Fires

Intelligent warfare

Drones can kill, but the information they gather can be even deadlier

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Fires

RUSSIA: A CASUALTY ADVERSE ARMY

By retired Lt. Col. John K. Foley

A Soviet gun crew in action at Odessa in 1941. (John Erickson/Wikicommons)

During the Cold War, the U.S. Army trained to oppose the hordes of the Soviet Red Army. The U.S. and NATO expected to engage in combat against advancing echelons of tanks and infantry swarming across the Fulda Gap, supported by mass artillery fire. However, following the collapse of the Soviet Union in the 1990s and difficulty fighting the Chechens, Russian military strategists were forced to creatively overcome their military disadvantages.

Our image of Russian forces has radically changed since now they became a casualty-adverse army. This is largely due to demographic, social and technological changes in Russia. It's also the driving force behind Russia's transition to a volunteer Army.

For the last few decades, Russia has experienced a demographic decline. The combination of low birth rate and high mortality rate; especially among men, led to a bleak outlook for their future fighting force.[1] During WWII, the Soviet Army commonly used its numerical advantage to conduct mass human wave-style attacks against the German Army. However, in the years following WWII, Russia transitioned from a rural population to an urban industrial population. As a result, Soviet women opted for one- or two-child families.[2] Many factors contributed to this: a high demand for women workers, a highly educated female population, high abortion rate, even adverse pressures of Soviet and later Rus-

1   Joshua Keating, 'Did Russia Really Boost Its Birthrate by Promising New Mothers Prize Money and Refrigerators?'(13 Oct 2014), Slate Magazine.

2   A.AVDEEV, 'The extent of the fertility decline in Russia: is the one-child family here to stay?'Center for Population Problems Studies, Moscow State University, Moscow, 2001

sian society.[3] These demographic challenges now rule out future Soviet-style massed echelons of armor and mechanized attacks.

Coinciding with this shift to smaller families is the decreasing positive image of the military. Through a series of wars beginning in the 1990s, Russia engaged in continuous combat in one form or another. All of these conflicts proved unpopular, especially to the one-child families. Russia's leaders were beginning to take notice of the effect this had on its military. During the Chechen Wars of the 1990s several high profile instances occurred where mothers of servicemen came to the battlefield to retrieve their sons.[4] These young men often were taken as prisoners of war or killed. Russian military mismanagement compounded the negative perception of the war.[5] The loss of life in this conflict was publicized by the new "free" Russian media which created an uproar among the Russian public. Lessons from these wars forced military planners to think about becoming averse to strategies that created casualties.[6]

In Russia, military service has a long history of dread among the population. In Czarist days, villages fulfilled annual quotas to supply recruits. Military service in Soviet times became more common, especially during WWII. However, following the war Soviet society was stratified with the upper class "nomenklatura" and all others below them. The avoidance of military service became common place for the nomenklatura. Therefore, military service fell disproportionally on the population who could least avoid conscription. During the late Soviet period, military service became even less attractive as the military became notorious for "dedovshchina," or violent hazing and bullying within the ranks. To this day "dedovshchina" is reportedly common in the Russian military. In 2006, the New York Times cited 16 soldiers were killed by the practice and hundreds more committed suicide.[7] The war in Afghanistan escalated the problem, only to be followed by the collapse of the Soviet Union. By the onset of the Chechen Wars of the 1990s, Russia's military was in dire straits.[8] Parents' aversion to conscription still continues to haunt the Russian military.

Since the early 2000s, Russia has embraced the concept of professional officers, noncommissioned officers and soldiers. They have invested in improved military education. Instead of modeling the U.S. system, Russia chose the Swiss and Austrian systems.[9] Russia has drastically reduced the size of their army, but they tripled the salary for officers and soldiers. They even adopted a Russian version of the Servicemembers Group Life Insurance with a Russian insurance company, SOGAZ, which pays 3,506 million rubles — $58,000 — to families of deceased soldiers.[10] They discarded the old Soviet-era uniforms and equipment and started outfitting their soldiers with modern digital camouflage uniforms and new weapons. The downside is that Russia continues to fall short of its recruiting targets to field a full volunteer (contract) military. They prioritized combat arms units with contract soldiers. As a result they still are dependent on conscription combat service support, especially in logistics and support units.

IN RUSSIA, MILITARY SERVICE HAS A LONG HISTORY OF DREAD AMONG THE POPULATION.

Russia also leverages surrogate forces in all of its conflicts. One of the distinctions between the Chechen wars of 1995 to that of 1999, was how the Russian Army co-opted and used specific Chechen forces in their second war in 1999. Chechen units such as the Vostok (eastern) and Zapad (western) battalions, led by members of the GRU (military intelligence) and Russian Special Forces community proved instrumental in Russia's invasion and subsequent counterinsurgency campaign inside Chechnya.[11] The Russian surrogate Vostok Battalion went on to participate in the invasion of Georgia and is now participating in the current Ukrainian conflict in the Donbas.[12] Due to this success, numerous other surrogate forces have been established and masquerade as "separatist" including Donbass People's Militia, Army of the South-East, the Russian Orthodox Army, Neo-Cossacks, Ossetian and Abkhaz paramilitaries.[13] There are many benefits of these forces, from plausible deniability to local knowledge and experience, but the fundamental advantage is they are not citizens from the heart of Russia. Those Russians that do engage in this type of warfare are "volunteers." Unlike the Russian conscript whose parents didn't want their sons in military service against their will, these hardcore mercenaries operate as a quasi-Putin Foreign Legion. They operate under the guidance and instruction of military intelligence and Special Forces. Any casualties they incur are of little to no concern of families back home in Moscow.

A common theme running through developments in Russian military technology is fighting a stand-off battle. The Russians invest heavily in cyber and information warfare. Unlike the U.S. where many college students in the science, technology, engineering and math (STEM) fields are foreign students, Russia has effec-

3 Nicholas Eberstadt, Drunken Nation: Russia's Depopulation Bomb, World Affairs Journal, Spring 2009.4Carlotta Gall and Thomas de Waal, Chechnya: Calamity in the Caucasus, NewYork, 1998, p. 124.

4 Carlotta Gall and Thomas de Waal, Chechnya: Calamity in the Caucasus, NewYork, 1998, p. 124.

5 Pavel Felgenhaur, Russia's Forces Unreconstructed, Perspective, Vol X, Number 4(March-April 2000), Institute for the Study of Conflict, Ideology, and Policy.

6 Ibid.

7 Mike Bird, 'What it's like to be a conscript in the Russian military', Business Insider, 29 October 29, 2015.

8 Pavel Felgenhaur, Russia's Forces Unreconstructed, Perspective, Vol X, Number 4(March-April 2000), Institute for the Study of Conflict, Ideology, and Policy.

9 Gustav Gressel, Russia's Quiet military Revolution, and What it means for Europe, Policy Brief, European Council on Foreign Relations, October 2015.

10 FMSO, OE Watch, Life Insurance for Russian Soldiers, Vol. 5 Issue #09 September 2015.

11 FMSO, OE Watch, "Detailed Description of Russian GRU Utilization in Eastern Ukraine' Vol. 5 Issue #09 September 2015.

12 Tim Ripley, 'Kiev troops retake Donetsk airport', Jane's Defense Weekly, 4 June 2014.

13 Alec Luhn, 'Volunteers or paid fighters? The Vostok Battalion looms large in war with Kiev', The Guardian, Friday 6 June, https://www.theguardian.com/profile/alec-luhn

tively grown highly skilled Russian STEM students.[14] Now they are a world leader in the realm of computers, software development and some of the most notorious computer hackers. They have effectively wielded these weapons against the U.S. and NATO countries.[15] Of more concern to the warfighter is their effective use of unmanned aerial system (UAS) technology. They have used the Ukrainian conflict as a testbed for not only a multitude of UAS systems, but they are also developing a new artillery doctrine in conjunction with UAS doctrine. This falls in line with their heavy reliance on artillery and multiple rocket launchers. Russia is using these as stand-off weapons in Ukraine to a great effect.[16] Compounding this threat is Russia's use of sub-munitions, which they have used against the Ukrainian military with devastating results. The U.S. has largely given up the capability to use artillery sub-munitions due to the Ottawa Mine Ban Treaty, AKA "Princess Diana" treaty, outlawing landmine and sub-munitions.[17] Russia has also invested heavily in non-lethal effects like electronic warfare (EW). Creditable analysis now attributes Russia having overmatch with regard to the U.S. in the field of tactical-level EW.[18]

Russia has also spent billions of dollars upgrading their armor in T-72, T-80 and T-90 tanks. Russian battalion tactical groups now outrange the typical U.S. brigade combat team and can fight their U.S. counterpart at maximum ranges in direct fire engagements.[19] Tanks like the T-90 and the T-14 Armata place greater emphasis on crew survivability. The T-14 even takes comfort into consideration, which the Russians have not been widely known for in their armor development. The Armata tank uses an electronic, non-manned tank turret, with the crew positioned in the hull for increased survivability.[20] The T-14 Armata hints at the Russian evolution to robotic tanks.[21] The Russian's are increasingly placing emphasis on robotics, as a further use of stand-off weapons and are actively pursuing unmanned ground warfare and unmanned ground vehicles (UGV). They have developed and deployed the "Platforma-M" armed robot system with some of their elite units, like naval infantry. They are even considering plans to retrofit main battle tanks into UGVs. As with UASs, the Russians could quickly excel in the field of military robotics. This tactic makes for a perfect solution to their demographic problem.

For this casualty adverse army, achieving success in the long-range fight (air, artillery, tank etc.), is of utmost importance. For U.S. forces, combatting this starts with joint Fires. This is a "must win" fight for the U.S., so all assets need to be available with minimum restrictions. Russia knows our ability to fight in a joint environment is one of our greatest strengths, which is why they started organizing to fight jointly as well.[22] Since they are at an earlier development in joint warfare, this is still a strength the U.S. and its allies can leverage. The key to successfully targeting the Russians in joint warfare is to destroy their EW and command and control capability (C2). These tend to be redundant and so its destruction is a challenge for U.S. forces. Additionally, the focus should be on destruction, not suppression. Fighting the Russians will be unlike anything ever experienced by America's armed forces. Since the end of the Cold War, the U.S. has focused on achieving military results with minimum casualties on both sides, civilian and military. Russia's EW and C2 capability are targets where the low density military occupational specialties (MOSs) reside. Whoever successfully produces the most casualties among the others low density MOSs, will have an advantage in achieving victory on this high technology battlefield. The U.S. military should also focus extra attention on attacking Russian logistics. Logistics is traditionally a Russian weakness and targeting it will adversely impact the Russians in battle. It will also hit the conscripted forces in greater numbers which is more likely to undermine Russia's will to continue an armed conflict. Lastly, the U.S. must dominate the close fight at the brigade combat team level. Be it by tactics, and/or weapons, neither side can afford to suffer excessive casualties among its professional volunteer forces. They are expensive to maintain and hard to replace. That said, every advantage must be sought when engaging Russian forces to produce casualties. This may seem obvious to military leaders, however not since the Gulf War of 1991, has U.S. armed forces dealt the level of destruction required to defeat an adversary like Russia.

When taken as a whole, Russia not only needs to fight a stand-off battle to offset casualties, but has the capability to do so successfully. When the totality of Russia's assets are accounted for: information warfare, surrogate forces, EW, UAS, artillery, upgraded armor, combined with their new volunteer army, Russia poses a challenge to U.S. forces. They are an old threat made new and a significant threat to U.S. forces not only in Eastern Europe, but in the Middle East as well. The challenge now is to acknowledge this threat and get after the hard task of problem solving to mitigate it.

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RUSSIA ALSO LEVERAGES SURROGATE FORCES IN ALL OF ITS CONFLICTS.

14   Yale Richmond, 'From Nyet to Da: Understanding the Russians', Intercultural Press, 2003.

15   Timothy Thomas, 'Russia's 21stcentury Information War: Working to Undermine and Destabilize Populations', Defense Strategic Communications, Volume 1, Number 1, Winter 2015.

16   Lester Grau and Chuck Bartels, 'Integration of unmanned aerial system within Russian artillery,' Fires Journal, May-June 2016

17   Jonathan Ferguson & N.R. Jenzen-Jones, 'Raising Red Flags: An Examination of Arms & Munitions in the Ongoing Conflict in Ukraine', Armament Research Services (ARES), Research Report No. 3, 2014

18   Journal of Asymmetric Warfare, 'Tactical EW and Cyber: Russian versus U.S. Capability', Vol. 1, Issue 2, August 2016

19   Amos C. Fox, 'Russian Hybrid Warfare and Its Relevance to the U.S. Army's Infantry', INFANTRY magazine April-July 2016

20   Christopher F. Foss, Russian Armata MBT trials under way, Jane's Defence Weekly, 5 February 2014

21   FMSO, OE Watch, 'Technical Specifications of Russia's T-14, 'Armata' Chassied Tank', 3 February 2015

22   FMSO OE Watch, 'Much Ado about Russian SOCOM', Vol. 4, Issue#4, April 2014.

An Afghan tactical air coordinator radios information to an aircraft before calling in strikes during a training opportunity near Kandahar, Afghanistan, March 14, 2017. The Afghan ATACs are responsible for helping coordinate strikes on enemy positions while advisors from Train, Advise, Assist Command-Air oversee their training. (Senior Airman Jordan Castelan/U.S. Air Force)

Improving Fires in Tarin Kot provides roadmap for future Afghan success

By Capt. Everett Heiney

The Afghan National Security Forces must actively fight insurgent groups while simultaneously training to become better at doing so, hindering their ability to make quick progress toward either goal. Over the past year, 4th Brigade, 205th Corps of the Afghan National Army, stands out as a unit making tangible progress fighting insurgents because of recent improvements in Fires capabilities. Improved artillery training and the development of close air support capabilities played a critical role in staving off capture of Uruzgan's provincial capital, Tarin Kot, and continues to help in the expansion of the security zone surrounding the city. The success of the 205th Corps' integration of a light air force and artillery into maneuver operations, supported by advisors from the Texas National Guard 36th Infantry Division; 3rd Brigade Combat Team, 101st Airborne Division (Air Assault); and Romanian and Bulgarian Armed Forces provides a roadmap to success for the rest of Afghanistan and other emerging militaries conducting counter-insurgency operations.

The disposition of Afghan Fires recently underwent a radical change in the 205th Corps area of operations. This area consists of three provinces, including the highly contested Uruzgan. The need to provide counter-insurgency Fires that are able to target a mobile, lightly-armed enemy operating in rural and urban environments spurred these changes. The MD-530 light attack helicopter and A-29 turboprop light-attack aircraft are new Afghan Air Force enablers introduced over the last two years. The A-29 has the most potential to transform fighting in Afghanistan because it is the most capable of destroying buildings, the favored fighting position of insurgents in urban conflict areas. The constant on the battlefield is the D30, the ANA's staple 122 mm towed howitzer, which provides reliable area fire support in all conditions. A light air force capable of destroying soft-targets and buildings combined with artillery support when these assets are not available is the ideal, flexible make-up of militaries conducting counter-insurgency Fires. Successful Afghan Fires tactics, techniques and procedures in the 205th Corps are built upon the solid foundation of these three assets, well suited for any counter-insurgency fight.

Correctly using these enablers is often more difficult than acquiring them. The coalition forces main effort is to train and advise their Afghan counterparts on how to use their assets for maximum effect. Coalition forces and skilled Afghan artillerymen teach how to improve D30 accuracy and lethality at the Kandahar Artillery Academy. The Afghan Tactical Air Coordinator (ATAC) Academy is instructed by coalition forces who teach Afghan forward observers how to integrate A-29s and MD-530s into combined arms operations. This specialized training provides Afghan artillerymen the ability to execute their jobs to standard and to properly support

An Afghan tactical air coordinators writes down essential information before calling in strikes during a training opportunity near Kandahar, Afghanistan, March 14, 2017. (Senior Airman Jordan Castelan/U.S. Air Force)

maneuver operations. To capitalize on this training, expeditionary advising packages (EAPs) send coalition forces kilometers away from the fight with the Taliban, to places like Tarin Kot, to help the ANA plan and execute Fires efficiently. The advising assists key Afghan leaders on how to best use their new or improved enablers and integrated them into maneuver operations. These efforts are critical in helping emerging militaries develop successful counter-insurgency Fires.

Afghan tactical air coordinators survey a training zone near Kandahar, Afghanistan, March 14, 2017. (Senior Airman Jordan Castelan/U.S. Air Force)

Training artillery capabilities

Many developing militaries struggle to employ artillery to maximum effect. Afghanistan is no exception. Some Afghan artillerymen resort to questionable tactics, techniques and procedures to mitigate a lack of specialized training. These soldiers often prefer to fire directly at targets instead of using indirect fire because it does not require an artillery observer or fire direction computations. The range of the D30 is cut in half when this mode of fire is used. If the rounds do not hit the target, "Kentucky windage" is used to adjust rounds instead of formulas, which is rarely accurate. Without proper training, these artillerymen are lucky if their D30 rounds land within a kilometer of the intended target.

The Kandahar Artillery Academy, a three-week course, has been reformed to address these problems and provide Afghan artillerymen the training needed to achieve accurate effects using indirect fire. After collective training in map reading and radio operation, students are broken down into observer, fire direction, and gunline specialties to receive focused training. Before, artillerymen only received generalized training ineffective at mastering artillery tasks. The new specialized training helps them better understand their role on the artillery team, the math required for each job and how to operate job-specific equipment. During the last week of class they now work in teams to conduct practice fire missions, culminating in a live-fire exercise. The live-fire exercise, is a new addition to the academy. It builds confidence in indirect fire and demonstrates that rounds land accurately using the academy's method.

These changes to the Kandahar Artillery Academy improved Fires in Tarin Kot, the most highly contested city in the 205th Corps area of operations. In November 2016, the Afghan artillery section only fired directly at targets and struggled with accuracy. By May 2017, many of the artillerymen were graduates of the academy and successfully computed fire direction data using the Afghan Field Artillery Computer. Artillerymen tracked friendly positions and potential targets with FalconView mission planning software. The artillerymen cleared airspace through the air liaison officer to ensure no aircraft would fly in the path of artillery rounds. Most importantly they achieved accurate effects using indirect fire with D30s which increased lethality to the enemy and reduced risk of civilian casualties. A coalition force's unmanned aerial vehicle observed the D30s supporting offensive operations and achieve first-round effects on two buildings two days in a row. The artillerymen accomplished this despite difficulty meeting the five requirements of accurate predicted fire because of new rounds and lack of means to measure weather, muzzle velocity and tube wear, among other factors. But, this is not preventing them from firing with great accuracy in all weather, day or night. Training conducted by coa-

lition forces and host-nation experts is critical to ensure artillery is utilized to its maximum effect and can always accurately support Afghan troops maneuvering on the battlefield.

Training aerial Fires integration

The introduction of MD-530s and A-29s into the Afghan Air Force provides new opportunities and challenges to the ANA and their coalition forces advisors as they integrate them into counter-insurgency operations. Afghans have little experience with air power and until recently have not used these enablers effectively. They used A-29s to conducted air interdiction missions only, attempting to disrupt insurgents deep in enemy controlled territory with few means of obtaining a battle damage assessment. They used MD-530s to target buildings despite having little ability to damage them with .50 caliber and rockets. The most prominent

issue was that no one on the ground could coordinate these assets, pushing them away from the close fight because of safety concerns.

Coalition force advisors developed the ATAC Academy to fill this void. Joint terminal attack controllers from the Train Advise Assist Command-Air and a 3rd Brigade Combat Team joint Fires observer taught 205th Corps' 20 top junior artillery officers how to safely conduct close air support using A-29s and MD-530s. The class was rigorous and students were required to pass multiple map reading and radio tests and situational training exercises to stay in the course. The class culminated in an A-29 live fire in the Registan Desert south of Kandahar Air Field in which each student conducted an A-29 mission. Nine ATACs graduated the course and were assigned to the 205th Corps' four brigades. It was critical for coalition forces to take the lead and kick-start an air-ground integration training program to help the Afghans properly use their newly acquired air power.

Advising utilization of new enablers

Although training was successful, the 205th Corps initially employed ATACs improperly because they were a new capability not well understood by Afghan Army leadership. Leaders put ATACs on checkpoints, made them tactical operation center officers, or brigade air liaison officers (ALOs). To properly implement the program, a deliberate effort was made through EAPs to the

Afghan tactical air coordinators gather essential information before calling in strikes during a training opportunity near Kandahar, Afghanistan, March 14, 2017. (Senior Airman Jordan Castelan/U.S. Air Force)

Kandahar Artillery Academy conducted an artillery live-fire exercise and graduation Feb. 15 - 16. The training and advising that the Afghan National Army Soldiers received from Train, Advise and Assist Command - South prepares them to be more precise, accurate and confident with artillery fire. (Courtesy photo Train, Advise Assist Command - South)

brigade headquarters. This opportunity presented itself in 4th Brigade, 205th Corps in Tarin Kot, Uruzgan, where Afghan National Security Forces struggled to preserve the security zone around the provincial capital and airfield.

Fourth Brigade was an ideal unit to help institute the ATAC program because they had already attempted air-ground integration. MD-530 pilots are permanently stationed at Tarin Kot to support combat operations and the brigade G3 attempted to talk them onto targets in the past. The MD-530 pilots effectively destroyed insurgent convoys and soft targets, but were not properly armed to destroy buildings. Insurgents held key terrain using tough mud civilian structures and the Afghans could do little to force them out. Coalition forces experienced difficulty assisting because of the time-intensive analysis required to comply with rules of engagement to strike the structures. A-29 pilots soared onto the battlefield soon after with rockets, .50 caliber and unguided 250-pound and 500-pound bombs. They filled the capability gap and turned the tide against the insurgents.

Coalition Fires, intelligence, air and operations advisors visited 4th Brigade Headquarters multiple times during month-long EAPs to prevent the fall of Tarin Kot and to train, advise and assist the Afghan Army in regaining ground around the provincial capital. Fourth Brigade leadership did not request A-29s to support this effort because of the perceived complexity of the request process and because they could coordinate with the aircraft on the ground. First, the intelligence advisor convinced the brigade S2 to submit A-29 requests and assisted him in properly filling out the form. The

Fires advisor then monitored the requests as they went through the Corps to the Afghan Ministry of Defense targeting cell, to the mission processing center, back down to the A-29s at the Kandahar Air Wing. The air advisor socialized the missions with the A-29 advisors. The operations advisor assisted the brigade in finding its ATAC and properly equipping him. Finally, the Fires advisor ensured the ATAC possessed the Gridded Reference Graphics (GRGs) and proper materials for the mission from the Afghan G2. Through these efforts, the first A-29 strikes occurred in Uruzgan. Each ANA fighting function required a concerted, combined arms advising effort to understand its role in utilizing the emerging capability.

