearsals to ensure units understand training objectives, identify shortcomings and deficiencies in the plan, instill confidence in the plan, and correct issues. Two rehearsals specific to Field Artillery units include the Field Artillery tactical rehearsal and the Field Artillery technical rehearsal. The "tactical rehearsals ensure the [Field Artillery support plan] properly plans and synchronizes [Field Artillery] tactical fire control, movement, and key CSS operations." The technical rehearsal is of unique importance to the FDO. "Technical rehearsals are used to ensure that the [Field Artillery support plan] properly addresses... technical [fire direction] and to exercise the technical [fire direction] process." The technical rehearsal pays dividends in the execution phase.

Rehearsals are one of the most important factors driving success in a DA rotation. Units should conduct a technical rehearsal internally before higher headquarters technical rehearsals in order to identify issues and develop proficiency prior to the technical rehearsal. Platoons should build guns into every position area to determine data to each target assisting with the discovery of intervening crest, range to target and battery minefield angle issues for special munitions. The platoon internal rehearsal should be very detailed and intensive calculating data for every tube. The platoon FDO should work to rehearse every target but pay specific attention to special munitions and priority targets. The platoon FDO should pass issues that

Tube Serial	Cannon Serial	End Item Serial	UIC	Last Pull Over Gauge (Dia)	Date (mm/dd/yyyy)	Total EFCs Fired	Remaining Life (EFCs)	Calculated MVV Loss using EFC	Charge-3H (m/s)	Charge-4H (m/s)	Charge-5H (m/s)
									-1.3	-1.0	-0.7
1436T	10265	200	WALWA0	6.1	3/8/2013	141.15	2508.85	-0.8	-2.1	-1.8	-1.5
1440T	10269	1702	WALWB0	6.1	2/26/2013	73.6	2576.4	-0.4	-1.7	-1.4	-1.1
1521T	10316	5463	WALWB0	6.1	2/28/2013	57.95	2592.05	-0.3	-1.6	-1.3	-1.0
1525T	10320	4936	WALWB0	6.1	3/23/2013	197.15	2452.85	-1	-2.3	-2.0	-1.7
1577T	10372	504	WALWA0	6.1	3/8/2013	157.5	2492.5	-0.8	-2.1	-1.8	-1.5
15T	2599	2632	WALWB0	6.1	3/5/2013	235.700	2414.301	-1.1	-2.4	-2.1	-1.8
2245T	4999	222	WALWB0	6.1	3/5/2013	122.75	2527.25	-0.6	-1.9	-1.6	-1.3
869T	10128	412	WALWB0	6.1	3/12/2013	128.6	2521.4	-0.7	-2.0	-1.7	-1.4
956T	10174	4958	WALWB0	6.1	3/5/2013	75.85	2574.15	-0.5	-1.8	-1.5	-1.2
1454T	10283	1616	WALWB0	6.105	3/21/2013	184.8	2465.2	-0.9	-2.2	-1.9	-1.6
1479T	4716	1593	WALWA0	6.105	8/27/2012	219.95	2430.05	-1.1	-2.4	-2.1	-1.8
1924T	10752	703	WALWA0	6.105	8/27/2012	57.5	2592.5	-0.3	-1.6	-1.3	-1.0
824T	5626	2397	WALWA0	6.105	8/27/2012	248.5	2401.5	-1.2	-2.5	-2.2	-1.9
1539T	10334	4927	WALWA0	6.11	8/29/2012	178.1	2471.9	-0.9	-2.2	-1.9	-1.6
1542T	10337	2300	WALWA0	6.11	8/27/2012	210.1	2439.9	-1	-2.3	-2.0	-1.7
2072T	10811	6869	WALWA0	6.11	8/27/2012	81.7	2568.3	-0.5	-1.8	-1.5	-1.2

Table 4. Muzzle velocity variation and propellant efficiencies by tube and charge. (Information provided by CPT Westly T. LaFitte)

arise during the rehearsal to the battalion FDO prior to the higher headquarters' rehearsal.

The battalion and higher technical rehearsal should execute to script every time regardless of the mission types unless the unit has time constraints. In the event of severe time constraints, the unit should rehearse the highest priority targets and special munitions. Always rehearse special munitions and time on targets. During the rehearsal establish communications and practice alternate modes of communication. Each unit should calculate data to primary and alternate targets while the platoons capture and report shift times. The rehearsal includes focus on database verification and concepts of operations. Rehearsals can be time consuming, but a well-conducted rehearsal is beneficial to the successful outcome in a DA scenario.

Fire Direction Officer Equals Meteorological Officer. The weather man of the battalion is the battalion FDO. Since the military occupation specialty restructuring that eliminated the 13W MOS while combining those functions within the FDC section, the FDO has now become the subject matter expert in all things meteorological. This means he must immerse himself in FM 3-09.15, *Tactics, Techniques and Procedures for Field Artillery Meteorology*, and have a functioning understanding of meteorology.

Meteorological data is a major factor in achieving first round fire-for-effect. The FDO must own the meteorological plan. He must learn to use the different sources for deriving meteorological information for his Computer, Meteorological Data Profiler System.

It is important to understand how the environment dictates the meteorological schedule. In arid environments, such as the area around NTC, the atmosphere can fluctuate drastically compared to humid environments.

The FDO must be cognizant of the transfer limits of meteorological data. Meteorological data is only valid for a limited distances and directions. The fast pace of DA scenarios may require multiple meteorological areas due to large movements or space between units. The FDO should identify large movements in which it will be necessary to download meteorological data during the planning process and communicate them to subordinate elements. The FDO extracts meteorological data from the center of the expected target area. All elements, battalion and battery, should be able to operate the meteorological system.

The battalion FDC manages the application of meteorological data, as this requires a verification mission due to the change in database, which takes tubes out of action. This provides the FDO with a method to control who is able to service targets. Units should apply meteorological data when there are lulls in battle. If a unit receives meteorological data they can hold it in queue until they are ready to apply, thus the FDO can send meteorological data on his schedule. Units can delay meteorological data application based upon the situation (i.e. there is no drastic change in lines of meteorological data since the last update and a high probability of firing, or the unit is already having accurate effects on target) and apply the meteorological

M232				M232A1						M232A2	
ITH02D-027901				GDB06B-031003			GDB09C-031021			GDB04K-027920	
Charge-5H (m/s)	Charge-3H (m/s)	Charge-4H (m/s)	Charge-5H (m/s)	Charge-3H (m/s)	Charge-4H (m/s)	Charge-5H (m/s)	Charge-3H (m/s)	Charge-4H (m/s)	Charge-5H (m/s)	Charge-3H (m/s)	Charge-4H (m/s)
-0.1	-5.4	-5.9	-6.6	-4.5	-2.5	-3.5	-1.1	2.3	0.7	0.9	0.2
-0.9	-6.2	-6.7	-7.4	-5.3	-3.3	-4.3	-1.9	1.5	-0.1	0.1	-0.6
-0.5	-5.8	-6.3	-7.0	-4.9	-2.9	-3.9	-1.5	1.9	0.3	0.5	-0.2
-0.4	-5.7	-6.2	-6.9	-4.8	-2.8	-3.8	-1.4	2.0	0.4	0.6	-0.1
-1.1	-6.4	-6.9	-7.6	-5.5	-3.5	-4.5	-2.1	1.3	-0.3	-0.1	-0.8
-0.9	-6.2	-6.7	-7.4	-5.3	-3.3	-4.3	-1.9	1.5	-0.1	0.1	-0.6
-1.2	-6.5	-7.0	-7.7	-5.6	-3.6	-4.6	-2.2	1.2	-0.4	-0.2	-0.9
-0.7	-6.0	-6.5	-7.2	-5.1	-3.1	-4.1	-1.7	1.7	0.1	0.3	-0.4
-0.8	-6.1	-6.6	-7.3	-5.2	-3.2	-4.2	-1.8	1.6	0.0	0.2	-0.5
-0.6	-5.9	-6.4	-7.1	-5.0	-3.0	-4.0	-1.6	1.8	0.2	0.4	-0.3
-1.0	-6.3	-6.8	-7.5	-5.4	-3.4	-4.4	-2.0	1.4	-0.2	0.0	-0.7
-1.2	-6.5	-7.0	-7.7	-5.6	-3.6	-4.6	-2.2	1.2	-0.4	-0.2	-0.9
-0.4	-5.7	-6.2	-6.9	-4.8	-2.8	-3.8	-1.4	2.0	0.4	0.6	-0.1
-1.3	-6.6	-7.1	-7.8	-5.7	-3.7	-4.7	-2.3	1.1	-0.5	-0.3	-1.0
-1.0	-6.3	-6.8	-7.5	-5.4	-3.4	-4.4	-2.0	1.4	-0.2	0.0	-0.7
-1.1	-6.4	-6.9	-7.6	-5.5	-3.5	-4.5	-2.1	1.3	-0.3	-0.1	-0.8
-0.6	-5.9	-6.4	-7.1	-5.0	-3.0	-4.0	-1.6	1.8	0.2	0.4	-0.3

data when able. Regardless, the need for accuracy and risk to mission should be weighed before meteorological data is applied.

The Big 3 and the Big 3 in Number 3. It is imperative that the FDO, fire direction noncommissioned officer, and master gunner share responsibility for ensuring the battalion has accurate weapon and ammunition data. Upon arrival to NTC or any theater of operation, the three should quickly inspect the ammunition in the ammunition holding area noting ammunition lots, models, and square weights. Using this information, they should negotiate with the ammunition holding area manager to issue the unit desired lots. Desired lots include lots that are calibrated with the unit's tubes, lots with the greatest quantity on hand, and lots absent of efficiency issues. If the FDO is not able to affect the lots the unit draws, he should create a detailed ammunition plan by ammunition characteristic. It is best not to assign non-calibrated, small quantity lots to a battery with a greater requirement for accuracy.

After the ammunition holding area reconnaissance, the FDO should immediately begin research on the lots available. Inside his muzzle velocity variation logbook, he tracks the following information for the battalion: calibrated MVV's, DA 2408-4's, and the current propellant efficiencies for all lots in the U.S. arsenal. The FDO keeps an updated MVV book and frequently inspects subordinate FDO's MVV logbooks to ensure they are updating baselines and 2408-4's. FDO's should actively search for ammunition safety messages on the Logistic Support Activity website, Picatinny Arsenal website, and the professional Fires forum keeping a copy of these messages in his logbook. Using his MVV logbook, he determines what available lots are currently calibrated. For uncalibrated lots, he determines a baseline using the propellant efficiencies or infers MVV's. He keeps a

logbook because the Paladin Digital Fire Control System may lose the recorded muzzle velocities or the chronograph may malfunction.

A tool to manage muzzle velocities is to utilize Microsoft Excel. The FDO can use an Excel spreadsheet to store and calculate baseline MVV's by charge, lot, and tube, linking the gun cards to the spreadsheet for quick reference. Table 4 below illustrates the use of an Excel based MVV baseline logbook. The FDO creates this for all possible lots his unit can draw and disseminates to subordinate FDO's.

The baseline calculated muzzle velocity is reliable if the DA 2408-4's are accurate. Common errors include failure to update with rounds fired, imprecise pullover gauge measurement, and inaccurate effective full charges. Any of these errors can cause issues with achieving accurate first round effects. The FDO, MG, and FDNCO have to closely monitor the DA 2408-4's for quality control to ensure data accuracy. Obviously, the unit should conduct calibration as soon as possible to obtain more accurate muzzle velocities, as baselines are an estimate of reality.

On the Paladin, the PDFCS updates muzzle velocities when the variations meet a certain threshold. PDFCS will update the muzzle velocities without a notification. The FDO has to request an update to muzzle velocity variations, verify, and apply the changes to the AFATDS. Failure to update the muzzle velocity variations periodically will hinder future attempts to verify databases since the PDFCS updated but the AFATDS kept old data.

The unit does not have to fire a separate calibration; they can conduct the calibration in conjunction with fire missions. The platoon FDO should monitor muzzle velocities and update when he notices

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Soldiers assigned to 6th Battalion, 37th Field Artillery, 210th Fires Brigade, 2nd Infantry Division, prepare the vehicles during the brigade alert recall exercise on Camp Casey. The alert was to test and improve the unit's readiness to *Fight Tonight* to deter aggression against South Korea. (Photo by CPL Kim Han-byeol, U.S. Army).

Red, Amber, Green... and Ready?

By CPT Gregory Gemedschiew

The 6th Battalion, 37th Field Artillery Regiment, 210th Fires Brigade, 2nd Infantry Division has a unique task to provide North Korean counter-provocation for Combined Forces Command. Currently, we implement a red, amber, green cycle for our Multiple Launch Rocket Systems firing batteries that focuses on brigade and division recurring tasks, battery maintenance, individual Soldier readiness, and mission essential task list focused battery training. The amber battery also stands ready to support red battery to

conduct recurring tasks from higher headquarters. This model is inconsistent with the 2nd Infantry Division *'Fight Tonight'* mantra because it effectively reduces our surface-to-surface strike ability by at least one-third at any given time. It also decreases green battery's ability to conduct training off the installation. Our RAG cycle incorporates theater-specific limitations of routine personnel turnover, limited training areas and host-nation civilian encroachment upon training areas to maximize training value and

provide flexibility and responsiveness to the Republic of Korea-U.S. alliance.

The RAG cycle is rotational and changes approximately every 45 days. It is deliberately designed to enable units in the Korean theater of operations to remain mission capable while recognizing the unique challenges inherent to Korea. Soldiers in red battery conduct recurring tasks both on and off post. In some instances, Soldiers require a full day to return to their assigned unit from the task location. The loss of one-third of

our surface-to-surface strike ability creates tactical risk that could lead to mission failure. If red battery finds itself so heavily tasked that it requires amber battery support to accomplish the red cycle mission, our combat power situation is then magnified.

Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms*, defines N-Day as the unnamed day an active duty unit is notified for deployment or redeployment. In the KTO, units have an N-Hour sequence that is executable on N-Day. The N-Hour sequence is very precise and is based partly on relevant assumptions. The time needed to recall Soldiers from red cycle tasks is variable and is not one of those assumptions.

Mission command for red cycle recurring tasks is decentralized by nature. Soldiers from red battery often report to a garrison location where the authority is an Installation Management Command civilian employee. Examples of such details include the post gym noncommissioned officer and sports support detail. Commanders maintain a troop-to-task document to stay aware of each Soldier's duty location, task and purpose during red cycle to maximize their unit's readiness to conduct wartime missions. However, commanders are not in charge of their own Soldiers conducting red cycle recurring tasks. This is problematic due to the precise nature of our N-Hour sequence and the requirement for red battery to be in position, ready to fire on short notice.

Another challenge unique to the KTO is the exception to modification table of organization and equipment from which 210th Fires Brigade derives its current task organization. Most Field Artillery brigades in the Army are comprised of two battalions, with two firing batteries. Each firing battery has two platoons of four rocket launchers. The 210th FiB is configured with two firing battalions of three firing batteries each and each firing battery has two platoons of three rocket launchers.

The 6-37 FAR is not the first or only Field Artillery unit in the Army to have a counter-provocation mission. However, most FiBs share this mission across two battalions, not just one. For us, because we have three firing batteries, ready and green are one and the same. The challenge for 6-37FAR, is how to discriminate between ready battery duties to support the CFC commander with counter-provocation Fires and green battery duties to conduct METL-focused training. A conflict arises when the green/ready battery commander takes his unit to con-



PFC Joseph Whyte, from Bethesda, Md., a multiple launch rocket system operations/fire direction specialist, assigned to B Battery, 6th Battalion, 37th Field Artillery Regiment, 210th Fires Brigade, 2nd Infantry Division, checks communication between launcher and command vehicle during the brigade alert on Camp Casey, South Korea Sept. 17, 2013. The alert was to test and improve the unit's readiness to 'Fight Tonight' to deter aggression against South Korea. (Photo by CPL Kim Han-byeol, U.S. Army)

duct METL-focused training off-post. He separates his firing assets from their ammunition and makes it impossible to execute the N-hour sequence to standard.

In order to reduce tactical risk to 6-37 FAR, our higher headquarters should prioritize the battalion above other units on the peninsula to conduct recurring tasks. We should not conduct higher-level tasks which preclude Soldiers from returning to their assigned units in a timely manner. The short-notice nature of our counter-provocation mission makes it challenging, if not impossible, to execute current recurring tasks and the red battery N-hour sequence simultaneously.

To delineate the purposes of green battery from ready battery, 6-37 FAR should share the counter-provocation mission with our sister MLRS battalion within 210th FiB. Make counter-provocation a brigade mission to enable green battery to focus on METL training without regard to proximity of ammunition.

