Fires

Leveraging JIM
Pieces of the Puzzle

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Disclaimer

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Purpose

Originally founded as the Field Artillery Journal, Fires serves as a forum for the discussions of all Fires professionals, Active, Reserves and National Guard; disseminates professional knowledge about progress, development and best use in campaigns; cultivates a common understanding of the power, limitations and application of joint Fires, both lethal and nonlethal; fosters joint Fires interdependency among the armed services; and promotes the understanding of and interoperability between the branches, all of which contribute to the good of the Army, joint and combined forces and our nation.

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On the cover

Slovenian and Italian Army Joint Terminal Attack Controller soldiers pose for a portrait with U.S. Air Force JTAC trainer, Capt. Skylar Jackson of the Bullseye Observer Coach Trainer Team after a successful training scenario in the Hohenfels training area, Germany, during exercise Allied Spirit IV, Jan. 25, 2016. JTAC Soldiers execute complex air-to-ground missions that integrate ground-based radio operations with fixed and rotary wing aircraft in combat environments. The training they receive at JMRC with its advanced simulations and real-life squad tactics lanes will prepare them for real combat scenarios. Exercise Allied Spirit IV is a U.S. Army Europe-directed, 7th Army Joint Multinational Training Command-conducted multinational exercise that is designed to prepare forces in Europe to operate together by exercising tactical interoperability and testing secure communications within NATO Alliance members and partner nations. (U.S. Army photo by Sgt. 1st Class Caleb Barrieau)

Rossi leaves Fires community, takes Space command

By Marie Berberea

Maj. Gen. John Rossi, outgoing Fires Center of Excellence and Fort Sill commanding general, made history as the first air defender to command the FCoE. He leaves Fort Sill a more balanced post as the home of both the field artillery and air defense artillery. (Courtesy photo)

Maj. Gen. John Rossi, outgoing Fires Center of Excellence and Fort Sill commanding general, said the demand for field artillery and air defense artillery is at an all-time high.

"Both branches are in need by the joint force and the Army community," said Rossi.

That need is outlined in the Fires warfighting function which includes the following tasks: deliver Fires; integrate all forms of Army, joint, and multinational Fires; and conduct targeting.

Much progress has been made to meet those tasks under Rossi's leadership.

The Joint and Combined Integrated Directorate transformed into the Fires Targeting Center in 2015, with the mission of addressing Army targeting doctrine, policy and program oversight within the joint community. Since then, Rossi was designated as the force modernization proponent for targeting and

an Army Targeting Work Group formed with 71 stakeholder organizations to forge the Army's way ahead.

He said the Army is looking to capitalize on skills from all assets in a term called "multifunctional convergence" which was demonstrated during the recent Maneuver Fires Integrated Experiment April 11-22 at Fort Sill.

"We basically used field artillerymen and their equipment to track an unmanned aerial system to make an engagement on it," said Rossi.

The experiment demonstrated two types of weaponry – one using lasers and the other using electricity-propelled projectiles to acquire and destroy targets. Both weapons have the ability to operate an effective counter mission on as little as a few gallons of gas or a small amount of electricity.

Rossi said MFIX, along with the newly approved Electric Fires Range, will help keep the Army prepared for the changing landscape of war.

"Future doctrine, future weapon systems are critically important to make sure the Army has an enduring capability. You do not want to be the ones to show up with a bow and arrow at the gun fight."

"As we move into the future some emerging concepts from the Fires perspective are really gaining a lot of traction," said Rossi.

He said one of those concepts is the expansion of cross domain Fires.

"We're looking hard at how we take our capabilities from both branches and expand them into the other domains: maritime, space and cyber domain and vice versa. How do we better use the capabilities we have? The fact that a target may be on water should be irrelevant. The best opportunity to engage it, whether it's from an Army system or a Navy system or an [Air Force] system, should be deployed to defeat that threat."

He along with Gen. David Perkins, Training and Doctrine Command commander, briefed the chief of staff of the Army recently on that topic.

"We think this is a great time to do this especially as some of our sister services' leadership are really asking for

this. The [Pacific Command] commander specifically highlighted that he would love to see support from the Army in the maritime domain to help," said Rossi.

He said an area of the Fires warfighting function that needs improvement is the Army's integration with joint, inter-organizational, and multinational partners.

"Improved integration multiplies system capabilities, reduces redundancy, provides overlap and enhances our relationships with key partners. Fires forces must understand partner capabilities and integration challenges in order to facilitate targeting to enable freedom of maneuver through all domains."

Air defender

Rossi made history as the first air defender to lead what used to be the home of the field artillery. The air defense artillery came to Oklahoma during a base realignment and closure move in 2005.

He is satisfied with efforts to balance the presence of air defense and field artillery on Fort Sill.

"Both branches spawn from artillery. Common history is one that we need to not only reference, but also build upon. And truthfully every Soldier has a branch and then that branch needs a home and they need to be proud of that home.

Rossi takes command of the Army Space and Missile Defense Command/Army Forces Strategic Command in Huntsville, Ala. at the end of July.

Maj. Gen. John Rossi, outgoing Fires Center of Excellence and Fort Sill commanding general, was known for his competitive spirit and instilling that in his Soldiers. He did not believe in giving trophies for second and third place and had them removed in post intramural sports. "The Army is built on winning. We don't do ties. We don't do losses. The winners get the spoils in war and in sports and everywhere else," said Rossi. (Marie Berberea)

Lindsey's strength in service comes from strong family ties

By Marie Berberea

Command Sgt. Maj. Brian Lindsey, outgoing Fires Center of Excellence and Fort Sill CSM, believes constantly educating yourself is very important. He didn't flourish in college originally because he said "college wasn't all in me right then," but during his time in the Army he earned a master's degree and is now an adjunct professor at Upper Iowa University. (Courtesy photo)

Command Sgt. Maj. Brian Lindsey is leaving Fort Sill after serving as the "backbone" of the Fires Center of Excellence for the past two years.

His biggest lesson learned was "Never forget where you came from."

As an Army brat, Lindsey came from a lot of places, but a lot of those places happened to be right here at Fort Sill, Okla. His father was stationed here with the 299th Engineer Battalion, and his mother worked in clothing and sales on post.

Lindsey said the Army was constantly switching his father's permanent duty station from Sill to Germany and then back again.

Lindsey attended school at the now gone Geronimo Road Elementary, where he first met his wife, Vicki. Later on he went to Lawton High School and then Cameron University for two years where he played football.

"Three quarters of my childhood was spent here and it seems like three quarters of my military career was here as well," said Lindsey.

He joined the Army as a canon crewmember and went to basic training here. He came back to become a drill sergeant and went on to be the 1st Battalion, 79th Field Artillery command sergeant major and then the 434th Field Artillery Brigade command sergeant major. He spent several months as the 2nd Battalion, 2nd Field Artillery command sergeant major before working at the Pentagon with a follow-up assignment here as the post command sergeant major.

"I think I followed my dad's footsteps a little bit coming back."

It is fitting his career path would have a strong tie to his family because Lindsey makes sure his relationship with his own is a priority.

"I called my parents every day. Even as sergeant major I made sure to pick up that phone and give them a call every day."

That habit helped him as he spoke with his father the day before his father passed unexpectedly.

Leading leaders

He said he watched his father be fair, but firm. That balance helped him in his current position as he had to coach, mentor and teach 62 sergeant majors under him.

"Sometimes you have to be firm about some things and realize they're out there doing a hard job as well. I look at it as I've done the jobs that they're doing. 'Don't forget where you came from.' I think that's important.

Command Sgt. Maj. Brian Lindsey, outgoing Fires Center of Excellence and Fort Sill command sergeant major, gave Soldiers here an opportunity not typically afforded to them; he sent them to Air Assault School. Soldiers were screened by their unit and then put through physical tests before being allowed to go to the school in Fort Hood, Texas. Lindsey saw the opportunity to send them to Air Assault School as a retention tool. (Marie Berberea)

ADA, FA schoolhouses get new leaders

By Monica Wood

The Field Artillery and the Air Defense Artillery schoolhouses held a double change of command and change of responsibility ceremony June 3 at the Fires Center of Excellence.

Brig. Gen. Christopher Spillman handed off the ADA guidon and leadership to Brig. Gen. Randall McIntire; Fort Sill also welcomed Command Sgt. Maj. Finis Dodson who replaced Command Sgt. Maj. Harold Lincoln.

McIntire arrives from Headquarters, Department of the Army, where he was the Strategy, Plans and Policy Directorate deputy director. Spillman's next assignment is commanding general of the 32nd Army Air and Missile Defense Command at Fort Bliss, Texas.

Brig. Gen. William Turner turned over responsibility to Col. Stephen Maranian, the new commandant and chief of FA. Maranian previously served as U.S. Army Africa/Southern European Task Force's chief of staff. Turner moves on to become the deputy division commander at Fort Riley, Kan.

The FA School also welcomed Command Sgt. Maj. Berk Parsons, filling a position vacant since December.

Turner thanked Maj. Gen. John Rossi, Fires Center of Excellence and Fort Sill commanding general, for "challenging us to find innovative ways to achieve our objectives while meeting your intent.

"From the start our focus has always been on training and educating adaptive and innovative leaders and Soldiers, the reintegration of our division artilleries, modernizing our capabilities while also seizing opportunities to converge with the greater Fires force, and finally on recruiting and retaining quality Soldiers in our ranks," said Turner.

"During the last couple of years the 17th, the 75th and the 18th Field Artillery brigades have deployed to U.S. Central Command areas of responsibil-

ity, expertly conducting mission command of firing units throughout the region," he said. "Simultaneously the 210th Field Artillery Brigade continues its mission to deter North Korea aggression and maintain peace on the Korean peninsula. These units are performing exceptionally well."