The initial A-29 mission in the Tarin Kot bowl reportedly killed 17 insurgents and wounded eight, clearly demonstrating the capability of A-29s and ATACs to the Afghans. Fourth Brigade began requesting A-29 strikes every few days. During the first month of the EAP, A-29 strikes killed over 50 insurgents in the Tarin Kot bowl. They were caught unprepared for the barrage of Afghan Air Force bombs capable of destroying their safe havens. The 4th Brigade ALO/ATAC developed a strong working relationship with the A-29 pilots, and with the assistance of the PC-12 surveillance aircraft crew, gained enough trust to request strikes on targets of opportunity to ensure the A-29 pilots always left with maximum insurgent casualties and were black on ammunition. Though coalition forces conducted a great deal of initial work to convince Afghans to use A-29s properly, once they realized its benefit, the Afghans requested A-29 support utilizing ATACs as often as possible without coalition forces assistance.

Advising aerial Fires synchronization with maneuver

The advisors next major challenge was convincing the Afghan Army to use A-29s closer to the frontline and incorporate them into their scheme of maneuver. The insurgents around Tarin Kot adapted. They no longer stayed static in buildings with Dshkas on the roof with white flags flying for everyone to see. Instead, they moved from building to building in the villages, making it difficult for the G2 to send exact enemy grid coordinates to Kabul to request A-29s in a timely manner. Corps leadership expressed reluctance engaging enemy structures because they did not want to kill civilians or friendly forces.

Advisors made a concerted effort to assist their counterparts in reducing this risk. They briefed Afghan leaders, ATACs, and intelligence personnel on synchronization techniques to protect civilians and friendly forces from A-29 strikes. Advisors developed common operating pictures with Afghan counterparts to ensure all elements of offensive operations understood what roles enablers would assume. Afghan G2 personnel developed a common set of GRGs for all participants in the operation to streamline battle-tracking. First, the Afghans developed an A-29 target for a building occupied by insurgents preventing friendly maneuver 400 meters away from their frontline. This successful strike helped boost Afghan confidence in A-29 close air support. A few weeks later, advisor efforts paid off when an A-29 sortie came on station while a maneuver element was in contact and an ATAC utilized A-29s to suppress the enemy in direct support of offensive operations. Coalition forces enabled the Afghans to achieve even greater effects with A-29s by helping Afghans get out of their comfort zone and realize the true potential of this enabler.

Coalition forces are now working with 205th Corps to spread ATAC lessons learned to the other brigades. Afghan leaders brought 3rd Brigade's ATAC/ALO to Tarin Kot to conduct combat A-29 missions in order to get experience, build connections with mission requestors, and bring the skills back to the brigade. This training is offered for the other brigades as well. With over 100 enemy kills in Uruzgan, A-29s are the key part of a developing Afghan counter-insurgency air force turning the tide of battle in southern Afghanistan.

Tarin Kot's airspace is now full of enablers, hunting the remaining insurgent force, and reinforcements advancing in from surrounding provinces. D30s, MD-530s, A-29 and Mi-17 transport helicopters fitted with rockets provide fire support to Afghan maneuver forces, pilots driving the enemy from key terrain and villages outlying the provincial capital. Careful coordination is required between coalition aircraft, Afghan aircraft and D30s on artillery hill overlooking Tarin Kot Airfield. D30 crews clear air with coalition JTACs and the 4th Brigade ALO whenever they fire to ensure air is synchronized. FalconView and GRGs provide enablers and observers a common operating picture to coordinate efforts. Maneuver plans are made with targets for MD-530s, A-29s and D30s in mind. The evolution of the Afghan Army is occurring. Over the span of six months, combined arms capabilities continue to develop thanks to coalition forces advising, and training on proper tools to conduct counter-insurgency Fires.

Tarin Kot's situation is improving. After being brazenly occupied by the Taliban for at least a year, Shah Mansoor Hill, the high point overlooking Tarin Kot, was recaptured by 205th Corps, 2nd Mobile Strike Force, and 3rd Special Operations Kandak forces. These forces lowered the white flag of the Taliban from a radio antenna. The Afghan flag now flies in its stead. D30 Fires suppressed the enemy and destroyed structures. A-29s obliterated fighting positions and MD-530s prevented enemy resupply. Fires proved to be the decisive factor that pushed the insurgents out of the Tarin Kot bowl.

The roadmap to successful counter-insurgency Fires for any emerging military is clear. Artillerymen must be properly trained to achieve maximum effects with surface-to-surface area Fires in all conditions. A basic, light air force capable of destroying buildings and conducting close air support is required to provide lethality and precision beyond basic artillery capabilities. Observers need training on how to integrate the air force into maneuver operations and senior leaders need to know how to properly use emerging Fires capabilities. Artillery, ATACs and A-29s are a deadly force in Tarin Kot, Uruzgan, and provide a template to future development of counter-insurgency Fires in emerging militaries.

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Servicemembers participating in the Kandahar Artillery Academy pose for a group photo. (Courtesy photo Train, Advise Assist Command - South)

FILLING IN DOCTRINAL GAPS

A DETAILED GUIDE FOR THE DIVISION FIRES CELL IN DECISIVE ACTION

By Maj. Jim Kane

First Lt. Elyse Ping Medvigy, D Company, 1st Battalion, 12th Infantry Regiment, fire support officer, conducts a call-for-fire during artillery training near Kandahar Airfield, Kandahar province, Afghanistan. (Staff Sgt. Whitney Houston/U.S. Army)

The Army has a problem. As the Chief of Staff of the Army, Gen. Mark Milley has pointed out on multiple occasions, the Army faces the prospect of fighting large scale force-on-force battles, and as an institution we have forgotten how to do that.[1] A renewed emphasis by the CSA to try to recapture some of the capability that the Army had prior to the Global War on Terror and the transformation to a modular army has led to efforts across the force. Most visibly, the emphasis on the division warfighter exercise program, led by the Mission Command Training Program out of Fort Leavenworth, Kans., has forced Army divisions to engage large-scale enemy forces in a high tempo maneuver warfare against a thinking opponent.

As a member of the organization formerly known as the Joint and Combined Integration Directorate (now the Army

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1   Helene Cooper, "Long Emphasis on Terror May Hurt U.S. in Conventional War, Army Chief Says," The New York Times, 15 May, 2016; Mark Milley, "Chief of Staff of the Army: Changing Nature of War Won't Change Our Purpose," Association of the United States Army Green Book, 1 October, 2016.

Targeting Center) at Fort Sill, Okla., I was assigned to attend division warfighter exercises from 2014-2015 to assist with the training and integration of the Joint Air Ground Integration Center (JAGIC). When my permanent change of station window opened up, I requested the Mission Command Training Program where I was able to work as a Fires observer controller trainer from 2015-2016 working with division fire support centers and division artillery (DIVARTY) headquarters as they struggled to find a role in the modern division structure. Now, as a student at the School of Advanced Military Studies, my area of research is the organization of the modern division and its ability to employ Fires.

I mention my own experience here because this article provides depth to topics that are hardly mentioned in doctrine, if at all. The role of Fires at the division level in a decisive action scenario is not explained in doctrine in sufficient detail to employ Army or joint Fires. This is an especially critical shortfall as the primary way that higher headquarters (divisions and corps) have affected the battlefield historically is through Fires. I have personally observed eight different divisions fight through this problem with various levels of success. The lessons learned are not yet contained in doctrinal publications.

This lack of guidance creates challenges for leaders assigned to work in Fires cells at these echelons. It also damages the relationship between the Fires cell and the rest of the battle staff who don't know what to expect from their Fires personnel. This kind of ambiguity causes headaches during counter-insurgency operations where higher-echelon involvement isn't necessary for immediate tactical success, but it spells disaster in a decisive action scenario where the success or failure of fast moving operations often lies with the ability of the Fires cell to execute its responsibilities.

To dust off old doctrine from the 1990s would be the easy answer to the problem of how to employ Fires. It would also be inappropriate because the structure of the Army fundamentally changed during the transformation to a brigade combat team (BCT)-based Army in the early 2000s. The modern BCT holds the role the division held from the World War II era up until the Global War on Terror. The modern division is closer to the corps of old except that it is not a corps of old. It does not have the structure or the capabilities (such as logistics and reconnaissance assets) that the corps once

had. Opening up old Airland Battle doctrine, or Army of Excellence publications provide insight into how large-scale operations could be conducted, but this insight needs to be translated into the current force structure to be useful.

The challenges that division staffs across the Army are facing as they head into warfighter exercises are severe, but the division Fires cell (FC) suffers perhaps the hardest problem set. Unlike other portions of the division staff who can operate along the old French axiom that they can just debrouiller (muddle through), and figure things out as they go, if the fire support system at the division is dysfunctional, Fires may stop entirely. A BCT that does not get appropriate or timely guidance from the division will be at a disadvantage, but can still engage the enemy. A field artillery unit that does not get appropriate or timely guidance from division cannot engage the enemy at all.

Fire support personnel working at the division level operate in an absence of applicable doctrine, and are in the most need of specific guidance. Unit tactical standard operating procedures (TACSOPs) could cover the needed details, but usually are geared toward counterinsurgency operations in Iraq and Afghanistan where the tempo (and criticality) of Fires is exponentially less than in a decisive action scenario against an enemy that may attack the division with tens of thousands of soldiers and weapon systems at the same time. Divisions that have tried to update their TACSOPs to deal with this "new" scenario usually reincarnate procedures from the pre-modularity division, which did not have the same force structure as the current division. Current doctrine falls into this same problem in Field Manual 3-94, and Army Techniques Publication 3-90.

This article is designed to be a guide for *Redleg*s assigned to work in a division Fires cell, with a specific focus on the division's mission in a decisive action scenario. It is a "how-to" for operating a division Fires cell in an environment unlike what any, except the most senior of officers and non-

commissioned officers, have ever trained for. Current doctrine does not travel down the paths this article follows and is almost silent on topics relevant to the primary focus of operations at the division level. In the next few pages, the reader will find a framework to understand the role of Fires at division level and practical methods for creating a fire support and targeting system that operates as an efficient machine to connect priority intelligence requirements with strike assets at the division level.

DIVISION-LEVEL FIRES

The role of Fires at the senior tactical and operational levels is at the center of the effort to re-learn large-scale combat operations. Since division and higher level headquarters affect the battlefield through shaping efforts focused in the deep fight, Fires is the primary weapon of commanders to affect the battlefield from their level.

While Fires doctrine gives detailed guidance for operations at the BCT-level and below, details are lacking for division through theater levels. For division-level operations, Army Doctrine Reference Publication (ADRP) 3-09, "Fires," provides few specifics for the employment of Fires, role of the Fires cell, or relationship of fire support personnel to the rest of the staff. ADRP 3-09 dedicates six pages to cover this topic, most of which is split between the duties and responsibilities of the primary personnel of the Fires cell and a description of air defense organizations by echelon.[2] Field Manual (FM) 3-09, "Field Artillery Operations and Fire Support," April 2014, adds a layer of complexity because it groups the Fires cells differently than in ADRP 3-09. Although it provides a bit more detailed guidance on the types of activities conducted at corps/division, its three and a half pages are far from sufficient to execute operations.[3] Similarly, within the specific realm of targeting, doctrine covers detailed targeting procedures up through the BCT-level in Army Techniques Publication (ATP) 3-60, "Targeting," and then picks up back at the Joint Task Force level in Joint Publication 3-60, "Joint Targeting," skipping division and corps echelons.[4]

2   Army Doctrine Reference Publication (ADRP) 3-09, Fires, (Washington, DC: Government Printing Office, 2012), 2-3 through 2-9.

3   ADRP 3-09, 2-3; Field Manual (FM) 3-09, Field Artillery and Fire Support, (Washington, DC: Government Printing Office, 2014), 2-3 through 2-7. ADRP 3-09 organizes the levels of Fires cells as Joint Force Land Component/Joint Force Command, and Division/Brigade while FM 3-09 organizes them as JTF/JFLCC and Corps/Division.

4   Army Techniques Publication (ATP) 3-60, Targeting, (Washington, DC: Government Printing Office, 2015); Joint Publication 3-60, Joint Targeting, (Washington, DC: Government Printing Office, 2013).

ADRP 3-09 states that the Fires cell at division level, "Plans, prepares, executes and assesses Fires in support of current and future operations," but this is only part of the role of Fires at the division level.[5] Fires at the division level must shape the enemy in the division deep fight, provide Fires and fire support coordination for subordinate units, and on occasion provide Fires and fire support coordination for higher and adjacent units. A division Fires cell operating according to doctrine will find that they are forced by the requirements of the division commander, the subordinate brigades and the rest of the staff to perform far more roles than what doctrine prepared them for.

These roles are not captured in ADRP 3-09 (or ADP 3-09, or FM 3-09), but they were at the heart of the framework which was designed leading up to World War II and remained essentially unchanged until the beginning of the 21st Century. As per the 1941 FM 100-5, "Field Service Regulations," the role of division artillery was to mass supporting Fires in direct support of the division's subordinate maneuver units. The role of corps artillery was to destroy the enemy's artillery and to interdict enemy forces not yet in contact with friendly forces.[6] Additionally, division artillery had to be prepared to reinforce corps artillery Fires when needed, and corps artillery was prepared to reinforce division Fires.[7] This framework still fits the role of Fires in the modern force if the specific tasks are moved down one echelon so that the modern division fills the role that was once performed by the corps and the BCT fills the role of the division.

Including these additional roles for Fires at the division level helps ensure that the fire support system across the whole theater is connected and responsive. If FC personnel understand their expanded role it will cut down confusion when requirements from subordinate, adjacent, or higher headquarters arise during the course of a battle (which they invariably do).

FIRE SUPPORT

All the activities of the division Fires cell can be broken down in to the category of either executing fire support or planning fire support. This delineation is important because if you are assigned to work in a division Fires cell you will generally end up in either role.

Despite a lack of guidance from doctrine, the distribution of fire support personnel across the two functions has been similar among divisions observed during warfighter exercises. Even with that being the case, slight modifications can lead to the neglect of either the planning of Fires or their execution if critical positions are not filled. The following proposed division of labor could avoid this issue.

LEADERSHIP, INTEGRATION
- Fire support coordinator (FSCOORD) is located with the division command group.
- Deputy fire support coordinator (DFSCOORD) is located at the division main command post, synchronizes planning and executing efforts with FSCOORD guidance.

Executing fire support:
- Field artillery intelligence officer (FAIO) is located in the division analysis and control element (ACE).
- Fire support officer (FSO) is located in the division JAGIC.
- Fire support NCO (FSNCO) is located in the division JAGIC.
- JAGIC targeting officer is located in the division JAGIC.
- Assistant fire support coordinator (AFSCOORD) serves as the JAGIC chief.

PLANNING FIRE SUPPORT
- Assistant fire support coordinator is located in the division Fires cell or division G3-5.
- Division fire support sergeant major is located in the division Fires cell.
- Division targeting officer is located in the division Fires cell.

The FSCOORD and the DFSCOORD provide leadership and integration between fire support plans, execution and the rest of the division. The FSCOORD is the division commander's senior advisor for Fires, and is often located with the command group. The FSCOORD provides Fires input to the command group and is the conduit for the division commander's intent for Fires to flow to the rest of the Fires cell. As the division artillery (DIVARTY) commander, the FSCOORD also integrates DIVARTY efforts into the larger division effort. The FSCOORD stands split between the division headquarters and the DIVARTY, leading through the DIVARTY staff on one hand and the DFSCOORD and the Fires cell on the other.

The DFSCOORD represents the FSCOORD to the rest of the division staff, and works as the integrator between planning fire support and executing fire support. Some doctrinal publications (for example ATP 3-91.1, "The Joint Air Ground Integration Center") give specific duties to the DFSCOORD which would draw him or her deeper into full time activities such as clearing airspace or approving individual fire missions.[8] Since pulling the DFSCOORD into this level of detail would prevent him or her from the key roles of leading and integrating the overall planning and execution, those duties must be delegated to an AFSCOORD.

EXECUTING FIRE SUPPORT

In the role of executing fire support, the Fires cell will take on division shaping Fires and manage the fire support structure throughout the division area of operations. Again, these two delineations are not specified in current doctrine, but are directly inferred by the role of the division in unified land operations and the requirements of the Fires systems available to the division.

To execute division shaping Fires, the division Fires cell will perform dynamic targeting and will coordinate Fires assets to strike targets once located. Dynamic targeting is conducted by the field artillery intelligence officer (FAIO) who resides in the division ACE and the targeting officer seated on the division JAGIC. The FAIO finds targets (with the help of all assets of the division G2 in the ACE) and forwards them to the targeting officer sitting on the JAGIC to prosecute. Between these two positions, targets must be identified via the high payoff target list (HPTL), commander's priority intelligence requirements and the collection plan which should be synchronized, validated (via target selection standards) and then forwarded on to be prosecuted. Where these discrete activities of detecting, deciding and delivering occur is not designated in doctrine.[9] In the last three years of observation, different U.S. divisions have varied greatly in where these activities are conducted and who specifically is responsible for executing these tasks. The transfer of intelligence into actionable targets, the decision on which targets to strike, and the transmitting of those targets to specific Fires assets are all processes that must be completed in order for Fires to affect the battlefield. Doctrine lacks a detailed cohesive system for how to accomplish this. Some divisions lay all of these responsibilities on the FAIO, some on the targeting of-

5   ADRP 3-09, 2-7.

6   US War Department. FM 100-5, Field Service Regulations, Operations, May 22, 1941, (Washington D.C.: Government Printing Office, 1941), 47-54.

7   FM 100-5, 53-54.

8   Army Techniques Publication (ATP) 3-91.1, The Joint Air Ground Integration Center, (Washington DC: Government Printing Office, 2014), 1-3.

9   Army Techniques Publication (ATP) 3-60, Targeting, (Washington, DC: Government Printing Office, 2015). The Decide, Detect, Deliver, Asses (D3A) Methodology is the basis for army targeting. This article focuses on the first three steps of the D3A as they are the steps necessary during the staff battle drill that results in effects on targets.

ficer and some divisions skip steps in the process, desynchronizing the entire fire support system. In warfighter exercises, entire field artillery brigades of rocket artillery have sat idle because divisions failed to man a single FAIO position in their ACE.

Here is a suggested breakdown of the roles and procedures for these critical positions:

FAIO: Selects potential targets identified in the ACE and after vetting and validating, forwards them to the JAGIC targeting officer. The FAIO should be the owner of the target selection standards (TSS) for the division. Target selection criteria should be defined and readily available for each of the targets on the HPTL and the FAIO should have the specifics of each of the division's likely collection assets. As an example, if an SA20 Air Defense system is on the HPTL, the FAIO should know the acceptable target decay based on the mobility of the target. If it takes 60 minutes to tear down and move a deployed SA20 system, then a spot report within 60 minutes should indicate that it is still in place). The FAIO should also get the target location error, a standard factor based on the type of intelligence asset providing the location of the target. As a sidenote, a prophet system provides a more accurate target location than a spot report by a civilian informant calling from a cellphone in enemy territory.

The battle drill within the ACE between G2 personnel and the FAIO must be rehearsed and refined. G2 personnel receiving reports from collection assets must understand what targets the FAIO is looking for and when and how to provide located targets to the FAIO.[10] The FAIO then needs a system to transmit the selected targets to the targeting officer on the JAGIC. In an ideal system, targets would be transmitted digitally from collection personnel using the Distributed Common Ground System-Army to the FAIO's Advanced Field Artillery Tactical Data System (AFATDS), and then the FAIO would forward selected targets to the JAGIC targeting officer via AFATDS as fire missions. As logical as that sounds, I have yet to observe an AFATDS or DCGSS operator who could make this connection work digitally.

JAGIC targeting officer: Receives targets from the FAIO and determines the appropriate asset to service the target. The attack guidance matrix (AGM) is the key document that the JAGIC targeting officer uses to determine which asset is the best fit for the target identified by the FAIO. The AGM is developed by the division targeting officer as a part of fire support planning, but the JAGIC targeting officer needs to be the owner of this document during execution and should be responsible for updating it to match the changing situation in the current fight.

As per ATP 3-91.1, "The Joint Air Ground Integration Center," the role of the JAGIC targeting officer is to recommend options to the JAGIC chief, generally understood in the ATP to be the deputy fire support coordinator since that is who has the authority to direct a joint Fires asset (primarily field artillery or Air Force assets) to attack a target.[11] In practice, however, some of this authority will be delegated to the JAGIC targeting officer. Especially as the tempo of a battle increases, the division will provide more authority to the JAGIC targeting officer to the point where they will be sending targets directly to supporting field artillery units and the division tactical air control party. In this case, the JAGIC chief will usually be too busy to make a decision on every target that the division will have the opportunity to strike, and will instead give left and right limits for the JAGIC targeting officer to work within. For instance, the JAGIC targeting officer may be told to send field artillery targets straight down to the DIVARTY, but to check with the JAGIC chief for approval before sending a target for close air support (CAS) or air interdiction.

JAGIC fire support officer: The only guidance FM 3-09, "Fire Support," gives for the role of an FSO at division level is that they are, "responsible for advising the supported commander and assisting the senior Fires officer of the organization on Fires functions and fire support."[12] This is at once inadequate, and also inaccurate since at the division and higher level the FSO will not advise the supported commander (that is the role of the FSCOORD), nor are they directly involved with assisting the senior Fires officer (the FSCOORD) on Fires and Fires support (that is the DFSCOORD). ATP 3.91.1, "The Joint Air Ground Integration Center," provides more accurate duties for the FSO as they relate to specific JAGIC battle drills to clear airspace and deliver Fires, but does not cover the majority of the duties for which the FSO at division level will be responsible. [13]

At the division level, the FSO is responsible for managing the fire support system for the division. The FSO maintains contact with the FSOs of the subordinate brigades as well as the fire direction center of the DIVARTY. They serve as the final arbiter of priority of fire, assignment of fire missions, and formal and informal fire support coordination measures. The FSO is the master of this system, speaking with the authority of the fire support coordinator and division commander.

As the FSO manages the fire support system within the division, he or she must also participate in the larger corps (or equivalent) fire support system. The FSO needs to maintain communication with the FSO's of adjacent divisions, as well as with the FSO at the corps level. The goal of this interconnected system is that divisions should be able to assist each other with Fires or ground clearance near and across the division boundaries, and reinforce Fires both vertically and laterally.

Within the JAGIC, the FSO is the field artillery input to the joint Fires options available to the division to strike targets. When the JAGIC receives a target and evaluates options, the FSO provides the field artillery options available. The FSO needs to have the locations of field artillery units within the division at hand as well as the types of ammunition available. Because of limitations of the computer simulation in division warfighter exercises, the location of munitions within the logistics system rarely becomes an issue, but in actual operations the location of special munitions within the area of responsibility is critically important to overall field artillery operations. For instance, the FSO should be able to inform the JAGIC chief on the location of extra stocks of guided multiple launch rockets and how long it would take to resupply a specific firing unit.

In addition to the responsibilities already detailed, the FSO often has to fill in as the JAGIC chief, making calls for airspace clearance and the decision to employ joint Fires since the JAGIC chief may be pulled into meetings, or other planning efforts.