The red and green batteries are unique-

ly challenged in the KTO. Decentralized leadership adversely affects the red battery commander's ability to muster his formation and provide responsive Fires to counter North Korean aggression. The task for green battery to conduct parallel missions creates conflict when the green battery commander conducts off-post training. If our higher headquarters prioritizes 6-37 FAR above other units when assigning recurring tasks and makes counter-provocation a brigade mission, 'fight tonight' is a real possibility.

Captain Gemedschew graduated from Old Dominion University, Norfolk, Va., with a Bachelor of Science in Industrial Technology. He graduated Basic Officers Leadership Course II at Fort Benning, Ga., in December 2007, and FA BOLC III at Fort Sill, Okla., in May 2008. From June 2008 to June 2009, he served as MLRS platoon leader, and later executive officer of C Battery, 1st Battalion, 38th Field Artillery Regiment at Camp Casey, South Korea. In July 2009 he worked for the I Corps Protocol Office before serving as the assistant fire support officer for 2-2 SBCT until July 2011. He attended the FA Captain Career Course from September 2011, to March 2012, and served as the fire support officer for United States Army Central in Kuwait until April 2013. He is currently the assistant operations officer for 6th Battalion, 37th Field Artillery Regiment at Camp Casey, South Korea.

Learning to Operate While Sprinting to the Start of a Marathon

By Captain Edward A. Guelfi

Training in preparation to deploy rarely goes as planned. For the Soldiers of *Black Sheep* Battery, 1st Battalion, 6th Field Artillery Regiment, short-notice and at times, no-notice mission changes increased the challenges faced by leaders and Soldiers preparing to deploy to Afghanistan's Kandahar province in the spring of 2013. Much of our learning occurred on the move and the lessons learned over the past 18 months may assist other leaders as they prepare their organizations for operations in any theater of engagement.

CPT Edward A. Guelfi, commander of B Battery, 1st Battalion, 6th Field Artillery, calls in a situation report during a dismounted reconnaissance patrol near Forward Operating Base Spin Boldak in Kandahar province, Afghanistan. The unit was patrolling to recon the area and to project force posture. (Photo by SPC Jovi Prevot, U.S. Army)



During the preponderance of our train-ready phase, the battery did not know mission specifics for our eventual deployment to Afghanistan. With this in mind, the battery focused our time and energy on returning to core artillery skills proficiency. The battery and battalion would ensure that all Soldiers and leaders mastered each table of training before moving to the next. As an organization we trained and honed artillery skills and common core tasks that atrophied during previous deployments of performing non-standard missions and realigned our focus on our shared mission of effectively and efficiently massing platoon and battery Fires to provide lethal effects for our infantry brigade combat team.

All training had a tactical focus and mindset; when the battery left the motorpool (i.e., crossed the line of departure) all movements were deliberate. 'Missions' required an operations order, vehicle manifest, load plan, and mission brief. The organization did not allow administrative moves or returning to retrieve forgotten items – we instead would learn to fight without it. Firing point occupations were equally deliberate and tactical with no open field 'lazy W' formations or open field ammo-filled flat racks. We spent much of our time putting up nets, building fighting positions, filling sandbags, stringing concertina wire, ensuring 6400-mil firing capability and establishing digital communications. Survivability moves and the triangle defense became the standard and occupations once again became second nature.

We placed significant emphasis on ensuring platoons could operate independently from the battery and battalion. From small-arms ranges to complex field problems this ensured that platoon leaders could think through ambiguous situations and develop a solution if the worst case scenario should arise. The battery and battalion enabled the platoons to plan and execute training on a routine basis by exercising mission command. Never far from the watchful eye of the battalion commander, platoon leaders would develop their training plan, execute troop leading procedures, and then conduct training to standard. Platoons initially failed to see the true value in this training. Many young leaders wanted to be told what to do and how to do it. What they often ignored was that at every turn they were being required to think through a complex problem and develop a course of action that ensures mission success. This design paid off over time, as today these leaders are solving very real-world problems in Afghanistan, using the skills learned at home-station.

Our initial focus on core artillery skill competencies paid long-term dividends for the battery as we prepared for our next fight. In the beginning, processes needed to be relearned with officers, noncommissioned officers, and Soldiers, all having to study and prepare to apply what, at times, seemed like forgotten skills. After five-months of arduous work, the battery once again became proficient in core artillery competencies and standards. The tactical mind set, attention to detail, and sense of teamwork set the conditions for our future success. However, it took constant leader engagement, from battalion to section, to ensure 'Old Army' standards became the norm and we did not let competing administrative demands become an excuse to 'do what we always did.'

The tactical and deliberate mindset became especially important as we approached our mission readiness exercise at the Joint Readiness Training Center, Fort Polk, La., in the winter of 2012. With less than a month to go before our movement to Louisiana, the battalion reorganized the battery into a motorized rifle company. The battery would support the battalion's main mission as a battle space owner/integrator for multiple brigade security force assistance teams. We converted the two-platoon battery into a four-platoon motorized rifle

company with each of the battery lieutenants now serving as platoon leaders.

As an area of focus during our train up, the organization fired tens of thousands of rounds of small arms and crew serve ammunition, worked with attack aircraft and the brigades shadow platoon whenever possible and always remained ready for a transition to motorized rifle company if the call came, but when it did we found that our largest challenges were still ahead. As shown over time, light artillery batteries are well-suited to perform non-standard missions as a motorized rifle company. Multiple factors play into this but one key one is its already integrated organic leadership. With four lieutenants assigned, we maintained existing capacity to provide leaders already familiar with each other's capabilities. We identified NCOs and Soldiers with previous experience conducting similar non-standard missions, particularly those who served during the unit's previous deployments to Afghanistan, and placed them in positions of influence within the platoons. These Soldiers became our resident experts, who would be cross-leveled across the battery, to provide the necessary skills for mission accomplishment. Since most of our equipment had already been shipped to JRTC we used our empty storage areas and spaces around the unit to conduct classes and maneuver training, as well as situational exercises – creativity was essential.

Despite our early and repeated efforts to prepare for the mission, we experienced numerous growing pains during the initial phase of our MRE. The first few weeks were long and taxing, as the opposing forces taught us difficult lessons and exposed weaknesses. We took the lessons from our observer/controller-trainers, documented everything, and shared lessons horizontally and vertically within the organization so others would not share in the same mistakes. One of our biggest challenges was keeping Soldiers who were highly proficient at artillery tasks and not used to failure, motivated and focused on learning to improve. This was another area where teamwork and a tactical focus mattered. They prepared leaders to coach and mentor young Soldiers so they absorbed the right lessons and retained a warrior mindset to overcome all obstacles. Our time at JRTC prepared our organization for combat. Though it showed us areas of weakness, it provided a sense of confidence that we could adapt and overcome any challenge.

After returning from JRTC, initially it was decided that the entire battery would not have a role in the upcoming mission to Afghanistan. We once again would return to our original configuration and return our focus to core artillery skills. At that time, the only mission was for a single artillery platoon to support the brigade's mission in Zabul province. The battery reorganized into two firing sections for the M77A2 and completed exercises with a mobile training team from Fort Sill, Okla., and 4th Brigade, 10th Mountain Division, from Fort Polk, La.. Though this training was challenging and new to most in the unit, our initial focus on core artillery skills allowed us to excel and become rapidly proficient on this new weapon system.

In late April, our final deployment orders arrived and it was at that time that we truly learned what it means to sprint to the start of a marathon. The battery's new mission in Kandahar province, required us to integrate 63 Soldiers (more than a 70 percent increase in the unit's strength) from across the brigade and begin training on a completely new mission set. After completing augmentation we organized, trained, and equipped six platoons to perform non-standard artillery missions supporting Combined Task Force Centaur throughout southern Afghanistan. The battery would still detach one artillery platoon and disperse them to two separate locations in Zabul province in support of the brigade missions, while the remainder of

the battery, and the battalion headquarters, would be arriving in Kandahar province to replace the 2nd Battalion, 23rd Infantry Regiment, from Joint Base Lewis-McChord, Wash.

Upon our arrival at Forward Operating Base Spin-Boldak we formed two organic maneuver platoons and a force protection platoon responsible for securing the base. We also incorporated one infantry platoon from the brigades; 2nd Battalion, 2nd Infantry Regiment, provided additional 13B augmentation, a section of 120 mm mortars, and a security force assistance team comprised of an 11-man adviser team and an 18-man security force. The battery's platoons would support an area with more than 1,500 villages, 200 named routes, and a combined population of more than 250,000.

Today the battery continues operations and missions across all of southern Afghanistan. These missions have enabled Afghan National Security Force elements to control Highway 4, and disrupt historically lethal facilitation routes. Throughout our road to war, the most difficult task was simply managing change while dealing with the unknown. Sticking to the basics and maintaining a tactical focus throughout allowed us to mitigate these difficulties. It cannot be overstated that the battery's initial focus on core artillery competencies and preparing to fight – wherever, whomever, and however – ensured that we developed a strong sense of teamwork that allowed us to rapidly adapt and excel at our changing mission. The ambiguous training events and situations were probably the best recipe a commander could have asked for throughout our preparation for combat. If Afghanistan has shown anything to the Soldiers of *Black Sheep* Battery, it is to always prepare for change, because it is always just around the corner.

Sharing information early and often is a key lesson we learned throughout our training and initial stages of combat operations. Simply put, an organization is only as good as the lessons it learns and passes along to others. Our critical early lessons learned include:

- As early as possible contact the unit you will be replacing and ask for pictures and or diagrams of the firing point. This will help to generate questions and discussions regarding limitations and capabilities that often get overlooked.
- If asked to provide a security force for an SFAT, integrate your

SFAT into your formation as early as possible. We built them as an additional platoon into the battery which allowed us to better support them across all key lines of effort—security, governance, retrograde and force protection.

- Expose as many of your Soldiers to the equipment they will encounter in theater as soon as possible. Not doing this precipitated many painful lessons and a steep learning curve for the first month of our deployment. If possible, front load communication training (simple key loaders, Multiband Inter/Intra Team Radio, AN/PRC-152, TACSAT-RT-1796, etc.). Make it mandatory for all Soldiers to know how to complete the basic steps needed to use these systems and identify/fix faults.
- Identify your talented drivers prior to arrival in theater. Upon arrival, mandate that all drivers and vehicle commanders complete a rigorous driver training program with special emphasis on training with Spark-II Mine Rollers. To date, mine roller-equipped vehicles account for the most accidents across Afghanistan.

Captain Edward A. Guelfi received his commission from the University of Pittsburgh, Pa., in May 2007. His first assignment was to the 3rd Heavy Brigade Combat Team, 3rd Infantry Division, Fort Benning, Ga. Upon his arrival he served as a company fire support officer and assistant battalion effects coordinator for the 2nd Battalion, 69th Armor Regiment, where he deployed in support of Operation Iraqi Freedom. Guelfi would later serve as a platoon leader for B Battery, 1st Battalion, 10th Field Artillery Regiment in Iraq as part of Operation New Dawn. Following the completion of Captains Career Course at Fort Sill, Guelfi was assigned to the 1st Battalion, 6th Field Artillery Regiment, Fort Knox, Ky., as the battalion assistant operations officer. Guelfi assumed Command of Black Sheep Battery, 1st Battalion, 6th Field Artillery Regiment in the spring of 2012 and deployed as part of Combined Task Force Centaur to Regional Command-South in the summer of 2013. After his command, Guelfi was assigned as the lead brigade planner for Combined Task Duke in Zabul province, Afghanistan. CPT Guelfi's civilian education includes a Bachelor of Arts degree in Political Science and Sociology. His Military Education includes the Field Artillery Captains Career Course, the Field Artillery Officer Basic Course and the Basic Officer Leader Course.

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a significant change. AFATDS does not automatically apply velocity readings, thus the platoon FDO must accept the readings and perform an update. Of course, a muzzle velocity variation update requires a verification mission. Therefore, the platoon FDO deliberately applies an update when the situation allows for a unit to go out of action.

The FDO plays a pivotal role in ensuring the success of the Field Artillery battalion during DATE rotations. If he acts as a team player, his role can expand beyond the confines of the FDC vehicle. There are a myriad of techniques to execute the duties of the FDO and each may be correct depending on the situation. What may work in one scenario, may not in another due to personalities and environmental variables.

The FDO must develop systems to streamline the planning, preparation, execution, and assessment process. Ammunition management is a hefty duty that requires intense thought and analysis. Automated systems help the FDO manage his ammunition more efficiently thereby reducing his workload. Emplacing systems that reduce time spent tracking enable the FDO to apply brainpower to

other endeavors such as research and developing new techniques. The manner and depth in which he conducts rehearsals, combined with his knowledge base, maintains his unit's readiness for fire missions. The systems and techniques he develops combined with his knowledge base are a significant factor in success during DA scenarios.

The operational tempo of DA scenarios places added stress on artillerymen through the plan, prepare, execute, and assess process. These stressors require agile and adaptive artillery leaders to formulate solutions to complex problems. Utilizing basic knowledge, systems, and ingenuity the FDO can overcome most issues presented by the DA scenario. The FDO, an enforcer, a tactician, a mathematician, a scientist, and a thinker, must harness his skills to create systems to assist in sound decision-making.

Captain Westly T. LaFitte is from Shreveport, La., and is a 2007 graduate of the United States Military Academy at West Point, N.Y. and holds a degree in Life Sciences. He is currently assigned as the battalion FDO of 4th Battalion, 42nd Field Artillery Regiment, 1st Brigade, 4th Infantry Division, Fort Carson, Colo. He is currently serving in support of Operation Spartan Shield, Southwest Asia. He has served as a maneuver platoon leader, platoon FDO, cannon platoon leader, battery executive officer, and battalion FSO in 4th Brigade, 10th Mountain Division, Fort Polk, La. He has deployed to both Operation Iraqi Freedom 07-09 to east Baghdad and Operation Enduring Freedom 10-11, to Logar province, Regional Command-East.



Cannon crew members prep the Excalibur round for firing. (Photo courtesy of LTC Gary C. Leroux)

Excalibur Home Station Live-Fire Training

By LTC Gary C. Leroux

On Dec. 5, 2012, the 212th Fires Brigade and the 1st Armored Division proved that Excalibur live-fire training can be conducted at home-station and it has significant training value. The Fort Bliss, Texas, Fires team of the 212th FiB and the 1st AD conducted months of planning to execute this multi-echelon training exercise. Execution had a number of challenges, and two in particular required significant effort to overcome: first was the development of the surface danger zone; and second, the acquisition

of Excalibur rounds, which are currently restricted to 'war time' use.

Nevertheless, the Fort Bliss Fires team was able to overcome these challenges and conducted high-value training. The links created and strengthened during the preparation and execution of this live-fire exercise will pay dividends for not only the Fort Bliss Fires team, but for other Fires units across the force.

The need for a cannon-fired precision munition was first identified early in Operation Iraqi Freedom to fill a capability gap

identified between traditional artillery rounds and precision air-to-ground munitions.