Turner said he was especially proud to have established a Fires Targeting Center.

"The FCoE is now a proponent in joint targeting accreditation, developing targeting doctrine and policy and also managing our Army's targeting certification programs. We have developed a comprehensive 13 Series MOS review that effectively integrated technological advancements and leveraged the phenomenal capabilities of our Soldiers."

Maranian praised Turner, in whose footsteps he follows.

"Under his watch field artillery has made great strides in regaining competencies that have eroded over

Left: Brig. Gen. Randall McIntire accepts the colors as the new Air Defense Artillery School commandant and chief of ADA, replacing Brig. Gen. Christopher Spillman. The ADA also welcomed Command Sgt. Maj. Finis Dodson during a change of responsibility ceremony June 3 on Fort Sill. Right: Brig. Gen. William Turner hands the colors of the Field Artillery School to Maj. Gen. John Rossi, Fires Center of Excellence and Fort Sill commanding general, in a ceremonial passing of command to Col. Stephen Maranian, the new Field Artillery School commandant and chief of FA. The FA School also welcomed Command Sgt. Maj. Berk Parsons, filling a position vacant since December. (Monica Wood)

Brig. Gen. Randall McIntire, the new Air Defense Artillery School commandant and chief of the ADA, speaks to the crowd gathered for the change of command and change of responsibility ceremonies June 3 on Fort Sill. (Monica Wood)

Maj. Gen. Rossi speaks to the audience during the joint ADA and FA commandants change of command ceremonies. (Monica Wood)

the last 15 years. Field artillery has an amazing legacy as the King of Battle. We're an essential, trusted and reliable part of the Army's combined arms team and in the months and years to come we will continue to hone our tradecraft. We'll modernize, organize and frame the force to deliver timely and precise, joint and combined arms Fires enabling unified land operations."

Rossi said Spillman's Patriot and THAAD forces are the most deployed units in the Army.

"He started figuring how in 20 years from now that force could be adjusted to stay as relevant as it is. At the same time he pushed and reinforced the need for a short-range air defense force.

He pulled the maneuver world into it and so now he has infantry and armored leaders saying 'I need what Spillman is advocating.' Like a skilled architect, piece by piece, Chris (Spillman) built this from the top down and he absolutely hit a home run."

Spillman thanked "soon to be Lt. Gen. John Rossi" for setting a good example for him when he was "a brand new officer."

Spillman said "I think we're at the very beginning of a new era of Fires for the United States Army. There is no better pick to be the ADA commandant in the Army than Randy McIntire. He worked up in the Army staff in the plans and handled many complex air defense

issues with other senior leaders and he did it spectacularly well."

McIntire said of his new job, "My overarching goal for the Air Defense Artillery Branch is simple: Ensure we do our part to contribute to warfighting readiness, which is achieved by focusing on the basics and setting that foundation. Creating air missile defense leaders and subject matter experts all starts here at Fort Sill. It's an honor to know that I am part of a branch that has a very bright future."

This information is from Cindy McIntyre's article, "ADA, FA schoolhouses get new leadership" in the Fort Sill Tribune.

Lindsey Farewell

And don't make your emergencies become their priority. Work through some things; there's some compromise and sometimes there's not going to be any compromise."

A professional Soldier, Lindsey will have served in the Army for 30 years in January. He said good work ethic is the reason he rose through the ranks and he said that ethic came from both of his parents.

"Strive to be the best you can be. Just keep a positive attitude and work hard. I believe you'll gain a lot from the fruits of your labor."

Lindsey and his younger brother, Command Chief Master Sgt. Kenny Lind-

sey, Air Force Warfare Center, remain very close. They even climbed the rungs in their military careers together.

"We are closer than a lot of folks would imagine, except he joined the Air Force. That's the only mistake he made," Lindsey said with a hearty laugh. "If we're not talking on the phone, we're either texting each other or something, keeping in contact with each other."

Lindsey said out of the positions he's held, serving as the command sergeant major of the Fires Center of Excellence has been his favorite.

"I have had some ups and downs, but I wouldn't change a thing.

"I think when something bad comes my way, just like the death of my father, I just say 'What would my dad want me to do right now?' Just perse-

vere and you get beyond it, but you don't forget it. … You hold your hand over a stove and you get burned and you realize OK I learned something from that. My hand still got burned. I didn't lose it, but I know next time not to put my hand over that, or not to get as close.

"I think that's what has helped me get this far in the military."

When asked how he dealt with the pressure of being the example of what "right is supposed to look like" he said he learned to be humble.

"Don't get so caught up in the job and think you're bigger than the folks out there."

His next assignment is to serve as the Institute for NCO Professional Development sergeant major.

Exercise Anakonda 2016

Photos by Caitlin Kenney, Coastal Courier Newspaper

Anakonda 16 has been described by many in the Polish and U.S. military as a multi-national exercise that demonstrates an alliance in Europe between Poland and other NATO countries.

It tests the ability of nearly 12,000 U.S. troops spread across 15 sites in Poland and Germany, with an additional 12,000 allied nation troops ability to deploy to an austere environment in order to fend off any adversary.

Soldiers from 1st Armored Brigade Combat Team, 3rd Infantry Division, take photos of an Apache helicopter as it flies above a military range while participating in a distinguished visitor's demonstration during Exercise Anakonda 16 in Drawsko Pomorskie, Poland June 16. (Photo by Caitlin Kenney/Coastal Courier Newspaper)

A Soldier from 3rd Combined Arms Battalion, 69th Armor Regiment, 1st Armored Brigade Combat Team, 3rd Infantry Division, fires a Javelin anti-tank missile June 13 during a combined arms live-fire exercise during Anakonda 16 in Drawsko Pomorskie, Poland. Anakonda 16 was a massive, multinational exercise organized by the Polish military with more than 30,000 participants from more than 20 NATO and partner countries. Soldiers from 1st ABCT, 3rd ID are currently the regionally allocated force for U.S. Army Europe. (Photos by Caitlin Kenney/Coastal Courier Newspaper)

Fratricide avoidance in multinational operations

By Maj. Patrick Bryan and Capt. Andrew Arndt

Soldiers from 1st Battalion, 64th Armored Regiment observe the operational area during their unit's training exercise. (Courtesy photo/ Maj. Patrick Bryan)

Despite continuous collaboration among multinational partners over the last 15 years in support of the Global War on Terrorism, there have been limited opportunities for our forces to join together to conduct unified land operations. As a result, today's Soldiers have rarely, if ever, had the opportunity to distinguish enemy from friendly forces in a decisive action environment.

Recognizing that this relative unfamiliarity can result in fratricide, combat training centers (CTCs) continue to develop realistic decisive action training environments (DATE) that exercise a unit's proficiency with fratricide avoidance. This assertion is based in both theory and observation. For example, during Combined Resolve V, a recent U.S.-led multinational brigade-sized DATE rotation at the Joint Multinational Readiness Center in Hohenfels, Germany, both the U.S. and its partner forces had difficulty distinguishing friendly versus enemy forces and equipment, which resulted in (training) fratricide.

Many service members, regardless of national origin, are now catching their first glimpse of the wide array of combat equipment and capabilities that exist in a multinational force at the CTCs. Likewise, commands and staffs are increasingly confronting the complexities and challenges of having to account for such diverse formations.

Fratricide avoidance is crucial to the success of any mission, but it is uniquely important during multinational operations. One single fratricide incident between partner forces can undermine the vital trust that is necessary for mission accomplishment. An incident can also have operational and strategic implications well beyond the loss of life and equipment on the battlefield. Fratricide avoidance is therefore among the most complex challenges facing multinational force commanders on today's battlefield. Through proper planning and preparation, however, units can minimize fratricide risk during mission execution.

Fratricide avoidance planning

Multinational formations are especially difficult to control due to myriad languages, cultures, vehicles, uniforms, etc. According to ADP 5-0, The Operations Process, May 2012, although there is no checklist solution, commanders can most directly influence fratricide avoidance during the military decision-making process (MDMP) and troop leading procedures (TLP). Placing an early command emphasis on properly understanding the operational environment (particularly as it concerns friendly and enemy forces and anticipated causes of fratricide) will produce better and more proactive solutions during the planning process.

Each iterative step of the MDMP should recognize fratricide avoidance as an issue to be identified, discussed and resolved or mitigated. Some of the tools to reduce the risk of fratricide are instinctive, such as technology, graphic control measures, standard operating procedures for passage of lines or adjacent unit coordination. But more critical thinking regarding fratricide needs to go into the planning process in order to show a measureable result.

Discussing fratricide avoidance should not occur in a vacuum; it should be an integrated effort among all the staff (including any liaison elements), with inputs such as applicable rules of engagement (RoE), enemy situation, friendly forces identification measures, task organization and others. At receipt of mission, somebody should be prepared to discuss which forces have been declared hostile under an appropriate authority and how to distinguish those forces from friendly or neutral forces. Similarly, and maybe more importantly, during mission analysis one might ask which forces within the operational environment have not been declared hostile, but who could nevertheless affect operations.

The planning staff must next ensure subordinate units understand the measures that have been implemented through effective briefing, orders production and confirmation briefs. Likewise, the planning staff must ensure fratricide avoidance measures are completely understood by the current operations staff during the plans-to-ops transition. Not only

will this shared understanding reduce the risk of fratricide, it will also drive overall situational understanding of the operational environment.