JAGIC fire support NCO: The FSNCO assists the FSO, but more specifically the FSNCO should be doing the hands-on management of the active field artillery targets and fire support coordination measures (FSCMs) for the division. If there is one person in the Fires cell who knows ex-

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10   Conversation with Dr. William Rierson, Senior Consultant-Fire Support Subject Matter Expert with CGI. The importance of this battle drill was stressed by Dr. William Rierson, who stated, "Rehearsing this battle drill is probably one of the most repeated failures in the D3A and F2T2EA process for all the division's I've seen (and I've seen them all)." Dr. Rierson is a subject matter expert on division and corps level targeting who has augmented the Mission Command Training Program during exercises since 2011.

11   ATP 3-91.1, 1-3.

12   FM 3-09, 2-11, 2-12. FM 3-09 provides some detailed guidance (2 paragraphs) for brigade and battalion fire support officers, as well as a paragraph for the duties of a company fire support officer, but no guidance for the role of the fire support officer at division and higher levels other than the quote provided.

13   FM 3-91.1, 1-5, A-13.

Second Lt. Robin Brooks, a fire support officer assigned to G Troop, 2nd Squadron, 2nd Cavalry Regiment, places his Soldiers into defensive firing positions. Capt. Petteri IIvonen, a Finnish Army observer controller trainer, watches as the unit conducts tactical operations during Exercise Allied Spirit IV, held at the Joint Multinational Readiness Center in Hohenfels, Germany. (Sgt. William A. Tanner/U.S. Army)

actly which firing units are available, which targets have been sent down to execute, and which FSCMs are currently active across the division, that person should be the FSNCO. The FSO and FSNCO should form a team, the FSO communicating vertically and laterally, while the FSNCO communicates to the subordinate unit Fires cells.

Assistant fire support coordinator: The AFSCOORD working in the execution of Fires will serve as the JAGIC chief. ATP 3-91.1, The Joint Air Ground Integration Center, states that the DFSCOORD should be the JAGIC chief, but in execution the DFSCOORD usually has far too many responsibilities across the staff to be tied to current operations in the JAGIC. The AFSCOORD serves in place of the DFSCOORD, responsible for all duties laid out for the JAGIC chief in ATP 3-91.1. The use of the AFSCOORD in this role allows the DFSCOORD the freedom of movement to synchronize the plans and execution sections of the Fires cell, and provides top cover for the FSO so that he or she can focus efforts on managing surface-to-surface Fires.

In this role, the AFSCOORD is the senior representative of Fires and airspace control in the division current operations integrating cell, and as the JAGIC is the portion of the division staff focused on the division deep area, the AFSCOORD will find him or herself as the key manager of the deep fight for the division. With this in mind, the AFSCOORD must understand the future direction of the division as seen by the division plans and future operations, and must work closely with the division chief of operations and G3 since he or she will be executing the deep fight in accordance with overall division operations.

BEST PRACTICES

A division collection asset observing a targeted area of interest locates an enemy system on the HPTL and G2 personnel give the spot report to the FAIO. The FAIO evaluates the report according to the TSS and the HPTL. If the report meets TSS and is on the HPTL, the FAIO forwards the target as a fire mission to the JAGIC targeting officer via AFATDS. The JAGIC targeting officer consults the AGM to determine the best method of engagement, and makes a recommendation to the JAGIC chief to strike.

The JAGIC chief directs either the Air Force senior air director (SAD) seated at the JAGIC or the FSO to strike the target. If using Air Force assets, the SAD directs CAS or AI sorties to the target location. If using field artillery assets, the FSO sends the fire mission to DIVARTY. The JAGIC simultaneously clears airspace for the strike asset.

High-volume of targets: If the volume of targets acquired by the division G2 exceeds what this ideal system can handle (and it will, logically, at the point in the battle where delivery of Fires is most critical), then steps in the system will have to be abbreviated. An effective tactic, technique and procedure in this case is to authorize direct links between intelligence and strike assets. For instance, when the volume of targets starts creating a backlog at the JAGIC, the JAGIC chief might direct that the FAIO send selected target types targets identified in a certain area directly to the DIVARTY, skipping the JAGIC for select individual fire missions. To facilitate this, the JAGIC should also create an airspace coordination measure to keep aircraft out of the area through which these fire missions will travel.[14]

PLANNING FIRE SUPPORT

Fire support planning includes deliberate targeting. The two should come together to provide the Fires execution team tools to find and engage targets with minimal additional coordination. The critical leaders for these two efforts are the division targeting officer and one of the AFSCOORD that can be designated as the division fire support planner. These two positions have areas with responsibilities that overlap, but it is important to keep some separation between them otherwise the tendency will be to neglect one or the other components of planning. Based on observations from warfighter exercises, divisions where the AFSCOORD manages the target decision board are often lacking fire support planning. Likewise, divisions where the targeting officer is submitting FSCMs or coordinating with the battlefield coordination detachment for CAS allocation will not have a useable target synchronization matrix (TSM).

Fire support planning at the division level consists of detailed planning to support the engagement of targets. With proper inputs to the planning process, sensors will be in place, sufficient Fires assets will be available when needed, positioned to engage targets, with the right ammunition on hand, and sufficiently protected from threats. The fire support planner should interface with both the division G3-5 future ops, and the division G5 plans sections to make sure the needed details are present in division plans to support target engagement.

Inputs to the G5 plans focus on making sure sufficient Fires assets are available to the division, and that field artillery assets have land and ammunition. Fires assets planning should be based on the requirements of planned operations and detailed relative combat power analysis. For Air Force delivered Fires, this portion of planning will result in a close air support allocations to the division and in prioritization of targets for air interdiction by the air component commander. This will also need to be synchronized with the battlefield coordination detachment.

For Army field artillery delivered Fires, planning involves making sure enough FA units are available for direct support, general support and reinforcing missions. Ensure enough land is available to operate and that ammunition is available (especially special munitions) with logistics assets tasked to support the movement of munitions. Also confirm forces are tasked to provide local security for field artillery units. These details need to be coordinated with the DIVARTY.

Inputs to G3-5 future operations focus on ensuring that Fires units are in place to engage specific targets and that coordination measures are in place to enable responsive engagement. CAS sorties must be coordinated so they arrive on station when division operations are projected to need them, rather than during lulls in the battle. The division air liaison officer should also be involved in this coordination. Position areas for field artillery units that are in range of expected targets must be planned at the time when the division expects to identify them. Movement of field artillery units between position areas should be coordinated through the division movement and maneuver cell to make sure routes are open and available to allow field artillery units to reposition and receive resupply of ammunition.

To ensure responsive engagement of targets by Fires assets, the fire support planning must inject FSCMs and airspace coordination measures (ACMs) into the maneuver plan. Often division staffs will stovepipe the creation of maneuver graphics in the hands of future operations and the creation of ACMs in the hands of the G3 air section. This practice creates significant conflicts with the ability to employ Fires. The fire support planner should make sure division maneuver graphics are drawn to allow the division to employ Fires, especially the location of unit boundaries, which double as FSCMs, and brigade limits of advance, which can be tied in to a division coordinated fire line.[15] For ACMs, the fire support planner must ensure that airspace is organized to allow Fires to engage targets with little or no additional coordination. The ideal output of the ACMs should be a system where field artillery units are pre-cleared to fire in any area where targets are expected.

Deliberate targeting is a process detailed in significant depth in Army and joint doctrine, and consists in a general sense of selecting targets, and then assigning sensors to find the target and Fires assets to strike the target once found. Of all the processes coordinated by the Fires cell, deliberate targeting is the one that has the most supporting doctrine and often receives the most command focus. In many divisions, the targeting decision board becomes the key battle rhythm event used by commanding generals to fight the division and synchronize the staff. The high amount of emphasis placed on deliberate targeting and the way its requirements cut across war fighting functions can lead to situations where everything done by the division is conceived as targeting (i.e. the division may target a key enemy unit and then engage this target with an armored brigade combat team). Given this broad range of activities looked at by targeting, the actual hands-on work of detailed synchronization of targets, sensors and shooters can fall by the wayside. Someone needs to do the detailed planning. Even the best targeting guidance from the division commander will not help defeat the enemy if it never leaves the division command post in an executable order.[16]

Generally, deliberate targeting will occur in conjunction with the air tasking order (ATO) cycle managed by the Combined Force Air Component Commander (CFACC). Most divisions have systems in place to manage the nomination of targets from subordinate brigades, and to vet and forward target nominations for approval from the commanding general. This is an established system from counterinsurgency

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14   Army Techniques Publication (ATP) 3-52.1, Airspace Control, (Washington DC: Government Printing Office, 2015), 33. JAGIC coordinates implementing ACMs to facilitate efficient use of airspace to accomplish operations and simultaneously provide safeguards for friendly forces and FSCMs to facilitate rapid target engagement and, simultaneously, provide safeguards for friendly forces.

15   FM 3-09, 4-13, 1-24. Unit boundaries can be considered permissive FSCMs for the use of Fires within a maneuver commander's boundaries, and as restrictive FSCMs requiring coordination with adjacent units to fire outside a unit's boundaries.

16   Rierson, "This is a key point. One that we've seen repeatedly not accomplished. There is a tendency for Fires cells to publish an initial TSM in the base order, then not update it either at all, or not until a phase change, vice in a daily FRAGORD for each ATO cycle."

(COIN) operations during the past 16 years and is appropriate for the pace of operations in a COIN setting. However, many divisions fail to change this process for large-scale combat in a decisive action scenario.

There are several adjustments that must be made to a COIN-based deliberate targeting system to allow the division to defeat the enemy through Fires in a decisive action scenario. The practice of expecting the commanding general, or one of his deputies, to approve all targets is unworkable. When the division is confronted by an enemy force of hundreds, or even thousands of potential enemy targets, either a commanding general is presented with a target list containing hundreds of targets — which they certainly will not have the time (or inclination) to review — or the targeting decision board will present a generalized HPTL that gives little guidance to the division and does nothing to assist the process of prioritizing and synchronizing target engagements from the actual division target list. Defining what guidance is needed from the commanding general, rather than treating the target decision board as mandatory authorization can help this process. Focusing on specific targets at the proper echelons will help as well.

Understanding the targeting echelon is key to allowing the division to aim specific enemy systems in a way that is executable and has an impact on the division fight. The division should look at what they can affect from their echelon that either cannot or will not be addressed by their higher or lower echelons. For instance, the BCTs under the division should have no problem handling enemy armor and infantry units on their own, but may have no way to engage enemy long-range artillery firing from outside the range of their own reconnaissance and Fires assets. Likewise, the CFACC usually has aircraft that can effectively attack those same enemy long-range artillery units, but will not target them because they pose no risk to aircraft or the objectives of the CFACC's air campaign. So an echeloned targeting plan would have the division targeting the enemy systems that fall in the gap between the BCT and higher headquarters.

A division that has not targeted the correct echelon specifically will usually have products that are too vague to effectively focus division efforts. One symptom of this problem is a high payoff target list that includes the division commander's priorities only by type of weapon system i.e., listing "air defense" as a high priority

target. This results in a division target list filled with Man-Portable Air Defense Systems which the division will try in vain to find, and country-level integrated air defense systems (if the division can locate) will lack any assets able to strike. At the same time the division is flailing to find and engage air defense systems that are already targeted by echelons above and below the division (and which have the appropriate assets to locate and engage these targets), there will be enemy air defense systems that are beyond the capabilities of subordinate units to engage, yet beneath the level that would draw attention from the CFACC or the Joint Force Command level.

The other problem that division deliberate targeting runs into in a decisive action scenario is with the expectation that target nomination will be a bottom-up process. ATP 3-60 describes a targeting system where target nominations are submitted to the division which uses these target nominations to populate its own target list. Since the deliberate targeting process is timed by the ATO cycle and lead time is necessary to input targets into the CFACC master air attack plan, this requires brigade and lower targeting officers to forecast days in advance of division to ensure nominations are accepted.

This system was appropriate for the environment of Operation Enduring Freedom or Operation Iraqi Freedom where brigades and battalions were generally static, but is absolutely unworkable in a large-scale maneuver conflict. Brigades do not often know where they will be moving, or what their mission will be several days in advance because the division is in the process of adjusting to the enemy. In this type of conflict, the division is looking further ahead than the brigades, and is in a much better position to conduct targeting and submit target nominations for upcoming operations. Successful divisions forecast requirements for their brigades and plan targets in support of their operations and only later (after the assignment of a mission to a specific brigade) pass the targets down to the brigade for refinement. These "placeholder" nominations serve an important role in the division planning process.

THE FIRE SUPPORT PLANNER

The division fire support planner is a part of an operational planning team (OPT) led by the division G5 to defeat enemy forces on a division-level objective. He or she assists the lead planner with input about available field artillery and air sup-

port for the attack, and this input is included in friendly and enemy-relative combat strength assessments to determine proper force ratios for the attack. The fire support planner details requirements for DIVARTY and air support, and creates FSCMs and ACMs to facilitate Fires engagement. Input is also provided to the division targeting officer, who plans targets in support of the attack, creates a division-echeloned HPTL and submits "placeholder" target nominations in support of the close fight of the brigades involved in the attack per G5's determined force ratios. The division commander sees these updated targeting efforts in the next target decision board, notes that the targeting effort supports the course of action produced through G5 and provides any needed refinement to the plan. The brigades receive an allocation of targets based on the "placeholder" nominations and the execution branch of the division Fires cell receives target lists, Fires assets and battlefield geometries already coordinated and ready to put into action.

This article has been formulaic and prescriptive for a reason. The lack of detailed guidance for how to operate within a division Fires cell has immediate impact on the ability of a division to employ Fires and integrate combined arms in general. Unlike other elements of the division staff which can "muddle through" problems while subordinate maneuver units engage the enemy, if the Fires cell does not operate effectively then Fires may shut down entirely. Multiple Launch Rocket System battalions assigned to support a division, for instance, have no way to engage enemy targets if the division Fires cell is not finding those targets and passing them to the firing unit.

The processes to plan and execute Fires at the division level described in this article are not meant to replace division standard operating procedures, but rather provide a framework for what should happen within the division Fires cell. The Army has a long road ahead of it. Regaining proficiency in fighting large-scale maneuver warfare and nailing down the specifics of the fire support system at division level is a key step on that road.

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UNDERSTANDING MODERN RUSSIAN WAR

Ubiquitous rocket, artillery to enable battlefield swarming, siege warfare

By Maj. Amos Fox
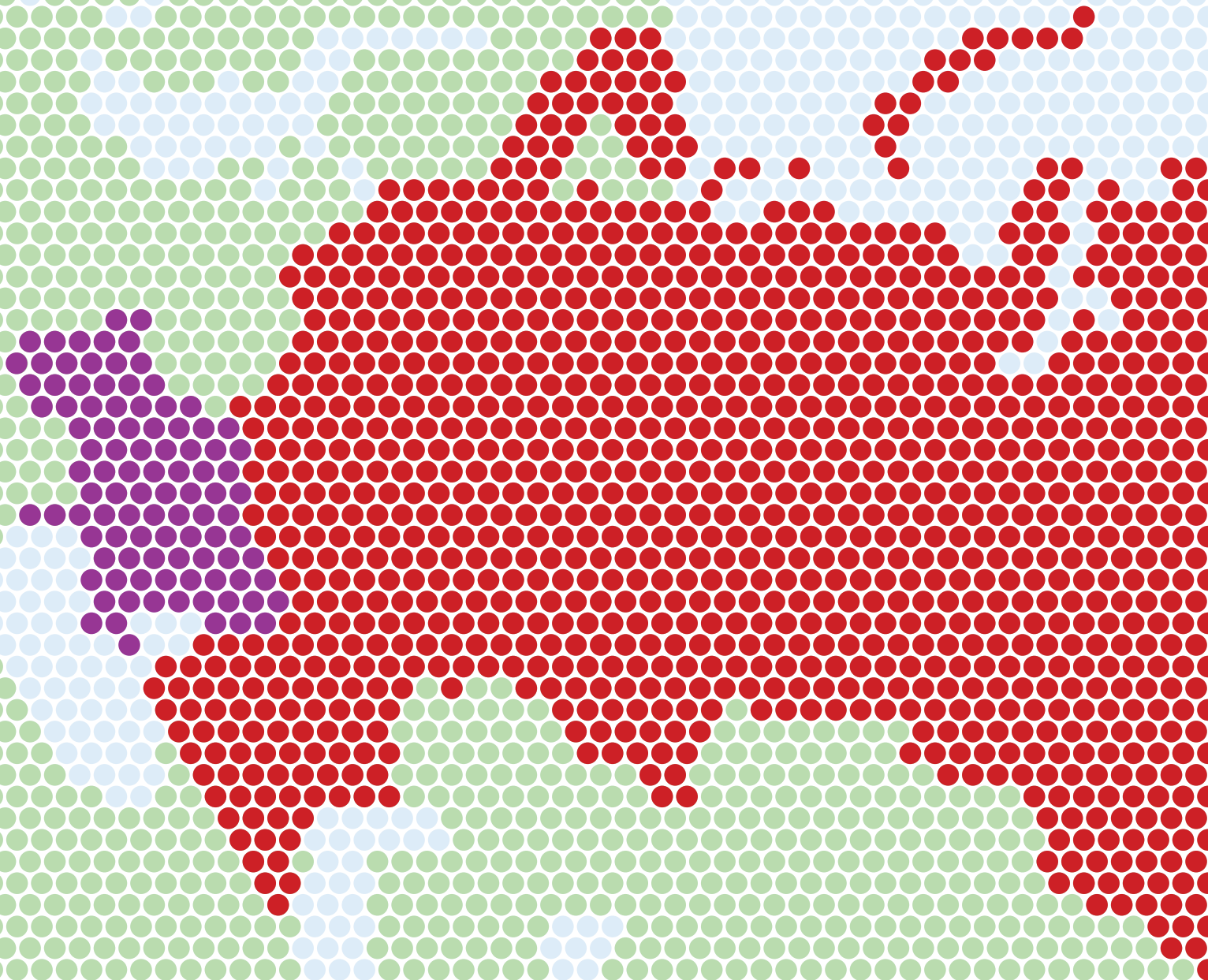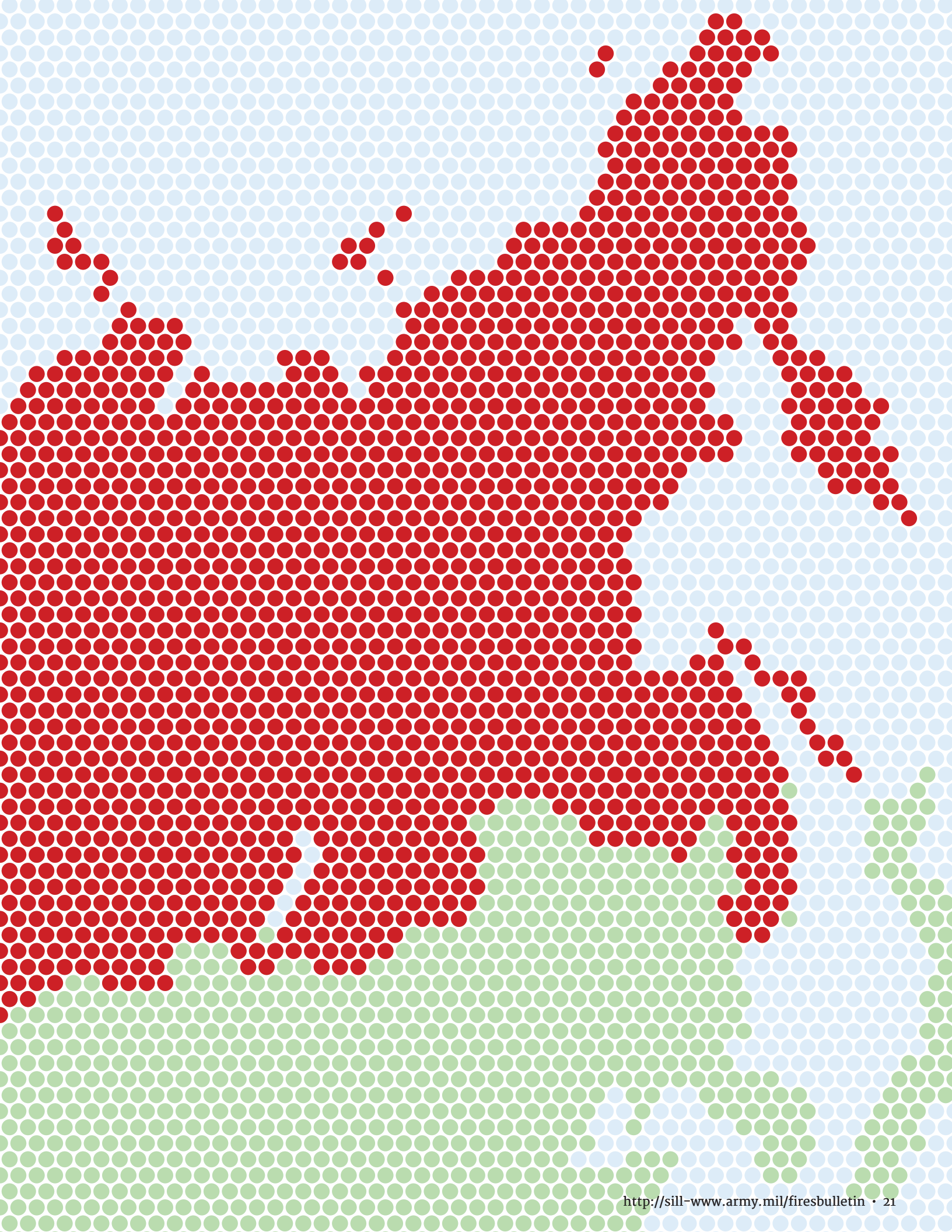
Russia's primary formation in the Russo-Ukrainian War is the battalion tactical group. The formation is dispersed and operates with near impunity beneath the anti-air/area denial umbrella Russia established in Eastern Europe.

A vast amount of information on the Russo-Ukrainian War has generated discussion within the U.S. Army as to the evolving character of contemporary and future war. That war includes the Crimean Campaign, which resulted in the Russian annexation of the peninsula, and the Donbas Campaign, which resulted in the Russian annexation of the Donbas region of Eastern Ukraine. These campaigns demonstrated many technological innovations. Current literature is replete with discussions of Russian cyber and electronic operations to neutralize mission command systems or influence information. However, a discussion of the conflict's conventional character is largely missing from this discourse. The battlefields in Eastern Ukraine are far more reminiscent of World War I than that of a digital battlefield fought with binary digits of ones and zeros. Russian forces continually exploit Ukrainian operational initiative in order to swarm those forces and then wage siege warfare on their opponent.[1] This paper expands the discussion of the Russo-Ukrainian War beyond the ruminations on technological innovation and instead focuses on the character of the conventional battles in the conflict, of which there are many.