The XM982 Excalibur Global Positioning System guided 155 mm round was developed to fill this requirement and by 2007, they were being fired in combat. The Excalibur's accuracy and low collateral damage quickly demonstrated the round's value in theater. The XM982's cost and its limited production, however, restricted its use to war time, which did not allow units to gain a lot of familiarity with it during home-station training. With the round in a war stock status, only units

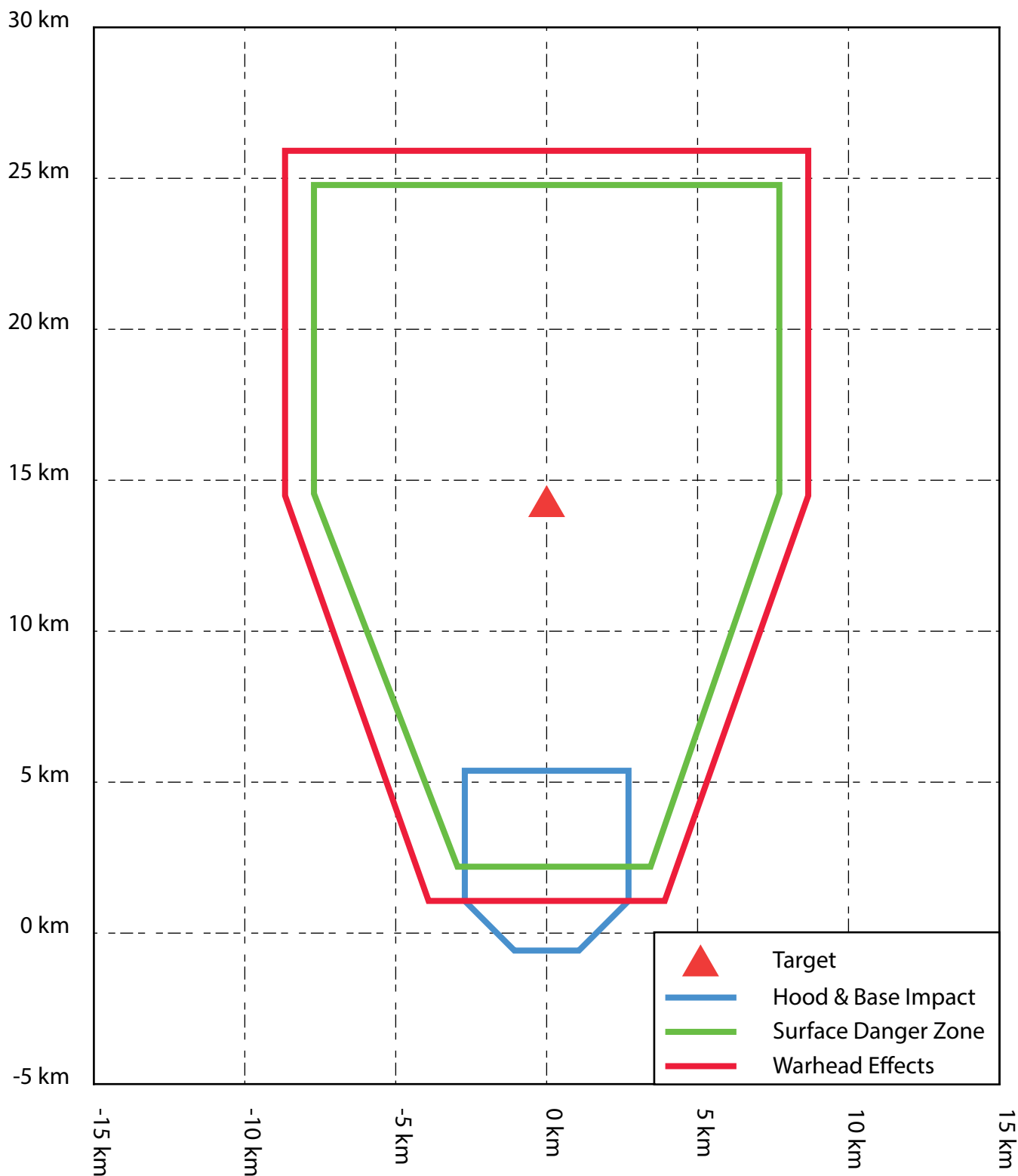


Figure I. Using the inputs, the ADS program determined the above SDZ. (Information provided by LTC Gary C. Leroux)

preparing to deploy to the Central Command area of responsibility have been able to conduct live-fire training during pre-deployment rotations at the National Training Center, Fort Irwin, Calif. Other opportunities to fire the Excalibur have been restricted to required testing and evaluation live-fire

events, including developmental testing and ammunition lot acceptance testing that occurs whenever the Army receives a new production lot from the manufacturer.

Live-fire training at NTC is necessary and valuable; however, it is focused on the rotational brigade combat team level and

below. Opportunities are lost for training and integration at the FIB and division level. The 1st AD commanding general, MG Dana J. H. Pittard, decided to change, directing his staff to develop a course of action that would allow units firing at Fort Bliss to gain the benefits of home-station Excalibur live-fire



A howitzer section emplaces the M777 howitzer in preparation for firing the Excalibur at Fort Bliss, Texas. (Photo courtesy of LTC Gary C. Leroux)

training. Pittard and his staff developed the following mission and intent:

Mission. 1AD Fires the XM982 Excalibur Precision Guided Munition on the Fort Bliss Range Complex on Dec. 5, 2012, in order to demonstrate the 1st AD's capability to support Excalibur live-fire exercise training, and to train units and leaders on precision Fires.

Key Tasks:

1. Determine SDZ that will allow the firing of Excalibur PGM
2. Conduct an environmental impact study and submit any necessary waivers
3. Update the Fort Bliss range regulations
4. Procure ammunition
5. Coordinate Excalibur new equipment training
6. Plan and execute an Excalibur LFX

End State. Excalibur LFX conducted on Fort Bliss with range regulations and catalogue updated to reflect this capability.

The 212th FiB, acting as the Force Field Artillery Headquarters--further developed the COA for this exercise. The 4th Battal-

ion, 27th FA (a Fires battalion assigned to the 2nd BCT 1st AD), was selected as the firing unit. The 4-27 FA conducted NET on the XM982 Excalibur munition prior to the LFX. B Battery, 4-27 FA provided the firing platoons, 1st Battalion, 35th Armor provided the fire support element, and two combat operations lasing teams to observe.

The mission and intent for the 212th FiB: Mission: The 212th FiB provides mission command by planning, preparing, and executing oversight in order to ensure the successful firing of two Excalibur munitions at Fort Bliss, from Oct. 30 to Dec. 12, 2012.

Purpose. Conduct Excalibur PGM LFX on Fort Bliss ranges in order to enhance the training of units and leaders on precision Fires, as well as establish Fort Bliss as an Excalibur PGM-capable post.

Key Tasks:

1. Conduct exercise consisting of two Excalibur rounds
2. Establish communications with all player nodes
3. Develop conditions checklist

4. Identify training locations
5. Capture lessons learned
6. Identify subject matter experts and briefers
7. Develop task organization
8. Develop scenario conditions to execute Excalibur fire mission

End State. The 212th FiB, in conjunction with 4-27 FA, successfully executes the firing of two Excalibur munitions, destroying two targets. This generated a shared understanding among 1st AD units of the conditions, requirements and effectiveness of the Excalibur munition. This also increased the reputation of Fort Bliss as a center of excellence for combined arms operations.

The guidance received from the division and brigade commanders was clear, but the execution of this operation still remained. First was the development of the SDZ, allowing the employment of the Excalibur round on the installation. Because of the round's non-standard trajectory and its ability to glide extended distances, standard 155 mm artillery SDZs could not be applied. Working



with the product manager for Excalibur, the Fires team at Fort Bliss developed an SDZ that, while significantly larger than standard SDZs, remained within the boundaries of the installation.

The PdM's office, in conjunction with the Raytheon Corporation, generated the SDZ using a program called 'All Digital Simulations' or ADS. ADS uses a 'Monte Carlo' type analysis that applies the military standard 882 safety criteria of 1 to 1 million (i.e., only 1 of 1 million rounds fired would impact beyond the area of the SDZ) and examines all Excalibur failure modes including the worst case mode involving post-Canard deployment failures.

In order to develop an SDZ specific to the training mission, additional information was required: projectile type and operational flight software version, gun and target location and altitude, firing platform, quadrant elevation, charge, projectile temperature, charge temperature, air temperature, atmospheric pressure and density, and an annual wind profile of the target area, including up to 75 percent maximum wind speed values for the target area.

Although still significantly larger than

standard SDZs, the ADS version was small enough to use on the installation and allowed the mission to continue. However, developing the SDZ did not complete all the safety requirements and it was necessary to get a deviation request authorizing the SDZ boundaries to contain some personnel and facilities including the observers. With appropriate risk mitigation, the overall danger of the live-fire was assessed as 'moderate' and the commanding general's approval authorized the deviation.

Another significant challenge to execution was acquiring the ammunition. As war stock, there are no allocations for the Excalibur in standards in training commission and hence no training rounds were available. Again the PdM provided critical assistance. As previously mentioned when the Army receives a new lot of Excalibur rounds, the PdM's office gets a limited supply to conduct lot acceptance testing, and typically (when testing goes well-which is the norm), they do not expend all of the rounds. The remaining supply is usually repurposed to meet emerging requirements, but in this case, the PdM's office and 1st AD were able to receive

authorization from the Army G3 to release two rounds for unit live-fire training.

The final challenge was the development of a suitable target since the impact area lacked any structures suitable for an Excalibur engagement. The solution was to construct a pair of 10x10 buildings in the impact area. Four days before the planned execution date, Fort Bliss range personnel constructed the two small buildings. Unfortunately, the construction timeline made target mensuration impossible because there was not enough time to get the appropriate satellite imagery needed for mensuration. Contrary to popular belief, mensuration is not required for use of the Excalibur round; however, a target location error of 10 meters or less is. Mensuration is one method often used down-range to achieve this TLE but other methods can achieve the same TLE or lower. In the case of this exercise, the TLE requirement was met by the use of the Improved Position and Azimuth Determining System to emplace two survey control points in the target area. The range support personnel constructed both of the target buildings over these two SCPs and the grids were passed to the forward observers.



Damage sustained to the target post-impact. (Photo courtesy of LTC Gary C. Leroux)

The execution phase began with unit movement to the training area on Dec. 1, 2012. The battery fire direction center, battalion FDC, and firing platoons were co-located with the 212th FiB command post in a roughly 400 meter box. The battalion FSE and observers occupied an observation post approximately two kilometers from the target location. A battalion radio retransmit element was located inside the SDZ as well to ensure communication between the battalion FSE and the brigade CP.

Unit rehearsals were conducted from the observers through the FSE, to the brigade CP, battalion FDC, battery FDC and firing platoons. The 212th FiB used the rehearsals to complete and validate the execution checklist. The checklist proved to be a valuable tool for controlling the exercise and monitoring its status. For example, the after action review noted that an additional day

of rehearsals would have been useful. Also, the additional time would have reinforced lessons learned.

On the day of execution, the 212th FiB used the live-fire as an opportunity to educate the entire Fort Bliss Fires community on the value of the Excalibur munition and the advantages of home-station live-fire training. An innovative program, called the 'Fires University' and managed by the 1st AD and Fort Bliss, was used to support this educational opportunity. The Fort Bliss Fires University is a quarterly Fires Soldier development program that brings fire supporters and maneuver leaders from across Fort Bliss to observe and participate in Fires training. The Excalibur live-fire event was a perfect opportunity for incorporation into their quarterly training plan.

The 212th FiB established a CP tent solely for the execution of the Fires Univer-

sity. The CP was equipped with two television monitors that displayed live video feeds from ground cameras and unmanned aerial vehicles. Fire supporters and maneuver leaders from across the installation were flown to the site and presented with the concept of the operation and the capabilities of the Excalibur round. In addition to the exercise viewing, Fires University Soldiers were given the opportunity to observe fire missions in the FDCs, observe crew drills on the gun line, and visit the observation point between round firings.

The exercise culminated with two successful XM982 Excalibur engagements. The fire missions were executed with digital communications from the observers to the gun line. Both Excalibur rounds functioned within one circular error of probability of the target and would have delivered lethal effects on any enemy forces in the shelters, yet with slight enough damage that both structures could have been repaired. This demonstrated the versatility of the Excalibur in situations where collateral damage is a concern.

The Fort Bliss Fires team from the 212th FiB and 1st AD proved that home-station training of the Excalibur is not only achievable, but also highly valuable. The unit gained experience they could apply in combat operations while informing maneuver leaders and fire supporters on the unique capabilities the Excalibur munition delivers. They were able to overcome significant challenges in SDZ development, ammunition acquisition, and target location error minimization, and through the disciplined application of the five requirements for accurate fire, lethal effects were achieved on the targets. The successful execution of this Excalibur live-fire event clearly demonstrates the need for an Excalibur training requirement to be formally established in the STRAC so other units can follow Fort Bliss' example and execute high quality Excalibur live-fire training. Fires Strong!

Lieutenant Colonel Gary C. Leroux attended Reserve Officers Training Corps at the University of Vermont and was commissioned into the EA on May 27, 1994. His first assignment was with 4th Battalion, 11th EA, Fort Wainwright, Alaska. Subsequent assignments include command of Headquarters and Headquarters Battery, 10th Mountain Division Artillery, Fort Drum, N.Y., battalion executive officer, 2nd Battalion, 4th EA, Fort Sill, Okla., and brigade XO, 214th FiB, Fort Sill. Leroux has deployed to Iraq and Afghanistan, and is currently serving as the strategy and integration officer in the Directorate of Training and Doctrine in the Fires Center of Excellence at Fort Sill.

Five Requirements of Accurate Fire for the 21st Century

By CPT Brock Lennon

Recently, the Fires Center of Excellence, Fort Sill, Okla. and the U.S. Army Field Artillery School announced changes to The Five Requirements for Accurate Predicted Fire. It has now been amended to read The Five Requirements for Accurate Fire.

The five requirements are listed as the following:

1. Accurate target location and size,
2. Accurate firing unit location,
3. Accurate weapon and ammunition information,
4. Accurate meteorological information,
5. Accurate computational procedures.

The five requirements, which have remained the same since World War I, have now been modified to reflect new systems and operational considerations, the use of digital weapon systems and the use of precision and near precision munitions.

The Five Requirements and Their History. The Five Requirements for Accurate Predicted Fire has been the foundation for artillerymen to solve the gunnery problem. Prior to World War I, artillery utilized observed fire to achieve effects on target. Essentially the battery commander would identify the target and bring his battery's fire to bear on the enemy through observing the impacts of the rounds. While effective in the delivery of Fires on the battery or battalion level after adjustment, this method did not allow for the massing of higher echelons.

It was the Germans who developed predicted fire technique. This allowed their artillery units to mass Fires, up to the army echelon on targets without the requirement of adjustment. This allowed for massed, surprise Fires and awarded a distinct tactical advantage. As with many tactical and technical innovations adopted by the United States, the method of predicting fire was borrowed from the German military and summarized in our five requirements for accurate predicted fire.

However, the question arose about the continued validity of the five requirements in this modern era of joint operations, global positioning systems, digitized systems, and precision munitions. While the FCOE did determine some updates, the basic methodology remains relatively unchanged. The physics behind the delivery of ballistic, level of effort, munitions has not transformed over time, however, new systems and operational considerations have created the need for extra considerations within the five requirements.

1. Accurate Target Location and Size. Typically this is the observer's responsibility, and this requirement allows the location of target to be plotted by the fire direction center in order to determine range, deflection, and vertical interval in relation to the firing unit. This aspect of the requirement remains unchanged, however, it was determined that the requirement lacked concrete objectives in terms of the accuracy new target location assets can obtain. Foremost among the updates, the first requirement now spells out the requirements for accurately locating a target: accurate reference location (either the sensor or a known point), accurate distance derivation, accurate direction derivation, accurate coordinate determination, ac-

curate altitude derivation, and accurate target description, dimensions, and disposition.

Additionally, the accuracy standard for reference location was set at ≤ 10 meters, or the accuracy provided by GPS. While all six of these requirements may or may not be utilized depending upon the target location method utilized, it was felt that there was a need to explicitly state the observer's responsibilities.

It was decided that in terms of employing precision or near precision munitions, the standard for target location error in acquiring coordinates was set at the joint definition for precision at ≤ 6.5 meters. It is important to note that the accuracy standards are just that, standards. This is not to say that a firing unit cannot achieve accurate first round fire-for-effect if the TLE is determined to be larger than expected. However, it primes both the observer and the FDC to consider the effects of TLE in the tactical employment of Fires when not meeting explicit standards.

2. Accurate Firing Unit Location. The second requirement remains the responsibility of the firing unit's leadership. Once the firing unit location is accurately determined, it is compared to the target location in order to derive range, deflection, and vertical interval. It is important to emphasize the determination of an accurate altitude for each howitzer as well as a sharp emphasis on directional control. However, none of this is new to artillerymen. With the advent of self-locating howitzers it is important for firing unit's leadership to understand that verification of both location and directional control for each howitzer are mandatory. The goal set forth by the working group for howitzer location is ≤ 7 meters circular error probable. Once again, this is a goal that aligns with the accuracy provided by GPS integrated into our self-locating howitzers.

3. Accurate Weapon and Ammunition Information. The third requirement solves for the effect of interior ballistics. Under normal circumstances, a firing unit is able to determine the actual achieved muzzle velocity for a given projectile-fuze-propellant lot combination. The one update to this requirement is to expressly state the fuze in said combination. Once the fuze is considered, its effect on the projectile/fuze mean square weight can be determined, and a more accurate muzzle velocity variation can be determined.

4. Accurate Meteorological Information. The fourth requirement solves for the effect of exterior ballistics in terms of atmospheric conditions. By considering the atmospheric conditions of wind direction, wind speed, air temperature, and air pressure a firing unit can apply corrections to compensate for these conditions and achieve effects on target. The one update to this requirement is to state the fire direction officer's responsibility of validating the meteorological message.