Company-level leadership and below must address the same fratricide avoidance considerations as part of parallel planning during its TLP. For company level and lower echelons, control measures and details about other units in the area of operation are of even greater importance. It is just as important to know not just who is next to you,

A Leopard II armored personnel carrier. (Courtesy photo/Maj. Patrick Bryan)

A Romanian soldier takes aim. (Courtesy photo/ Maj. Patrick Bryan)

but what that unit looks and sounds like. Information such as exactly what type of vehicles they use, what those vehicles look and sound like during the day or at night in the open, in concealment and in cover should become common knowledge of every Soldier. Similarly, every Soldier should understand what adjacent units wear and what language they speak and the process in place to communicate effectively with them.

Finally, at every level of command, confirmation of functional understanding through rehearsals and back briefs ensures that target engagement criteria, target identification, adjacent unit coordination and liaison, are not just rote recitation, but dynamically understood. Units should post the RoE in the com-

mand post. It should be concise and understandable and should highlight whatever specifics the commander deems most important. At a minimum, it should state who can be engaged, how to identify who can be engaged and how they can be engaged. This is particularly important at the beginning of hostilities when the RoE is in a constant state of flux, but remains necessary throughout the mission/tasks (especially when RoE changes are implemented).

Thus, planning procedures that emphasize fratricide avoidance as a key issue (i.e. a commander's priority) is the first step in addressing fratricide in multinational operations. The next step is to prepare to avoid fratricide.

Fratricide avoidance preparation

From individual Soldiers to commanders and staffs at all levels, fratricide avoidance begins long before mis-

sion execution. Fratricide avoidance must become a central aspect of training and rehearsals. Commanders should insist that fratricide avoidance be made a mission essential task at every level. At the tactical level, the Army Universal Task List provides a framework to conduct and evaluate fratricide avoidance. Among its subtasks are: detect and establish positive identification of friend, foe, and noncombatants, perform target detection, decide target engagement and engage hostile target. A caveat of this list is although doctrinally part of the protection warfighting function, fratricide avoidance applies to all warfighting functions and is so critical that its accomplishment is likely to determine the success of the next higher organization's mission.

Variations of multinational armored personnel carriers

Croatian Patria

U.S. Stryker

Czech Pandur II

Romanian TAB 77

(Photos courtesy of Wikimedia)

Because of the complexity of multinational operations, target identification and engagement must remain conscious, yet quick and seamless. Adequate preparation enables boldness and audacity.

According to ADP 5-0 The Operations Process, to prepare for any operation, one must build and maintain situational understanding. Operational environments are dynamic and complex, and often contain hybrid threats. Situational understanding regarding overall operational complexity is often confined to command and staff decision making. To a certain degree, that is understandable. The commander drives the operations process based on his situational understanding as his staff has built it. But to avoid fratricide, it is imperative that every Soldier hone their situational understanding, at least to a certain level.

To drive situational understanding at its most basic level, every Soldier must first understand the RoE. For U.S. Soldiers, this means having a basic knowledge of the standing rules of engagement (SRoE), which provide clear guidance on the use of force, that it can be used against a declared hostile force (DHF) or in self-defense (hostile act/hostile intent). A "declared hostile force" is, "any civilian, paramilitary or military force or terrorist that has been declared hostile by appropriate U.S. authority." Once a force is declared "hostile," U.S. units may engage that force without observing a hostile act or demonstration of hostile intent; i.e., the basis for engagement shifts from conduct to status. This baseline should be so ingrained in Soldiers' minds during training that upon receipt of a mission, they need only need ask: "Who is the DHF?"

Once Soldiers know whom they can target, they need to know how to identify those targets. Whether termed "target identification" or "positive identification of a DHF," the requirement is the same: Soldiers engage only those they can confirm are the enemy. This is obviously more difficult than simply identifying tanks, infantry fighting vehicles and other platforms that do not look organic to one's own unit. Again, multinational operations

A Dutch Leopard I armored personnel carrier. (Courtesy photo/ Maj. Patrick Bryan)

likely involve a variety of friendly combat systems, the origin of which is entirely unfamiliar to the shooter. In fact, because many former Soviet Bloc countries are now members of NATO or the NATO Partnership for Peace (PfP), it is entirely conceivable that friendly forces are operating the same vehicles as potential enemy forces. Further, diverse languages, cultures and standard operating procedures complicate command and control, which further increases the fratricide risk.

Conclusion

As the United States and its multinational partners continue to focus their efforts on an uncertain future against uncertain enemies, they must build interoperability through mutual trust. That trust is easily broken after an incident of fratricide during mission execution. That is why it is so important to get this right. Soldiers at every level need to know whom they can engage (and whom they cannot engage) as well as what they and their equipment look like, through situational understanding. The risk of fratricide during multinational operations is great, but through conscious and effective fratricide avoidance planning, preparation and execution, the U.S. Army can reduce the risk to minimal, acceptable levels.

Maj. Patrick Bryan is currently assigned as the senior legal observer coach trainer at the Joint Multinational Readiness Center located in Hohenfels, Germany.

Capt. Andrew Arndt is currently assigned to the Joint Multinational Readiness Center as a legal observer coach trainer at Hohenfels, Germany.

Col. Samuel Saine (right), 4th Battlefield Coordination Detachment commander, shakes hands with Lt. Col. Matthew Worling, 4th Operational Support Squadron deputy commander Jan. 7 at Seymour Johnson Air Force Base, N.C. Saine and Worling met to discuss Army and Air Force joint training and coordination. (Courtesy Photo)

The Battlefield Coordination Detachment's enabling and integrating roles within the Theater Air Ground System

By Maj. Corrie Brice, Maj. DaMond Davis, Maj. Pablo Diaz and Maj. James Horn

Today's global security environment is volatile, complex and ambiguous and its rapidly changing nature requires persistent engagement. Advancements in technology and a growing number of threats require the United States armed forces to continually evaluate and evolve its doctrinal application of force. Nevertheless, each service of the U.S. military has its own mission and identity as well as distinct service culture, language and set of practices and procedures that, at times, diverge. In light of these differences, the U.S. Army and U.S. Air Force have made procedural, structural and manning efforts to bridge these gaps in order to facilitate the most effective application of joint power. This relationship developed over the years and has undergone a series of changes since the creation of the Air Force in 1947, and it will continue to be refined as the nature of warfare changes and the United States adjusts to counter the actions of threats and adversaries. The current mechanism that links the air and land components' operational actions is known as the Theater Air Ground System (TAGS).

Lt. Col. Matthew Worling, 4th Operational Support Squadron deputy commander, at Seymour Johnson Air Force Base, N.C. speaks with Col. Samuel Saine, 4th Battlefield Coordination Detachment commander, Jan. 7. Saine and Worling discussed how Army ground liaison officers with 4th BCD are coordinating joint training with the Air Force and Army. (Courtesy Photo)

By design, the system embeds liaison elements across services within the senior echelons of the combatant/ coalition commands to improve coordination, joint planning and to represent each services' priorities and perspectives. The Battlefield Coordination Detachment rests at the top of this structure as the Army's representative to the Air Force at the operational level of war. The liaison elements within TAGS communicate the land component commander's intent, share operational information and serve as an integrating enabler for close air support (CAS) and air interdiction (AI).

This article focuses on the historical development of these requirements and how the 4th BCD, U.S. Army Central, communicates and operationalizes land component requirements across the U.S. Central Command area of responsibility (AOR) from within the

609th Combined Air Operations Center at Al Udeid Air Base, Qatar.

Background and development of the BCD

The current structure of the TAGS is the result of a gradual evolution that began with the increased capabilities and employment of aircraft during World War II. This process continued after the war as the United States engaged in a range of armed conflicts and interventions. The National Security Act of 1947 removed the Air Corps from the Army and established the Air Force. From their inception as separate services, the Air Force and the Army struggled with air-ground integration, as the ground forces' demand for air support increased, commanders at the tacti-

cal level continued to find it difficult to maximize CAS integration.

During the Korean War, lessons learned led to the Joint-Training Directive for air-ground operations in order to better integrate ground observers with land forces. Although the air and land engagements were generally aligned, units struggled to identify engageable targets and aircrafts found it difficult to destroy the identified targets. The belief of many ground commanders was the Air Force was not interested in providing timely CAS and was more concerned with attacking their own targets behind enemy lines. Gen. Harold Keith Johnson, Chairman of the Army from 1964 to 1968 and a regimental commander during the Korean War, best captured a ground force commander's perspective on CAS by stating, "If you want it, you can't get it. If you can get it, it can't find you. If it can find you, it can't identify the target.

If it can identify the target, it can't hit it. But if it does hit the target, it doesn't do a great deal of damage anyway."

The inter-war era between the Korean War and the Vietnam War gave an opportunity for the Army to develop an organic ability to attack targets from the air with the advent of the attack helicopter. In addition, the development of the Tactical Air Control Parties (TAC-P) emerged as a means to provide terminal attack guidance at the tactical level. Unfortunately, operational planning systems remained under-developed and air-ground operations continued to perform at sub-optimal levels as helicopter gunship support provided an immediate solution to the air-ground integration dilemma.

After Vietnam, Air-Land Battle Doctrine was developed to counter the menacing threat of Soviet ground forces positioned throughout Eastern Europe. Emerging doctrine depended on the Air Force to disrupt and degrade Soviet ground formations when cannon and rocket artillery was unable to range or provide weight of fire to achieve the desired effects before maneuver forces entered the main battle area. This paradigm shift by the joint force met the operational needs of both components but also required close planning and co-ordination between the components at the operational level.