RUSSIAN INNOVATIONS FOR MODERN WARFARE

Russia's primary formation in the Russo-Ukrainian War is the battalion tactical group. The formation is dispersed and operates with near impunity beneath the anti-air/area denial umbrella Russia established in Eastern Europe. The battalion tactical group is equipped to obtain zones of proximal dominance in relation to its position on the battlefield. It achieves this through its task organization, which consists of a tank company, three mechanized infantry companies, an anti-armor company, two-to-three artillery or multiple launch rocket system batteries, and two air defense batteries.[2] The formation's task organization allows Russian forces to achieve overmatch at nearly any time or place on the battlefield, in the air and on the land. In essence, the formation possesses far more combat power than a U.S. Army brigade combat team, regardless of type. Taking this idea a step further, the battalion tactical group possesses greater combat power than any Ukrainian brigade does, which is the basic fighting formation within the

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1   Thomas Gibbons-Neff, interviewed by Ryan Evans, War on the Rocks, August 26, 2015, accessed September 29, 2015, http://warontherocks.com/2015/08/podcast-infantry-combat-from-modern-ukraine-back-to-world-war-i/.

2   Phillip Karber, "The Russian Military Forum, Russia's Hybrid Warfare Campaign: Implications for Ukraine and Beyond" (lecture, Center for Strategic and International Studies, Washington DC, March, 10, 2015).

Ukrainian Army. The ability to achieve rapid local dominance in the air and on the ground – or to swarm, is an obvious Russian advantage. Russia, seeking to maintain a weak Ukraine, both physically and morally, uses the battalion tactical group to accomplish these objectives through an attritional strategy of siege warfare – eroding physical strength and will through the abrading of tangible Ukrainian means.

Tactical drones have been invaluable to the combined Russian-partisan effort in Donbas. The absence of organic cavalry formations in the region creates a reconnaissance vacuum that the Russians and partisans fill with drones. The drones, often in conjunction with unconventional reconnaissance forces, answer information requirements and observe areas of interest for respective commanders. The drones are linked directly to the battalion tactical group and can therefore quickly conjure torrents of rocket and artillery fire to support local offensives, or hastily disrupt opposition action.[3]

Furthermore, Russian action during the Donbas Campaign validated two ideas regarding its use of rockets and artillery. First, much like its history implies, Russia focuses on the offensive use of artillery and rockets to set the conditions for maneuver. Historically, Russia has used rocket and artillery fire to soften the resistance before committing ground forces, whereas the U.S. Army seeks to employ field artillery and mortars in coordination with maneuver forces.[4] The difference is discrete, but a difference nonetheless. Second, the Russians are not concerned with minimizing civilian casualties. This is likely for information purposes; the message being that the Ukrainian government and armed forces are incapable of protecting the local populace, thus resistance is futile.

SWARMING AND SIEGES IN EASTERN UKRAINE

The July 11, 2014, strike at Zelenopillya is perhaps the most noticeable example of the combined effects of tactical drones with the battalion tactical group and its organic Fires capabilities. The attack was a preemptive undertaking oriented on Ukrainian brigades. Those brigades were postured in assembly areas and prepared to conduct offensive action against Russian and partisan forces. Buzzing tactical drones and cyber-attacks targeted Ukrainian commu-

> An onslaught of rockets and artillery fell on the Ukrainian position shortly after the drones arrived, leaving 30 Ukrainian soldiers dead, hundreds more wounded, and over two battalions' worth of combat vehicles destroyed.

nications before the strike. An onslaught of rockets and artillery fell on the Ukrainian position shortly after the drones arrived, leaving 30 Ukrainian soldiers dead, hundreds more wounded, and over two battalions' worth of combat vehicles destroyed.[5] This strike created a ruckus within the U.S. Army, specifically in relation to the sophistication of Russian cyber capabilities and in the loss of field craft operating in a combat environment. This strike also highlighted the disparity in artillery and rocket munitions between Russia and the U.S. Army, in that Russia still possesses and employs a variety of munitions to include dual-purpose improved conventional munitions and thermobaric munitions.

The Battle of Ilovaisk followed on the heels of the strike at Zelenopillya. Ilovaisk, a critical line of communication linking the Donetsk People's Republic (DPR) with Russia via highway, was held by DPR partisans and Russian forces. In early August 2014, Ukrainian forces fed approximately eight battalions into the city, attempting to extricate Russian and partisan forces from Ilovaisk. Their effort achieved moderate success so by the end of August, Russia had to dispatch multiple battalion tactical groups from its Southern Military District

in Rostov-on-Don to regain control of the situation. In doing so, Russian forces encircled the town, isolating the Ukrainian forces and began to besiege their forces. Many Ukrainian soldiers reported hearing the distinctive buzz of Russian drones prior to the deluge of rocket and artillery fire.[6] They attempted to breakout of their beleaguered position several times, but were never successful. By the end of the month, Ukrainian forces were in a critical position, forcing their government to seek a political solution. This led to the Minsk Protocol Sept. 5, 2014. The agreement allowed for a peaceful withdrawal of Ukrainian forces along a corridor back to Ukrainian-held territory. However, Russian forces opened fire on the Ukrainian forces as they withdrew. The resulting carnage from the battle and the shooting gallery along the corridor yielded over 1,000 Ukrainian soldiers killed in action, hundreds more wounded, and scores of combat vehicles destroyed. The Battle of Ilovaisk was the bloodiest battle of the war for the Ukrainian Army.[7] The Minsk Protocol did little to inhibit combat operations and Russian operations continued.

The next major Russian siege was at the Second Battle of Donetsk Airport or "Little Stalingrad" to its Ukrainian de-

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3   Ibid.

4   John J. McGrath, Crossing the Line of Departure: Battle Command on the Move, A Historical Perspective (Fort Leavenworth, KS: Combat Studies Institute Press, 2006), 185.

5   Lukas Alpert, "Heavy Fighting Kills at Least 23 in Heavy Fighting in Ukraine," The Wall Street Journal, July 11, 2014, accessed, September 12, 2016, http://www.wsj.com/articles/rocket-attack- kills-at- least-30- ukrainian-soldiers-1405081318.

6   Jams Marson and Allen Cullison, "Ukraine Suffers Harsh Defeat in Eastern Town," Wall Street Journal, September 2, 2014, accessed September 13, 2016, http://www.wsj.com/articles /ukraine-suffers-harsh-defeat- in-eastern-town- 1409616541.

7   Ukraine Conflict: Fierce Battle for Town of Ilovaisk," BBC News, August 20, 2014, accessed September 13, 2016, http://ww.bbc.com/news/world-europe- 28866283.

Looking beyond Eastern Europe,one can find Russia employing a similar approach to war in Syria, specifically in Aleppo. Russian armed forces, in conjunction with Syrian allies, have encircled the city, cut all ingress and egress routes, and ruthlessly assaulted the city.

fenders, from September 2014 to January 2015. Russian forces sought to capitalize on Ukrainian initiative by allowing them to invest a considerable amount of force at the airport before encircling the facility with multiple battalion tactical groups. Once isolated, Russian forces and partisans began a slow, concentric squeeze on the Ukrainians controlling the airport, much of which consisted of incessant artillery and rockets fired. As their grip grew tighter, Russian and partisan forces entered and cleared terminals, hangers and other facilities in which Ukrainian forces were located. The combined Russian-partisan team employed tanks in an infantry-support role throughout the clearance operation, providing covered movement from objective to objective and mobile protected firepower to achieve local overmatch for infantry forces.[8] The battle ended with the airport destroyed and Ukrainian forces mauled. Ukraine suffered approximately 200 killed in action, 500 wounded and double-digit losses in tanks, infantry fighting vehicles, artillery and other combat vehicles.[9]

The Battle of Debal'tseve was the last major siege of the Russo-Ukrainian War. The battle, similar in many ways to the Battle of Ilovaisk, was fought for lines of communication which were critical to both sides in the conflict. The city of Debal'tseve's 25,000 inhabitants, was held by Ukrainian forces and was the furthest piece of Ukrainian-held territory. The city presented a salient into Russian and partisan controlled territory, which offered Russia an enticing opportunity to shore up its front lines.[10] On Jan. 14, 2015, Russian and partisan forces attacked to collapse the shoulders of the salient and encircled the Ukrainians controlling the city. Once isolated, Russian forces launched massive salvos of rocket and artillery fire at Ukrainian forces and on the city's infrastructure. To make matters worse, they cut power and utilities in the city, which created a humanitarian crisis within Debal'tseve. By the end of January, Russian offensive action coupled with the harsh Ukrainian winter led to the death of 6,000 citizens, while another 8,000 citizens fled.[11] The battle triggered the Minsk

II agreement Feb. 11, 2015, but fighting continued until Feb. 20, when the city fell to Russian and partisan forces. All told, the battle saw approximately 8,000 Ukrainian soldiers defeated by over 10,000 Russian and partisan forces. The Ukrainians suffered close to 200 killed in action, well over 500 wounded, and hundreds missing or captured.[12]

STRATEGY FOR POLITICAL DOMINANCE

The benefit of a siege is its ability to transfer military power into political progress, while obfuscating the associated costs. A rapid, violent decisive victory in which hundreds of Ukrainian soldiers are killed in a matter of days is counterproductive to Russia's offensive political goals, whereas the incremental use of violence over time accomplishes the same objectives with less disturbance to the international community. Imagine a formation of tanks driving through the desert. They can quickly get to an objective by driving full-throttle, but in doing so they kick up a large amount

8   TRADOC G-2, Threat Tactics Report: Russia (Fort Leavenworth, KS: 2015), 40-42).

9   Sergei L. Loiko, "How Ukraine's Outgunned 'Cyborgs' Lost Donestk Airport," Los Angeles Times, January 28, 2015, accessed September 16, 2016, http://www.latimes.com/world/la-fg- cl-ukraine-donestk-airport- 20150128-story.html.

10   Ukraine Conflict: Rebels Celebrate Victory in Debaltseve," CBC News, February 19, 2015, accessed September 17, 2015, http://www.cbc.ca/news/world/ukraine-conflict- rebels-celebrate- victory-in-debaltseve-1.2962875.

11   United Nations Office for the Coordination of Humanitarian Affairs, "Ukraine: Situation Report No. 29," February 27, 2015, accessed on September 29, 2016, http://www.unocha.org/2015/annualreport/2015annualreport.pdf.

12   Alec Luhn, "Ukrainian Soldiers Share Horrors of Debaltseve Battle After Stinging Defeat," The Guardian, February 18, 2015, accessed September 17, 2016, https://www.theguardian.com/world/2015/feb/18/ukrainian-soldiers-share- horrors-of- debaltseve-battle- after-stinging- defeat.

operational and tactical initiative. This is not to marginalize the influence of nascent technology, but to illuminate Russia's true tactics in war, which are obscured by the threat of their cyber, electronic and information capabilities.

The major battles of the conflict demonstrate the Russian siege is intrinsically linked to the overmatch and area-denial capability of the battalion tactical group. Moreover, the siege is a product of positional warfare, in which Russia uses movement to elicit a desired response from the Ukrainians, the purpose being to lure them into encirclement and then to slowly abrade their formations through siege warfare. A highly effective reconnaissance model that removes the intermediary to allow rapid and overwhelming indirect fire support enables Russian swarming action.

Looking beyond Eastern Europe, one can find Russia employing a similar approach to war in Syria, specifically in Aleppo. Russian armed forces, in conjunction with Syrian allies, have encircled the city, cut all ingress and egress routes, and ruthlessly assaulted the city.[15] This demonstrates that Russia's fondness for the siege is not unique to Ukraine, but permeates across its military. While the means and methods employed in Syria are different than those in Ukraine, the approach – use of the siege to achieve political ends – is the same.

Finally, it is critical to remember that the contemporary Russian Army is not the Red Army of long ago, nor is it the Iraqi Army of 1991 or 2003. The contemporary Russian Army is combat-experienced in combined arms maneuver at all echelons of command, a skill in which the U.S. Army is still working to recover after well over a decade of counterinsurgency operations in the Middle East.

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of dust, making the tanks and direction of travel observable. However, a formation of tanks moving slowly through the desert kicks up less dust, making its presence less noticeable and its intentions less discernable. "Dust clouds" on the battlefield are inevitable. How one marginalizes the influence of the dust cloud in pursuit of its political goals is the essence of good strategy. This is a key consideration in understanding Russia's proclivity for the siege.

As Russo-Ukrainian War illustrates, the battalion tactical group is the Russian tool for accomplishing tactical and operational objectives in a siege. In late September 2016, Gen. Valery Gerasimov, Chief of the General Staff of the Russian Armored Forces, announced the Russian Army would increase the number of battalion tactical groups from 66 to 125 by 2018. Additionally, professional soldiers will staff them whereas conscripts will be assigned to rear-echelon formations.[13] As a result, the U.S. Army can expect to find Russian battalion tactical groups in areas where Russian ground forces are employed to achieve political objectives.

Furthermore, the battalion tactical group enables battlefield swarming. Military analysts John Arquilla and David Ronfedlt said swarming has two require-ments: an adversary must be able to strike from multiple directions with small, mobile units that are tightly interconnected. In addition, elements within the "swarm force" must actively contribute to the intelligence picture, forming a "sensory organization."[14] Taking this idea a step further, the ability to swarm mandates a doctrine that supports it. Adequate information on the enemy's location and communication infrastructure enables dispersed forces to swarm (physically or through strike capability), long-range Fires (i.e. mobile rockets and self-propelled artillery), rapid mobility and successful command and control architecture. The battalion tactical group meets each of these preconditions and enables Russian forces to quickly achieve overmatch through swarming.

This understanding is vital to U.S. operational artists and planners. Without a clear understanding of how the enemy fights and how they organize to fight, plans are made on little more than speculation. The tactical character of the Russo-Ukrainian War is more reminiscent of the warfare in the early 1900s. Specifically, the Russian Army's Donbas Campaign is characterized by use of mobile rockets and self-propelled artillery to swarm and subsequently besiege Ukrainian forces to gain

13   "The Number of Battalion Groups Consisting of Contractors in the Russian Army to Reach 125 in Two Years," Military News-Russia, last modified September 14, 2016, accessed September 20, 2016, http://militarynews.ru/story.asp?rid=1&nid=425709.

14   John Arquilla and David Ronfeldt, Swarming and the Future of Conflict (Santa Monica, CA: RAND Corporation, 2000), 24.

15   Lyse Doucet, "Aleppo Siege: We Are Crying and Afraid," BBC News, December 3, 2016, accessed December 9, 2016, http://www.bbc.com/news/world-middle- east-38194962.

Crews load an M777A2 onto a C-130 Hercules. (Courtesy photo/U.S. Air Forces Central Command)

ADAPTING TOWED ARTILLERY TODAY TO MEET A NEAR-PEER COMPETITOR TOMORROW

By Capt. Kiernan Kane

Albeit fictional, the findings of the RAND Arroyo Center war games in 2014-2015 were astonishing. They pointed out how the U.S. and NATO allies would not be prepared for a conflict of a near-peer Russian invasion of the Baltic States.

WARGAME SCENARIO

Following the success of the attacks against Ukraine in 2014, Russia unexpectedly deploys their increased military capacity toward the Baltic States and invades the Estonian capital of Tallinn with-in 60 hours.[1] In response, the U.S. defends the NATO ally and rapidly deploys a light airborne brigade combat team from the 82nd Airborne Division Global Response Force within 96 hours.[2] The Russian-U.S. conflict is unfrozen, and the U.S. and its NATO allies are now in a full-scale campaign.

In the games, when a premier light airborne brigade-sized element faced a Russian adversary, not only were they outgunned, but they lacked sufficient mo-bility.[3] Moreover, the most responsive and light units, equipped with towed artillery systems, were seemingly ineffective in such a conflict. If life was given to the wargame, and mobilization to counter Russian aggression occurred, towed artillery could not meet this long-standing near-peer adversary due to vulnerabilities in range, mobility and responsiveness. Originating at the battery level there must be a different approach to tactics, techniques and procedures (TTPs).

1   David A. Shlapak and Michael Johnson, "Reinforcing Deterrence on NATO's Eastern Flank: Wargaming the Defense of the Baltics," RAND Corporation, accessed December 28, 2016, 1, http://www.rand.org/pubs/research_reports/RR1253.html.

2   Brig. Gen. Charles Flynn and Maj. Joshua Richardson, "Joint Operational Access and the Global Response Force: Redefining Readiness," Military Review, June 2013, 38, http://usacac.army.mil/.

3   Shlapak and Johnson, "Reinforcing Deterrence," 6.

Look no further than the events surrounding the Russian-Ukrainian conflict just three years ago as a framework for the operational environment. Lessons learned not only provide a capabilities laundry list for the Russian artillery systems, but paint a pragmatic picture of what critical vulnerabilities exist in our towed artillery systems. The battles encompassing the conflict depicted a heavier precedence of artillery and long-range coordinated strikes. In total, the engagements amounted to artillery being the culprit of nearly 85 percent of casualties on both sides.[4] The most alarming capability the Russian artillery possessed was the psychological effect of seamlessly eradicating their Ukrainian adversary in minutes with the massed destructive effect of their indirect Fires. For example, in Zelenopillya, "... in a combined [Multiple Launch Rocket System] and self-propelled artillery fire strike that lasted no more than three minutes, two Ukrainian mechanized battalions were virtually wiped out."[5] This is a stark reality those at the tactical level must come to terms with. Overwhelming sentiment by top U.S. officials are best summarized by the Senate Foreign Relations Committee, as "very concerned,"[6] considering the Russian actions against Ukraine and its antithesis of U.S. values. The timeframe to counter Russian actions via military deterrence has already begun. The most immediate, as of Jan. 9, 2017, being the deployment of personnel, tanks and self-propelled artillery to Poland.[7] The arrival of the resources is the beginning of nine-month rotations to send armor brigade-size elements to Europe — a clear deterrence signal that towed artillery is ill-suited for and the Army must adapt quickly.

In a Senate Armed Services Committee meeting on emerging threats, U.S. Army Chief of Staff Gen. Mark Milley stated that the U.S. Army is currently "outranged"[8] against a Russian adversary. Specifically, in regards to the proliferation of Russian ground-based artillery and surface-to-air missiles in the European theatre. The maximum range capability inherent to the light
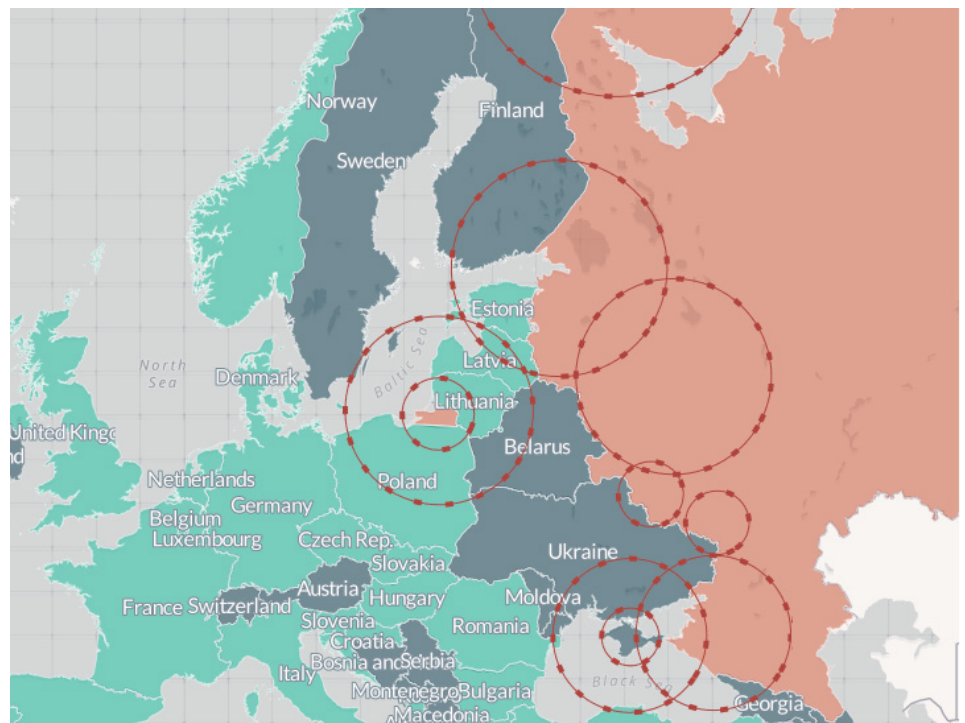

Figure 1. The Russia – NATO anti-access area denial environment. Source: Thomas Karako, "Looking East: European Air and Missile Defense."

towed artillery variant (M119A3) is approximately 19.5km.[9] Its medium brother, the M777A2, can reach out to 30km.[10] Although these ranges have been satisfactory in the domains of Afghanistan and Iraq, they are bulging vulnerabilities in an engagement against a near-peer competitor that can range out to 100km.[11] Moreover, to bring these towed artillery systems in during later stages of conflict would prove overly risky due to the Russian surface-to-air missile systems (Figure 1)[12] that threaten freedom of movement in the air domain. Hamstrung by range, towed artillery would move under constant threat of Russian ground-based artillery or surface-to-air missiles to be able to range the enemy. Due to this vulnerability, many U.S. allies in Europe transitioned artillery systems to circumvent threats posed by the Russians. In Germany, for example, the PzH2000 artillery platform has a 52-caliber cannon, compared

to the U.S. standard 39-caliber, which provides greater lethality and increased range up to 60km.[13] Acquisitions stateside have increased the range of the M777A2 medium-towed artillery platform to 70km.[14] However, with a lagging acquisitions process the answers to these shortfalls in proven weapon systems are up to those at the tactical level in the short term, specifically, at the battery level. A historical example of an army using a creative solution would be the Chechens who trained and adapted in the mid-1990s to combat the lethal range of Russian artillery by "hugging,"[15]or getting close to the Russian platforms to negate the superior Russian range capability. Because tactical units cannot wait for technology to overcome range dilemmas, they must use their time as stated in Field Manual 7-0, "Training for Full Spectrum Operations," to understand the environment and attempt to replicate the operational environment

4   Dr. Phillip A. Karber, "Lessons Learned from the Russo-Ukrainian War," Potomac Foundation, accessed October 2, 2016, 10, https://prodev2go.files.wordpress.com/2015/10/rus-ukr-lessons-draft.pdf.

5   Ibid., 18.

6   Heather A. Conley et al., "Transatlantic Forum on Russia," Center for Strategic International Studies, November 17, 2016, https://www.csis.org/events/transatlantic-forum-russia-0.html.

7   Staff Sgt. Elizabeth Tarr, "4th ID Crosses the Border into Poland after Three-Day Convoy," U.S. Army, January 12, 2017, https://www.army.mil/.

8   Jen Judsen, "U.S. Army Chief Sounds Alarm: Military at 'High Risk'," Defense News, April 7, 2016, http://www.defensenews.com/.

9   United States Army Combined Arms Center, JFIRE, ATP 3-09.32 (Fort Leavenworth, KS, 30 November 2012), 37.

10   Ibid., 37

11   John Gordon et al., "Comparing U.S. Army Systems with Foreign Counterparts: Identifying Possible Capability Gaps and Insights from Other Armies," RAND Cooperation, last modified January 24, 2017, xvi, http://www.rand.org/.

12   Thomas Karako, "Looking East: European Air and Missile Defense after Warsaw," quoted in Ian Williams, "The Russia- NATO A2AD Environment," Center for Strategic International Studies, July 14, 2016, https://missilethreat.csis.org/russia-nato-a2ad-environment/.