5. Accurate Computational Procedures. The computation of firing data must be accurate. The effective delivery of Fires requires balance between accuracy, speed, and other requirements. Accurate firing data is a function of procedure, training, and discipline. If all factors are performed correctly, the result is accurate firing data and

See **ACCURATE FIRE**, page 58

Leave Counter-Indirect Fire to the Redlegs

By CPT Kevin A. Chesnut

The 3rd Battalion, 320th Field Artillery Regiment, *Red Knight Rakkasans*, deployed to, Khost and Paktiya province, Regional Command - East, Afghanistan supporting the 3rd Brigade Combat Team of the 101st Airborne Division as a conventional light Field Artillery battalion whose primary mission is providing indirect fire support to the BCT. In addition to providing the BCT with IDF support to its maneuver units, the battalion is tasked to act as the BCT's central hub for the counter-IDF intelligence cell. LTC Mosakowski, the battalion commander of 3-320 FA, knew that the daunting task is best handled by a combat experienced artilleryman.

Many artillerymen can vouch timely, accurate and predictive artillery requires precision calculations and attention to detail in order

to achieve the desired effects on enemy targets. With the constant evolving battlefield, *Redlegs* are faced with these same precision calculations and attention to detail that helps define timely and accurate predictive analysis. As coalition forces retrograde from selected forward operating bases, combat outposts, and other scattered outposts throughout eastern Afghanistan, the freedom of maneuver of insurgents greatly increases as the coalition forces area of influence dramatically decreases. As the U.S. reduces its footprint throughout Afghanistan the increasing pressure of the transition of security to the Afghan National Security Forces is under constant scrutiny as IDF attacks take a physiological toll on the local populace. Insurgents use IDF attacks as part of their information

operation campaign to display ANSF's inability to bring security to the region.

The capability of the enemy to launch such attacks remains one of the greatest threats to CF/ANSF FOB/COP in theater. The most preferred method of IDF attack in area of operation Rakkasan in order of precedence is a variety of recoilless rifles (B-10, 82 mm being the most common), 107 mm rocket fire, 82 mm mortar, and an occasional 122 mm rocket attack.

These weapons provide the enemy with additional flexibility and greater firepower due to their ability to be employed in large numbers from improvised launchers at a greater standoff range. The threat to military, government, and civilian installations continues to increase as the insurgents improve and refine their IDF methods. The amount

Figure 1. Type-83 107 mm rocket launcher in position ready to fire. Insurgent's fire mission was disrupted by a combined dismounted combat patrol outside of COP Boris, Paktika province. (Inset) Two Chinese Type-63 107 mm rockets were found next to the tube. (Photos courtesy of SSG Roy Corpier)



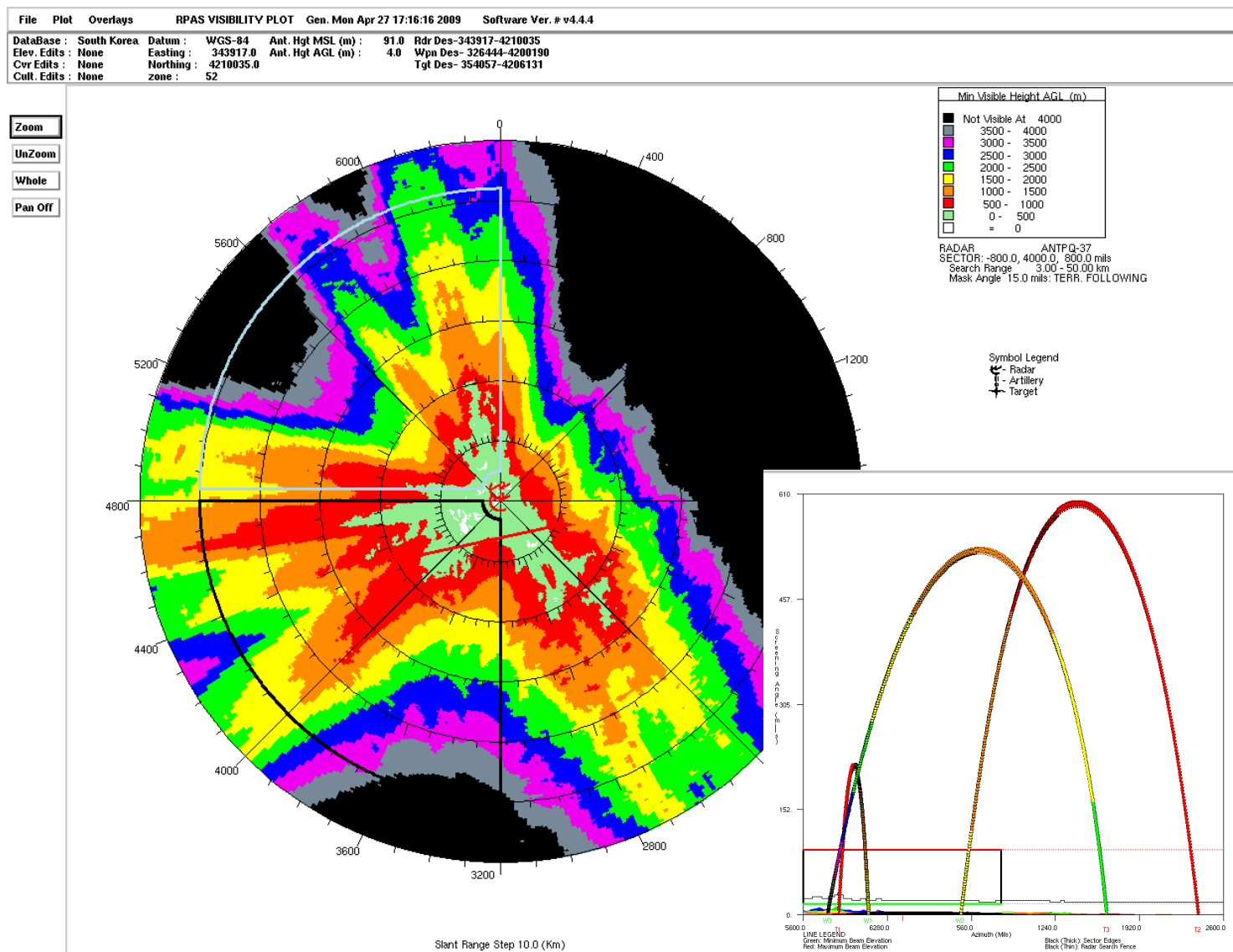


Figure 2. Illustrations of the capabilities of the RPAS software program. Visibility plot created by the RPAS. (Inset) Angle plot, point to point trajectory chart created by RPAS. Link: <http://www.tsc.com/Fact%20sheets/RPAS%20Technical%20Description.pdf> (Images courtesy of Technology Service Corporation)

and accuracy of IDF attacks continue to increase. As the enemy threat increases, greater emphasis was required throughout eastern Afghanistan to increase installation protection and improve countermeasures against such attacks.

S-2 Shop's Composition and Build up for Operation Enduring Freedom XII-XIII. During the deployment the C-IDF cell was composed of six personnel. CPT Kevin Chesnut (13A) S2, MSG Liviu Ivan (13Z) S2 NCOIC, SGT Saul Arroyo-Estrada (35F) all source analyst, and the civilian counter insurgent analytical team 59 Peter Vang (team leader and intelligence, surveillance and reconnaissance manager), Michael Brack (combined information data network exchange operator), and Miles Morita (human intelligence/All source analyst).

In May 2012, 3-320 FA deployed to the Joint Readiness Training Center, Fort Polk, La., for their rotational training exercise in preparation for their deployment in support of OEF XII—XIII. During this exercise the Red Knight S2 shop was tested on its ability to accurately depict enemy tactics, techniques and procedures and provide predictive analysis on enemy patterns of life. By the completion of the exercise, seven out of the eight enemy IDF cells were eliminated. After seeing the success and the usefulness of the C-IDF cell, MAJ Jimmy Gaw, the BCT S2, made it official that the *Red Knight's* S2 shop will be the central hub for the C-IDF fight. Responsibilities of the C-IDF intelligence team is assisting the BCT and battle space owners on developing enemy TTPs, employment of enemy weapon systems, providing

necessary intelligence and products for lethal and non-lethal targeting of insurgent IDF cell networks and analysis of emplacement of the brigade's Firefinder acquisition systems.

After the JRTC rotation, our training focused towards the basic fundamentals of C-IDF. First and foremost, in order to counter the IDF threat, understanding the limitations of U.S. IDF capabilities and that of the enemy was paramount.

Our training plan took an in-depth look on understanding the capabilities of the enemy we were facing. We studied the known weapon systems, munitions, communication, and transportation methods observed in Afghanistan/RC-E to include: physical characteristics of the IDF weapon systems, capabilities, proper and improvised employ-

ment methods, strength and weaknesses of the weapon systems and signatures when fired. It's vital to know this level of detail in order to anticipate how the enemy shoots, moves, and communicates.

Understanding what collection platforms are available to us at battalion, BCT, and theater level that would answer our commander's priority intelligence reports, intelligence gaps and kinetically target IDF cells operating in our AO was just as equally vital as understanding the capabilities of our enemy.

When acting as the BCT C-IDF cell, you must understand and be familiar with all aspects of the FA community. One of our responsibilities was advising the brigade sensor manager on the employment of Firefinder Radar Systems. We placed an emphasis on understanding the employment of and the capabilities/limitations of the various acquisition systems supporting the BCT. Understanding how each radar acquisition system works allows our team to take advantage and capitalize on that system's capabilities. Take for instance; the Q53 has had a recent upgrade feature called manual terrain following. MTF scans the relief and provides a graphical representation of intervening terrain features. With this feature the sensor manager can determine if this Firefinder system should be configured in the 360 degree 'seek and warn' mode or in the 90 degree fan mode. Each configuration provides different capabilities. Example, the radar may be geographically located in mountainous terrain in which configuration of the radar in the 360 degree seek and warn

mode can be limited by intervening crests in a specific direction. Where as if it was configured to the 90 degree fan mode, would provide greater coverage and distance for multiple areas of interest.

An excellent software program that helps depict the capabilities and limitations of various radar systems is the Radar Position Analysis System (see Figure 2.A and 2.B).

The Radar Position Analysis System is a position analysis software tool designed to predict the site-specific weapon location performance of U.S. Army weapon-locating radars for a wide range of potential weapon placements and characteristics.

Similar to the enemy IDF weapon systems we studied, it's also critical to understand the capabilities and limitations of U.S. conventional weapon systems and their munitions (both air and land). A critical factor for C-IDF is taking into consideration the current restrictions placed on our Fires such as the different levels of collateral damage estimate. For example, when using conventional surface to surface weapons such as howitzers and mortars, our team must understand the following: what type of target is it?, sheaf?, and shell/fuse combo to use that would be most effective with CDE of concern? Example, an open sheaf with a high explosive/variable time as the shell fuse combination is best used in open terrain with little to no CDE concerns. Whereas a closed sheaf with a smoke/point detonating combination may be best used when no lethal munitions can be used thus acting as a deterrent possibly forcing insurgents to change their pattern of

life for better collection. If CDE becomes too restrictive and the conditions are permissive, the best course of action may be the use of precision guided munitions.

Keeping true to the gunnery fundamentals helps in the targeting process, understanding and applying the Five Requirements for Accurate Fire will help explain if one is dealing with a highly trained IDF cell, a cell that just understands the basic fundamentals or an inexperienced cell. The Five Requirements of Accurate Fire are:

1. Accurate target location and size
2. Accurate firing battery Location
3. Accurate shell-fuse combination
4. Accurate meteorological data
5. Accurate computational procedures

Most of the IDF cells operating in AO Rakkasan can only meet elements one and two (accurate target location and size, and firing unit locations). Common enemy TTPs is selecting firing positions at the IDF system's maximum range. This is typically seen with munitions that have fixed propellant such as rockets and recoilless rifles. If the IDF system or rocket is placed at an elevation from 45-50 degrees, it will achieve its maximum range and the general point of impact is known. The next step will be applying the deflection. After a few fire missions, insurgents will have the necessary adjustments to deliver effective attacks. Tactical site exploitation from kinetic strikes against active IDF teams and various reports confirm some insurgents cells use global positioning system devices for finding the target location and their location. After the first volley, correc-

Figure 3 illustrates how these conditions could affect an engagement. (Information provided by CPT Kevin A. Chesnut)

Effects of Varied Conditions on Maximum Range for 122 mm 9M22U					
Condition	Standard	Change That Increases Range	Incremental Effect on Range	Hypothetical Conditions	Possible Range Increase
Wind	0 m/s	Increase	500 m/10 m/s	20 m/s	1000 m
Ambient Temp	16°C	Increase	260 m/10°C	35°C	910 m
Propellant Temp	15°C	Increase	100 m/10°C	30°C	300 m
Barometric Press	760 mm Hg	Decrease	170 m/10 mm Hg	680 mm Hg	1360 m
Angle of Site	N/A	Target is lower than the launcher	200 m/ 500 m	1500 m (Launcher is above target)	600 m
These incremental effects are based on the performance of the rocket at maximum range. The values are not constant throughout the range spectrum and should not be expected to be linear for large variations in any given condition.				Potential Range: 24,570 m	



Figure 4. A graphical depiction of a scenario. (Photo courtesy of CPT Kevin A. Chesnut)

tions are applied as needed. It is a direct fire concept applied in an indirect fire mode.

Applying Non-Standard Firing Conditions to Explain Why and/or How. It is helpful to consider the nonstandard firing conditions after IDF attacks in order to explain how insurgents are achieving or failing to achieve the maximum or beyond maximum range capabilities and how that will limit them to specific area or terrain. When munitions exceed their maximum range it is because conditions in which they are being used may not be 'standard.' High temperatures, windy conditions, and higher firing altitudes compared to sea level are all factors that account for IDF munitions exceeding the expected maximum ranges.

For example, the most common 122 mm rocket encountered in Afghanistan is the 9M22U HE rocket. According to the firing tables for this rocket, the maximum range at standard firing conditions is around 20,400 meters. However, this is not the maximum distance the rocket is capable of traveling for all conditions.

Figure 3 illustrates how these conditions could affect an engagement. This data is

representative of conditions that has been observed in Afghanistan.

By providing a scenario with a graphical depiction (Figure 4.A and 4.B), we will demonstrate with inductive reasoning how to effectively hypothesize enemy TTPs without historical reporting or battle damage assessments. COP Alpha continuously receives IDF attacks with 107 mm rockets; on average the COP receives two rockets per attack with each round three to five minutes apart. During one of the attacks, insurgents fired 2x 107 mm rockets. One of the first rockets overshot 150 meters to the north of the COP and the second rocket impacted 100 meters south of the COP. This is a strong indication that insurgents are bracketing. The Q50 picks up a point of origin at 9,010 meters from the COP with what looks to plot on the back side of a mountain; the Firefinder acquisition system has a target location error of 150 meters. The unit conducts a counter-fire mission - rounds complete, end of mission. After confirmation of the first impact air support is requested. Brigade dynamically re-tasks an air weapons team to support your mission. Upon rounds complete, AWT checks on

station and conducts battle damage assessment on the target counter-fired on. After AWT scans the targeted area for BDA, there is nothing significant to report. After crater analysis, it's confirmed that the rounds used were 107 mm rockets due to shrapnel and rocket motor recovered. The back azimuth of the crater collaborates with the radar acquisition.

What can We Conclude from this Scenario? Taking the information on common enemy TTPs, weapon characteristics, the Five Requirements for Accurate Fire, and non-standard firing conditions into account we can accurately depict and begin to develop the enemy's POL.