In 1984 the Army created a provisional organization called the Battlefield Coordination Element (BCE) to fulfill this role. The BCE was first officially employed in combat during Operation Just Cause, Panama in 1989. In November 1995, an agreement between the Air Force and Army formerly established the requirement for liaison elements between the components to codify their unifying efforts and formalize the air to ground system. The 1995 agreement defined the BCE as a liaison element within the Air Force Tactical Air Control Center which was later re-designated the Air Operations Center (AOC). As doctrinal application continued to develop for air-ground integration, the BCD served as the ground component's direct liaison between tactical air and ground units for close air support planning, processing of ground force air support requests (ASRs) and ultimately represent the ground force commander's priorities, guidance and intentions to the Joint Forces Air Component commander.

Col. Sam Saine, 4th Battlefield Coordination Detachment commander, stands with Timothy Adams, a ground liaison officer aboard the USS Harry S. Truman. The job of the ground liaison officer is to provide the ground scheme of maneuver to the pilots supporting operations in the U.S. Central Command area of responsibility. (Courtesy Photo)

Doctrinal application in the Combined Air Operations Center

The BCD is embedded across all five divisions of the Combined Air Operations Center: Strategy, Combat Plans, Combat Operations, Air Mobility and Intelligence Surveillance Reconnaissance Division. This enables the BCD to establish relationships in every part of the organization which is critical to facilitating information flow and advocating for the ground component commander's intent. The BCD translates language specific to the Army to the Air Force and vice versa, facilitating air requests to the Air Force in order to meet the intent of the ground force commander. This expedites the communication of ideas, information and the cooperation up and down the TAGS architecture.

The process begins when a ground commander identifies a need for CAS or AI. He initiates the process with a DD Form 1972 Joint Tactical Air Re-

quest (JTAR) to support an operation. The battalion fire support officer (FSO) forwards the request to the brigade FSO where it works its way up the chain of approval through the division/Coalition Forces Land Component Command and finally up to the corps/Combined Joint Task Force (CJTF) where it is prioritized along with other requests and sent to the BCD. All types of ground forces, conventional, special operations forces and coalition forces submit requests for dynamic or deliberate prosecution using joint/coalition air assets. The CJTF prioritizes the air support request in accordance with the CJTF commander's guidance and submits them to the BCD for processing. The BCD plans section creates an air support list (ASL) and in turn, the ASL is sent to the master air attack planners (MAAP) team within the CAOC Plans Division for tasking of air assets to support the operation and publishes this in the air tasking order (ATO). The BCD interacts with the targeting and ef-

fects team (TET) and the MAAP team to ensure common understanding so that the best available assets are allocated to prosecute the target. Once assets are allocated; the master air attack plan is communicated in a document called the "FLOW." The FLOW graphically depicts where and when aircraft will operate and the specific mission and/or JTAR they support. When requests are made within the 72-hour joint air tasking cycle, the BCD maintains situational awareness while the CAOC combat operations division (COD) ensures the requests are dynamically executed by the supporting ASOC if possible. Additionally, once the ATO is published, the BCD ensures the CFLCC and subordinate elements are advised which ASRs are supported and/or unsupported. In this process the BCD is the link between the ground commander and the supporting CAOC. The relationships and intangibles associated in this process play a great role in how the BCD executes its mission and high-

light why it is necessary for a strong relationship between the CFACC and CFL-CC organizations. Working among the various CAOC divisions ensures requests are synchronized with the air operations directive and ultimately aims to ensure the CJTF commander's intent and the desired effects are achieved. While the Air Force and the Army conduct business in separate and distinct ways, the BCD effectively assists both services with interoperability. As the joint force conducts combined and joint operations in the future, those relationships also assist other service and coalition units as they integrate with partner nations executing combined arms maneuver/wide area security (CAM/WAS) operations.

A BCD today

The BCE structure remains nearly identical to the BCD of today where there are now five BCDs aligned with U.S. Geographic Combatant Commands

Col. Sam Saine, 4th Battlefield Coordination Detachment commander, stands with Capt. Felicity Sparks, a ground liaison officer aboard the USS Harry S. Truman. The job of the GLO is to provide the ground scheme of maneuver to the pilots supporting operations in the U.S. Central Command area of responsibility. (Courtesy Photo)

including CENTCOM, United States Pacific Command, U.S. Southern Command, U.S. European Command and the Korean theater of operations, U.S. Forces Korea, Combined Forces Command, and function within their respective Joint Air Operations Centers/Combined Air and Space Operations Centers. The inactivation of 1st Battlefield Coordination Detachment after October 2016 reduces the Active Army's BCDs to four with two provisional National Guard BCDs identified to mitigate the loss of 1st BCD. The development of joint doctrine established a comprehensive Theater Air Ground System (TAGS) and an Army Air Ground System (AAGS) that allowed both the Army and Air Force to coordinate between operational staffs and tactical warfighters.

As 21st Century technological advancements are rapidly employed by asymmetric and hybrid threats, both in the War on Terror, Operation Inherent Resolve (OIR) or in future conflicts with near peer competitors, there will remain a high demand at every echelon for the application of air power in support of ground forces. This is true from the Combined Joint Task Force (CJTF) level through the Combined/Joint Forces Land Component Command (CJFLCC) and on down to a maneuver company or Operational Detachment–Alpha. This demand will only serve to increase the importance of the BCD within the air-ground integration domain and solidifies the necessity for an organization capable of meeting evolving operational requirements specific to an area of responsibility (AOR).

Currently, the 4th Battlefield Coordination Detachment supports operations in the Middle East, within the USCENTCOM AOR, encompassing Iraq, Afghanistan and Syria. The specific requirements of the AOR led the 4th BCD to apply a unique combination of doctrinal and non-doctrinal tasks to meet the needs of ground force commanders conducting operations that involved special operations forces, conventional forces, coalitional forces and partnered forces engaged in combat operations. Additionally, the demands of today's modern communications architecture require the BCD to broaden the scope of its predecessors and provide real-time situational reports and feedback gathered from across a given operational area. This is accomplished by maintaining situational awareness across various command and control elements of the CFACC and CJTF commander. JP 3-30, Chapter II, Paragraph A and B state that in order to establish and exercise command and control (C2), each service commander designates responsibilities and utilizes his own organic system for C2 of their air operations. As each of these organic elements integrates into the larger system it becomes what is known as the TAGS. Within TAGS, the CFACC ensures the C2 architecture supports joint air operations. Within this architecture normally collocated with the senior Army Fires element, the ASOC, collocated with the CJTF, coordinates and directs air power in support of land forces. The ASOC is directly subordinate to the AOC, and is responsible for the coordination and control of air component missions in its assigned area.

This is accomplished through maintaining situational awareness across various command and control elements of the CFACC and JTF commander. JP 3-30, Chapter II, Paragraph A and B state that in order to establish and exercise command and control, each service commander designates responsibilities and utilizes his own organic system for C2 of their air operations. As each of these organic elements integrates into the entire system it becomes what is known as the TAGS. Within TAGS, the CFACC ensures the C2 architecture supports joint air operations. Within this architecture normally collocated with the senior Army Fires element, the ASOC coordinates and directs air power in support of land forces. The ASOC is directly subordinate to the AOC, and is responsible for the coordination and control of air component missions in its assigned area. Finally, ongoing operations in Iraq and Syria continue to require the delivery of lethal effects by prosecuting coordinated dynamic air strikes. In the CJTF-OIR CJOA, strike cells at the CJFLCC (division) level are used to execute these operations. These strikes cells serve to enable the ground operations of our coalition partners and disrupt and degrade Dae'sh forces and their capabilities. The doctrinal organization similar to these strike cells is the Joint Air Ground Integration Center (JAGIC) which is designed to fully integrate and coordinate all Fires and air operations in a designated AO. As an enabler, a JAGIC has the capability to rapidly coordinate the clearance of assigned airspace, coordinate with the appropriate airspace control agency above the coordinating altitude (CA) and participate in clearance of Fires procedures.

As designed, the Army's BCD continues to represent the land component commander's priorities at the highest echelon of Air Force tactical command within a CJTF, and it provides situational updates and feedback from the ground forces perspective to the Combined Forces Air Component commander. At times the BCD accomplishes this for other components as our sister services are not structured or equipped to provide the requisite capability the Army BCD does. The BCD provides a unique enabling capability within combatant command's AORs to ensure effective air ground integration and efficient communication between air and ground components.

Conclusion

The BCD's mission is to bridge the gap between the Army and the Air Force by providing a unique enabling liaison capability within a combatant command's AOR. Today, its doctrinal employment ensures effective air ground integration and efficient communication between air and ground components. In the USCENTCOM AOR, the 4th BCD demonstrates this daily by embedding within the 609th Combined Air and Space Operations Center and providing the AOR's multiple Combined Joint Task Forces and Land Component Headquarters a single, real time, trained, digitally connected liaison element to the AOR's CFACC and it assigned capabilities. The BCD's positioning and responsiveness ensures clear communication and maximum support to ground force commanders. The BCD serves as the intermediary facilitating air requests made by the commanders on the ground ensuring air ground integration is achieved. Although not widely known or understood among Army organizations, the BCD continues to represent the land component commander's priorities and enables situational awareness and feedback from the ground force perspective to the CFACC providing a critical integrating and enabling function to joint operations.

Reshaping the JAGIC

Lessons learned from 4th ID Warfighter 16-03

By Maj. Lawrence Rubal, Capt. Matthew Lilley, Chief Warrant Officer 2 Robert Walthall, Sgt. 1st Class Shawn Ramirez and Spc. Ian Roth

While Joint Air Ground Integration Center doctrine has been in publication for almost two years with the release of Army Techniques Publication (ATP) 3-91.1 or Air Force Tactics, Techniques, and Procedures (AFTTP), it is only now that outputs are being identified throughout the force. Five years removed from the memorandum aligning Air Support Operations Centers (ASOC) to each division, the JAGIC concept has been put through its paces during multiple division level warfighter exercises. This paper serves not to challenge current JAGIC doctrine, but to provide insights into key lessons learned during the 4th Infantry Division Warfighter 16-03 exercise conducted in January 2016 at Fort Carson, Colo.