13   Gordon et al., "Comparing U.S. Army Systems with Foreign Counterparts," 22.

14   Lauren Poindexter, "Picatinny Engineers Seek to Double Range of Modified Howitzer," U.S. Army, March 17, 2016, https://www.army.mil/.

15   Lester W. Grau and Timothy L. Thomas, "Russian Lessons Learned from the Battles for Gozny," U.S. Army Foreign Military Studies Office, accessed Oct. 2, 2016, http://fmso.leavenworth.army.mil/.

in training.[16] Moreover, to break through the vulnerabilities in range, there must be disaggregated movement training focused on mobility and responsiveness to ensure artillery survivability. This translates to successful mission command where junior leaders at the platoon level have the trust from their chain of command to quickly execute within the framework of their commander's intent.[17]

Decade old howitzer firing tables for both towed artillery systems (M119A3 and M777A2) have requirements that prevent both platforms survival against a near-peer competitor. Currently, the acceptable time for towed artillery is up to eight minutes to emplace one howitzer and be prepared to fire.[18] In comparison, a German platoon of four PzH2000's cannons can emplace and deliver 120 shells in half the time.[19] The issue of time is exacerbated when an entire battery of six U.S. howitzers must emplace. Battery emplacements are the standard form of employing towed artillery to best support a battalion-sized maneuver element on the ground.[20] However, a battery position area for artillery (PAA) takes up a large footprint and is highly vulnerable to near-peer acquisition assets. Although the mass effect of six guns is sacrificed, the focus should transition from battery operations to platoon operations in engagements against more lethal ground-based artillery systems. Look no further than our competitor, Russia, who evolved their employment of artillery systems to allow for greater mobility and responsiveness. Historically known for linear formations and authoritative decision-making, Russian artillery adopted distributed areas for artillery that focus on shoot and move tactics to "... reduce the time in fire missions"[21] or in one location. The result of these tactical developments is a revival of timely, accurate and destructive Russian artillery that unveils current gaps in the employment of U.S. towed artillery. To prepare for a near-peer threat, training should focus on platoon-level mobility and responsiveness. Ultimately, an initial reliance on artillery survivability through quicker movements on the battlefield is the goal to break through range vulnerabilities to mass Fires at a point that is decisive. In addition, leveraging a battery's modular table of equipment with the assets that exist and determining new applications to aid in mobility is paramount. For example, the RQ-11 Raven unmanned aerial vehicle should be used in training for beyond line-of-sight in finding suitable PAAs. The end state is to adopt a shoot and move mindset with the RQ-11 providing platoons more fluid movements in between PAAs. Towed artillery's critical vulnerabilities can be solved today in the training we conduct. However, to succeed against a more lethal force, we must be creative in our approach with the doctrine and equipment already at our disposal.

The first step in solving a problem is admitting there is one. In the case of towed artillery, proponents for the platforms acknowledge pundits who state, "... towed artillery is too exposed on the battlefield, takes too long to get in and out of action and relies on vulnerable [vehicles] to move it any distance."[22] Understanding that towed artillery has its vulnerabilities, the pay offs of the system and its performance in the areas U.S. forces have been operating for nearly two decades affords an explanation to why its capabilities are still relevant. The primary reason, as the author for "Towed Artillery- Range and Light Weight Is the Motto" states, "... [is] the ability to transport the system over long distances much more easily than its self-propelled counterparts, most notably when rapid deployment and special forces are involved."[23] Although these systems are light enough to be transported via select type/model/series rotary wing aircraft as well as parachuted in via C-130J/C-130H/C-17 Globemaster III aircraft, this by no means accounts for the immense preparatory time that is inherent in either of these maneuvers. Conducting air raids, air assaults and parachute operations with towed artillery, these gargantuan tasks are by no means assisting towed artillery in becoming more mobile and responsive. For parachute operations, the outdated day and night standards allows up to 50 minutes[24] from landing on the drop zone to be in position to fire the first round. Even if this time standard was met, which is rarely the case, the towed artillery howitzer would not be able to provide responsive fire support to the ground scheme of maneuver. See the previous example of Russian artillery destroying two Ukrainian mechanized battalions in no less than three minutes[25] and the need to be mobile is apparent. The towed artillery systems in their current state are incapable to meet a near-peer adversary in the short term. However, there is still hope to revive the platform, if leaders at the battery level train creative TTP's.

The real challenge occurs when there is not a full understanding of the operational environment and how current TTPs and equipment might otherwise be vulnerabilities. In regards to towed artillery platforms, the capabilities in range, mobility and responsiveness have proven themselves in the domains the military has found itself in the past two decades. However, against a near-peer competitor, the advantages once enjoyed will no longer exist in tomorrow's operational environment. The character of war is constantly evolving and failure is remaining stagnate in how towed artillery is employed. There currently is no technical solution or developments to make up for the vulnerabilities that towed artillery faces against a near-peer. Thus, creative TTP's applied alongside maneuver warfare doctrine must be leveraged to facilitate flexible decision making and execution by our junior leaders at the platoon level. When unconventional methodologies, coupled with an understanding of a near-peer competitor, get trained today they might be our only saving grace to meet inevitable threats tomorrow.

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16   Headquarters Department of the Army, Training for Full Spectrum Operations, FM 7-0 (Washington, DC: Department of the Army, 12 December 2008), 9.

17   Headquarters US Marine Corps, Warfighting, MCDP 1 (Washington, DC: US Marine Corps, June 30, 1991), 58.

18   Headquarters Department of the Army, Field Artillery Gunnery, FM 3-09.8 (Washington, DC: Department of the Army, July 31, 2006), 4-65.

19   Gordon et al., "Comparing U.S. Army Systems with Foreign Counterparts," 23.

20   Headquarters Department of the Army, Tactics, Techniques, and Procedures for The Field Artillery Cannon Battery, FM 6-50 (Washington, DC: Department of the Army, Dec. 23, 1996), 17.

21   Capt. Keith W. Dayton, "Field Artillery Survivability: The Soviet Perspective." U.S. Army Russian Institute. Garmisch, Germany, 1981, 8.

22   "Towed Artillery - Range and Light Weight is the Motto," Armada International 27, no. 4 (Aug, 2003): 54, https://search-proquest-com.lomc.idm.oclc.org/docview/197083900?accountid=14746.

23   Ibid., 55.

24   Headquarters Department of the Army, Field Artillery Gunnery, 4-78.

25   Karber, "Lessons Learned," 18.

Cyber as a Fires function
An evolution in cyber Fires support

By Lt. Col. Tim Cochran

At what level does cyber Fires become an option for the tactical commander? It's a question I asked of my peers when entering the cyber community. The answer I heard was "Cyber is too important to allow at the tactical level. We don't know the collateral effects," or "We work at the national level not the battalion or company level."

While both statements are somewhat correct, I offer that cyber has a tactical capability and should be brought to bear as a function of non-lethal Fires at echelons corps and below. This shift supports the Cyber Command commander's intent of "planning, coordinating, integrating, synchronizing and conducting activities … prepare to, and when directed, conduct full spectrum military cyberspace operations in order to enable actions in all domains, ensure U.S./allied freedom of action in cyberspace and deny the same to our adversaries."[1] Empowering echelons at corps (and below), enables Army cyber to take a more relevant role in support of commanders in the field.

As a cyber Fires officer for Joint Forces Headquarters-Army, I was privileged to see cyber support at the strategic level from afar at CYBERCOM updates and discussions supporting national defensive and offensive priorities. Additionally, I saw it at the operational level, where the majority of cyber support from CYBERCOM rests with the Joint Force Headquarters-Cyber (Marine Corps Forces, Army, Air Force and Navy) each supporting different combatant commands. I was also lucky to be a small part of these operational cyber employments, coordinating command and control processes for effective timing and tempo. But it was a deployment with Combined Joint Task Force, Operation Inherent Resolve (CJTF-OIR) where I observed cyber support for the division achieved as a function of Fires processes; generating a request supporting the divisional commander's objectives, prioritizing high payoff functions and coordinating the request through supporting headquarters for cyber effects. Cyber has a place at the corps and below, and Cyber Branch should strive to ensure cyber professionals are included in the manning process within the Fires warfighting function.

Combined Joint Task Force, OIR has successfully integrated cyber effects into Fires planning much in line with Chairman of the Joint Chiefs of Staff Gen. Joseph Dunford's February 2016 remark on cyber usage in CJTF-OIR, "We are trying to both physically and virtually isolate ISIL. Limit their ability to conduct command and control, limit their ability to communicate with each other and limit their ability to conduct operations locally and tactically."[2]

The task force is currently the only corps echelon manned with a cyber cell focused on tactical and operational level cyber effects. Arguably, CJTF-OIR is a test bed for integrating cyber effects into the tactical commander's fire support plan and communicating cyber effects at the corps level and below.

As part of the corps Fires directorate, a cyber cell at corps would consist of four cyber professionals: one cyber operations officer in charge (major or lieutenant colonel), one cyber operations technician warrant officer, one field artillery technician warrant officer and one cyber operations specialist noncommissioned officer.

Combined Joint Task Force-OIR uses this model as the core of the cyber planning and coordination cell, and has directed electronic warfare officers in their subordinate divisional non-lethal Fires cells to perform the functions of cyber planners. Viewing cyber effects no differently than other non-lethal Fires, the results have been phenomenal, creating an increased visibility and demand for tactical cyber at the divisional and task force level.
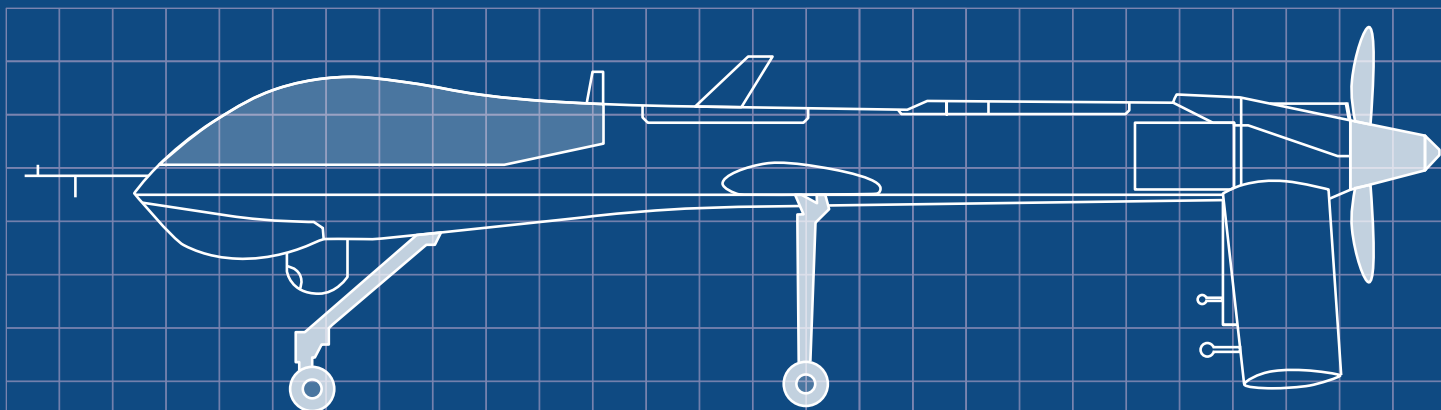
So what would support at the corps and below mean for the Army Cyber Branch in general? It requires a paradigm shift from general support to the Army as a whole, to direct support of corps and below in cyber mission development and all the supporting functions that go with that shift in thinking. It means growing the cyber force beyond developing technically sound leaders into cyber professionals, but also harnessing the contributions of tactically honed combat arms experience that can translate cyber capabilities into cyber effects in the field. Along with that tactical and technical experience comes the experience to integrate cyber capabilities into existing joint Fires processes.

By "powering-down" cyber leaders to corps and below, it enables maneuver forces to harness capabilities in the cyber domain. Operations in the Middle East have proven that the model can work, and cyber effects are not solely for national and operational levels of war. As we continue to fight in the cyber domain, tactical commanders will be compelled to use offensive cyber to their advantage, and our cyber corps must adapt to this need. If we do not, we will surely become irrelevant to the maneuver force at large.

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1   https://www.stratcom.mil/factsheets/2/Cyber_Command/

2   http://dailycaller.com/2016/02/29/secdef-us-military-hackers-are-limiting-isis-locally-and-tactically/#ixzz4DQwV8Xyu

HOW THE 3RD COMBAT AVIATION INTEGRATED THE GRAY EAGLE FIRES SYSTEM

By Capt. William Neltner, Maj. Nathan Applebaum and Chief Warrant Officer 2 Barry Galinger II

The U.S. military has used unmanned aerial vehicles (UAVs) for reconnaissance and precision strike purposes in the counter-insurgency (COIN) fight for almost two decades. From humble beginnings, the UAV platforms have progressed in both capabilities and capacities. The systems became more ubiquitous with various platforms in the U.S. Army down to the battalion level.

Today, the United States is not the only country to have UAVs and while the American military has focused on their use in the COIN fight, other nations have made the tactical leap of implementing their systems into high intensity conflict (HIC). In his July 2015 paper discussing lessons learned from the current Ukrainian conflict, Dr. Philip Karbler describes when Russian forces began their July, 2014, intervention in the Donbas region. They deployed multiple versions of UAVs, from small quad copters to fixed-wing long-range systems, each with different tactical and operational missions. Of note, Karbler described how the short-range and medium-range systems were tied to field artillery systems such as the BM-21 Multiple Launch Rocket System, Urgans and Smerchs, often with less than 15 minutes between the UAV acquiring the target and the Ukrainian unit being attacked by medium and long range artillery. Karbler states, "The surprising thing about the Russian use of drones is … their ability to combine multiple-sensing platforms into a real-time targeting system for massed, not precision, fire strikes."

While Karbler describes some room for improvement in processes and techniques, the Russians are developing the capability to extend the eyes of the field artillery team as far as their arms can reach. The question is, how does the United States not only match, but regain superiority in this critical field?

In 2013, the 3rd Combat Aviation Brigade, 3rd Infantry Division received nine Gray Eagles. Immediately, 3rd CAB and 3rd ID seized the advantages a medium altitude, long endurance unmanned aerial system could provide the division in a decisive action training environment (DATE) or HIC fight. The Gray Eagle's ability to remain on station for long periods of time, armed with up to four AGM-114 Hellfire missiles provided 3rd ID with the capability of organic reconnaissance assets that ranged the deep fight along with a limited precision strike capability for high payoff targets.

Additionally, depending on mission requirements, 3rd ID often chose to extend the range of the system by forgoing or reducing the armament carried. With the refocus to DATE/HIC fight, the reconnaissance and targeting capabilities of the Gray Eagle are a greater asset than the precision strike capability of a Hellfire missile. This requires the effective integration of the Gray Eagle's reconnaissance ability with timely and accurate effects. With support from 3rd ID's division artillery (DIVARTY) and linking the Gray Eagle directly to the Advanced Field Artillery Tactical Data System (AFATDS), 3rd CAB and 3rd ID are able to increase the capacity for the division to shape the battlefield, particularly in the deep fight.

As one of the few organic assets capable of observing the deep fight for a division, Gray Eagle's ability to loiter at extended ranges allows the division to observe enemy threats prior to ground or air maneuver forces engaging the enemy. This allows 3rd ID DIVARTY and 3rd CAB attack battalions to effectively shape the fight and help deliver success. In the current developed theaters of a COIN fight, communications between Gray Eagle and the supported unit is not an issue. The Gray Eagle operator can use Secure Voice over Internet Protocol (SVOIP), chat programs, and Command Post of the Future (CPoF) to provide situational awareness to a static, developed command post.

However, in the DATE/HIC fight, maneuver forces operating in the expeditionary mode without stationary command posts often lack the time and ability to use the workaround systems the military has employed for the last 15 years. At 3rd CAB, this shortcoming was revealed during training simulations resulting in increased mission processing time and targets going unprocessed due to exceeding target decay time.

The process was as follows: Gray Eagle operators identified a valid target, began processing a call for fire (CFF) through SVOIP, chat programs, or CPoF to 3rd ID current operations (CUOPS) Fires cell. Third ID CUOPS then pulled Gray Eagle's feed and confirmed the validity of the target. Following that, CUOPS entered the CFF into AFATDS and began the digital process to the firing unit. This sequence during lull periods led to an average of 15 minutes from the input of the CFF to the confirmation of shot. Often during periods with multiple missions or multiple targets from Gray Eagles, the mission processing times extend past acceptable decay times, resulting in missions never being fired.

Longer fire mission processing equates to decreased ability to observe other parts of named areas of interest (NAIs), decreased loiter time over secondary objectives, and a decrease in the ability of the division to effectively shape the battlefield.

With the need to reduce the mission processing time in a DATE/HIC fight clearly identified, 3rd CAB element (FSE) set about integrating the Gray Eagle's observation ability with 3rd ID DIVARTY's ability to deliver timely and accurate Fires by linking the Gray Eagle directly to the AFATDS through the Fires Command Web and giving the Gray Eagle operator a digital call for fire capability. The Fires Command Web allows up to 15 Secure Internet Protocol Router (SIPR) systems (laptop or CPoF) to link into the AFATDS. This program allows the Gray Eagle operator to generate a priority fire mission directly to AFATDS through a SIPR system (with Internet Explorer) digitally linked to AFATDS.

The Gray Eagle operator then inputs the digital call for fire to AFATDS at the Gray Eagle command post. The brigade AFATDS operator processes the mission, checking against the AFATDS, Tactical Airspace Integration System (TAIS), and air and missile defense workstation for fire support coordination measure violations and air space issues. Any violations of geometries in AFATDS or air space issues from TAIS will alert the operator requesting further coordination. Depending on the Gray Eagle operator's abilities and understanding of the commander's guidance, the digital CFF system allows the specification of the number and disposition on enemy forces, requesting of specific munition types and the type of weapon systems to fire. After the target is successfully transmitted to the AFATDS, a tab appears on the top of the Internet Explorer window with the target information allowing for immediate re-attack as needed.

This process was tested first during an internal 3rd ID simulation exercise and later at Joint Readiness Training Center Rotation 16-09, where E Company, 3rd Combat Aviation Brigade supported 3rd Infantry Brigade Combat Team, 82nd Airborne Division's rotation with Gray Eagles. During the command post exercise, the mission processing time was reduced from an average of over 15 minutes to under seven

minutes with a best time of four and a half minutes. The CFF was sent from the Gray Eagle operator to 3rd CAB fire support element, then to the DIVARTY fire control officer (FCO) with an information copy sent to division FSE. The clearance of fire procedure was executed by division FSE at the same time the DIVARTY FCO was sending a "do not load mission" to the battery FDC. When clearance checks were complete, the "cancel do not load" was sent and the mission fired. Third ID was able to engage multiple target sets throughout the division's battlespace with both direct support and general support artillery utilizing targeting data from the Gray Eagle and the process described above. At JRTC Rotation 16-09, 3rd CAB further proved the Gray Eagle digital CFF concept by connecting the Gray Eagle operator to the 3rd IBCT FCO using a standalone SIPR computer inside the Gray Eagle command post.

As with any new technique, the Gray Eagle digital CFF processing capability does have some risks. First, digital CFF from multiple Gray Eagles increases the possibility of overwhelming an undermanned CAB FSE, which will increase the mission processing time. Currently, 3rd CAB utilizes two personnel: a senior fire support non-commissioned officer and fire support specialist in order to effectively man and track fire mission processing. During high-tempo mission processing times, the assistant fire support officer assists in synchronizing assets with 3rd ID CUOPS and DIVARTY while the NCO assists in the clearance of Fires with the CAB's lift battalions (only attack battalions are MTOE'd, modification table of organization and equipment). During jump command post operations, the FSE personnel are reduced and can be overwhelmed by sustained high-tempo fire missions.

The next identified risk is Gray Eagle operators are non-standard observers. As such, Gray Eagle operators require CFF training and a basic understanding of the high payoff target list, target sync matrix, target list worksheet, and attack guidance matrix. Lack of training results in the CAB/division FSEs spending additional time checking the Gray Eagle operator's CFF for correctness. The 3rd CAB FSE mitigated that through sustained training and direct interaction of the Gray Eagle operators.

The final major risk is the Fires Command Web system hardware connection has limitations that are unavoidable with the current configuration. If FDS or DDS are non-mission capable due to server maintenance or disruption to the satellite transportable terminal connection, then the Gray Eagle operator loses the ability to send fire missions digitally.

As discussed earlier, potential adversaries have the capability to link tactical and operational UAV's into their Fires team. This gives them an advantage over foes who do not possess that capability. Third CAB FSE, as part of the 3rd ID Fires team, identified the systems, tactics and techniques needed to complete the digital Fires chain and exploit Gray Eagle's capabilities as part of the Fires team. Currently the 3rd CAB FSE is working on expanding this capability into Shadow UAVs.

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Maj. Nathan Applebaum is the 3rd Combat Aviation Brigade fire support officer. Previous assignments include serving as 3rd Infantry Division battle major and G5 plans officer at Fort Stewart, Ga. He also served as 4th Battlefield Coordination Detachment operations officer at Shaw Air Force Base, S.C., and Al Udied, Qatar. At Fort Sill, Okla., Applebaum was a gunnery instructor; Headquarters, and Headquarters Battery, 2nd Battalion, 4th Field Artillery commander; deployed as a security force assistance team advisor to Afghanistan, and upon redeployment served as for 214th Fires Brigade assistant S3.

Chief Warrant Officer 2 Barry Galinger II is the 3rd Combat Aviation Brigade targeting officer. Previous assignments include 4th Brigade Combat Team, 3rd Infantry Division targeting officer, and the 4th Infantry Brigade Combat Team, 25th Infantry Division (AIRBORNE) targeting analyst.

Answering the small unmanned aerial system challenge in a DSCA environment

By Maj. Alexi Franklin

ENEMY
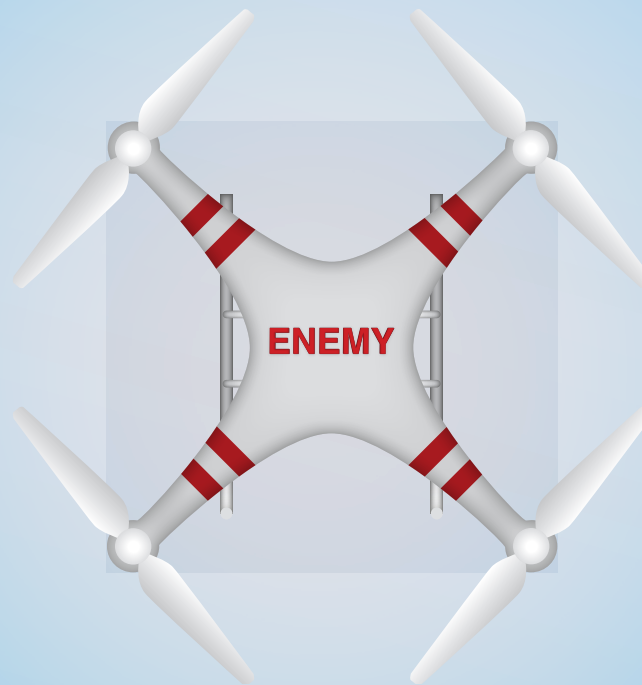
During my time on a National Guard Weapons of Mass Destruction (WMD) Civil Support Team, I helped support WMD monitoring at major events like the Pope's 2015 visit, the 2016 Democratic National Convention, and the commissioning of the U.S.S. Zumwalt. At a planning conference for one such event, the tabletop exercise was a hypothetical response to a small UAS spraying an unknown substance. Out of the dozens of multiple federal, state and local authorities assembled, there was no clear organizational lead, nor was any viable course of action presented. The conclusion was a collective shrug.