1. The 107 mm projectile weighs 40 pounds, is 33 inches long (w/fuse), and takes an electrical source that is produced by a small motorcycle battery or a 9-volt transistor battery. One man can carry both of the rockets but that can be very cumbersome, not to mention carrying enough wire, batteries, weapon, ammunition, and possibly the launcher. We can safely say it is a two to three-man team if they are in an area where they have freedom of maneuver, if not they probably have an

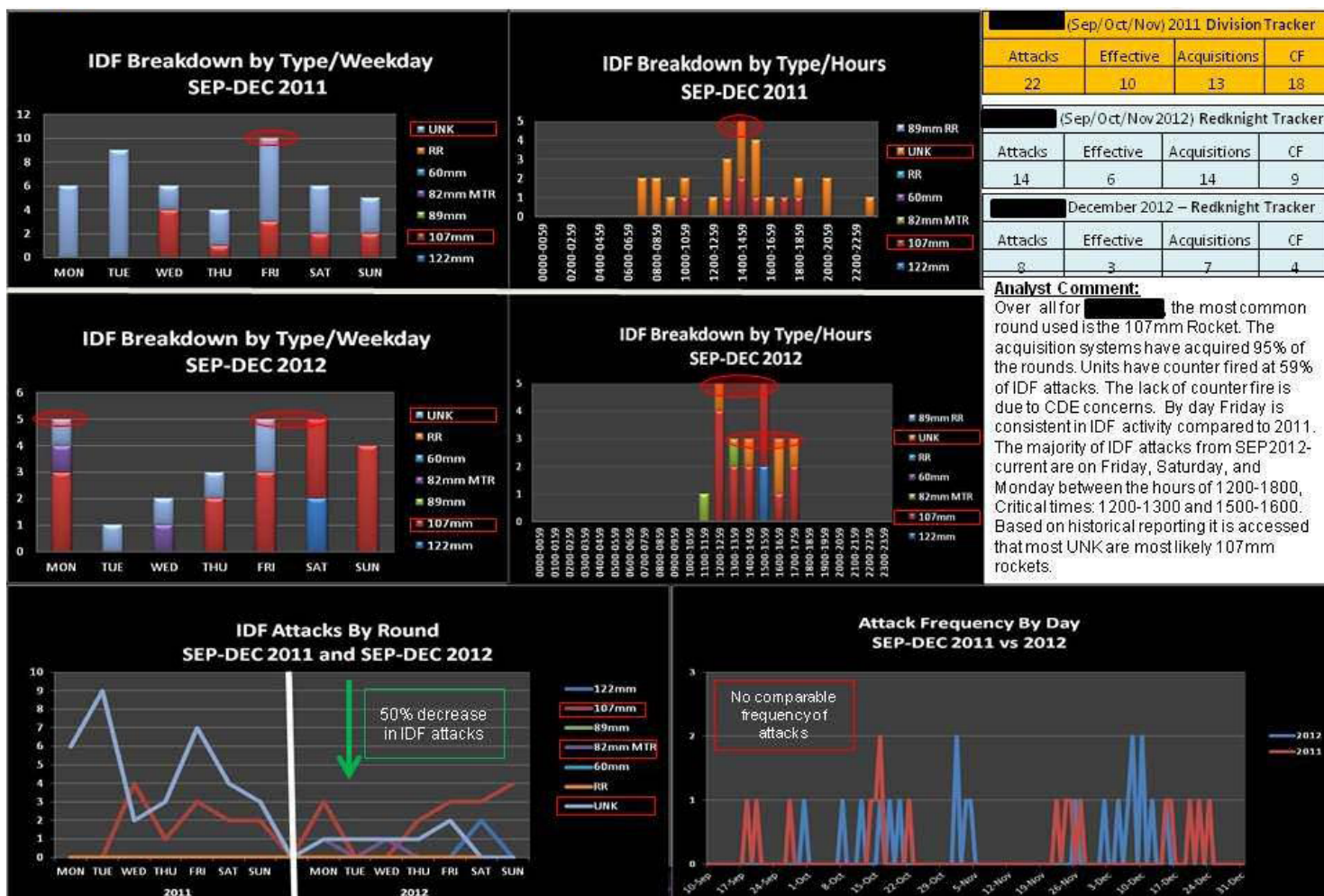


Figure 5. Graphic representation of collecting historical and current data. (Photo courtesy of CPT Kevin A. Chesnut)

- additional two-man security detail. Or, there is a cache that stores the rockets, fuses, launcher, wire, and batteries and is on the route of or nearby the POO site.
- The rockets impacted three to five minutes apart and it appears they bracketed the COP. One can reason that there is a spotter involved. If this is considered, he is communicating via push to talk radio or cell phone and the spotter is located in a position with direct line of sight to the COP/FOB.
 - The corrections in between rockets would have to be very minimal at that range. With that in mind the insurgents are not using a timer, They are at the firing point and are most likely using the actual Type 83 single tube launcher (Figure 1) or an improvised rail system capable of small adjustments. After a 107 mm rocket attack the motor and nozzle assembly system is usually recoverable. In this case the motor was recovered (Figure 4.A) and is marked by long vertical scratches (screw like pattern) down its side. These scratch-

es are indications insurgents are using an improvised or single tube launcher.

How is this hypotheses developed? A typical launcher is constructed near the same length as that of the rocket. Once the rocket is ignited it will rotate only one to three times prior to its departure from the launcher. These long vertical scratches are generated during the initial take off from an improvised or the actual Type 83 rocket launchers. A 107 mm (Type 63) is a spin stabilized rocket caused by six canted ports at the base of the rocket (nozzle assembly), these ports cause the rocket to spin at an average of 366 rotations per second after 1.7 seconds from initial take off. Due to the fact the rocket is spinning at such a high rate, scratches made upon impact would be in a parallel circular pattern (ring like marks).

- In addition to using a rail system, one could safely assess they have the ability to gather accurate target location and battery location. If insurgents can effectively engage the COP, but only from the weapon

systems max range from different firing points, it is indicative of the use of a GPS device. Insurgents can easily create a way-point by just driving near the COP, once insurgents establish coordinates to their desired targets they can achieve accurate target and battery location. By setting the weapon system at the max range and aligning the deflection toward the COP, insurgents will be able to fire the rocket within adjustable tolerance. With the use of a spotter, the accuracy can increase quickly.

- The Q50 detected that the POO site was 9,010 meters from the point of impact. This was 510 meters past the max range of the rocket. The text book max range of weapon systems is compiled from the average from thousands of rounds fired under standard firing conditions. When non-standard firing conditions are applied the ballistics of the IDF round can be at times severely affected. Much of the elevation and terrain in Afghanistan will

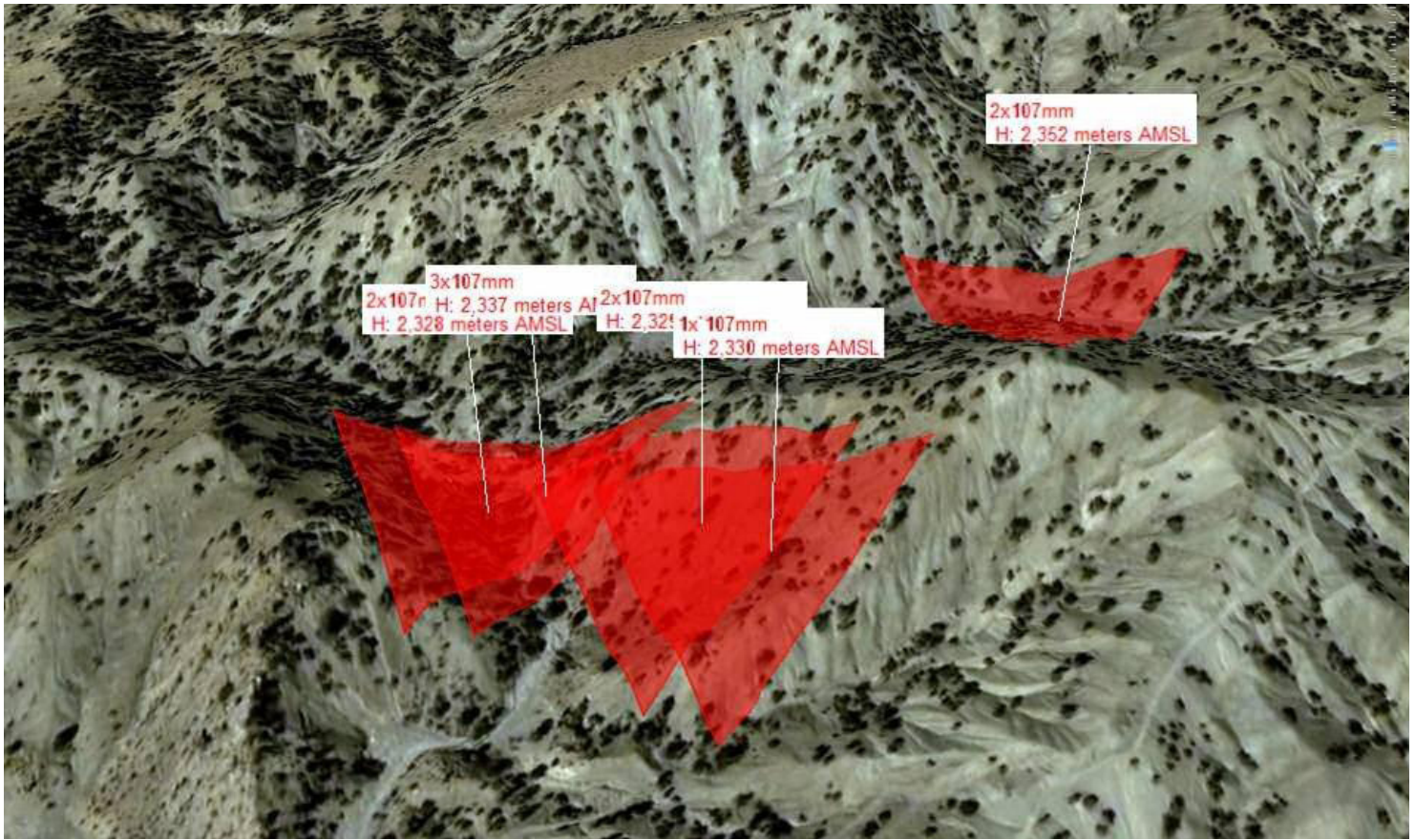


Figure 6. Refinement of target location by overlapping the average of the Firefinder's target location error. (Illustration courtesy of CPT Kevin A. Chesnut)

provide IDF munitions additional range initially.

6. Air weapon's team had nothing significant to report from the impact area from the counter fire. Either the target location error from the Q50 was too great thus the counter-fire was ineffective. Or the insurgents fired from a location that allows a quick egress (perhaps with a vehicle) and relocated to a hide point in anticipation of a counter-fire and air support.

Collecting Historical and Current

Data. A time consuming project we encountered during our mission was the refinement of historical IDF events. When developing our historical database, we collected and compared data from significant activity trackers starting at the company level working up every echelon to the division level. Once our data was as refined as possible we used the combined information data network exchange database for final refinement. After our historical data was compiled and analyzed we noticed a significant amount of the data is skewed due to incorrect reporting or poor management. As a solution for our AO we developed an IDF tracker that would answer meticulous details for the refinement

of data collection on IDF events. For every IDF attack on coalition forces troops a strike report is created and sent to BCT within four hours of the attack. This strike report had the most accurate and detailed information needed from the attack. At the end of the month we would compare our IDF tracker with other battalions and the BCT to ensure all events are recorded. From this tracker we would easily create products that would graphically depict the needed information for pattern analysis (see Figure 5 for example of a product typically created for pattern analysis).

Refining the Target and Developing Your Collection Plan. When refining the target location we considered the average of the FOB/COPs Firefinder's target location error with the combination of terrain analysis. Taking the average of the radar's TLE we began to plot historic IDF POO acquisitions which refined areas/military grid reference service grids (see Figure 6 for an example). This refinement created targets for registration/calibration missions for our conventional IDF weapon systems making counter-fire on historic POO sites more effective. When refining the target we conducted terrain

analysis with Geospatial imagery that allowed us to narrow down possible egress and ingress routes, caves (hide points/possible cache locations), and areas that were most conducive for conducting IDF attacks. When refinement of the target and terrain analysis was complete we produced a product that allowed us to develop a collection plan based on a series of overlays consisting of historical SIGACTS, reporting and possible egress/ingress routes.

Getting Assets to Collect. Since 3-320 FA is not a BSO, they are not allocated ISR assets for collections. The C-IDF team must make collection recommendations to BSOs and brigade. Collection recommendations are made by creating IDF named areas of interest and targeted areas of interest based on fusing historic IDF SIGACTS, IDF-related caches found, POO sites, signal intelligence and human intelligence together. This paints the picture for the C-IDF team to better understand the IDF cells POL, time/date of IDF attacks and other means to refine the area for critical collection time. Once TAIs, NAIs, critical time are known, the C-IDF team must recommend collections by capability-type and give it a task and purpose



Impact site of a 122 mm rocket that struck on FOB Salerno. Left: Inside view of impacted building. Right: Outside view of impacted building. (Photos courtesy of ILT Alexander Shoaf)

The following is a generic example of a IDF task and purpose: Task: Full motion video to provide overwatch, Purpose: Locate and identify any threats IVO NAI 2, focusing on TAI 2A and TAI 2B from 1130Z - 1330Z. Look for 4 - 6x PAX with possible rocket or rocket rail system, PAX (possible spotter) on high terrain in the vicinity of NAI that has line-of-sight to coalition forces base, motorcycles or vehicles entering or departing TAI. Tasks and purposes must be clear and precise to give the collection operator a good understanding of your desired request.

Since improvised explosive devices are still the primary threat in Afghanistan, most intelligence, surveillance and reconnaissance assets are dedicated by the BSOs and brigade for counter-IED missions; however, there are national level enablers that the C-IDF team could reach out to assist in collections. Organizations such as the National Ground Intelligence Center, National Air and Space Intelligence Center, 513th Military Intelli-

gence Geospatial Intelligence and Military Commercial Imagery can conduct deep dives and pull updated imagery to assist the C-IDF team. Often a request for information to these enablers will save the team from major headaches and allows the team to effectively manage C-IDF throughout the brigades AO.

Effective C-IDF Measures. Throughout the deployment we noticed the most effective C-IDF measures were combat patrols in areas of suspected IDF activity, timely counter-fire missions, border check points and outer perimeters, and of course lethal strikes via armed ISR platforms, close air support, and close combat attack. The counter IDF measures are fairly simplistic but effective especially conducting combat patrols in an area of high IDF threat. Through the course of repetition we notice units that did not conduct patrols in villages of suspected IDF cell activity or POO sites saw an increase of IDF attacks as proposed to those who too more proactive than reactive measures against the

C-IDF cell. As mentioned earlier, conducting calibration missions on known POO sites is proactive measure in increasing the accuracy and response time.

Effects of That Accurate One Round. According to the ISAF Joint Command (IJC) Combined Information Network Exchange, millions of dollars of equipment and infrastructure have been damaged/destroyed. IDF attacks are the third most casualty producing attack against CF, Afghan National Security Forces ANSF, and local nationals in Afghanistan.

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Accurate Fires, from page 51

accomplishment of the mission. The working group determined that some of these accurate computational procedures must be expressly stated, as well as the inclusion of precision/near precision munitions considerations.

First is the requirement for a strict adherence to independent checks. This system of independent checks must be a continuous process, a discipline lived by all artillerymen rather than a simple set of rules. Independent checks include automated database verification for Advanced Field Artillery Tactical Data System, Centaur, and Digital Fire Control System, and specific checks for each fire mission as it is processed.

When employing precision or near precision munitions, the elements of satellite datum availability, digital communications between the FDC and howitzers, and TLE/CEP limitations in aimpoint selection must be considered for effective employment.

Predicted Fire is a Misnomer. After review of the elements of the five requirements, the working group relooked the title. The title, formerly known as The Five Requirements for Accurate Predicted Fire, became a misnomer. In the past this title held true as the method of predicting the impact points of ballistic munitions. However, with the inclusion of precision and near-precision munitions into the firing unit's inventory, there are instances where we are in fact not predicting the true trajectory of the projectile. This requires a shift in ideology and culture to fully appreciate each of the elements of the five requirements in achieving accuracy or precision standards for all munitions. A prime example of this is determining the firing data for an Excalibur projectile. To accurately determine the precision flight and a ballistic impact in a GPS failure, all elements of the five requirements must be met. Thus, in order to cover all points the title was changed to The Five Requirements for Accurate Fire.



SFC Justin Rotti, assigned to Fire Support Specialist Training and Doctrine Command Capabilities Manager Fires Cell, Fort Sill, Okla., tests the prototype MHFA using a smartphone device. By 2016, forward observers will use the Mobile Handheld Fires Application on the Nett Warrior Device to digitally call for Fires. (Photo courtesy of SFC Justin Rotti)

Handheld Devices and Forward Observers

By LTC Larry Glidewell

The difference between mission success and missing the target, or worse, experiencing civilian or friendly casualties lies in part with the forward observer, who is charged with initiating the call for fire by accurately identifying targets and securing proper communications up the fire chain. Today, FOs must operate multiple pieces of technology and carry a large equipment load. To ease this burden, a lighter, more intuitive and more powerful call for fires handheld capability is swiftly moving through a new acquisition process.

Currently in technology testing, the Mobile Handheld Forward Entry Application managed by the Product Director Fires Support Command and Control and developed by the U. S. Army Aviation and Missile Research Development and Engineering Center will feature real-time precision targeting capabilities and is expected to field in late FY16.

The MHFA will reside on a modified Nett Warrior End User Device. Nett Warrior, developed by Project Manager Soldier Warrior,

is a smartphone-like device used by dismounted leaders to transmit information such as text messages, photos and global positioning system locations, as well as to access various mission applications.

The MHFA is a significant addition to the Army's Equipment Modernization plan, which calls for improvements to precision targeting capabilities and an overall increase in handheld systems. It will eventually replace the Pocket-sized Forward Entry Device, the current FO device that features an integrated military GPS capability and also utilizes both a laser range finder and a precision fire imagery application to generate a grid coordinate for the Advanced Field Artillery Tactical Data System. With PFED recently receiving approval for use across the entire Army, more Soldiers will have access to a mobile forward observer capability as a precursor to the MHFA.