This paper utilizes the perspective/insights from five different personnel from across the 4th ID JAGIC team rather than the traditional insight of a single subject matter expert. It is the summary of a three-day working group that included personnel from every section of the JAGIC internal to 4th ID (Division Fire Support Element, Air and Missile Defense, and G3 Aviation), 4th ID's supporting Air Support Operations Squadron: 13th Air Support Operations Squadron, Fort Carson, Colo., and 4th ID's supporting air support operations squadron: 712th Air Support Operations Squadron, Fort Hood, Texas. Two diverse topics affecting JAGIC execution are covered. The first topic looks at human dimension issues related to creating a team from different specialties, duty stations and services to make critical decisions that heavily impact the division commanding general's mission. The second topic examines the technological lessons across information systems and deconfliction of friendly airspace, which when properly utilized, make the JAGIC more efficient and therefore, more lethal.

The human dimension of sustaining the JAGIC: Training, trust and TACSOPs

Maj. Lawrence Rubal and Sgt. 1st Class Shawn Ramirez

The very formation of the JAGIC presents problems for what a recent Army white paper calls the "human dimension." With dwindling resources, the Army is placing onus on optimizing human performance. Training and trust become issues for a team that is built across services, and sometimes across the United States, to form what needs to be a closely-knit team. In reference to teamwork, the Army white paper states, "Because every member plays a critical role in solution development in the highly complex future, they must share a deep trust and confidence in each other built around a philosophy of mission command, and forged in a series of tough, realistic collective training events that develop cohesion and effective team problem solving." The JAGIC internal after action review identified a lack of confidence and familiarity within the newly formed team as contributing factors to both longer than desired clearance of Fires times during the first two days of the 4th ID's warfighter exercise and a lack of internal communication within the JAGIC. These friction points were aggravated by rapid turnover rates common to the division staff and the challenge of training a diverse team dispersed across the staff at Fort Carson (4th ID and 13th ASOS) and Fort Hood (712th ASOC). This team complexity challenges the ability to execute collective training. The 4th ID JAGIC utilized a command post exercise (CPX) in December as a platform to prepare for WFX 16-03, but did not have the luxury of operating with the same supporting ASOC or injects necessary to provide appropriate realism. While it was clear that individuals excelled at their assigned duties, the team struggled to communicate early on. Issues with trust and teamwork were exacerbated by a deficiency in team-level training and JAGIC tactical standard operating procedures (TACSOP) used and understood across the center. Lack of comfort with and confidence growing from knowing the team was clearly alleviated by day three of the exercise, and as a result, fire mission clearance times dropped significantly.

The JAGIC is a division staff entity that does not train or assemble until combat or major training events. Dissimilar from other staff functions (i.e. G-2 or G-6), JAGIC personnel are pulled

The JAGIC concept has been put through its paces during multiple division level warfighter exercises.

	4ID_Airspace_Coord	4ID_Surface_Fires_Coord	4ID_CAS_AI_Coord	4ID_Intel_Coord	C2_Coord	CAOC_SADO	4ID_JAGIC_INT	4ID/Adjacent Unit_JAGIC	4ID_Targets	4ID_CUOPS
FSO/JAGIC Chief	Participant	Owner	N/A	Participant	Monitor	N/A	Participant	Owner	Participant	Participant
FSNCO	Participant	Participant	N/A	Participant	N/A	N/A	Owner	Participant	Participant	Participant
TARGO	Participant	Participant	Participant	Participant	N/A	N/A	Participant	Participant	Owner	N/A
AMD	Participant	Monitor	N/A	Participant	Monitor	Participant	Participant	Participant	Participant	N/A
Aviation	Owner	Participant	N/A	N/A	N/A	N/A	Participant	Participant	Participant	N/A
UAS LNO	Participant	Participant	N/A	Participant	N/A	N/A	Participant	Participant	Participant	N/A
DIVARTY FCE	N/A	Participant	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DIVARTY CF	N/A	Participant	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
FAIO	N/A	N/A	N/A	Participant	N/A	N/A	N/A	N/A	Participant	N/A

Notes: Owners need channel administrator status so they can control and manage participants in each room.

Figure 1. Chat matrix from 4th Infantry Division Tactical Standing Operating Procedure. (Courtesy illustration)

from across staff planning teams that are not focused daily on the JAGIC's operations. External to the division staff, the JAGIC must be supplemented by division artillery and Air Force ASOS personnel. The ASOS's wartime mission is to provide personnel trained to perform both the TACP and ASOC functionality at the tactical warfighting headquarters. However, the Air Force is currently in the process of aligning ASOC functions in every ASOS at each division. Currently, in some ASOSs, ASOC personnel are not co-located with Army counterparts and therefore are rarely in contact. Until this alignment is complete, there will always be a gap in both confidence (trust built over time or experience) and training within each JAGIC. As a result shown in WFX 16-03, the JAGIC "team" often first meets on the battlefield (simulated or real) and the chance to hone training and embed trust becomes difficult. However, there are three tentative solutions to bridge the gap of trust and proficiency within the JAGIC.

1. The Army Joint Support Team (AJST) at Hurlbert Airfield in Florida possesses the ability to supplement training that currently cannot be recreated elsewhere. The JAGIC not only requires information system connectivity, but complex injects to feed each digital information system and simulate air/ground deconfliction (unsupportable by internal personnel). However, AJST-like training is a pricey solution. Either the division pays for temporary duty for JAGIC personnel or an agency like the AJST must be paid to visit (including supporting ASOC personnel) for any developed training requirements.
2. Creating an organic training system co-located with each division provides a better solution. Either

local mission training complexes (MTCs) can facilitate the intricate injects necessary, or at the very least, division elements can utilize backup information systems to create an internal training center. Organic training centers do not alleviate the issue of dispersed ASOCs personnel, but JAGICs can connect information systems and integrate at least co-located Air Force (ASOS) personnel to improve training and build personal trust. While this solution serves the purpose of closing the training and trust gap by increasing training opportunities for fluctuating personnel, without MTC level support, the complexities of the injects necessary for realistic training (similar to warfighter exercises) would fall short of realistic training.

3. The best solution would be internal JAGIC training centers, most likely supported by MTCs across the Army to incorporate proper injects to stimulate the team. This concept would support the revitalization of home station and realistic training identified by the Human Dimension white paper. Organic training centers would also facilitate efficient training opportunities and the possibility of creating a certification process co-located with the majority of personnel that man the JAGIC (co-located ASOS personnel can sub in for distant ASOC team members).

Another issue that affects sustaining JAGIC competency and trust is persistent personnel turnover. Field grade and company grade officers will most likely spend transitional periods within the division staff (awaiting key developmental positions or their exit

from the division). The effort to train JAGICs must be increased and structured over time since turnover won't likely be reduced. Adding to this issue, unlike fire support teams, tank sections or infantry companies, there currently is no qualification or certification process for the JAGIC in doctrine (such as Training Circular 3-09.8 FA Gunnery that outlines the certification process for Brigade Fires Cells, but fails to mention division-level fire support). This becomes a major concern considering the team's importance as the designated authority for the commanding general's execution of fire support. The establishment of a certification process as a part of Division Artillery (DIVARTY) Red Books simultaneously assuages the trust and training issues organic to the JAGIC. Assembling the team to train and certify at least bi-annually provides a forcing function and certification process. Concurrently, it presents additional training opportunities for the JAGIC to build mutual trust and mitigates continuity of personnel lost due to personnel turnover. Regardless, until the ASOC is co-located or at least in direct support of each division, the JAGIC will only be able to train as a partial team, or the division will incur TDY costs for each event to borrow missing pieces of the JAGIC team.

Finally, JAGIC TACSOP serves as a living document to close the fissure of training and trust beyond the discussed increase in team interaction. The Army's human dimension white paper identifies living doctrine as a means of maximizing performance. This particularly applies given JAGIC turnover. The 4th ID chief of staff served as a forcing function to complete the TACSOP rewrite across the staff immediately following WFX 16-03. Personnel from the supporting ASOS were brought back to Fort Carson to participate in working

groups and write the JAGIC TACSOP in an effort to maximize collaboration. Each section within the JAGIC was represented, including the DIVARTY team. The outward support from the chain of command ensured lessons were captured and codified in a new 12 page TACSOP, formal AAR, and this article.

With the fluctuation of personnel previously discussed, the constant amendment to the TACSOP provides a framework and the shared understanding necessary to successfully execute mission command (since the JAGIC is ultimately delegated authority in line with the philosophy). The TACSOP begins with the foundations of ATP 3-91.1 and shapes it to the strengths of the specific personnel supporting the JAGIC. Just like any doctrine, we utilized ATP 3-91.1 as a foundation, but ultimately discovered that not every concept straight from the doctrine applied to the 4th ID system. Lessons learned cost digital lives during WFX 16-03, but were immediately codified with support from our chain of command. The codification is particularly imperative for an element as complexly assembled as the JAGIC. Without change to the limited training opportunities already discussed, the TACSOP may become the only shared understanding and commonality the JAGIC team brings to being armed for battle.

Complex JAGIC relationships

Maj. Lawrence Rubal and Capt. Matthew Lilley

Another piece of the human dimension that should be addressed within the JAGIC construct are relationships with internal and external entities. Many of these relationships defy clarity in ATP 3-91.1 and became complex during WFX 16-03. Without a detailed discussion, a risk of overlap or gaps in authorities between internal and external elements to the division increases. Particularly, relationships with the division current operations integration cell (COIC) personnel and the DIVARTY may change based on commander preference and unit specific TTPs. This section provides some issues and solutions to two complex relationships experienced be-

We realized the synchronization of fire support and maneuver is absolutely necessary and best when face-to-face during complex conflict.

tween the JAGIC and the COIC and DIVARTY.