Despite warning signs like this, we are failing to field a domestic response capability to this growing threat. The World Trade Center was attacked in 1993, but it took the same building being attacked in 2001 to cause a significant change to U.S. Department of Homeland Security's posture. When it comes to facing the small UAS challenge, we are living in that gap.

Small unmanned aerial systems (UAS) have already gotten disturbingly close to national political figures. A fringe German political party crash-landed a drone feet away from German Chancellor Angela Merkel Sept. 15, 2013. A couple years later a two-pound drone landed on the White House lawn after Secret Service agents were unable to bring it down Jan. 26, 2015.

Small UAS have also been used to carry dangerous chemical, biological, radiological and nuclear (CBRN) materials. A protestor flew a drone, carrying a sample of sand from Fukushima containing radioactive Cesium 134 and 137 April 9, 2015, onto the roof of the Japanese prime minister's office. The drone was discovered, by accident, April 22. Dà-Jiāng Innovations Science and Technology Company in China sells an agricultural drone with a 10-liter tank that can cover up to 10 acres in an hour with pesticides. In comparison, the Aum Shinryko subway attack killed 12 people and injured over 4,000 with only 24 liters of Sarin.

Small UAS also cause issues for local law enforcement. Police officers shot down a privately owned drone — technically a federal offense — that was flying near a Dakota access pipeline protest Oct. 23, 2016. Following the downing, the Federal Aviation Administration emplaced a flight ban on the area and the North Dakota National Guard fielded an Avenger missile system to the protest site in January of this year.

The FAA enacted rules in 2016 that require mandatory training and registration for any small UAS from .55 to 55 pounds, with increased regulations for larger UAS, or UAS for commercial purposes. The guidelines also direct that small UAS operators remain within line of sight of their UAS, only fly during the day, respect no-fly zones and follow other common-sense restrictions.

This addresses most of the "good actor" small UAS operators. For the "bad actor," a variety of counter-UAS technologies exist to include acoustic and radio frequency detection systems, firmware fencing, electronic countermeasures, rifle-fired nets, anti-UAS, and even trained falcons. But the legal framework to guide their use and the tactical doctrine to employ them has not been adapted. We cannot make the perfect enemy of the good and wait to develop a one-size-fits-all solution to the small UAS problem instead of codifying how to use what we have now.

Current response operations

The National Guard's Weapons of Mass Destruction Civil Support Teams (WMD-CST) is made of 22-servicemembers (both Army and Air Guard), active guard and Reserve units chartered to provide state-controlled, Department of Defense-trained, CBRN detection and response in support of state and local governments. All members of the team are trained hazardous materials technicians with hundreds of hours of additional specialized training. A total of 57 civil support teams (CSTs) currently exist, one per state and territory with an additional team in Florida, New York and California. The Title 32 status enables DoD standardization and training while permitting unfettered state-level use, specifically for

use in concert with local law enforcement without posse comitatus conflicts.

Each team consists of a survey section that conducts contaminated area operations; a communications section to facilitate downrange operations and technical reach back; a medical section to treat team members and serve as on-scene CBRN medicine advisors; an analytical section to run the unit's mobile laboratory, as well as supporting support; operations and command sections. CST's regularly provide standby support at events of state or national significance, assist state and local law enforcement on routine presence patrols, offer training and expertise to government and industry and are prepared to respond (on short notice) to real-world emergencies. Much of the intent and doctrinal framework that exists for the CST's (as outlined in National Guard Regulation 500-3, "Weapons of Mass Destruction Civil Support Team Management" and Field Manual 3-11.22, "Weapons of Mass Destruction–Civil Support Team Operations" could be adapted to a domestic air defense application.

Possible approach

Similar to the National Guard's WMD civil support teams, the DoD could field National Guard air defense artillery civil support teams. In this hypothetical construct, the leadership and personnel on the teams would be staffed by ADA Soldiers. While this problem is not currently a core mission of the ADA, the branch has the institutional mindset of fighting a three-dimensional battle from the ground and is the best proponent to face this new challenge.

Doctrine and training would have to be developed by the Fires Center of Excellence, specifically tailored with Defense Support of Civil Authorities (DSCA) considerations and the small UAS threat in mind. Similar to the WMD-CSTs, all team members would go through an additional skill identifier or special qualifications identifier training program tailored to the mission. This would also ensure a baseline of interoperability, minimum qualification and assist in personnel management.

Existing facility space likely exists at Fort Sill, Okla., that could support this additional requirement. Within the states, assigning armory space for a small team would not be extremely onerous. Finding local training areas may prove contentious, but the security benefits offered by such a team would hopefully overcome any state, local or federal issues in a given jurisdiction. However, practicing in an open field away from prying eyes is not good enough. States would have to train and exercise in built-up areas in order to prepare for the difficulty of conducting operations while coping with operational security, radio frequency, airspace and physical challenges.

The organization of a proposed air defense artillery civil support team (ADA-CST) could counter the small UAS threat. As envisioned, the core, operational element of the team would consist of three squads, with a squad leader overseeing a two-service member "killer" fire team and a two-service member "hunter" fire team. The ADA civil support teams would require a robust communications capability in order to communicate with first responders and to provide a technical reach-back capacity. It would be less than that of a WMD-CST as the WMD-CST's communications package is intended to work in the aftermath of a catastrophic WMD incident. Without the need for medical or analytical sections, additional personnel could be devoted to both the operational elements of the team and to assuming the key airspace management and airspace control systems that would be essential to the safe and effective employment of the team.

Three squads would allow for a "red/white/blue" readiness model with one team on standby at all times. Squads could be immediately dispatched throughout the state to support emergencies, provide standby support during holidays or special events, or advise local law enforcement, industry or private citizens on best practices. Similar to the WMD-CSTs, each team would belong to a Federal Emergency Management Agency region and would operate on a "bronze/silver/gold" readiness model to support emergencies in nearby states.

Teams would not employ standard, doctrinal air defense artillery materiel solutions to destroy threat UAS in a DSCA setting due both to safety considerations and a capability mismatch between the small UAS threat and equipment designed to shoot down large airframes with considerable heat signatures. Rather, teams would receive a suite of technology ranging from high-tech electronic warfare solutions to low-tech less-than-lethal shotgun rounds. This would tailor their force posture to the threat level and environment and to provide redundancy.

Policy implications are potentially the most difficult hurdle to overcome. Commercial airports, local law enforcement, homeowners or stateside military units need clear rules of the use of force, tactics, techniques and procedures (TTPs) to be employed in counter-UAS operations, with emphasis on potential WMD delivery devices. A working group comprised of a variety of actors—DoD, Department of Homeland Security, FAA, Federal Communication Commission (FCC), as well as state and local officials, industry, international partners, and the do-it-yourself and UAS operator communities — must convene and clarify the way forward.

In addition to responding to incidents or pre-positioning at special events, ADA-CSTs could serve as the state-level, one-stop solution to resolve potential FCC and FAA conflicts while actively mitigating the domestic threat. Rather than relying on multiple federal, state and local agencies to field their own equipment, develop their own tactics, and ensure their counter-UAS programs met FCC and FAA requirements, these considerations could be "baked in" from the birth of the ADA-CST. Some federal, state and local law enforcement would undoubtedly still want to possess their own counter-UAS capabilities, and the ADA-CST could serve as the local clearinghouse for TTPs, best practices, training and civil compliance.

As an alternative to growing force structure, the existing National Guard CBRN Response Enterprise – the Homeland Response Force (HRF), CBRNE Enhanced Response Force Package (CERF-P), or the WMD-CSTs could be furnished the equipment and training necessary to assume this mission. However, of those organizations, the WMD-CSTs are the only all-air to ground ranging force capable of a rapid response. WMD-CSTs are already extensively utilized, stretched thin both operationally and intellectually, required to maintain a robust in-house knowledge and certifications to respond to both standard and non-standard CBRN threats. The HRF and CERF-P are considerably larger, but have limited full-time manning and would almost certainly require increased full-time allocations to meet this additional mission requirement.

Whatever the solution ends up being, the time for a cross-jurisdictional, nation-wide domestic response to the small UAS threat that can cut across federal, state and local lines has come. The National Guard has a proven track record of fielding specialized teams to respond to technical threats in just this manner. While the constructs suggested above may not be the solution, and decision-makers may deem that the National Guard is ultimately not the best place for such a capability, the inescapable truth remains that some form of response is badly overdue.

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Sgt. Chad Carmichael, a native of Fort Walton Beach, Fla., and a flight heath care specialist assigned to Company C, 2nd General Support Aviation Battalion, 1st Aviation Regiment, 1st Combat Aviation Brigade, 1st Infantry Division out of Fort Riley, Kan., awaits his passengers before conducting a flyover of wildfires burning near the Kalispel Indian Reservation, Wash., Aug 31, 2015. Carmichael, and his fellow aviators, is on standby to provide medical evacuation support for Soldiers assigned to Task Force First Round, out of Joint Base Lewis-McChord, who are conducting wildland firefighting suppression operations across Northeastern Washington (Sgt. 1st Class Andrew Porch/28th Public Affairs Detachment)

Understanding aviation for better planning in multi-domain battle

By Maj. Russell Varnado

For the majority of Army units, an operational readiness rate of 90 percent or higher is standard. Aviation units however define their readiness level at 75 percent. A technician who typically assesses ground units may find this statistic to be alarming.

The reason for the lower required percentage is because aircraft, especially the AH-64 Apaches, require sound unit-level as well as contract maintenance to stay in the fight. This does not mean that aviation commanders handle these vessels with kid gloves. In fact for the last 15 years, commanders, both air and ground, have pushed these crafts well beyond reasonable limits and exceeded expectations while supporting Soldiers on the battlefield.

Aviation is a complex entity that is perhaps one of the least understood disciplines in today's Army. Employment of these assets requires as much science as it does art. To equate a ground unit's maintenance program or a 12-hour patrol in a mine-resistant, ambush-protected vehicle to similar activities conducted by aviation assets is ill-informed.

The aviation community does not judge flight hours or blade time as a measure of aircraft availability. They use a metric called endurance capacity, commonly referred to as bank time, to judge aircraft readiness and maintenance status. This metric provides Army leaders a better understanding of an aviation unit's ability to generate and sustain combat power. In short, bank time is a percentage of aircraft usage based on a 240, 300 or 500 flight hour maintenance schedule, depending on airframe. Once an aircraft has been in use for these requisite hours it must undergo a near-complete overhaul. These procedures typically take between three to four weeks to complete. What that means for a planner is that just because you have X number of aircraft available does not necessarily mean you have that many aircraft capable of flying at any given time.

The versatile capabilities these platforms bring to combat engagements fail in comparison to the complex maintenance packages required to keep them in the air. Because of the intensive attention all aircraft need to stay airborne, the aviation maintainer is as important to a formation as the pilot. In fact, the CH-47 Chinooks typically fly with three mechanics on board. It is essential for planners to understand when constructing requests for forces (RFF) that helicopters do not deploy without an accompanying maintenance component and should not deploy in smaller than company-size elements.

Planners must understand what it means to employ Army aviation. As budgets shrink across the force, the assumption that aircraft will always be available in sufficient numbers has to be smashed. Going forward, ground forces must learn to defeat ground forces, indirect fire systems must learn to accurately and rapidly employ their assets, and commanders have to develop adaptable courses of action in order to overcome the limitations associated with a disputed sky in a decisive action environment.

Maj. Russell Varnado is the 1st Combat Aviation Brigade, 1st Infantry Division fire support officer.

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Maintaining tactical sense during reconnaissance, selection, occupation of position

By Capt. Chris Campbell

Paratroopers, with C Battery, 2nd Battalion, 319th Airborne Field Artillery Regiment, 82nd Airborne Division, engage ISIS militants with precise and strategically placed artillery fire in support of Iraqi and Peshmerga fighters in Mosul. The fuel, munitions and life support essentials needed to sustain the fight against ISIS in the U.S. Army Central Command area of operations are provided by U.S. Army Reserve Soldiers from the 316th Sustainment Command (Expeditionary), acting as the 1st Sustainment Command (Theater) Operational Command Post, in Camp Arifjan, Kuwait. The 1st TSC has provided approximately 22 million rounds of ammunition, nearly 3 million gallons of fuel, over 1,000 vehicles, nearly 400 million gallons of water and more than 13,000 weapons. (Sgt. Christopher Bigelow/U.S. Army)

The Field Artillery Captain's Career Course cadre have identified a critical gap in knowledge – Soldiers don't know how to maintain tactical sense, or it is not practiced enough. Survivability through passive and active measures is a requirement to support the maneuver commander's plan, but more importantly, to win in a complex world. From multiple perspectives, this could be solved by opening the discussion to the force and providing a way to conduct a tactical reconnaissance, selection and occupation of a position (RSOP).

This article is what the FA CCC instructors have recently adopted as instruction for students. Additionally, it can be used for a wide variety of FA units from towed, self-propelled rockets, to command posts and more. In short, Gen. Bruce C. Clark summarized it best, "A unit does well those things the commander wants done well."

In the late 1970s, the Field Artillery School invested much of their resources to develop tactics, techniques and procedures on how to execute a tactically sound RSOP. The focus was to defeat a threat that had similar capabilities – a near-peer competitor. Much of what this technique includes re-invigorates now aging, yet appropriate, resources and ties them back to current doctrine. The intent is for future leaders to mitigate tactical mistakes made throughout the reconnaissance of a future position.

The RSOP is a tactical maneuver with guidance from the battery commander (BC) executed through subordinates. As the senior officer in the battery, the BC is responsible for ensuring their intent is clearly communicated to subordinates through good orders. Although other personnel in the battery may have more technical knowledge of the conduct of the RSOP, the BC is the senior tactical commander responsible for the RSOP mission. This responsibility cannot be delegated.

The current Army Techniques Publication 3-09.50 outlines the steps and responsibilities of those involved in the RSOP. This is only acceptable for a conceptual understanding of what is planned through troop leading procedures (TLPs), but lacks the necessary tactical consideration needed for execution of a successful RSOP.

The recommended conduct of RSOP is compiled into 14 steps and discussed in an iterative method. Execution of RSOP may require a non-linear approach and is always constrained by the amount of time available.

For the purpose of this article, the BC has maximum time available to conduct the RSOP and enemy contact is possible. The battery is comprised of the M109A7 Paladin and all associated vehicles and equipment. However, the following steps can be conceptually applied to towed and rocket artillery units all the same. The advanced party (AP) consists of the task-organized Soldiers responsible for conducting RSOP.

Step 1 – Receive the mission and begin TLPs

During this step, an order is received from higher or the BC has determined the conditions have been met to move to an alternate or subsequent position. The BC must gather all necessary tools to include maps, intelligence, standard operating procedures (SOPs) and alert all individuals to be involved. Although unit SOPs may include the advanced party's composition, the commander must always consider the enemy threat, mission/operational variables, etc. during assessment of the operational environment.
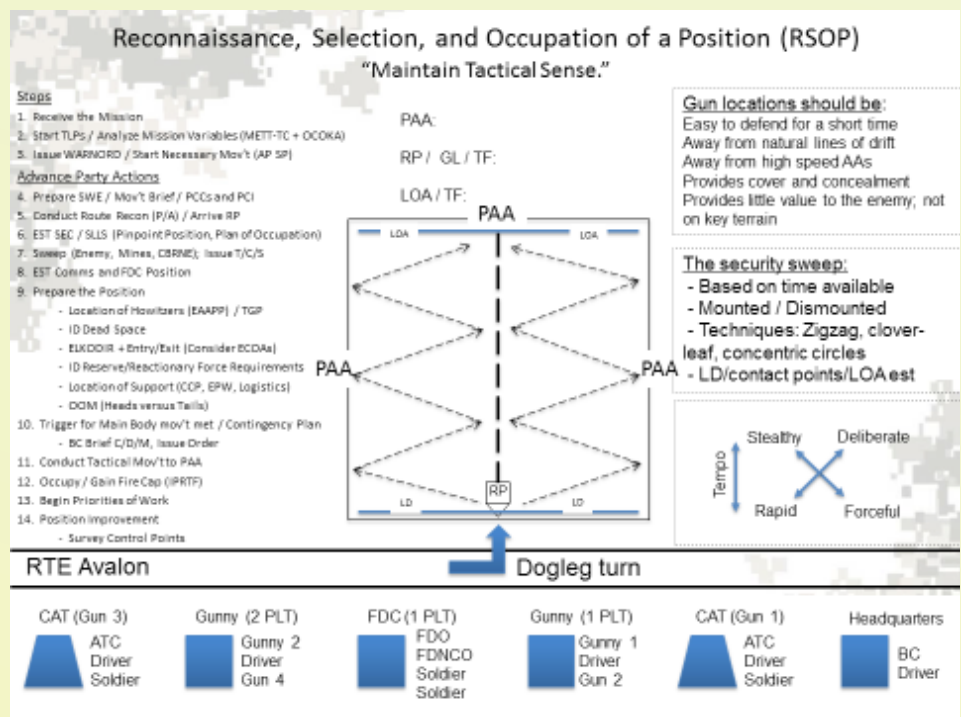
Figure 1. This smart card provides a quick reference for the battery commander in the execution of the reconnaissance, selection and occupation of position and planning considerations. (Courtesy illustrations)

An M270 Multiple Launch Rocket System assigned to the A Battery, 6th Battalion, 37th Field Artillery Regiment, 210th Field Artillery Brigade, 2nd Republic of Korea/United States Combined Division, fires a missile into the East Sea off South Korea, July 5, 2017. (Staff Sgt. Sinthia Rosario/U.S. Army)

Figure 2. The security sweep. (Courtesy illustration)

The primary consideration for the formation of the AP will be the time available to the unit to conduct a thorough RSOP. If the tempo dictates that the RSOP must be conducted quickly, then the AP will likely trade stealth and a deliberate reconnaissance for a forceful and rapid reconnaissance. Based off the BC's analysis of time, he must decide which vehicles and weapon systems accompany the AP. However, another important consideration is the enemy threat.

The enemy threat will directly influence how the BC decides to task organize the AP. Depending on the mission, the BC may decide the enemy threat and possibility of contact is high. This may sway the BC to reduce the overall signature and send a smaller AP to conduct the reconnaissance with less vehicles and less opportunity for the enemy to acquire our assets. Regardless, the BC must decide between maintaining stealth or maintaining a forceful posture and reconnaissance.

If the commander decides there's an adequate amount of time to conduct a deliberate reconnaissance when enemy contact is possible, and friendly elements have bypassed small pockets of enemy resistance, protected vehicle platforms such
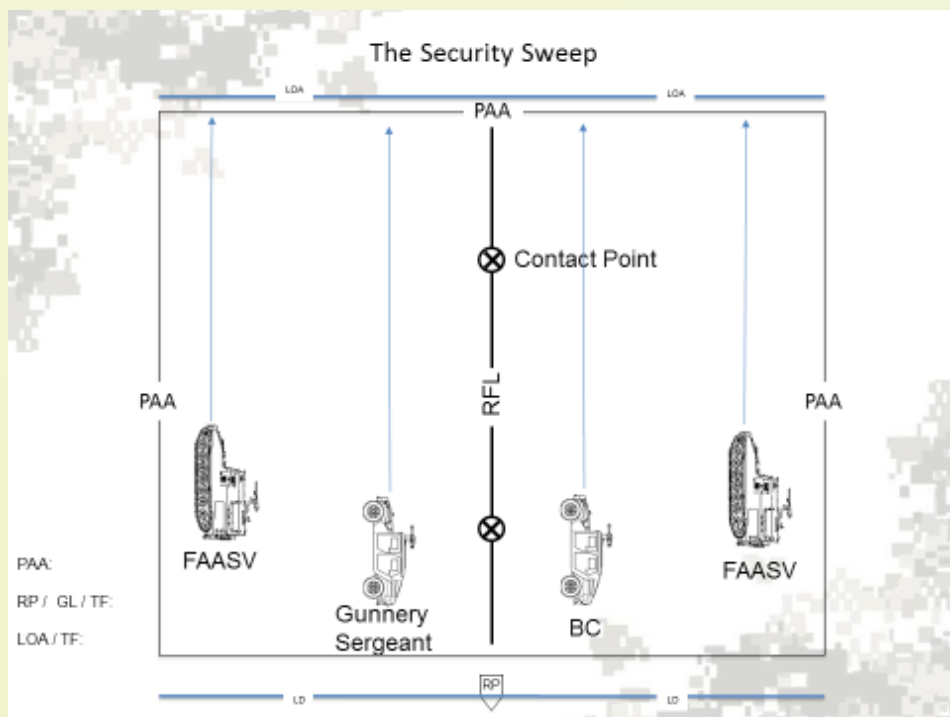
as Field Artillery Ammunition Supply Vehicles (FAASVs) with MK-19s and .50 calibers mounted can be incorporated. This provides the AP the firepower necessary to break contact with a small enemy unit.

Next, the BC must consider what the mission is. At the completion of determining what the equipment and personnel the AP should consist of, the BC will issue a warning order (WARNORD) to his battery.

Step 2 – Analyze mission variables and terrain

Once the WARNORD has been issued to the battery and preparation for the AP begins, the BC must analyze mission, enemy, terrain and weather, troops and support available, time available and civil considerations. Ideally, much of this will be reinforced by the battalion S2's intelligence report. The BC will need to extract the pertinent information. If such analysis is not available from higher, the battery commander is responsible for conducting an intelligence preparation of the battlefield to discern critical enemy capabilities and what impacts to the mission the environment will have on the battery's operations. Specifically, the BC considers the following at a minimum:

- What is the enemy's scheme of maneuver and likely courses of action?
- Does the commander have freedom of maneuver to bring the guns forward to the next position?
- What is the most likely threat to the battery? Consider these forms of contact at a minimum: maneuver forces, enemy indirect fire systems and capabilities, aerial reconnaissance and attack, counter-mobility operations, and possible civilian considerations.
- What is the mission?
- Should the battery not spend much time at its next position, it may not require hardening.
- Conversely, if the battery will occupy the area for a substantial amount of time, the need to prepare an in-depth defensive plan may be necessary.
- Regardless of the time available, priorities for the establishment of the position must be made. This is to ensure the battery maintains its focus on survivability.
- Friendly scheme of maneuver – The field artillery battalion staff is responsible for ensuring that proper coordination on the positioning of the battery is made with other units to prevent artillery positions being planned which hinder the maneuver commanders from being able to accomplish their mission. Sometimes, this responsibility may fall on the BC's shoulders.

Once the commander has taken time to reflect on relevant mission variables, it's time to brief the battery.