To ensure the end-product meets the needs of today's and tomorrow's FOs, Soldiers assigned to the Training and Doctrine Command Capabilities Manager Fires, Fort Sill, Okla., are working with software

developers to shape requirements for the MHFA effort. A prototype of the MHFA has participated in multiple exercises, including live-Fires at the U.S. Army Maneuver Center of Excellence, Fort Benning, Ga., the Combined Endeavor integration exercise for coalition forces in Grafenwoehr, Germany, and at the recent Network Integration Evaluation 14.1 at Fort Bliss, Texas. The MHFA is scheduled to participate at the NIE 14.2 in May 2014, to gather additional user feedback as part of the Precision Fires Warrior effort, and to support entry into formal developmental and operational testing.

Initial feedback has confirmed the application is meeting the Army's intent. First, the device is lightweight, providing the FO with greater mobility. With sensor-to-shooter capability, FOs are receiving real-time geospatial intelligence on their intended target. In addition, the target location transmission speed has increased; as soon as the FO lasers the target the information pop ups in the handheld device for an immediate call for fire transmittal. Soldiers wearing the Nett Warrior device are visible to one another, making it easier to identify friendly troops and thus capture an enhanced picture of the battlefield. The device is part of the Android smartphone family; therefore the technology is completely intuitive to today's Soldier. Senior Army leaders attending the 2013 Association for the United States Army

A 2nd Brigade Combat Team, 101st Airborne Division Soldier uses Nett Warrior at the Joint Readiness Training Center, Fort Polk, La. By 2016, forward observers will use the Mobile Handheld Fires Application (MHFA) on a similar device to digitally call for fire, providing greater mobility and an improved situational awareness picture for enhanced friendly and enemy identification. (Photo courtesy of JRTC Operations Group Public Affairs)



conference in Washington, D.C. showed great interest in the MHFA, and expressed a desire that the capability would be in the hands of the FOs as soon as possible.

Ensuring Soldiers quickly obtain the MHFA or any relevant system requires an acquisition process that can keep pace with today's technologies, and the acquisition process for this effort is expeditiously progressing through the required stages. The Fires Center of Excellence TCM first discovered the capability at the Army Expedition Warfighting Experiment at Fort Benning in the summer of 2012, and soon determined it would be a viable solution for the next generation of PFED. From there, the team of PM MC, AMRDEC, and PM SWAR formed, and obtained the Materiel Development Decision in January, 2014.

The condensed timeline is the result of using an acquisition model that leveraged efficiencies by pairing the Army's Science and Technology resources, PM MC and PM SWAR to produce an entirely government-owned capability. By eliminating potentially time-consuming contract modifications and replacing them with user juries, the FO was afforded a larger stake in shaping the requirements. This revolutionary acquisition process has the added benefit of significant costs savings, which the Army's Acquisition Executive directed become a model for future and larger efforts.

The partnership between PM MC, PM SWAR and AMRDEC has not only accelerated the acquisition process, it has brought together the best in class in device and application capability development. PM MC, assigned to the Program Executive Office for Command, Control, Communications-Tactical, provides applications and infrastructure capabilities to help commanders collaborate, decide and lead on the battlefield. PM SWAR builds integrated Soldier systems designed to increase Soldier situational awareness while decreasing their combat load, and is assigned to Program Executive Office Soldier (PEO Soldier). In addition, PEO C3T's Project Manager Tactical Radios is also enabling tactical communications for handheld applications, including MHFA, by providing the radios that connect handheld devices to the tactical network.

By establishing synergy between several government organizations, the MHFA effort has captured the FO's current technology desires, implemented an unprecedented acquisition process and yielded a state-of-the art capability at a significant cost savings. The Army has never retreated from its resolve to maintain the most decisive and precise Fires force in the world, and the MHFA effort is one more component towards that reality.

Lieutenant Colonel Larry Glidewell is the Product Director for Fire Support Command and Control, assigned to PM Mission Command. He was previously assigned to Program Executive Office Missiles and Space as the deputy product manager for Close Combat Weapon Systems at Redstone Arsenal, Ala. His career assignments include a tour as the lead sustainment officer for Power and Energy at the Army Capabilities and Integration Center, Fort Monroe, Va. and two tours at Redstone Arsenal as a project officer for PEO Aviation working Test and Evaluation for the Comanche Program Office and leading the Comanche Program Termination efforts. He also served as commander of a Defense Contingency Support Team in Afghanistan, for the Defense Logistics Agency and a tour with the Defense Supply Center Columbus, Columbus, Ohio, as a deputy joint weapons systems integrator. Glidewell served as a chemical staff officer in Korea and with the 1-5 Infantry Battalion, 25th Infantry Division, Schofield Barracks, Hawaii. Glidewell is a graduate of Ohio University, Athens, Ohio. He holds a master's degree in Quality Systems Management, from the National Graduate School. In addition, he has been awarded a Lean Six Sigma Green Belt and Black Belt and has mentored others in seeking efficiencies.



WE NEED YOU! COAST ARTILLERY CORPS U.S.A.

Resurrecting the Coast Artillery

By LTC (Ret.) Stephen L. Melton

The Chinese have ambitions in the western Pacific that we and our allies can no longer wish away. In the East China Sea, China claims the uninhabited Senkaku Islands, possessed by Japan since 1895, and has been sparring with elements of the Japanese Self Defense Forces in the area since 2011. In the latest escalation, in November 2013, the Peoples Republic of China proclaimed the islands as part of its “East China Sea Air Defense Identification Zone.” Jane Perlez, in a 2013 New York Times article, “Calls Grow in China to Press Claim for Okinawa” says: Chinese ‘hawks’ are even promulgating historical claims on the Ryukus, including Okinawa, in official publications. Further south, China claims virtually the entire South China Sea as its sovereign waters, despite the various counterclaims of Taiwan, the Philippines, Brunei, Malaysia, and Vietnam. China has maintained a constant military presence in the Spratleys since they attacked Vietnamese oil exploration and fishing vessels there in 2011. In 2012, the PRC established Sansha City in the Paracels, the first permanent settlement in the low-lying island group. That same year, ships from the PRC took de facto possession of the Scarborough Reef off the west coast of the Philippines, building a barrier across its entrance and turning away non-Chinese vessels. In between, China covets reunification with its ‘breakaway province’ of Taiwan and will attempt to retake the island by force if need be. Beyond these near-term goals, China seeks to be the pre-

mier military and maritime power in the Far East, eclipsing the role played by the United States since 1945.

The People’s Liberation Army Navy possesses some 500 or more ships, more than 400 aircraft, and some 290,000 personnel. Though not as capable as the larger and more technologically sophisticated U.S. Navy, the PLAN benefits from a focus and proximity that the U.S. Navy cannot match. Her naval platforms are mostly smaller surface ships—frigates, destroyers, and patrol craft—but include nuclear powered submarines and even an old Ukrainian aircraft carrier, rechristened the Liaoning. Chinese shipyards churn out more and better ships each year. The PLAN hopes to establish naval control of the seas out to the “First Island Chain” (Taiwan, Ryukus, Japan) by about 2020 and thereafter expand its patrol areas out to the “Second Island Chain,” meaning beyond the Philippines and into the Central Pacific, including Guam, somewhat later in the century.

As the PLAN gathers experience, its seamanship improves and its footprint grows. As Vice Admiral Robert L. Thomas, in a December 2013, CNN interview recently noted, “Two years ago it was a big deal if they [PLAN] were able to conduct an exercise in the Philippines Sea for a week, now it’s routine.” In “Xi’s War Drums,” Foreign Policy, May/June 2013 edition, by John Garret, Captain James Fanell, the U.S. Pacific Fleet’s top intelligence officer, states, “The PLAN is going to sea to learn how to do

naval warfare.” He assesses that the PLAN is expanding into “blue waters” explicitly to counter the U.S. Pacific Fleet. While most analysts judge that the People’s Liberation Army would lose a fight with the U.S. Pacific Command, or even the Japanese Self Defense Forces, if it were to happen now, it is clear that the long-term PLA goal is to force the U.S. Navy to withdraw from the western Pacific region, compelling the nations of East Asia, including Japan, to rely on Beijing for security and trade guarantees now supplied by Washington. The stakes for America and our Asian allies could not be larger.

The revolutionary Dong Feng (East Wind) anti-ship ballistic missile is a key component of the Chinese ‘anti-access/area-denial’ military strategy. Called the DF-21D ‘Carrier Killer’ by the American defense community, the missile is fired from land-based mobile launchers to targets far at sea. Entering service in 2009, the missile’s range is variably estimated at 850 to over a thousand nautical miles, and China is working to extend the warhead’s operational range, perhaps by using a larger rocket booster. Travelling at mach 10, the conventional warhead reaches its targets only minutes after launch. Using the new Chinese Bei Dou-2 regional global positioning system and terminal radar homing, perhaps even visual homing, the DF-21D ‘system’ is believed to be capable of finding and sinking U.S. ships in the contested waters. Ranges and accuracy will improve over time. Launched from a 22-wheeled,

truck-like, transport erector launcher, the DF-21D can be moved to and fired from a large number of pre-prepared launch pads. The 'carrier killer' emerges as an asymmetric weapon system that changes the rules of the game, what China terms an 'assassin's mace.' If the DF-21D makes operating in western Pacific waters too dangerous for large American vessels and their crews, the smaller PLAN vessels would enjoy a freedom of action they currently do not. The expensive U.S. combatant ships could be held at bay by comparatively cheap and numerous land-based anti-ship ballistic missiles.

The U.S. goal in the Far East is strategically defensive—we wish only to enforce international maritime law and preserve the freedoms of action across the diplomacy, information, military and economy that we and our allies currently enjoy. We hope our current policy of 'engagement' with China will beguile the PRC into accepting our post-1945 liberal order, preserving both the peace and our regional influence. However, a great number of U.S. policy makers are becoming less sanguine about the likelihood of avoiding military contests with China, especially in light of recent developments, and are instituting programs to counter potential Chinese aggression.

Currently, the U.S. armed forces are embarking on two initiatives to ensure continued U.S. access in the Far East. The first, air-sea battle, came into being in 2010, the year after the DF-21D entered service. As the U.S. Department of Defense's Quadrennial Defense Review stated: "The Air Force and Navy together are developing a new joint air-sea battle concept for defeating adversaries across the range of military operations, including adversaries equipped with sophisticated anti-access and area denial capabilities." The second initiative is the so-called 'Pacific Pivot,' which will result in a larger U.S. military concentration in the western Pacific.

The Navy is attempting to fulfill its air-sea battle and 'Pacific Pivot' responsibilities through the development of an anti-ballistic missile capability and an expanded shipbuilding program. In what might be considered an emergency effort, the Navy is adapting the RIM 161 Standard Missile 3 Block IIA anti-satellite missile to perform an ABM role. In experimental tests conducted during the past year, Ratheon's prototypes reportedly intercepted and destroyed an intermediate range ballistic missile warhead similar to that the DF-21D might possess. We can anticipate that China will attempt to develop work-

arounds—decoys, jamming, saturation, etc.—to overcome our new defensive weapon.

Otherwise, the Navy continues its emphasis on large-deck carriers and plans to spend a whopping \$42.5 billion on just three new Ford class aircraft carriers, the first due to enter service in 2018. With its 4.5 acre flight deck, the USS Gerald Ford now under construction provides the DF-21D an ample aim point. Unfortunately, the aircraft on the carriers have short ranges and slow speeds, a combat radius of 610 nautical miles for the F-35, less for the FA-18, and both fly at Mach 1 or less to achieve those ranges. Compared to the 900 nautical mile, Mach 10 DF-21D, the U.S. carriers are in a no-win situation if a shooting war developed in the seas the Chinese covet. The Navy's Tomahawk cruise missile, which can be launched from surface ships or submarines, has sufficient range—1500 nautical miles—to sink PLAN assets within the First Island Chain, but flies at less than Mach 1, creating another asymmetric advantage for China. Assuming the DF-21D works as advertised, the long range strike advantage will likely accrue to the Chinese despite the Navy's current air-sea battle efforts.

The U.S. Air Force, the other leg of the air-sea battle bipod, stations some 45,000 airmen and nearly 375 aircraft at its nine major airbases in the Pacific region. As part of its rebalance toward the Pacific, the air service is arguing for an \$81 billion fleet of 100 new-long range stealth bombers capable of delivering nuclear and conventional munitions. The Air Force is also testing concepts for hypersonic (Mach 5-20) 'Prompt Global Strike' vehicles capable of delivering precision munitions from the United States to targets across the Pacific in an hour or less. Meanwhile, current Pacific Air Force bases—runways, planes, infrastructure—are increasingly vulnerable to the Chinese theater ballistic missile threat and may be unusable in an upcoming war. Like the Navy, the Air Force's current systems—fighters, bombers, and cruise missiles—are plagued by short range, relative slowness, and/or vulnerable launch platforms, relative to the PLA ballistic missile threats they face.

The U.S. Army has been a bit player in air-sea battle, as the name and the 2010 QDR suggest. One senior U.S. Army Pacific officer recently commented that the Army is inadequately involved in air-sea battle, but conceded that the environment is air, sea, cyber, and space centric, meaning outside the Army's bailiwick. The Army may be rethinking its position. In 2013 the RAND Corpo-

ration produced two reports for the Army, the first outlining how current Army systems, mainly Air Defense systems, could augment existing Air Force and Navy capabilities. The second study discusses buying and deploying batteries of foreign-made, shore-based, short-range, anti-ship missiles to threaten PLAN ships in close proximity of allied Pacific nations. While both studies are laudable, the Army must do far more.

This paper argues that the U.S. Army should answer the DF-21D threat with equivalent anti-ship, mobile, intermediate-range ballistic missiles that can destroy PLAN ships in their home waters and ports and, perhaps, execute counter-fire missions against DF-21D infrastructure on shore. The system should be deployed as soon as possible, before China gains more confidence in the DF-21D and certainly before 2020, when the PLAN will have become a much more formidable force capable of seizing the contested areas by coup de main. Because of the brief window of opportunity, the Army IRBM system should use existing technology that can be upgraded as time and technology permit. The best initial candidate would most likely be a system I will call the Pershing III, an upgrade of the 1980s Pershing II missile re-engineered for anti-ship warfare. The Pershing II was a Mach 9 missile that could deliver an 880-pound warhead out to ranges of 1770 kilometers within minutes. Fired from a mobile TEL, similar in concept to that of the DF-21D, the Pershing II launched inertial-guided, radar homing warheads that achieved a 30-meter circular error probable, even before the advent of GPS and modern precision guidance technologies. One could easily envision a Pershing III system that could strike a ship out to nearly 1000 nautical miles with a high probability of kill. If the SM3 Block II can be made to hit a tiny projectile traveling at mach 10, the Pershing III warhead equipped with modern homing technologies could strike a much larger PLAN ship steaming at a mere 30 knots. The Pershing III warhead would conceivably be fifty percent larger than those carried by the Navy's current anti-ship missiles.

Three Pacific Command Pershing III brigades, stationed on the Philippine island of Luzon, Okinawa, and the Japanese home island Kyushu, could range and sink PLAN vessels throughout the South China, East China, and Yellow Seas all the way China's coast, including the Taiwan Strait. By holding the PLAN at risk in the disputed sea areas, and even in most of its home ports and

coastal waters, the Pershing III would end the asymmetric threat the DF-21D poses. If the Chinese military believes it can quickly sink our ships with land-based missiles, the PLA must also recognize that we can sink theirs just as easily. Either the waters of the Far East are safe for all navies or for none. Our message would be clear: China must respect the freedom of the seas for all users, and territorial and resource disputes must be resolved by diplomacy, not China's unilateral military action.

While the proposal may catch some readers off guard, the Army role in naval warfare and theater ballistic missiles is firmly established in history. Coastal fortification and anti-ship artillery was an Army mission from the founding of the Republic through the end of WWII. Only the advent of overwhelming U.S. sea and air supremacy post-1945—a condition that is eroding rapidly in East Asia—made the Army's Coast Artillery Corps redundant.

The Army also developed America's first large ballistic missile, the liquid-fuel Redstone, which was fielded to U.S. Army artillery units in Germany in the late 1950s. The Redstone was the first U.S. missile to carry a nuclear warhead and, in 1961, was modified to launch Alan Shepard into space. In the mid-1960s, the Army deployed the solid-fuel Pershing I missile, which was replaced by the new Pershing II in the 1980s. Both systems were nuclear tipped and fired from mobile TELs. The Army's 5,000-soldier 'Pershing Brigade' in Germany commanded three firing battalions with 108 missiles and launchers, a battalion of infantry as guards, plus support and mission command units. However, the Pershing unit and its IRBM capabilities are now faded memories in today's Army. The brigade was deactivated and all its missiles destroyed as a result of the 1988 Intermediate-Range Nuclear Forces Treaty, which also required the destruction of the Soviet SS-20, their equivalent theater ballistic missile.