The COIC: One of the most debated relationships will continue to be between the chief of operations (CHOPS) and the JAGIC. The JAGIC is loud and disruptive, nested within a cell trying to calmly control the fight and update decision makers. A reoccurring topic of discussion during WFX 16-03 was whether the JAGIC co-locates with the COIC, is placed behind a wall or in an entirely separate room. This conversation was put to rest as we realized the synchronization of fire support and maneuver is absolutely necessary and best when face-to-face during complex conflict. The inability to clearly identify roles and specific authorities during WFX 16-03 (particularly the role of shifting the coordinated fire line) directly led to a fratricide incident. The incident was aggravated by miscommunication, specifically responsibility for moving the coordinated firing line and disseminating to subordinate elements. The ultimate question remains: how does a team focused on constant execution of Fires integrate during battle rhythm events and updates necessary to the function of the COIC?

The integration question never disappears, but our team found a solution within the redundancy of officers within the JAGIC. The division fire support officer (FSO) and JAGIC chief duties can, and often will, overlap. Since the JAGIC chief is responsible for anything that his section executes, his/her focus remains internal. This leaves the FSO to

become the utility officer. The FSO can participate in COIC meetings, drills and updates with little reduction in efficiency. In a perfect world (or war) the JAGIC chief keeps his/her focus on the "forest" and not the "trees," but for short periods of time, he/she can cover both FSO and chief positions (particularly facilitated by the fire support non-commissioned officer). This gives the COIC a JAGIC representative to maintain situational awareness and relay information back to the JAGIC chief. This relationship ensures mutual awareness for both maneuver and Fires elements and ensures synchronization.

DIVARTY: With the activation of DIVARTYs after the publication of ATP 3-91.1, its relationship with the JAGIC is less contentious than the COIC, but still somewhat unclear. Where do planning and execution responsibilities begin and end for either element? Most JAGIC personnel serve a planning function prior to execution, but that immediately shifts once the battle begins. While the deputy fire support coordinator (DFSCOORD) maintains his role as the senior fire support planner, the rest of the JAGIC personnel become overwhelmed with the current fight (as they should, since the JAGIC's responsibility is execution, not planning). Secondly, as executioners, we found a gap in the JAGIC's ability to analyze counterfire information and create airspace control measures (ACMs) or continue planning efforts during execution. These two gaps were thankfully filled by the DIVARTY staff.

People first, ideas second, hardware third.

The counterfire fight was spotlighted during WFX 16-03 after a major artillery exchange a few days into the battle. The issue was not DIVARTY's ability to manage the counterfire fight, but rather the information flow to the JAGIC and development of ACMs to expedite Fires. Without a planning mechanism, we found ourselves particularly reliant on the DIVARTY counterfire element and S-2 to conduct and disseminate counterfire analysis. This took simple integration between the JAGIC Chief, Army and Airforce airspace managers and the DIVARTY element in a working group format. Prior to major engagements (or as necessary), critical counterfire predictive analysis was discussed between the two elements, ensuring preparation for the upcoming fight. The synchronization of these personnel immediately reduced counterfire times, particularly on the JAGIC floor, and greatly increased counterfire effectiveness.

Similarly, the DIVARTY operations officer and fire control element (FCE) led hasty planning efforts during execution. Particularly for a hasty suppression of enemy air defense operation, the DIVARTY element gathered the tools and team, filling the planning gap created by JAGIC. The JAGIC chief/FSO redundancy allowed for necessary JAGIC planning integration, but the effort was led by the DIVARTY representatives. Constant integration of senior JAGIC personnel and robust DIVARTY elements, ensured shared responsibility and efficiency of planning and execution. Simultaneously, this integration between the two elements promoted a shared understanding of each mission from plan to execution.

The JAGIC ultimately controlled the fight. The DIVARTY tasks of subordinating firing elements and targeting servicing decisions (utilizing the high payoff target list) resided with the JAGIC chief. DIVARTY inputs were injected as part of the targeting process and hasty planning, leaving execution to the JAGIC. The JAGIC managed, disseminated and confirmed hourly all fire support control measures with subordinate and adjacent headquarters. This clear delineation of responsibility ensured continuity and accuracy across the team, which formed clear definition of responsibility from the onset. Relationships between the JAGIC and DIVARTY should be discussed and codified long before the fight. Ultimately, these internal relationships can be best decided by the FSCOORD and his deputy, as they are imperative to supporting the maneuver commander's mission.

JAGIC Digital Integration

Spc. Ian Roth

With the advent of mission command, the role of information systems in combat operations has drastically increased. Although mission command focuses on decentralized execution, commanders dictate their information requirements, often leading to an increased use and reliance on information technology. Information systems, especially the Advanced Field Artillery Tactical Data System (AFATDS), Air and Missile Defense Workstation (AMDWS), Tactical Air Integration System (TAIS), and Joint Automated Deep Operations Coordination System (JADOCS) "enable extensive information sharing, collaborative planning, execution and assessment that promote shared understanding." Since the JAGIC is focused primarily on execution, JAGIC information systems allow friendly forces to decrease execution times when combined with well-rehearsed practices and procedures. In order to be sure that each information system is put to its full potential, the JAGIC must make certain of three key points. First, each system must be communicating correctly with, and passing correct data to each other system. Second, personnel need to be trained on the use and maintenance of systems. And third is ensuring that systematic procedures are put into place to best utilize information systems.

A properly rehearsed and maintained communication structure is key to creating a well-functioning and interconnected JAGIC. All information systems in the JAGIC must be properly interconnected, passing the correct data, (whether it be tracks or geometries) to maximize information flow. For example, in order for the JAGIC to facilitate the expeditious clearance of airspace, it is imperative that the AFATDS be configured to pass relevant mission data to all JAGIC systems for clearance of green and blue airspace. When this process was not in place, it required JAGIC personnel to manually input, often through Transverse Chat, the position area hazard (PAH), target area hazard (TAH) and max ordinate for each fire mission. While it may be possible to accomplish this for a short period of time, a high operational tempo and large amount of counterfire normal in near-peer or peer competitors (observed during WFX 16-03) quickly overwhelmed the JAGIC. It is also important that JAGIC systems are "speaking" digitally only to systems necessary to accomplish the mission. One problem identified during WFX 16-03 with the increased usage of digital systems is "oversharing." This led to circumstances where subordinate units requested to communicate with JAGIC systems for the sole purpose of marking it off as green on their communications tracker, not out of mission necessity. If this is allowed to occur, the possibility exists that systems will be inundated with unneeded data, tracks and unit updates that should be feeding into the JAGIC from other channels, such as the G3 current operations (CUOPS). One telling example during WFX 16-03 was the constant flow of unnecessary unit updates from subordinate units. This had the consequence of creating large amounts of unit update notifications that would fill the message queue too quickly as well as distract the operator from his current task.

JAGIC personnel must be trained and proficient on their assigned information systems. Summoning the essence of the famous John Boyd axiom, "People first, ideas second, hardware third," it is important to realize that relying purely on technological means can be a strategic mistake. JAGIC personnel who don't know their assigned systems impede JAGIC execution flow

and degrade the mission. Though many information systems bill themselves as being intuitive to the end user, it is plain that they mean that a blind person can navigate the system just as easily as one that can see. All JAGIC personnel should be training regularly on the set-up, maintenance and operation of their system to prevent blindness. It is also important that JAGIC members have some knowledge of other information systems outside of their specialty in order to assist in troubleshooting or diagnosing the communications issues that will almost certainly arise. Division fire support element Soldiers assigned to a JAGIC should either attend the Digital Master Gunners Course, or at least set aside time and resources for cross training. For example, although an AFATDS operator may know exactly how to set up and use the networking and messaging capability built into AFATDS software, it is often beneficial for the operator to know what network and message types (e.g. U.S. Messaging Text Formatting and Variable Message Format) the AMDSW or TAIS expects to use to communicate. This can be accomplished by creating an area where there is, in a sense, a permanent JAGIC infrastructure. Since each section with an information system often has spare systems sitting idle, it is easy to set aside time for personnel to practice setting up systems and executing basic JAGIC functions. These functions can range from basic concepts taught at Advanced Individual Training, such as data distribution, to more advanced topics such as communication with the Data Dissemination Service (DDS), MFP distribution and other Army Battle Command Systems (ABCS) integration. Setting up this permanent JAGIC infrastructure will help to solve two things. First, it will allow new section personnel to become sufficiently trained on their assigned system. And second, it will help to evolve a team-building and confidence bootstrapping methodology. This can help to jump start the process of smoothing over any trust or confidence issues that may arise from rapid turnover rates and other personnel challenges presented earlier in the paper.

Implementing detailed and systematic procedures for the use and intercommunication of JAGIC information systems allows the JAGIC to increase

throughput and improve execution flow. These procedures should be "standard, detailed steps … which describe how to perform specific tasks to achieve the desired end state." Digital integration and information system usage should be intertwined with established JAGIC battle drills. For example, during intense counterfire periods, it was beneficial to create airspace measures using the TAIS that allowed for the expedited clearance of air while still maintaining airspace control. While it might seem intuitive to create SOPs based on a "if – then" methodology, it is important not to fall into the trap of relying on written documentation. Trained operators should be capable of identifying and improving upon pre-existing procedures on the fly. At the same time, processes must be put into place, whether they be dictated in SOP or doctrine, describing the implementation of each information system and data that system should be communicating to other JAGIC enterprises. These established procedures will reduce the possibility that information system capabilities are overlooked or underutilized. When at all possible these specific procedures should preferably be taken from the JAGIC doctrine ATP 3-91.1 rather than be being rewritten by units.