Step 3 – Issue the RSOP order, begin necessary movement

The RSOP order will follow the five paragraph OPORD. The minimum information required to brief subordinates consists of:

- Who is going with the BC to conduct the RSOP?
- Where the RSOP will be conducted and any mission-specific equipment that will be required.
- What the timeline is for the execution of the RSOP.
- Tasks to subordinate units while the BC is gone; what must the battery accomplish in the BC's absence?

- The contingency plan, including what will the battery do under enemy contact or if the BC doesn't return in the allotted time available.

If the commander determines that the enemy's absence in the area of operations allows the battery to move a platoon forward, this may be an opportune time to make the initial preparations for the guns to move. However, the movement or re-positioning of guns requires adherence to the battalion commander's guidance. In the event the battalion commander required a battery in position ready to fire (IPRTF) at all times, those cannons could not be taken out of the fight without explicit permission from higher. The BC must also consider the enemy threat to the cannons should they be brought forward.

For this example, the battalion commander's guidance requires the battery to remain IPRTF. The BC will not take any

A paratrooper with 2nd Battalion, 377th Parachute Field Artillery Regiment, 4th Infantry Brigade Combat Team (Airborne), 25th Infantry Division gives the signal for 30 seconds to drop time in a UH-60 Blackhawk over Malemute Dropzone on Joint Base Elmendorf-Richardson, Alaska, July 27, 2017. (Staff Sgt. Daniel Love/U.S. Army)

guns forward. Prior to the BC beginning the reconnaissance, they must ensure troops and equipment are adequately prepared.

Step 4 – Prepare the RSOP Soldiers, weapons, equipment, issue movement brief

Although the BC may not be responsible for conducting individual Soldier pre-combat inspections, they have to ensure the reconnaissance formation is tactically prepared for movement and execution. The BC's inspection should verify they are combat ready. Below are considerations to take into account, but it is not an inclusive list.

- Soldiers: All personnel involved are accounted for and in proper uniform, ammunition and personal equipment is properly secured and retained, personnel are combat ready.
- Weapons: Individual and crew-served weapons are properly maintained and have been test fired prior to staging point, ammunition is well maintained (links cleaned, no rust formed, properly oiled), sights are calibrated or zeroed and have backup batteries if necessary.
- Equipment: Radios filled with correct communication security, radio checks complete. Night vision goggles are powered and batteries are fresh with backups. Vehicles are fueled and loads plans established. All cargo is secured properly.

The BC must ensure, prior to conducting movement, the proper personnel understand their role and duties throughout the conduct of the reconnaissance. During the commander's brief, the BC should use their names and positions to give specific guidance for each member of the reconnaissance. This can be truncated through the use of unit SOPs, but the information is better briefed to ensure understanding between the individual members of the RSOP. (Trust, but verify unit SOPs.)

Movement briefs or the RSOP order should describe the plan for how the BC wants to conduct the route reconnaissance, the reconnaissance of future positions and the actions of clearing future positions.

The RSOP order or movement brief

The RSOP movement order combines a movement order along with specific information required to collect through the RSOP. Although the order can be reflected in a SOP, it must be known by all. Minimum requirements for the RSOP movement order include:

- The route to the position area for artillery (PAA) to include alternate routes and cross-mobility corridors (where can we bypass routes which cannot be traveled on?)
- PAA to recon with a grid location and an azimuth of fire.
- How the future position will be searched and cleared.
- Chemical, biological, radiological, nuclear and explosives (CBRNE) posture to maintain.
- Tactical convoy considerations (order of movement, intervals, weapon status).
- Priority intelligence requirements or other specific information requirements to support higher headquarters.
- Time of departure.
- Actions on enemy contact, vehicle recovery, vehicle breakdown, bump plans in route.
- Checkpoints, en route rally points, release points.
- Succession of command.
- Communications plan. The primary, alternate, contingency and emergency (PACE).
- It's recommended to add threat and maneuver's bypass criteria.

After the order has been briefed, the BC will issue guidance for rehearsals. The rehearsals should focus on how the RSOP element will conduct the reconnaissance and clearance of the future position as the highest priority followed by actions on enemy contact during the convoy, vehicle recovery, etc.

*The most complicated portion of the RSOP are the actions on the future PAA. This is also where the highest risk of fratricide and enemy contact exist. The BC has a few opportunities to brief a detailed scheme of maneuver regarding reconnaissance and clearance of this objective. It is recommended the BC briefs a detailed plan prior to staging point for the objective. This will prevent confusion on the objective if time becomes a factor and the BC must move the element to the future position.

Subsequently, if the BC briefs this scheme of maneuver prior to line of departure for the RSOP, the added detail of getting eyes on the objective prior to conducting the clearance will allow the BC to either accept, modify, or deny the plan to clear and occupy the position. This will allow the BC to take into account any unforeseen variables that may exist in the battlefield prior to the clearance, such as enemy presence in the area.

Finally, this point marks the last available opportunity for the BC to establish priorities of work for the battery in his absence. Ideally, the BC will leave the senior most officer and the first sergeant in control of the main body element and establish tasks to subordinates. Additionally, the BC will brief the following:

- Tasks to subordinates.
- Contingency plan: Where the BC is going, personnel going with, time the BC will be gone, actions to take if the battery receive enemy contact (broken down by types of enemy contact), and actions the BC will take if the RSOP element come into contact with the enemy.
- Trigger to move the battery – either established as receiving the order

for the main body to move by the BC (preferred), a tactical event tied to the friendly scheme of maneuver, or a time-based trigger (least preferred). Time-based triggers to signal the main body movement should be avoided due to a lack of coordination with the BC and RSOP element. This would ensure that the routes and future position are properly reconnoitered, cleared and prepared for the main body.

Once the battery has briefed on RSOP execution, the AP will assume tactical staging area, get in a tactical formation and begin movement along the previously established route. The battery's first action upon leaving the staging area should be to ensure security and communications are maintained and the battery perimeter is adjusted to account for the personnel who left on the RSOP.

Step 5 – Conduct the route and area reconnaissance

As the RSOP element goes to the start point from the battery's previous location, the route reconnaissance begins. The following list details major considerations and potential priority intelligence requirements (PIR) for the RSOP to answer.

- Maneuverability: Analyze any bridges (Can the battery safely traverse the bridge, is the bridge capable of supporting the tonnage required?), tunnels, or any other general obstructions along the route. If necessary, the field artillery battalion operations officer works with the brigade engineer to coordinate engineer reconnaissance. They are experts in providing analysis on bridges, tunnels, etc. If the military decision making process is conducted to standard, this information will already be in the brigade operations under the Engineer Annex.

- Potential ambush sites: As the BC identifies areas where enemy contact is likely along the route of march, the BC must decide whether or not to bypass that area. If it is determined based on time or other considerations available that the area cannot be bypassed, the BC should conduct a reconnaissance of that area to confirm or deny potential enemy threats.

- Bypass routes: In the event an obstacle along the route of march could potentially halt or stall the main body (such as fording a river or unstable bridge conditions), the BC will decide what bypass route the unit will establish. These bypass routes must be clearly marked and briefed to the main body. During planning for the RSOP, the BC will identify any possible cross-mobility corridors to the RSOP element and main body along the route of march. The main body element must be made aware of any changes to the route.

As the RSOP element closes on the future position, the BC may change the tactical formation or movement technique as required. Prior to arriving at the release point for the recon of the PAA, the BC should conduct a security halt in favorable terrain which overlooks the future position. This helps the commander have situational awareness of potential threats to the RSOP element prior to committing to the detailed reconnaissance of the PAA and allows the BC the ability to brief any changes to how the recon and clearance of the PAA will be conducted. This security halt requires the RSOP element to achieve 360 security in a covered and/or concealed location. Additionally, the commander issues guidance to the RSOP element to shut off all vehicles and conduct stop, look, listen and smell (SLLS). During this security halt, the BC will update his position on the map and issue any specific guidance (tasks, conditions, standards) for the reconnaissance and clearance of the PAA.

Soldiers from 1st Squadron, 33rd Cavalry, 101st Airborne Division (Air Assault) and 3rd Battalion, 319th Airborne Field Artillery Regiment, 82nd Airborne Division sing "The Army Goes Rolling Along" during a Transfer of Authority ceremony for the Multinational Battle Group-East Forward Command Post July 15, 2017 at Camp Marechal de Lattre De Tassigny (CMLT), Kosovo. (Staff Sgt. Nicholas Farina/U.S. Army)

Step 6 – Establish security halt and conduct SLLS at the PAA release point

If time did not allow the commander the opportunity to achieve over-watch of the future position, the BC will now conduct a security halt, map check/pinpoint location and SLLS. If time is available to the RSOP element, this should be conducted again prior to detailed reconnaissance of the objective. The key to survivability of the RSOP element is methodically gaining intelligence and situational awareness of the position to clear and later occupy. Some steps may seem redundant, however, these steps allow the BC to identify potential threats prior to being engaged.

A trained and proficient threat will seek to exploit tactical weaknesses in the friendly execution of maneuver regardless of their experience. It is the BC's responsibility to ensure the RSOP and main body operate tactically within the confines of his/her intent. Lack of a tactical posture against a near-peer threat will result in failure to accomplish the mission and failure to support the maneuver commander's decisive operation.

Step 7 – Conducting the reconnaissance and security sweep of the PAA

After the BC has determined the PAA will support occupation of the main body, he issues guidance to his RSOP element in the form of tasks, conditions, and standards to achieve the reconnaissance and security sweep. His guidance must ensure that fratricide is mitigated through positive control measures. Several techniques exist for the execution of the security sweep. They include having all personnel on-line or clover-leafing the objective. The techniques used will be determined by the mission and time available. At all times, a tactical posture must be adapted. In addition to deciding how the BC will clear through the objective, special considerations must be made to forms of contact other than a physical enemy presence in the area:

- CBRNE: Prior to executing the security sweep, the commander will test for possible contamination of the PAA. If contamination is present, the BC will immediately reconsolidate, send a report to higher, and begin tactical movement to an alternate PAA and coordination with brigade and/or brigade engineer battalion for additional support (chemical platoon). If the force is prepared for this eventuality and

in proper mission-oriented protective posture gear, the mission may require occupation of the site. The BC should ensure a decontamination plan is developed and synced with higher command.

- Mines: Also prior to beginning the security sweep, the BC must check the immediate area for mines or IEDs. If a significant threat exists, the BC must also consider moving to an alternate PAA, reporting to higher, or coordinating for engineer assets to conduct mobility operations.

After checking for passive enemy threats, the BC may begin the security sweep. The security sweep's focus is ensuring there are no additional enemy threats or presence in the future position's area – not establishing positions, communications or fire direction center locations. Subsequent steps will methodically prepare positions.

Due to the small size of the RSOP element, additional tasks cannot be accomplished until after the position has been cleared. Failure to clear through the objective thoroughly may result in enemy threats not being identified and it risks mission accomplishment. After the security sweep has been completed, the RSOP element will continue preparing the position.

The security sweep can be conducted in many ways. In the figure above, the BC decides to use the FAASVs weapon systems along with other organic weapon platforms to conduct a thorough sweep of the PAA. The BC must maintain control of the element conducting the sweep. This is done through graphical control measures such as a line of departure (LD), release point (RP), restricted fire line (RFL, unit boundaries between elements), and a limit of advance (LOA).

The remaining steps can be executed concurrently, but require the commander's guidance on how and where to place the guns, fire direction centers (FDCs), and any other supporting vehicles. The BC should incorporate the recommendations from the gunnery sergeants and other senior personnel on the RSOP. However, it is the BC's final decision on how the battery position will be employed and positioned.

Step 8 – Establish communications and the FDC location

Once the all clear has been given by security sweep teams (dependent on how the BC issues his guidance), the RSOP element must establish communications with higher headquarters. It is advisable to facilitate this step with communication's specialist and/or a FDC. This will ensure the future

planned position has the communication connectivity necessary to talk to higher headquarters.

The FDC element will immediately occupy a position within the commander's guidance. The BC will issue an order to occupy a position with good cover and concealment. The commander will also take into account line of sight (LOS) and other variables necessary to achieve good communications with higher. Once the FDC is in the proper position, the crew should set-up the OE-254 or other antennae mast group immediately. If communications cannot be made with higher from this position, the BC must move them immediately to a more suitable location. All attempts at gaining communication with higher must be exhausted. Mission command systems, e.g. Blue Force Tracker/Joint Capability Release, Command Post of the Future (battalion level) provide commanders the ability to verify LOS during the planning process.

Further considerations for the placement of the FDC include:

- Positioned away from the firing points or goose eggs (outside of potential areas where the cannons will conduct survivability moves).
- Away from high-speed avenues of approach – think about the enemy's course of action.
- In a concealed location – passive protection is the primary defense for the FDC crew.
- Based on time and the mission, remoting the antennae group to mitigate the enemy capability to radio-find command posts and FDCs.

Step 9 – Prepare the position

Executed simultaneously with emplacing the FDC, the battery commander will choose locations for the howitzers emplacement. The battery commander may issue guidance for positioning the guns to subordinates, however, this guidance is critical to a timely occupation and to ensure these positions will accomplish the battery's mission. Considerations for these locations include:

- Easily defendable location for a short period of time.
- Away from enemy high-speed avenues of approach.
- Away from natural lines of drift.
- Provides good cover and concealment.
- Provides little tactical value for the enemy commander and is not positioned on key terrain.

Once suitable locations have been identified for the howitzers, the battery commander's next consideration is observing and controlling the dead space in

between the guns, platoons or along potential avenues of approach. Oftentimes, 360-degree security is not attainable due to personnel available or the tactical situation. Some options for controlling or observing dead space will be discussed after the next concept of preparing the position.

Engagement area (EA) development is applied by tactical-level commanders conducting the defense. These seven steps will also be applied to develop the initial battery defense plan. If the battery commander has not yet developed a defensive order or annex to his OPORD, picking the primary, alternate and supplementary firing positions for the guns will allow the battery commander to begin thinking through what the defense should look like.

EA development consists of:

- Identifying likely enemy avenues of approach. What avenues of approach offer the enemy a high-speed axis of travel throughout your position? Where could the enemy come from and disrupt the operations of the battery with relative ease? Avenues of approach also include natural lines of drift – such as draws and ridgelines. Animal trails usually indicate paths of least resistance and possible enemy avenues of approach.

- Identifying the enemy scheme of maneuver – the most likely and most dangerous enemy courses of action. The battery commander has a finite amount of time to plan and execute the defense. Executing a 360-degree perimeter security in a dynamic environment with the constraints of time and personnel will not yield many options for conducting defense. Instead, consider likely enemy courses of action.

- Identify where to destroy or engage the enemy. The point of the battery defense is to enable options. These options are most commonly presenting a hard and prepared target (prevention), responding to and repelling an enemy attack (based on size of attacking enemy and capabilities), or buying the commander the time to displace the battery to an alternate location. Establishing where to kill the enemy (which is synchronized with the enemy scheme of maneuver).

- Placing obstacles. The BC must consider what engineer assets are available and what the priority of work for these assets are. For example, if provided a bulldozer what positions should be prepared first and foremost? What natural obstacles can be used to slow them with manmade obstacles? Often, in a high tempo operation, such engineer assets may not be available or available only for a short amount of time. Establishing a priority of work will help to best use these engineer assets. Additionally, the BC must tell the battery the intent for hardening and preparing the positions.

- Integrate direct fire weapons. Obstacles without observation and Fires integrated are at best a disruption. To maximize the effects against the enemy, direct Fires integrated with obstacles are the primary method of ensuring the battery is defended. Crew-served weapons and even those using howitzers should be given target reference points and direct fire control measures. Additionally, digging individual fighting positons to provide mutual support between gun positions and cover for Soldiers being engaged is necessary. From these hardened and prepared positions, Soldiers will more effectively return direct fire and increase the unit's survivability.

- Integrate indirect fire weapons. The BC should incorporate indirect Fires and final protective Fires into his defensive plan. These Fires should be planned through the battalion and to the brigade Fires cell to ensure integration into the brigade scheme of Fires.

- Conduct rehearsals. A good plan not rehearsed will lack the final polish and shared understanding from the subordinates executing it. At this time in the execution of RSOP, the BC must consider what type of rehearsal for the defensive plan and how it will be executed.

The battery commander must also identify requirements for a reactionary force and, if necessary, designate individuals and a rally point. Throughout the execution of the operation, the BC may not have all the information or intelligence necessary to counter every enemy course of action. Identifying a reserve or reactionary force allows the commander flexibility in planning the defensive and additional options should the situation demand.

Finally, the commander must decide the location of all support vehicles, how they will be tied into the battery's defense, and how and where the primary and alternate exits for the battery will be located. In the event the battery needs to exit the position in a hasty manner, the primary and alternate egresses should be well known and briefed down to the lowest level.

Once this step has been completed, it's time for the BC to trigger the main body movement to its next position.

Step 10 – Trigger the main body

Once all criteria have been met, the battery will begin its tactical movement forward. Normally, the main body movement is triggered by a radio call over secure communications. However, this can also be conducted by the BC or a designated representative traveling back to the battery's location and guiding them onto the planned position. It can also be designated by a technical or time-based trigger. The preferred method is by positive communications between the BC and the senior leader remaining with the main body. In some situations where the terrain or route has been bypassed, the BC or a representative would be best suited to ensure the battery does not get lost or confused. However, this is a time intensive/consuming technique.

The battery and its firing capability may be in jeopardy if the battery moves before the position is prepared or the position is untenable. If the battery commander leaves to bring the battery forward, a contingency plan must be established prior to SP.

Step 11 – Main body conducts tactical movement to planned position

Before stepping off to the next position, the convoy commander must conduct a brief. The convoy brief will be similar to the RSOP order. It includes:

- The route to the PAA to include alternate routes and cross-mobility corridors.
- PAA to occupy with a grid location and an azimuth of fire.
- How the future position will be occupied.
- CBRNE posture to maintain.
- Tactical convoy considerations (order of movement, intervals, weapon status).
- Priority intelligence requirements or other specific information requirements to support higher headquarters.
- Time of departure.
- Actions on enemy contact, vehicle recovery, vehicle breakdown, bump plans in route.
- Emergency firing points.
- Checkpoints, en route rally points, release points.
- Succession of command.
- Communications plan (PACE).
- Maneuver's bypass criteria.

Immediately following completion of the order, the convoy commander should designate a time and place to conduct re-

U.S. Army Maj. Gen. John L. Gronski, deputy commanding general for Army National Guard, U.S. Army Europe, talks with Soldiers of 5th Battalion, 113th Field Artillery Regiment, North Carolina National Guard, during Getica Saber 17 on July 7, 2017, in Cincu, Romainia. Getica Saber 17 is a U.S-led fire support coordination exercise and combined arms live-fire exercise that incorporates six Allied and partner nations with more than 4,000 Soldiers. Getica Saber 17 runs concurrent with Saber Guardian 17, a U.S. European Command, U.S. Army Europe-led, multinational exercise that spans across Bulgaria, Hungary and Romania with over 25,000 service members from 22 Allied and partner nations. (Spc. Antonio Lewis/U.S. Army)

hearsals. Priority rehearsals include: actions on enemy contact, occupation of the future position and emergency fire missions.

Steps 12-14 – Occupy, gain firing capability, begin priorities of work

Once the main body closes in on the prepared position, a representative should be located at the RP to ensure vehicles know where to make their initial turn into the PAA and to ensure the track plan is maintained (reducing the signature of multiple vehicles creating multiple indicators of presence … a lot of tracks, a lot of vehicles). Once the howitzers are in their designated locations, they begin occupation, gain firing capability and establish priorities of work.

Priorities of work will focus on ensuring the positions are improved and hardened before serving meals and rest. Below is an example of priorities of work.

- Immediately: Establish security and position listening posts/observation post for early warning.
- Ensure all crews have good digital communications (from the howitzers to the battery FDC to battalion).
- Emplace crew-served weapons, complete howitzer range cards and machine gun range cards.
- Prepare defensive positions (based on mission and time available).
- Camouflage howitzers, FDC and other support vehicles and equipment.
- Construct and prepare alternate and supplementary howitzer and battle positions.
- Conduct vehicle, equipment and weapon maintenance.
- Establish crew rest/sleep areas.
- Serve meals, conduct personal hygiene.

Conducting the RSOP in a tactical manner is fundamentally developed from small unit tactics that require senior leaders to put the enemy hat on and consider how

the posture, planning and flexibility of the battery will directly be tied to its survivability on the battlefield. Similar principles can be applied for the emplacement/displacement of a battalion, field and combat trains command post.

Under optimal conditions, field artillery Soldiers won't engage directly with an enemy force that has overmatch over organic capabilities. The unnecessary loss of Soldiers, critical capabilities and resources can be mitigated by training realistically and enforcing leaders to maintain the tactical edge against threats.

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Soldiers fire a Paladin weapon system during a training exercise at Fort Hood, Texas, June 11, 2016. (Maj. Randall Stillinger/36th Infantry Division Public Affairs)

Integration of UAS in division artillery proactive counterfire

By Capt. Jeffrey Horn

NOTE: This article focuses on division artillery supporting a division. However, as a Force Field Artillery Headquarters, the same concept could apply to other echelons.

This article captures the 101st Airborne Division Artillery's key concepts and lessons learned with the integration of unmanned aircraft systems (UAS) in division artillery (DIVARTY) proactive counterfire. These concepts were conceived during 101st DIVARTY's participation in Warfighter Exercise 15-05 with 36th Infantry Division at Fort Hood, Texas. They were validated and codified in 101st DIVARTY's standard operating procedures at WFX 16-02 with 101st Airborne Division (Air Assault) at Fort Campbell, Ky. Only real-world mission

processes are included in this article. "Gameisms" used to avoid issues with the warfighter simulation are omitted.

Soldiers in 101st DIVARTY followed a dual-pronged approach to dynamically re-task UAS to DIVARTY. See Figure 1. The first prong was an internal DIVARTY dialogue to factor the military aspects of weather (visibility, precipitation, cloud ceiling and temperature) and mission, enemy, time, terrain, troops and civilian considerations (METT-TC) to systematically determine the feasibility, acceptability and suitability of the direct sensor-to-shooter link with DIVARTY and UAS. The second prong was a four-fronted DIVARTY-to-division dialogue to prioritize and request limited UAS assets.

Following the dynamic re-task, the subsequent direct sensor-to-shooter fire mission followed a seven-step fire mission process:

1. UAS coordination.
2. Target identification and target mensuration.
3. Fire mission transmission from lethal Fires/targeting cell to the fire control element (FCE).
4. Legal review and collateral damage estimate (as required).
5. Air clearance.
6. Approval and fire mission transmission to the firing unit.
7. Battle damage assessment.

This systematic process attempts to lend some simplicity to a complex process.

Up front, WFX 16-02 produced three key lessons learned. First, direct sensor-to-shooter rehearsals prior to execution are essential to ensure a fast, responsive and effective counterfire capability. Second, counterfire time is significantly reduced when external coordination is conducted prior to execution. And third, pre-established restricted operations zones (ROZ) facilitate responsive counterfire.