The INF treaty overshadows any proposal for the U.S. to deploy a system similar to the DF-21D. With the U.S. and the U.S.S.R. the only two signatories, the treaty bans nuclear and conventionally armed ground-launched ballistic and cruise missiles with intermediate ranges, defined as being between 500 and 5,500 km. China is not a signatory and has continued to develop and deploy a variety of IRBMs, including the DF-21D 'Carrier Killer.' In a Jan. 2, 2011, Washington Post article, Mark Stokes and Dan Blumenthal, "Can the Treaty Contain China's Missiles?"

state: To develop the Pershing III, the U.S. would have to notify the Russians of our intent to leave the treaty. The Russians may or may not object. They have themselves threatened to leave the treaty if the U.S. deploys ABM systems. They too are alarmed at the asymmetric advantage China gains by the treaty. According to a New York Times article, "U.S. Says Russia Tested Missile, Despite Treaty," by Michael R. Gordon asserts that the Russians are already circumventing—if not outright violating—the treaty with their own development of the RS-26 ballistic missile and their recent testing of a new ground launched cruise missile. In any event, the Russians would see from the stationing that Pershing III poses no threat to Russia.

The Chinese will be outraged by the Pershing III deployment, just as the Soviets were when we deployed Pershing IIs to Europe as one answer to their SS-20. First of all, we must recognize that China is not prepared for war with the United States at this time and is unlikely to initiate war over our deployment of a class of missiles that they themselves deploy. Secondly, the U.S. should assure the Chinese that the missiles are conventionally armed. Nuclear tipped IRBMs would be unacceptably threatening to China, just as Soviet nuclear missiles in Cuba were unacceptable to us in 1962. We should offer the Chinese an agreement under which they could inspect the Patriot IIIs in return for some corresponding U.S. inspection of Chinese IRBMs. Last of all, we should offer a theater ballistic missile 'no first use' treaty with China, where both sides pledge not to launch unless the other side first initiates kinetic acts of war. If we can allay their fears and build military transparency, we may eventually be able to negotiate more comprehensive treaties that promote long-term peace.

U.S. diplomats will also have to convince Japan and the Philippines to host the new Pershing III brigades in the face of Chinese threats and propaganda, similar to that accompanying our 1980s Pershing II fielding. However, both of these countries are the targets of China's expansionary actions and their armed forces are ever more harassed and threatened by China's military action. Both nations are looking to the U.S. for security guarantees, and there is none firmer than the stationing of U.S. ground forces in the path of the potential aggressor. It is highly unlikely that either nation would deny our request.

The most difficult problem of persuasion might be within America's own defense community. As noted above, air-sea battle

and the 'Pacific Pivot' underpin Air Force and Navy rationales for very expensive weapons programs that have garnered the support of large and powerful Congressional constituencies. Both services would be loathed to admit that a relatively inexpensive Army ballistic missile would be a better, or even complementary, answer to the Chinese DF-21D. Joining the naysayers in the joint chorus, the Army 'maneuverists' will likely realize that the new Pershing III brigades may be 'paid for' with dollars that would otherwise fund brigade combat teams and their modernization. Existing active component Fires brigades are already earmarked as one of the biggest losers in the drawdown. 'Buying back' these brigades to convert to Pershing III units will be politically difficult, as will be finding the dollars for a resurrected Pershing system. Bureaucratic objections and roadblocks could delay for years any U.S. anti-ship ballistic missile program and hand the near-term initiative in the Far East to China.

Whether we like it or not, the days of space-enabled persistent intelligence and long-range precision strike are forever changing the way we must think about war at sea. No longer will navies be able to hide in the ocean's vast expanses. Satellites and other sensors can provide us and our most sophisticated military competitor's near-complete, real-time positions on all ships at sea in areas of interest. Precision strike from shore makes all ships constantly vulnerable within the ever increasing ranges of the shore-based weapons. Indeed, in the near future all the navies of the world will operate wholly dependent on the forbearance and sufferance of land-based anti-ship ballistic missiles. Just as the long-ranged airplane made the big gun battleship obsolete seventy-five years ago, now a new cluster of technologies undermines the utility of our Navy's current inventory of capital ships and its legacy notions of battle at sea. The Army must step forward and claim its crucial role in maintaining our nation's freedom of the seas.

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Soldiers from Headquarters and Headquarters Troop, 2nd Squadron, 1st Cavalry, man a Fires observation post. (Photo courtesy of CPT Rod O'Connor)



Fires and Effects Retrograde Operations

By CPT Rod O'Connor

In support of forward operating base retrograde operations, elements of 2nd Squadron, 1st Cavalry Regiment, *Blackhawks*, 4th Stryker Brigade Combat Team, 2nd Infantry Division, and 2nd Platoon, A Battery, 1st Battalion, 41st Field Artillery, incorporated Fires and effects assets to shape and restrict the enemy's operational environment.

Operation Sage Abi (Sea Dog), a coalition led mission, was planned and executed to retrograde U.S. service members and equipment from a remote outpost in the Naw Bahar district of Zabul province, Afghanistan. Village stability program Naw Bahar was used

by coalition forces to train, equip, and advise Afghan local police in the district. In support of Operation Enduring Freedom force reduction, VSP Naw Bahar was chosen for closure and handover to the Afghan National Army. In order to retrograde coalition equipment and personnel, 2-1 CAV, in conjunction with elements of the 3rd Brigade Support Battalion, established and held a route for coalition vehicles to travel. The Fires effects coordination cell for this operation, which consisted of the Task Force 2-1 SQDN fire support officer, SQDN assistant FSO, SQDN fire support noncommissioned officer, SQDN assistant FSNCO, SQDN electronic warfare officer, SQDN joint





Local national and U.S. cargo trucks moving in preparation to retrograde U.S. equipment and personnel. (Photo courtesy of CPT Rod O'Connor)

terminal air controller, and 1st Armored Brigade Combat Team, 3rd Infantry Division brigade fire support noncommissioned officer, utilized an extensive intelligence preparation, of the battlefield, to create a holistic Fires and effects plan.

The commander's intent for Fires, provided by LTC Charles Lombardo, 2-1 CAV SQDN commander, was to shape and disrupt the enemy's OE by utilizing every fire support asset available to the squadron in order to maintain accurate computational data and provide additional space and time to allow coalition forces to retrograde safely while limiting the enemy's ability to effect the retrograde.

Our plan consisted of two main focuses. The first focus was the creation of a robust test fire and registration packet of every indirect fire asset available (60 mm, 120 mm mortars, and 155 mm M777 howitzers), which covered the depth of the operation. The pre-approval of registration and calibration Fires allowed 2-1 CAV to maintain the accuracy and computational data of all indirect fire weapon systems, at every range.

A secondary effect of deliberately registering unit indirect fire weapon systems was that it greatly deterred and disrupted enemy movement in the operational environment. The enemy does not always know a unit is solely registering weapon systems and may often confuse it as a lethal effect. The use of Fires causes the enemy leadership to reevaluate their decision-making process and question who, if any, fellow insurgents are currently under coalition indirect Fires. It has an emboldening effect on our Afghan National Security Force partners, who view our indirect fire systems as a key enabler to their operations.

Every target grid was tied to specified named areas of interest where analysis had shown enemy activity. The collating of NAI and target observation allowed the cavalry scouts and forward observers to focus their observation while providing effects and security throughout their assigned sectors.

The indirect Fires plan was tailored to support Operation Sage Abi during the three most important phases of the operation. An essential element key to the initiation of any pre-planned Fires is the

necessity to establish one hour of pattern of life analysis, collateral damage estimate verification, and appropriate air clearance procedures before firing. During the first phase (infil), subordinate units initiated targets, in the vicinity of their limit of advance, with their organic mortar systems and/or M777's after establishing the required POL analysis. The initiation of these targets exercised our indirect fire systems but also discouraged enemy movement along the friendly axis of advance. This additional space and time provided increased freedom of maneuver to subsequent units and their local-national truck driver counterparts in their movement towards the objective. Upon reaching their assigned platoon sectors, each platoon established a guard with redundant observation posts. Platoon OP's were carefully chosen so they had optimal visibility and observation of platoon NAI's and assigned targets.

During the second phase (upload of coalition equipment), our subordinate units periodically initiated targets, in their assigned sectors of responsibility, in order to maintain the accuracy of their IDF systems. The larger effect of IDF systems being utilized in the operational environment during phase two was that it extended the reach and effect of platoon observation and also minimized the enemy's willingness to re-seed the route with improvised explosive devices during the hours of darkness.

The third and most critical phase (exfil), required the echelonment of unit IDF systems as platoons withdrew from their positions and in conjunction with the retrograding convoy. Platoons were provided with strict guidance to maintain appropriate surface danger zones and POL to ensure the elimination of any friendly or civilian injuries. Once given the warning that the retrograde convoy was prepared to depart the objective, each platoon was responsible for initiating their respective M777 registration target with the coordination of the SQDN FSO. Once complete, the platoons ceased their M777 targets and initiated their organic mortar targets. As the retrograde convoy passed each platoon position, units test fired their 60 mm mortars in direct fire mode within the limits of SDZ before withdrawing and joining the retrograding convoy. With each platoon completing these



CPT Rod O'Connor, squadron fire support officer for Headquarters and Headquarters Troop, 2nd Squadron, 1st Cavalry, and SGT James Hubert, fire support NCO, conduct CCA and SUAV air space deconfliction. (Photo courtesy of CPT Rod O'Connor)

fire support tasks along the entire route, 2-1 CAV left enemy forces, in the area, with little opportunity to engage a relatively slow moving and easily targetable retrograde convoy as it moved through a historically IED laden area.

Due to the time necessary to gain pre-approval, Fires planning must be detailed and observation positions must be picked carefully, in order to ensure they nest with the overall ground scheme of maneuver. If the observer cannot see the target from his location, he must either move to gain observation, or not fire the mission. The SQDN utilized its entire suite of indirect Fires capabilities to include 60 mm and 120 mm mortars, and M777 howitzers.

The second focus was the integration and deconfliction of aerial assets, specifically electronic warfare, into the SQDN fire support plan. We wanted to exercise lessons learned in the schoolhouse by all fire supporters and JTACs, that aerial asset deconfliction and active battalion or squadron level FECC management is more than just a doctrinal idea, but with good communication and proactive effort, a reality.

Throughout the operation, EW platforms conditioned and shaped the battlefield and disrupted enemy mission command abilities. The decision to bring the SQDN EWO on the operation proved to be extremely helpful in three important ways. First, he provided real-time operational guidance and control over EW assets in support of the operation.

Second, he was able to disseminate information and collections to the SQDN FSO and command immediately. Lastly, he was able to gain FM communications with EW aircraft and provide efficient air space and asset deconfliction.

We have made it a SQDN effort to overcome the historic complications of utilizing multiple Fires and effects platforms and the integration and associated deconfliction concerns. By integrating these assets, we have maximized our limited combat power and enhanced our real-time information gathering and operational reach. In the expected and increasingly restrictive Fires and effects climate of a slowing combat mission and transition period, it is still possible to integrate and use fire support systems to compliment retrograde operations, minimize risk of equipment and personnel loss, and maximize combat power. With the integration of the EWO, FSO, and JTAC, the squadron was able to incorporate and deconflict close combat attack, close air support, EW, intelligence surveillance and reconnaissance, small unmanned aerial vehicle, FA, and mortar missions simultaneously.

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Soldiers from the 1st Battalion, 7th Air Defense Artillery Regiment manning the Engagement Operations Center inside the Integrated Collaborative Environment. (Photo courtesy of COL Rob Rasch, LTC Rob Sleasman and MAJ Jason Carney)

Demonstrating the Future of Air and Missile Defense

By COL Rob Rasch, LTC Rob Sleasman and MAJ Jason Carney

Change is coming to the Army Air Defense Artillery... change in how our Air Defense forces train, organize, deploy and fight. The catalyst for this change is the Army Integrated Air and Missile Defense program and the IAMD Battle Command System that will be fielded across all Army Air Defense echelons. From Air Defense Airspace Management cells to Army Air and Missile Defense Command headquarters and from integrated fire protection capability platoons to Patriot battalions, the IBCS engagement operation center will standardize mission command capability across Army Air and Missile Defense. This standardized mission command includes both engagement operations and force operations capabilities incorporating all elements of ADA capability and will include ties to joint level Air Defense information not routinely available with our current Air Defense systems. It integrates sensors, weapons, and a common mission command capability across a single, Integrated Fire Control Network providing a high-fidelity single integrated air picture for

the Army and is the Army contribution to joint IAMD capabilities.

The system offers commanders the ability to battle manage across all sensors and shooters through the IFCN, eliminating single points of failure and to scale and tailor their force packages. Advanced collaborative tools enable positive mission command of Air and Missile Defense assets across enlarged areas of operation. The composite / integrated and distributed air picture afforded by IBCS significantly improves combat identification and fratricide reduction on the battlefield by providing commanders improved situational awareness and situational understanding. The ability to use all sensors and launchers on the network enables commanders to defend a larger area against a full spectrum of threats. These threats include cruise missiles, ballistic missiles, unmanned aerial vehicles, and large caliber rockets – with greater flexibility to tailor weapon-to-target pairings.

The concepts behind AIAMD and IBCS have existed for many years. Even prior to Operation Iraqi Freedom, limitations to

the current systems based AMD approach were recognized. The fratricide incidents during OIF I and the resulting 2005 Defense Science Board Task Force findings drove the point home, eventually providing the impetus behind the AIAMD requirements and its establishment as an Army 'program of record' in 2009. When fielded in 2017, IBCS will integrate Patriot radars and launchers, Sentinel radars, and potentially Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System components to support engagement of AMD threats. Each sensor and weapon platform will have a 'plug and fight' interface module which supplies distributed battle management functionality to enable network-centric operations on a high bandwidth, low latency Warfighter Information Network - Tactical sub-network. The plug and fight architecture will also facilitate integration of future AMD capabilities.

Given the complexity associated with the design, development, and test work needed to achieve the integrated AMD capability, the program schedule extends from project office establishment in 2009 to initial opera-

tional capability in early 2017. After engineering and design work, the AIAMD program begins formal testing in FY14, continuing through developmental testing and operational testing for the next three years.

The combination of the capability's importance, the unprecedented integration of AMD command and control systems, and the lengthy program timeline was a concern not lost on program executive officer missiles and space leadership. To mitigate this, the PEO MS directed the program to conduct a formal demonstration which would provide the user community an early look at evolving IBCS capabilities, validate the program path, and provide risk mitigation to the overall AIAMD acquisition program. The resulting demonstration was a team effort amongst several contributing project offices at PEO MS and was based primarily around five Training and Doctrine Command Capability Manager Army Air and Missile Defense Command defined objectives and two PEO MS defined objectives.

Initial planning for the IAMD demonstration began shortly after the PEO's direction and was focused on aligning what would be technically possible in the 2013 timeframe with what would be worthy to demonstrate. Although objective quantities and descriptions fluctuated over time, they stayed within seven basic areas:

- Perform Integrated Defense Design from within an AIAMD battalion EOC
- Utilize a Common Warfighter Machine Interface within an AIAMD battalion EOC
- Bi-directional Link-16 interoperability via 3011C (Joint Range Extension Applications Protocol) at an enhanced update rate
- Viable use of Secure Internet Protocol Router/ Non-Secure Internet Protocol Router Access Point (SNAP) satellite terminal / Tropospheric Scatter Radio Terminal within an AIAMD battalion to extend IFCN beyond line of sight
- Utilize Sentinel radar data over an IFCN within an AMD battalion
- Extension of integrated Air Defense operations capability to brigade combat team/forward operating bases
- Demonstrate Initial Integration of battery command post/tactical command system replacement capability

Ultimately, the IAMD project office of the PEO MS conducted a IAMD demonstration on Redstone Arsenal, Ala., from Oct. 2 to Nov. 6, 2013.