With the ever increasing view and establishment of fighting methodologies based on information systems, it is vital that the JAGIC grow and adapt in its usage of information systems. When possible, tasks that were once accomplished manually should be implemented on newer versions of software. These
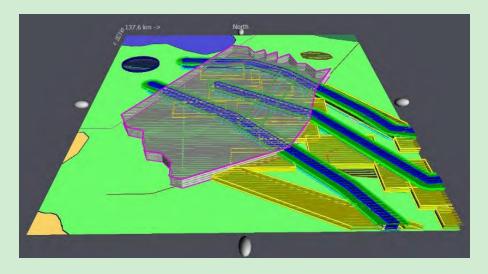
information systems will ultimately allow the JAGIC to cope with increasing amounts of tasks and improve its execution flow to allow for successful mission completion. Although not definitive, this can be accomplished by paying attention to the key points iterated throughout this paper. Digital systems that communicate effectively and pass the correct data, operators that are trained and proficient on their systems and well-rehearsed and maintained systematic operating procedures all work together to improve JAGIC execution, reliability and ultimately success.

Division airspace best practices within the JAGIC
Chief Warrant Officer 2 Robert Walthall

Establishing an effective and manageable coordinating altitude (CA) for Army divisions operating a JAGIC prior to execution of the mission or exercise is imperative for effective airspace management. When the CA is set too low the Air Force Tactical Command and Control (TAC C2) agency, Airborne Warning and Control System (AWACS), the Control and Reporting Centers (CRC), and the JAGIC will often become oversaturated when needing to clear above the division airspace. By increasing the CA and allowing the ASOC procedural controllers (PC) located within the JAGIC to control both Army and Air

Figure 2. This illustration displays the boundary ACM used in a daily ACO. (Courtesy illustration)

Force air assets within the division's airspace, clearance time can be drastically reduced. JAGIC airspace needs have enough dedicated altitude to enable permissive Fires from brigade 105 mm and 155 mm artillery – thus allowing for more rapid response. Additionally the CA should allow the immediate control of division assets such as close air support (CAS) and intelligence, surveillance and reconnaissance (ISR); not to mention the capability to immediately execute dynamic re-tasking of armed attack/reconnaissance unmanned assets such as the MQ-1C Gray Eagle and RQ-7B Shadow. During WFX 16-03, a seemingly sufficient altitude was initially chosen based on the preponderance of 105 mm and 155 mm artillery. In hindsight, clearance of Fires and counter-Fires time could have been decreased with additional altitudes based on significant changes in mountainous terrain. CA analysis during planning should include a detailed study of terrain. However, increased elevation of the CA can often become a tough sell to the air component headquarters that may need to utilize the airspace for multiple, joint applications.

Once an altitude has been determined which allows a permissible environment for Fires and one that the Division Airspace Element and ASOC can effectively control, that altitude must then be requested. The process of requesting a coordinating altitude by the division airspace element is currently unclear. Without a procedure in place a justification letter was written and sent via email through the Corps and Battlefield Coordination Detachment (BCD) levels to the Air Operations Center (AOC) in order to request airspace levels. This approach was sufficient, but is actually nothing more than how the JAGIC conducted airspace integration, control and coordination or our "airspace plan." Until there is a joint agreement in regards to CA requests, establishing sufficient airspace for JAGIC operations will continue to be an issue prior to execution. Once the CA has been established and the Unit Airspace Plan (UAP) has been developed the airspace control orders (ACO) becomes the next obstacle.

Developing an ACO using the Fire Support Coordination Line (FSCL) as a coordination measure was not sufficient during WFX 16-03 as a means of clearly identifying the division's forward airspace boundaries. The AOC/BCD required the use of an airspace control measure (ACM) of unspecified type that would clearly show the division's CA, rear, lateral and forward boundaries in the AOC's Theater Battle Management Core System (TBMCS). The ACM used boundary geometry during the WFX. This had minor effects on the TAIS such as increased screen clutter below the CA, but provided TBMCS a clear illustration of the division's airspace and gave the "red gumball" in AFATADS, requiring additional airspace coordination.

Using this ACM seemed to meet the intent of the AOC and had little effect on our systems operations when hidden or turned off during execution. The biggest issue caused by the boundary ACM was the secondary effects brought about by using an ACM that delineated the division airspace for a specific ACO/ATO execution period. It severely limits the ability to plan beyond the FSCL and caused undue ACO changes when the battle moved faster or slower than expected. If operational tempo was slower than planned, using a boundary type ACM that restricts the forward line, other than the FSCL, has the potential to allow shots forward of the FSCL without the proper coordination being made. For example, if the airspace was planned using the BNDRY ACM for a FSCL to be at Phase Line 2 for an ACO being executed in 72 hours, but at the time of ACO execution the FSCL remained at Phase Line 1, there is nothing that restricts or prevents a shot being fired past Phase Line 1, the current FSCL. This can also present issues between CAS and AI due to the same forward boundary being misidentified. In the airspace annex of the OPORD from higher headquarters, the airspace is clearly defined for each division. This definition should allow planning without the restriction that is imposed by an ACM that redefines the boundary. By using the FSCL to identify the division fight, we can "segment" the airspace battle, simply turning the

ACMs on and off as needed. That is exactly what was needed for a fight with fast operational tempos.

Determining, establishing and managing the airspace through the use of ACMs is vital to the success of a division conducting JAGIC operations. Equally valuable is the coordination between the division airspace manager, SAD and the division Fires in determining the best CA that can provide responsive Fires while simultaneously allowing freedom of movement by USAF aircraft. Managing the airspace allocated to the division with an effective UAP and ACO allows for integration of joint airspace users within the airspace boundary. Ultimately, successful airspace control at the division level is determining an effective and manageable CA, coordinating for that CA and finally managing the division's airspace effectively.

Moving forward

Properly employed, the JAGIC pays dividends for the division headquarters and its commander. Centralizing diverse subject matter experts and systems to execute joint Fires at the division level is critical given the varied and complex threats facing today's military. However, for the JAGIC to operate as advertised, it has to overcome challenges in the human domain and the systems that help optimize its performance. A diverse, distributed team and the challenging relationships it maintains must be discussed, exercised and codified to maximize the teamwork and trust necessary to advance the concept. Likewise, systems designed to maximize efficiency become expensive paperweights if improperly utilized. Maximizing the human performance of the JAGIC will be dependent on the ability to master these domains and transform living doctrine. Thankfully, exercises like the warfighter series present opportunities (although few) to experiment, improve and codify lessons learned. However, failing to move forward and share lessons learned across the force could provide catastrophic. We know from the fall of 2001 that the fight turns real quickly, and the catastrophe of failure can cause more than digital casualties.

Artillery, Apaches and Marine F/A-18 put steel on targets

By Spc. Scott Lindblom

FORT STEWART, Ga. - The AH-64 Apache helicopter pilots of the 3rd Combat Aviation Brigade, along with field artillery from 1st Battalion, 9th Field Artillery Regiment, 3rd Infantry Division Artillery, teamed with Marine F/A-18 Hornet pilots of the Marine All Weather Fighter Attack Squadron 224, Marine Aircraft Group 31 to deliver deadly accurate fire during Joint Air Attack Team (JAAT) training on Fort Stewart May 22.

The JAAT was part of the two week Falcon Focus training exercise where the 3rd CAB is validating Soldier skills and mission command systems for future operations around the world.

Staff Sgt. Trevor Swords, Troop B, 6th Squadron, 8th Cavalry Regiment, 2nd Brigade Combat Team has conducted JAAT training in a war zone and observed the impacts from the observation post.

"A JAAT is a term used when you are massing Fires on an objective or series of targets within close proximity of one another using different assets," Swords said. "Today we are having 155 mm Howitzers engaging targets simultaneously with a F/A-18 from the Marine Corps all at the same time, we have AH-64 Apaches engaging with rockets and 30 mm rounds."

An MQ-1C Gray Eagle unmanned aerial system from Company E, 3rd CAB guided artillery along with providing the targeting laser for Hellfire anti-tank missiles fired by Apache Helicopters.

Chief Warrant Officer 2 Barry Galinger, brigade fire support officer, 3rd CAB spoke of the added benefit the training provides for the future battlefield.

"The benefit of the joint training is you never know where you're at, and you never know who's going to be there for you when you're out in combat," Galinger said. "Identifying these types of training events and working together we get comfortable, so we know who's up there, and we know how they're going to react for us when we need timely fire."

After the training, 3rd CAB commander, Col. Jeffrey Becker commented on how he felt everything went.

An AH-64D Apache Helicopter from 3rd Squadron, 17th Cavalry Regiment, 3rd Combat Aviation Brigade fires a rocket during the Joint Air Attack Team on Fort Stewart May 22. The JAAT involved Air Force Joint Terminal Attack Controller coordinating artillery and AH-64D helicopters form 3rd Infantry Division along with an F/A-18 from the Marine Corps. (Spc. Scott Lindblom/U.S. Army)

"Not only did that Joint Air Attack Team training event include all the components of the joint force, it absolutely showed the capability of combining the manned unmanned system and a maneuver team of AH-64D Apaches and MQ-1C Gray Eagle UAV," Becker said. "The aircraft maneuvered as part of the JAAT to find and destroy the enemy armor formation that was moving our way. It was highly effective and highly lethal."

Becker said this is key in today's military where we need to maximize the value of our training dollar. The training is also important as the unit prepares for a War Fighter training exercise later this year.