UAS dynamic re-tasking process

The direct UAS to DIVARTY link can be preplanned and tasked 72 hours out as a part of the air tasking order, however, the requirement for
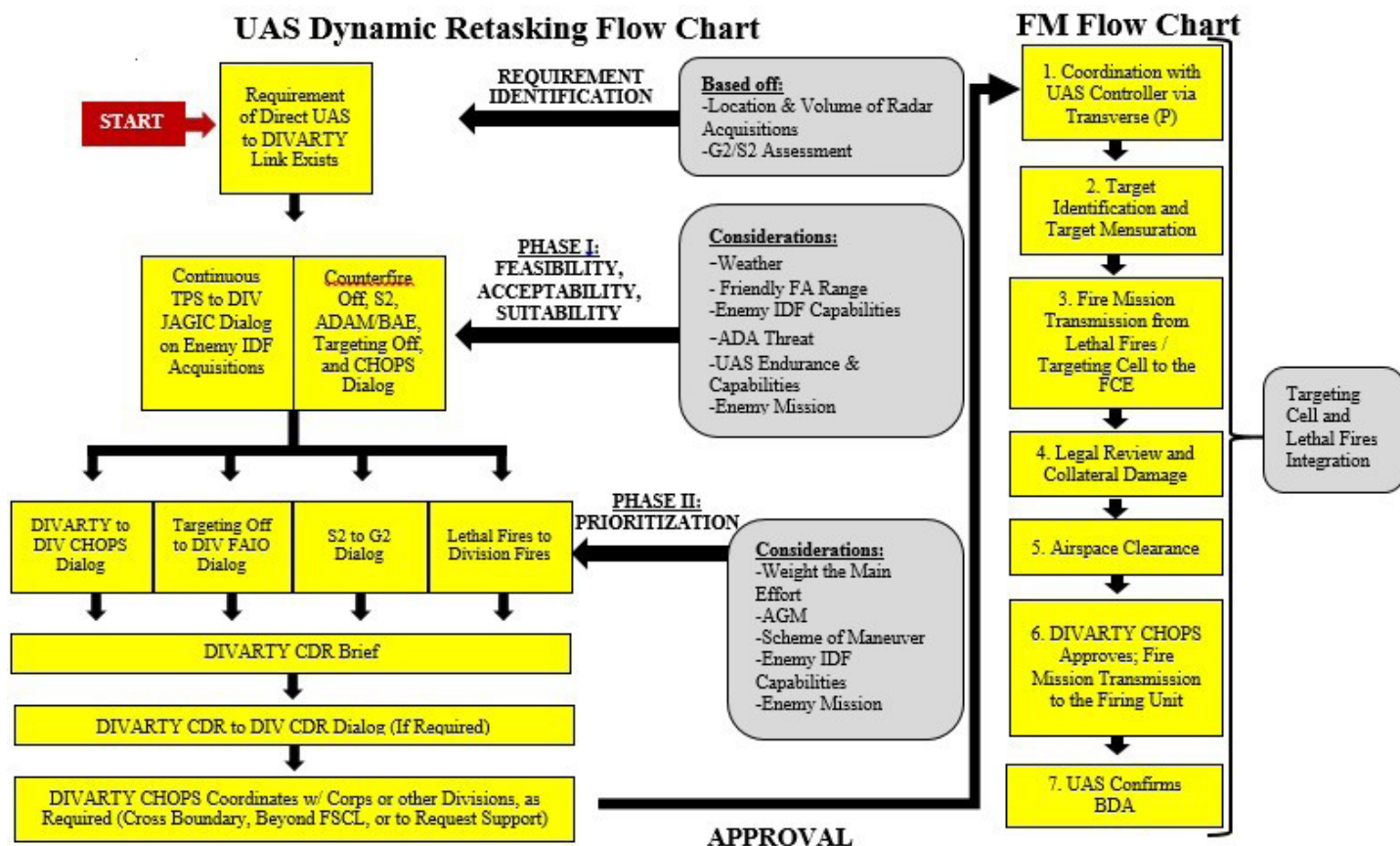
Figure 1: UAS Dynamic Retasking Flow Chart and Subsequent Fire Mission

Figure 1. UAS dynamic re-tasking flow chart and subsequent fire mission. (Courtesy illustration)

a direct UAS to DIVARTY link more likely follows from a dynamic re-tasking based off radar acquisitions and intelligence assessments. Due to the erratic nature of this re-task, direct sensor-to-shooter rehearsals prior to execution are critical to ensure a fast, responsive and effective counterfire capability. A primary, alternate, contingency and emergency (PACE) communication plan should be established during or before these direct sensor-to-shooter rehearsals.

Not factoring the continuous target processing station to the division joint air ground integration cell (JAGIC) dialogue on the location and quantity of enemy indirect fire acquisitions, UAS dynamic re-tasking process exists in two phases:

1. Phase I is a DIVARTY internal dialogue to discuss the feasibility, acceptability and suitability of the requirement for a direct sensor-to-shooter link before a request is initiated to division.

2. Phase II is a DIVARTY to division dialogue to prioritize and request limited UAS assets.

This entire process should take less than 15 minutes and all involved parties need 24-hour representation. Figure 2 provides a list of duties and responsibilities for the direct DIVARTY to UAS link.

Phase 1

After the requirement is identified, the DIVARTY S2 (intelligence), brigade aviation element (BAE), air defense airspace management (ADAM), lethal Fires, targeting officer and DIVARTY chief of operations (CHOPS) must discuss the feasibility, acceptability and suitability of the direct sensor-to-shooter link. Heavy reliance on the DIVARTY BAE and the DIVARTY S2 is required to assess the effects of the weather on different UAS. All military aspects of weather apply:

visibility, winds, precipitation, cloud ceiling, and to a lesser extent, temperature.

The DIVARTY S2 and DIVARTY CHOPS must then assess the range of both friendly and enemy indirect fire (IDF) systems. If either the enemy or friendly IDF systems are out of range, a direct sensor-to-shooter link may not be feasible, suitable or acceptable. However, conditions rapidly change, so any range disparity does not necessarily circumvent a direct sensor-to-shooter link. Another related consideration is the availability of extended-range precision munitions (anything beyond 45 kilometers). These munitions are generally in short supply and these extended-range precision munitions require Category 1 grids. This limits the types of munitions available to support, and it requires other means of target refinement, as no UAS in the United States arsenal can unilaterally acquire Category 1 grids.

The enemy air defense artillery threat must also be assessed for feasibility, acceptability and suitability of the direct UAS to DIVARTY link. The DIVARTY ADAM cell and S2 current operations (CUOPS) must conduct analysis on the composition, capability and intentions of enemy ADA units. With a high demand for a limited number of UAS assets, some risks posed by flying UAS assets are greater than the potential rewards.

Finally, the range, endurance and capabilities of UAS systems must be assessed. UAS endurance varies from 50 minutes to 31 hours and UAS range varies from 10,000 nautical miles to just over three nautical miles. Sensor capabilities are also diverse. Serving as the DIVARTY's subject matter expert on UAS, the DIVARTY BAE must conduct analysis to determine which (if any) UAS systems are capable of supporting the pending mission.

Phase II

After the DIVARTY team determines the direct sensor-to-shooter link is feasible, acceptable and suitable, dialogue with division must be initiated to prioritize limited UAS assets. This dialogue typically occurs simultaneously, and it exists on four fronts:

1. DIVARTY S2 to division G2 (intelligence).
2. DIVARTY CHOPS to division CHOPS (operations).
3. Targeting officer to division field artillery intelligence officer (targeting).
4. DIVARTY lethal Fires to division Fires (Fires).

The DIVARTY S2 to division G2 dialogue focuses on enemy IDF capabilities, composition, location and intent. Effective enemy IDF is not always the catalyst for a direct DIVARTY to UAS link, even if all other factors align. Assessments of the enemy's artillery in the most likely and most dangerous course of action are imperative, as are the enemy's IDF capabilities to support those courses of action. Additionally, the G2 and S2 make a gain/loss assessment that measures the effects on intelligence collection from reallocating UAS assets.

Concurrently with other required dialogues, the DIVARTY CHOPS and division CHOPS must discuss the requirement for a direct UAS to DIVARTY link. The discussion here is the broadest, covering relevant information from all the warfighting functions. The focus is to weigh the main effort within the division. The attack guidance matrix and friendly scheme of maneuver are involved in this analysis, and they play a vital role in prioritizing limited UAS assets.

The targeting officer to division field artillery intelligence officer dialogue and the lethal Fires to division Fires dialogue are identical. These personnel have in-depth knowledge of the division fire support plan and a comprehensive understanding of other assets available to support. This knowledge greatly assists in assessing and mitigating (where required) the effects on fire support from reallocating UAS assets. Those personnel must explore options beyond surface-to-surface Fires. Information collection assets other than UAS are also discussed. The key is to support counterfire efforts with the most efficient means possible. This equates to providing adequate support to committed units, weighing the main effort, maximizing responsiveness and planning ahead to facilitate future operations.

The fire mission thread with a dedicated UAS in the proactive counterfire fight is significantly different than other DIVARTY fire missions. The DIVARTY's support to the JAGIC greatly increases within the confines of the proactive counterfire fight. In this role, the DIVARTY has the responsibility to identify targets and clear the ground and air for any subsequent fire missions. Additionally, in its role as the counterfire headquarters, the DIVARTY has the authority to directly coordinate with corps and other divisions to strike beyond the fire support coordination line (FSCL), to strike beyond the supported division's boundary, or to request support. At WFX 16-02, response time was significantly reduced when this coordination was conducted prior to execution.

With the integration of an UAS, the fire mission process is a longer and more complex, multistep process. After the DIVARTY CHOPS issues the commander's guidance, the DIVARTY lethal Fires is the driving force behind all dynamic targeting within the DIVARTY, to include the direct UAS to DIVARTY link. Upon notification of the direct DIVARTY to UAS link, the targeting cell must integrate with lethal Fires throughout the entire fire mission process.

Step 1: UAS coordination

DIVARTY lethal Fires/targeting cell must coordinate with the UAS controller to assist in locating the enemy artillery. The targeting cell monitors the

Figure 2. Staff section duties and responsibilities. (Courtesy illustration)

STAFF SECTION	DUTIES AND RESPONSIBILITIES
LETHAL FIRES	➢ Drives Dynamic Targeting in the DIVARTY, to include the Direct UAS to DIVARTY Link ➢ Provides the Link to Division Fires Deliberate Targeting Process ➢ Coordinates with and Provides Guidance to the Dedicated UAS Controller ➢ Responsible for Liaison / Coordination with Division Fires
TARGETING CELL	➢ Integrates with the Lethal Fires Cell in the Direct UAS to DIVARTY Link ➢ Conducts CDE, as Required ➢ Conducts Target Mensuration, as Required ➢ Monitors the UAS Feed and Provides Situational Awareness to the Lethal Fires Officer ➢ Coordinates with and Provides the Lethal Fires Officer's Guidance to the Dedicated UAS Controller
S2	➢ Weather Analysis ➢ Provides Analysis on Enemy Artillery Location, Composition, Capabilities, and Intentions ➢ Provides Counterfire Analysis ➢ Responsible for Liaison / Coordination with Division G2
TARGETING OFFICER	➢ Provides Counterfire Analysis ➢ Assists Lethal Fires in the Direct DIVARTY to UAS Link, as Required ➢ Responsible for Liaison / Coordination with Division FAIO ➢ Assists Lethal Fires in CDE and target mensuration, as required
CHOPS	➢ Approval Authority for Fire Missions ➢ Assesses Capabilities and Limitations of Friendly IDF Available to Support ➢ Responsible for Coordinating with Corps and/or other divisions for support, and with cross boundary counterfire or counterfire beyond the FSCL ➢ Responsible for Liaison / Coordination with Division CHOPs
ADAM CELL	➢ Provides Analysis on Enemy ADA Threat ➢ Responsible for Liaison / Coordination with Division AMD ➢ Serves as the DIVARTY's expert on Airspace Deconfliction
BAE CELL	➢ Serves a Unique Roll as the DIVARTY's Subject Matter Expert on UAS ➢ Responsible for Liaison / Coordination with G3 Air, the Combat Aviation Brigade, and/or Other Aviation Entities
TPS	➢ Provides Counterfire Data ➢ Continuous Dialog with Division JAGIC on Location and Quantity of Enemy IDF Acquisitions
FCE	➢ Receives and Processes Fire Missions

Figure 2: Direct DIVARTY to UAS Link Duties and Responsibilities

live UAS feed and provides situational awareness to the lethal Fires officer. The Joint Automated Deep Operations Coordination System (JADOCS) feed and counterfire analysis are used to focus the UAS onto specific targets. The DIVARTY S2 CUOPs and the targeting officer assist in the counterfire analysis to refine named areas of interest and target areas of interest.

Step 2: Target identification and target mensuration

Upon target detection, the targeting cell refines target location through target mensuration using Precision Strike Suite for Special Operations Forces. Target mensuration is required with precision munitions and is a measurement of a feature or location on Earth to determine the absolute latitude, longitude and elevation. At WFX 16-02, most counterfire missions required precision munitions due to the increased range of those munitions.

Step 3: Fire mission transmission from lethal Fires/ targeting cell to the fire control element

After target mensuration, the fire mission is sent from lethal Fires/targeting cell to the FCE's Automated Field Artillery Targeting Data System (AF-ATDS) utilizing JADOCS.

Step 4: Collateral damage estimate (as required) and legal review

The targeting cell conducts a collateral damage estimate using the Digital Precision Strike Suite Collateral Damage Estimation, as required. The judge advocate on the CUOPS floor then provides a fast legal review. In self-defense, there are typically few restrictions, especially in a decisive action fight.

Step 5: Air clearance

If there is no pre-established restricted operations zone (ROZ), the ADAM/BAE cell clears the air for the fire mission on Tactical Airspace Integration System (TAIS). (ROZs denote airspace activities in which the operation of one or more airspace use is restricted.) When set up correctly, the firing unit's fire control panel will directly interface with the AF-ATDS, which will directly interface with the TAIS system. This will occur near instantaneously after the fire mission is sent to the firing unit.

At WFX 16-02, a pre-established ROZ significantly reduced counterfire times. The ADAM/BAE cell can create ROZs to "preclear" the air when armed with the gun target line, point of origin, point of impact and the maximum ordinate. These ROZs should remain in a cold status until fire missions are imminent to minimize airspace restrictions. Techniques, tactics and procedures for establishing a ROZ fall outside the scope of this article, but the two primary methods used at WFX 16-02 included the "hotwall" and the "goal post" methods.

Step 6: Approval and fire mission transmission to the firing unit

The DIVARTY CHOPS must approve or deny the fire mission. If approved, the FCE will send the firing unit a "fire when ready" command on AF-ATDS.

Step 7: Battle damage assessment confirmation

Once the fire mission is complete, UAS confirms the battle damage assessment.

Reattack is conducted as necessary.

After completion of the fire mission process, the decision to release focus of UAS back to division is two-fold. First, analysis to weigh the supported division's main effort is conducted to prioritize limited UAS assets. The supported division's UAS must go where they can best support the division. Second, the range to the enemy artillery is assessed to determine if the targets are within M26A2 (Dual Purpose Improved Conventional Munition Extended Range Rocket) range (45 km). If the targets are within M26A2 range, Q-37 or Q-53 radar acquisitions are probably sufficient to serve as the direct sensor-to-shooter link because there is no requirement for a Category 1 grid. However, conditions may prevent Q-37 or Q-53 radars from cueing (e.g., the presence of enemy UAS within the vicinity of friendly radars to avoid detection).

Lesson learned: Communication, coordination and rehearsals can streamline counterfire operations and significantly reduce counterfire time.

1. Rehearsals and PACE plan: Direct sensor-to-shooter rehearsals prior to execution are essential to ensure a fast, responsive and effective counterfire capability. A PACE communication plan should be established prior to execution, preferably during or before direct sensor-to-shooter rehearsals.

2. Coordination prior to execution: Counterfire time is significantly reduced when required coordination is conducted prior to execution. As the division's counterfire headquarters, the DIVARTY can directly liaison with corps and other divisions for cross-boundary Fires, Fires beyond the FSCL or to request support.

3. "Pre-cleared" air: A pre-established ROZ can significantly reduce counterfire times, when feasible. As the subject matter experts in airspace clearance, the DIVARTY ADAM/BAE cell should advise on the best ways to "preclear" air to facilitate responsive counterfire.

Filling the void of existing doctrine, the process employed by the 101st Airborne DIVARTY at WFX 16-02 can be effectively applied to DIVARTYs across the Army to enhance proactive counterfire operations. The dual-pronged approach that factors the military aspects of weather and METT-TC enables an internal DIVARTY dialogue to systematically determine the feasibility, acceptability and suitability of the direct sensor-to-shooter link with artillery and UAS. The dialogue with division to prioritize limited UAS assets is streamlined and organized with a concurrent, four-fronted approach. Finally, the systematic, seven-step fire mission process offers simplicity to a complex process.

Capt. Jeffrey Horn is the B Battery, 1st Battalion, 320th Field Artillery Regiment commander. He's served as B Battery, Steel Squadron, 3rd Cavalry Regiment, fire direction officer and platoon leader. Horn also served as the III Corps Joint Operations Center current operations officer while deployed to Afghanistan in support of Operation Enduring Freedom.

The Army Targeting Center and instructors from 428th Field Artillery Brigade certify the first group of students on the Digital Image Exploitation Engine (DIEE) program. The Army is the first to teach the newly approved DIDE software in the Precision Fires Course at Fort Sill, Okla. The first class graduated July 23. (Marie Berberea)

Army first to certify students on new targeting software

By Marie Berberea

The Army became the first service certified to teach the Digital Image Exploitation Engine program across the Department of Defense.

The National Geospatial-Intelligence Agency approved the DIEE program in April and the Fort Sill Army Targeting Center staff and instructors from 428th Field Artillery Brigade worked feverishly to update the Precision Fires Course to include the new software.

At the same time, the Army Targeting Center passed their two-year accreditation check by the NGA.

"We knew our two-year review was coming up. That gave us about three months to get everything done. Between the contract instructors and us at the Targeting Center it was a lot of man hours," said Chief Warrant Officer 3 Nathan Dukellis, Army Targeting Center targeting officer.

The first class to go through the new Precision Fires Course graduated July 21. The students were a mixed group of active-duty, Reserve, National Guard, NGA employees and instructors from other services.

The Army Targeting Center and 428th FA Brigade staff created the screen shots for the new 40-hour course. Dukellis said the previous course certified students on two tools and two target coordinate mensuration methods. Now they leave the Fires Center of Excellence certified on two tools and three target coordinate mensuration methods.

Remarks from the first class showed the course only needs minor tweaks.

"The feedback from NGA was, 'Clean up these couple things on some processes and the Army is good for two more years with [target mensuration only].'"

The DIEE program was developed by the Naval Air Warfare Center in China Lake, Calif. It eliminates the need to manually transfer target coordinates from one software to another.

Chief Warrant Officer 4 Houston Burke, Army Precision Fires functional manager, said the Army Targeting Center has been looking for software with this capability for the last eight years.

"We always had to piecemeal software. You could do one piece on this software, but then you had to print it off, get the numbers and hand jam it into another piece of software. We've been working with the joint community to come up with software that would allow you to do all of it at one time," said Burke.

He said although DIEE won't save a lot of time, its help with ensuring accuracy is vital to the force.

Soldiers in B Battery, 3rd Battalion, 29th Field Artillery, fire M109A6 Paladins July 11, 2017, during the multinational fire support coordination exercise, Getica Saber 17 in Romania. (Sgt. Justin Geiger/U.S. Army)

"Once you get down to doing it you'll save 20 to 30 seconds. Which if someone is shooting at you that's a big deal, but what it really saves is the human error of having to manually type in grids. If you're typing in a grid to a house that's sitting next to a hospital and there's people shooting at you from the house at coordinates 37 — that's the last two numbers — but you type in 73, that moves it almost 40 meters away and now you're hitting the hospital.

"Our weapons have gotten so accurate that they go exactly where we tell them to go. We just have to make sure we're telling them to go to the right place," said Burke.

Dukellis said they have only scratched the surface on the DIEE program's capabilities and eventually it can be used across target development as a whole.

"This course is only teaching the target mensuration piece of it, but it also helps with the collateral damage piece and the weaponeering piece as well. Eventually it will build and we'll be able to use it in all three pieces."

He added DIEE allows the user to pass coordinates between echelons as well.

"I could do my work at a brigade fire support cell and I could save a scenario file and send it via file share or classified email and you can open up that scenario file and see all the work I did. It's going to facilitate quality control checks."

He said as the Army works with the Air Force and other services in cross domain Fires capabilities, DIEE's file format will allow flexibility and growth.

Burke said another capability DIEE gives is updated imagery that matches what Soldiers see in near real-time. He said it takes NGA's imagery and overlays scene-based imagery the user can manipulate.

"You can go in and if you know a vehicle is parked in a certain place, you can draw in that vehicle or you can bring in a template and you can put in multiple different structures. You can build it to how it actually looks and you can run different scenarios. Before you had to do that in multiple different systems and each system wouldn't take the input from the other one. It would take the coordinates, but that was about it."

Now that the Army Targeting Center and 428th FA have the course done to NGA's standards, they will work to get units that are deploying certified to use DIEE first.

"They're already pounding at the email door. We had to get the Army course right and we had to get NGA to say yes that's good so we didn't put something out and then have to change it because we messed something up as we were building the course," said Dukellis.

After a Soldier is certified in DIEE, they have to pass practical exercises to keep up their certification.

"We track every person by name and when they took it," said Burke. "It's just like a PT test -- you have to take it every six months to stay in good standing," said Burke.

Dukellis said ultimately the DIEE program is going to help the Fires and joint force now and in the future.

"It's going to be another tool for the force to use to do what we already do, just a little better."

Marie Berberea is the Fires Bulletin editor.

Marines practice aiming with the M777 Light Towed Howitzer during a section chief course at Camp Lejeune, N.C., August 3, 2017. The Marines conducted their final performance evaluation in operating the howitzer as an artillery section chief; the final practical application of skills before graduation. The artillery Marines are with 1st and 2nd Battalion, 10th Marine Regiment. (Lance Cpl. Leynard Kyle Plazo/U.S. Marine Corps)

In the next issue of Fires

Nov.-Dec. 2017, Battle ready: The fight begins before Soldiers and Marines ever roll onto the battlefield. This issue will cover how the Fires force is preparing for the enemy before they lock and load, Fires doctrine update, the evolution of Fires doctrine in support of cross domain Fires, understanding the current threat environment, moving on from the counter-insurgency fight, leveraging classroom and simulator training opportunities and lessons learned from the field, battery and below.

The deadline for submissions is Oct. 1, 2017. Send your submissions to usarmy.sill.fcoe.mbx. fires-bulletin-mailbox@mail.mil or call (580) 442-5121 for more information.

Soldiers of the Grand Forks-based 1st Battalion, 188th Air Defense Artillery Regiment complete weapons qualification on a simulated weapons range, Engagement Skill Trainer, June 5, 2017, at Camp Grafton, N.D. (Spc. Kristin L. Berg/116th Public Affair Detachment)