Additional risk mitigation benefits of the demonstration from an integration and test

planning perspective cannot be understated. In the program's developmental test program beginning this year, the IBCS system will be used in conjunction with existing AMD equipment in actual flight tests at the range. The lessons learned by the AIAMD test team while coordinating and leading the IAMD demonstration provide a level of experience across the government and contractor team that will make the flight test process somewhat easier. To maximize staff planning and learning opportunities, location selection for the IAMD demonstration included areas the program planned to use in its test program such as White Sands Missile Range, N.M., and McGregor Range Complex, Fort Bliss, Texas. This provided the invaluable opportunity to fully exercise an end-to-end process ranging from delivery to the government of contractor developed major end items, through lab integration and pre-mission testing, and then to range delivery, setup, checkout, execution, and redeployment. Lessons learned from the technical integration period leading up to the demonstration are already implemented in the integration plans moving forward leading into the next phase of testing.

The IAMD demonstration defense design included several current force and developmental systems task organized as an ADA brigade headquarters, an AMD task force, and aBCT. AMD TF assets included an IBCS battalion EOC, an IBCS battery EOC, two Patriot radars, an information coordination central, two engagement control stations, two Sentinel radars with IFCN connectivity through IBCS IFCN relays, and two SNAP/TROPO terminals. The BCT assets included an ADAM cell modified for integration into the IBCS architecture via the IFCN, one Sentinel radar, and a Multifunction Radio Frequency Radar System radar. This enables the sharing of sensor data between the sensors organic to the IBCS architecture and those tied into ADAM BCTs. ADA brigade functionality was achieved through SNAP connectivity and live scenario stimulation. Forces Command Soldier support provided manning for the battalion and battery EOC fire control elements and the ADAM cell.

Although significant planning and coordination had occurred and momentum was building, fact of life funding constraints in spring 2013 required a location change to Redstone Arsenal. The locations used for emplacement included the IAMD Government Systems Integration Lab, Aviation & Missile Research, Development, and Engineering Center Radar Operations Facility,

Weeden Mountain Relay site and Redstone Test Center, training areas three and five. The equipment used at the IAMD GSIL included a battalion EOC, IFCN relay, and an IAMD ADAM cell with a Sentinel radar located just adjacent to the GSIL in training area three. There was a Sentinel radar and a battery EOC located at the AMRDEC ROF, a Highband Network Radio relay located at an elevated relay site (Weeden Mountain) and another Sentinel with an IFCN relay emplaced at the southern end of Redstone Arsenal in training area five. Also, the Flight Mission Simulator/Digital at the Patriot software test facility provided the Patriot radar capability, ensuring no operational differences from previous defense designs.

The IAMD demonstration consisted of five phases to be conducted from Oct. 2 to Nov. 6, 2013. Phase one - training phase - ensured that the Soldiers understood the concept of the operation and how to use the system and was conducted in parallel with phase two. Key tasks for phase one included; rehearsals, checks on learning, scenario development, and practical exercises.

Phase two was the system integration and check-out phase. This phase ensured that phase three (live) and four (simulation) configurations were in working order. SICO allowed system engineers to test system configurations and ensure hardware and software were in proper working order which also reduced risk in the following phases. Key to the success of the SICO phase was insuring that the three Sentinel radars being used in the demonstration were integrated into the architecture and passing live tracks into the network. This transmission of Sentinel measurement data over the IFCN was a key integration aspect of the demonstration as well as a major objective for the event. Two of the Sentinel radars were adapted to provide measurement data directly onto the IFCN network and one was a legacy system which passed track data onto the network through the IAMD ADAM cell.

Phase three focused on the demonstration objectives in a live air object environment with Soldier participation. This phase was accomplished by utilizing tactical systems, sensors and instrumented air objects which included the Puma and Outlaw Unmanned Aerial Vehicles as well as the Velocity manned aircraft. Phase three also afforded the opportunity to demonstrate the IDD prototype. The IDD integrates the planning capabilities of multiple air and missile defense systems. It is fully integrated in the CWMI, designed with input from air

and missile defense experts and current Warfighters. IDD provides a more intuitive experience than legacy planners with easy to use drag and drop interactions to build threat sets and task force structures.

Phase four of the demonstration shifted from the use of live targets to a simulated air object environment and allowed Soldiers to exercise tactics, techniques and procedures against threat targets. The TTPs originated from the training Soldiers received in phase one and recommendations generated from the crews. The principal difference from phase three was the ability to demonstrate IAMD objectives with Patriot provided targets and the introduction of threat scenarios via simulation drivers. Phase four took place from within the Software Engineering Directorate / ROF network utilizing tactical systems with a Flight Mission Simulator - Digital, Sentinel Simulation, and Counter Rocket, Artillery and Mortar Distributed System of Systems Simulation support.

Phase five focused on the IAMD joint analysis team's ongoing collection, reduction and analysis of data. Data was collected throughout the demonstration and resulted in a final report that documented the accomplishment of all demonstration objectives in December 2013.

At the conclusion of the demonstration and successful completion of all objectives, there were key observations and lessons learned gathered in the areas of planning and execution, training of project office personnel and allowing Soldier feedback to be seen firsthand by the Soldiers. Demonstration planning and execution was managed by creating an integrated product team composed of subject matter experts from multiple functional areas. Regular participation from these SME's early in the planning phase was critical to identifying potential issues and risks and mitigating those risks in a timely fashion.

Establishment of the cross-functional team of SME's early in the demonstration planning cycle was critical to the overall success of the mission. The lessons learned

through planning and executing the demonstration allowed project manager IAMD to better prepare for upcoming formal testing.

Also, leading up to the demonstration, it became apparent to the leadership that in order cut down on risk to operations and prepare for formal testing, project office personnel had to be trained on how to operate the IBCS hardware and software. By allowing time for formal instruction on IBCS operations by the prime contractor, PM IAMD was able to reduce the amount of contractor personnel needed to operate the system. This lesson learned allowed the contractor to free up more personnel to work on other areas of the demonstration and also gave project office personnel the opportunity to learn the system and prepare them to focus on creating processes that will be used during the formal testing phase starting in early 2014.

In preparation for the demonstration, Soldiers participated in a two-week early training session during August. During the course of this early train up period, the Soldiers made several comments and observations to enhance the system. After the official start of the demonstration, the Soldiers were able to see firsthand that their comments had already been incorporated into the IBCS. By incorporating their comments quickly into the IBCS the Soldiers could see that their input and observations were important to the success of the system and were a crucial part to improving the system.

The 2013 AIAMD demonstration provided an early look at emerging IBCS capabilities. It allowed the IAMD program to mitigate program risk by exercising procedures that will be used during upcoming formal system testing, provided a 'snap shot' of developmental efforts, demonstrated emerging capabilities through user-defined objectives while mitigating program risk, exercised formal system testing procedures and afforded the opportunity for the IAMD Project Office to receive Soldier feedback on IBCS hardware, software, and operating procedures early in the development cycle.

The demonstration showcased the current

integration efforts of hardware and software such as the IBCS engagement operations center and IFCN relay; the Sentinel radar; the ADAM cell and Ku-Band Multi-Function Radio Frequency System radar; and the Patriot Engagement Control Station and Information Coordination Central. The demonstration provided an initial look at current developmental efforts focused on achieving a common, network-centric Air And Missile Defense mission command capability, increased integrated defense effectiveness, and reduced mission command footprint. Feedback from the Soldiers operating the system was overwhelmingly positive, and they seemed ready to embrace the future of Air Defense Mission command - a future with Integrated AMD.

Colonel Rob Rasch is currently the project manager for the AIAMD program at Redstone Arsenal under the PEO MS. His previous acquisition assignments include Product Manager One-Semi Automated Forces, director for Joint and Coalition Simulation Systems and worked as the assistant product manager for the Defense Advanced Research Projects Agency Future Combat Systems Command and Control program. Prior to Acquisition, Rasch served as an infantry officer with operational assignments at Fort Bragg, N.C., Fort Benning, Ga., and Iraq.

Lieutenant Colonel Rob Sleasman is currently assigned to the Missile Defense Agency's Terminal High Altitude Area Defense Project Office in Huntsville, Ala., as a product director for Training Aids, Devices, Simulations, and Simulators. His previous acquisition assignments include assistant project manager for LAMD Integration, serving as the LAMD demonstration Integrated Product Team chairman; assistant product manager for the IBCS EOC, and assistant TRADOC Capabilities Manager at the Fires Center of Excellence, Fort Sill, Okla., supporting development and testing of Field Artillery systems. Commissioned as a second lieutenant in the Field Artillery in 1997, his operational assignments included duties at Fort Sill, Fort Lewis, Wash., Fort Bragg, and Iraq.

Major Jason Carney is currently assigned to the PEO MS LAMD Project Office in Huntsville, as assistant product manager for integration. His previous acquisition assignments include assistant product manager for Guided Multiple Launch Rocket System Alternative Warhead and LAMD demonstration Integrated Product Team chairman. Carney was commissioned as a second lieutenant in military intelligence and branch detailed armor in 2001. His operational assignments included duties at Fort Lewis, Fort Riley, Kan., Wiesbaden Germany and Iraq.

Acronyms

AAMDC - Army Air and Missile Defense Command
ABM - anti-ballistic missile
AD - Armored Division
ADA - Air Defense Artillery
ADAM - Air Defense Airspace Management
ADLT - Air Defense Liaison Teams
ADS - All Digital Simulations'

AFATDS - Advanced Field Artillery Tactical Data System
AIAMD - Army Integrated Air and Missile Defense
ALP - Afghan local police
AMD - Air and Missile Defense
AMRDEC - Aviation & Missile Research, Development, and Engineering Center
ANA - Afghan National Army

ANSF - Afghan National Security Force
AO - area of operation
AOF - azimuth of fire
AOR - area of responsibility
ARF - aerial response force
ARCENT - Army Central Command
ASCC - Army Service Component Command
AWT - air weapons team

Acronyms, cont.

BCD - Battlefield Coordination Detachment	HE - high explosive	PFED - Pocket-sized Forward Entry Device
BCT - brigade combat teams	HIMARS - High Mobility Artillery Rocket System	PGM - precision guided munition
BDA - battle damage assessment	HMMWV - High Mobility Multipurpose Wheeled Vehicle	PL - platoon leader
BOLC - Basic Officers Leadership Course	HQ - Headquarters	PLA - People's Liberation Army
BSO - battle space owner	IBCS - IAMD Battle Command System	PLAN - People's Liberation Army Navy
C2 - command and control	ICC - information coordination central	PM - project manager
CAB - combat aviation brigade	IDD - Integrated Defense Design	PM SWAR - Project Manager Soldier Warrior
CAV - Cavalry	IDF - indirect fire	POL - pattern of life
CBRN - chemical, biological, radiological, and nuclear	IDF - Israeli Defense Forces	POO - point of origin
CCL - combat configured loads based	IED - improvised explosive devices	PRC - Peoples Republic of China
CDE - collateral damage estimate	Ifcn - integrated fire control network	PTDO - prepare to deploy order
CDS3 - Distributed System of Systems Simulation	INF - Intermediate-Range Nuclear Forces	QDR - Quadrennial Defense Review
CE - critical events	IO - information operation	RAF - radio access facilities
CENTCOM - Central Command	IP - internet protocol	RAF - requirements for accurate fire
CEP - Circular Error Probable	IRBM - intermediate-range ballistic missiles	RAG - red, amber, green
CFACC - Combined Forces Air Component Command	ISR - intelligence, surveillance and reconnaissance	RC-E - Regional Command- East
CFC - Combined Forces Command	JASDF - Japan Air Self-Defense Force	RC-S - Regional Command - South
CFF - call-for-fire	JLENS - Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System	RCT - regimental combat team
C-IDF - counter-IDF	JNN - joint network node	ROF - radar operations facility
COA - course of action	JREAP - Joint Range Extension Applications Protocol	ROZ - restricted operations zones
COB - center of battery	JRTC - Joint Readiness Training Center	RTO - radio telephone operators
COP - combat outposts	JTAC - joint terminal air controller	SCP - survey control points
CP - command post	KTO - Korean Theater of Operation	SDZ - surface danger zone
CPN - command post node	LFX - live-fire exercise	SFAT - security force assistance team
C-RAM - Counter Rocket, Artillery and Mortar	LoE - line of effort	SICO - System Integration and Check-Out
CWMI - Common Warfighter Machine Interface	MC - mission command	SIGACTS - significant activities
D3A - decide, detect, deliver, and assess	MCDP - Marine Corps Doctrinal Publication	SIPR - secure internet protocol router
DA - decisive action	METL - mission essential task list	SME - subject matter experts
DATE - decisive action training environment	MFT - MUOS functional transmitter/receiver terminals	SNAP - subnetwork access protocol
DCG-O - deputy commanding general for operations	MG - master gunner	SNAP/TROPO - Secure Internet Protocol Router/ Non-Secure Internet Protocol Router Access
DFCS - digital fire control	MHFA - Mobile Handheld Forward Entry Application	PST/TSRT - Point Satellite Terminal/ Tropospheric Scatter Radio Terminal
DISN - Defense Information Systems Network	MILSATCOM - military satellite communications	SOP - standard operating procedures
DP - decisive points	MLCOA - most likely course of action	SQDN - squadron
DPICM - dual-purpose improved conventional munitions	MLRS - Multiple Launch Rocket Systems	STRAC - standards in training commission
DS - direct support	MOE - measures of effectiveness	TA - target acquisition
DSST - Digital Systems Sustainment Training	MOP - measures of performance	TAC - tactical air command
ECS - engagement control stations	MOS - military occupation specialty	TAI - targeted areas of interest
EDRE - emergency deployment readiness exercises	MPI - mean points of impact	TAIS - tactical airspace integration system
EFC - equivalent full charge	MRE - mission readiness exercise	TCM - TRADOC Capabilities Manager
EOC - engagement operation center	MRFRS - Multifunction Radio Frequency Radar System	TCM AAMDC - Training and Doctrine Command Capability Manager Army Air and Missile Defense Command
EW - electronic warfare	MTF - manual terrain following	TEL - transport erector launcher
EWO - electronic warfare officer	MTOE - Modified Table of Organization and Equipment	TF - task force
ExCIS FSA - Extensible C4I instrumentation Suite - Fire Support Application	MUOS - Mobile User Objective System	THAAD - Terminal High Altitude Area Defense
FA - Field Artillery	MVV - muzzle velocity variation	TI - tactical internet
FAR - Field Artillery Regiment	NAI - named areas of interest	TI - Time
FASCAM - family of scatterable minefield	NCO - noncommissioned officers	TIC - troops in contact
FCOE - Fires Center of Excellence	NET - new equipment training	TLDHS - Target Location, Designation and Hand-off System
FDC - fire direction centers	NIPR - non-secure internet protocol router	TLE - target location error
FDNCO - fire direction noncommissioned officer	NSN - national stock number	TOC - tactical operations center
FDO - fire direction officer	NTC - National Training Center	TOEL - time ordered events list
FECC - Fires and effects coordination cell	OC/T - observer controller/trainer	TRADOC - Training and Doctrine Command
FECC - Fires effect coordination cell	OCS - Officer Candidate School	TTP - tactics, techniques and procedures
FFA - force Field Artillery	OE - operating environment	UBL - unit basic load
FiB - Fires Brigade	OEF - Operation Enduring Freedom	UHF - ultra-high frequency
FMS - foreign military sale	OIC - officer in charge	UN - United Nations
FMS/D - Flight Mission Simulator/Digital	OIF - Operation Iraqi Freedom	UNIFIL - United Nations Interim Force in Lebanon
FO - forward observer	OP - observation posts	USARPAC - U.S. Army Pacific
FOB - forward operating base	OSC-I - Office of Security Cooperation Iraq	VSP - village stability program
FSCC - fire support coordination center	OVS - orthogonal variable spreading	VT - variable time
FSE - Fire support element	OVSF - orthogonal variable spreading factor	WB - white-bag
FSNCO - fire support noncommissioned officer	PACOM - Pacific Command	WCDMA - wideband code-division multiple access
FSO - fire support officer	PD - point detonating	WGS - wideband global SATCOM
FTD - Fires Test Directorate	PDFCS - Paladin Digital Fire Control System	XO - executive officer
FY - Fiscal Year	PDM - product manager	
GFT - graphical firing table	PE - probable error	
GMLRS - Guided Multiple Launch Rocket System	PEO C3T - Program Executive Office for Command, Control, Communications-Tactical	
GPS - global positioning system	PEO MS - program executive officer missile and space	
GSIL - Government Systems Integration Lab		
GTL - gun-target-line		

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Field Artilleryman PVT Darrell Futrell, A Battery, 2nd Battalion, 150th Field Artillery Regiment, headquartered in Greencastle, Ind., lifts a 155 mm round, weighing roughly 100 lbs., to be fired from a M777 howitzer at Camp Atterbury Joint Maneuver Training Center in central Indiana, Nov. 4. Futrell and his Indiana National Guard unit fired the M777 together for the first time since the equipment was issued to the Indiana Guard and fielded. (Photo by SGT John Crosby, U.S. Army)

PIN 103906-000