"This training exercise has proven that the combat aviation brigade is an enormous part of a divisions maneuver capabilities with the speed, flexibility, mobility and lethality that we bring to bear with the systems that we employ," Becker said.

Chief Warrant Officer 2 Barry Galinger, brigade targeting officer, 3rd Combat Aviation Brigade and Capt. William Neltner, assistant fire support officer, 3rd CAB synchronize aircraft and artillery during a Joint Air Attack Team on Fort Stewart May 22. The JAAT involved Air Force Joint Terminal Attack Controller coordinating artillery and AH-64D helicopters form 3rd Infantry Division along with an F/A-18 from the Marine Corps. (Spc. Scott Lindblom/U.S. Army)

A white phosphorus round air burst over targets during the 3rd Combat Aviation Brigade's Joint Air Attack Team on Fort Stewart May 22. The JAAT involved Air Force Joint Terminal Attack Controller coordinating artillery and AH-64D helicopters form 3rd Infantry Division along with an F/A-18 from the Marine Corps. (Spc. Scott Lindblom/U.S. Army)

Russian soldiers prepare a Granat-1 unmanned aerial system for launch. (Courtesy photo)

Integration of unmanned aerial systems within Russian artillery

By Lester Grau and Chuck Bartles

Artillery has always held pride of place in the Russian and Soviet armies. Imperial Russian artillery officers enjoyed a reputation for intellectual and professional excellence above the other branches. The Soviet army was one equipped with a lot of tanks. They structured their army around artillery. The advent of the unmanned aerial system (UAS) heralds a new age of Russian artillery providing real-time, accurate targeting, fire adjustment and post-strike assessment. The UAS is an enabler while

artillery remains the all-weather means of Russian destruction and maneuver support.

The Russians have long viewed aviation as an important adjunct to artillery since aviation could perform reconnaissance, adjust fires, conduct post-strike analysis and conduct deep fire attacks out of the range of artillery. The difficulty with using aviation to perform reconnaissance, adjust fires and conduct post-strike assessment is that this puts pilots loitering in those

areas where air defense assets are concentrated. The Soviets began designing the LA-17R unmanned aerial system in 1959. By the 1970s and 1980s, the Soviets were constructing and fielding a variety of strategic-operational and tactical-range UAS. For example, they fielded 950 of the tactical TU-143 [-Voyage]. The TU-143 were deployed in squadrons containing 12 UAS and four truck launchers. They flew from 50 meters to 2000 meters elevation at a speed of up to 950 kilometers/hour. They had
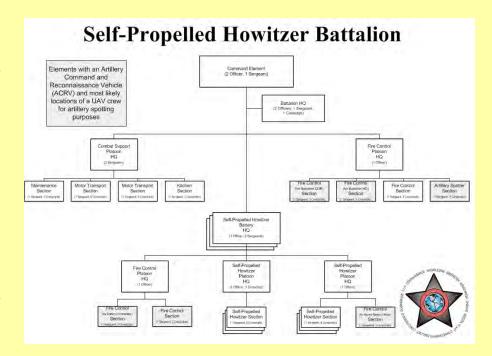
an 80 kilometer radius and the flight duration was only 15 minutes. They were recovered by parachute. Some Syrian TU-143 saw action in Lebanon during the early 1980s. The supersonic TU-141 was an operational-level UAS with a 400 kilometer radius that flew at 1110 kilometers per hour from 50 to 6000 meters altitude. The problem with these fast-moving reconnaissance craft was that they carried excellent, expensive cameras which had to be recovered and the film developed before the information was available for exploitation. The development of robust video cameras with improved optics changed all this. Inexpensive UAS with long loiter times can provide instantaneous targeting information to the commander and the firing batteries.

Currently the Russian Army is assigning a UAS company to a maneuver brigade. The brigade contains multiple artillery battalions, but organic artillery can be reinforced with attached, reinforcing or supporting artillery from the military district. The UAS company is not part of the artillery battalion, but is a separate brigade unit since the UAS company has several types of short and medium range UAS systems and a variety of UAS missions including artillery support, electronic warfare and communications retransmission. The relationship between the UAS company and the organic brigade artillery is best understood through the understanding of Russian artillery terms and concepts.

Artillery terms and concepts

Artillery missions include annihilation, destruction, neutralization/suppression and harassment of a target. Missions are assigned according to the nature of the target, overall mission and type of target.

Annihilation inflicts such losses or damage on a target that it completely loses its combat effectiveness. In the annihilation of unobserved targets, fire is conducted until a mathematically determined number of rounds are expended that assures a 70-90 percent kill probability of individual targets or the mathematical expectation of 50-60 percent of targets destroyed in a group target. The implication is that the target

The unit structure of a Russain self-propelled howitzer battalion. (Courtesy illustration)

is so damaged that it cannot be reconstituted and is incapable of even token resistance.

Destruction puts a target into an 'unfit' condition. The target is so damaged that it cannot be reconstituted without a significant expenditure of time and resources and is capable of only sporadic, uncoordinated resistance.

Neutralization/suppression inflicts such losses and creates such conditions that the target is temporarily deprived of its combat effectiveness, its maneuver is restricted or prohibited or its control is disrupted. In neutralizing an unobserved group target, the expenditure of a norm of rounds assures the mathematical expectation of 30 percent of the targets destroyed. The implication is that the target is severely damaged, but would be capable of eventual coordinated resistance once the suppressive fire is lifted.

Harassment involves a limited number of artillery tubes and a specified number of rounds fired within a prescribed time to exert moral-psychological pressure on enemy personnel in defensive positions, assembly areas, control points or logistics areas. Firing platoons or batteries normally conduct harassing fire from temporary firing positions or positions previously occupied by a larger artillery unit.

Much of the terrain in which Russia may fight is fairly flat and, consequently, difficult to get forward observers into good positions to spot artillery targets. Consequently Russian artillery planning involves the expenditure of significant amounts of artillery ammunition. Annihilation artillery missions against unobserved targets involves the physical removal of hectares. The availability of a UAS company may significantly diminish artillery ammunition expenditure. The UAS can identify targets, adjust artillery fire and perform post-strike damage assessments.

One of the problems with Soviet artillery was that they were not always able to conduct split-battery fires since the battalion fire direction center could only conduct a limited number of fire missions simultaneously. Now, with improved communications and computing technology, split-battery fire is possible and common. Each battery now has its own fire direction center (FDC). The best way to adjust and access this split-battery fire will be one UAS to a split-battery mission. The number of available UAS may be the determinant of the number of simultaneous fire missions possible on flat terrain.

Artillery fire is further classified as fire against an individual target, fire concentration, standing barrage fire, defensive rolling barrage fire, successive fire concentration, offensive rolling barrage fire, and massed fire. UAS support will prove most effective in supporting the first two classifications

A Russian Orlan-10 unmanned aerial system is fitted to a catapult and readied for launch. (Courtesy photo)

since the rest are predetermined and fired against a schedule.

Positioning of artillery

In the offensive, a howitzer battalion is commonly attached to or put in support of a maneuver battalion. Howitzer battalions are also incorporated into brigade artillery groups (BrAG) which include gun and multiple-rocket launcher battalions. Surface-to-surface missile battalions are not incorporated into BrAGs, but remain in support of the military district plan. In the defense, artillery battalions are more often placed in support of forward maneuver battalions. Gun and howitzer batteries are positioned astride armored axes of approach in order to employ their direct fire capability. Mortar batteries and multiple rocket launcher batteries are located in areas inaccessible to tanks. Firing positions are located away from prominent features which would aid the enemy in registration. Intervals of 20-40 meters are maintained between guns, howitzers and mortars, while a 50-60 meter interval is maintained between multiple rocket launcher platforms.

An artillery battalion has one primary and one or two alternate positions.

A battalion may have a temporary firing position in the security zone, in defending a forward position, when conducting fire against distant targets or when acting as a roving battalion. Each battery has a primary and one or two alternate positions in a battalion area. In addition, a battery may have a temporary firing position when serving as a roving battery or duty battery. Batteries normally shift positions following a fire mission.

Artillery reconnaissance is conducted from the battalion artillery command/observation post (COP) and the battery COPs. Normally the artillery battalion commander collocates himself and his COP with the maneuver battalion command post. Battery commanders are often collocated with maneuver company commanders. The artillery battalion may also establish forward and lateral observation posts to provide complete observation. With sufficient time, artillery observation posts and supporting vehicles are dug in with overhead cover. Radio intercept and radar intercept provides target intelligence to the artillery. Sound-ranging platoons and ground reconnaissance patrols provide target locations as well. The battalion FDC is located near one of the artillery batteries. The battalion chief of staff controls the battalion's fires since the battalion commander

is forward at the COP. Ideally the UAS operator control station for the medium-range Orlan-10 would be located with the battalion FDC, if its electronic signature does not attract enemy fire. The UAS operator control station for the short-range Granata-1 will probably be located with the battery COP.

Revitalization and down-sizing the reconnaissance-fire group

In the mid-1980s, the Soviets developed and fielded a first-generation reconnaissance-fire complex-a tactical range system linking a real-time reconnaissance/target designation/vectoring system with an intelligence fusion center and a fire direction center. In turn, these were linked to dedicated, high-precision weaponry which could destroy the target in near-real time. The targets were tactical nuclear delivery systems, self-propelled artillery and mortar batteries, family of scatterable mines-delivery systems, command posts, reconnaissance systems, aircraft parked on airfields and carrier decks and other high-value targets.

The reconnaissance-fire group consisted of several artillery battalions, a dedicated artillery reconnaissance platoon, a group headquarters and often a helicopter. The assets normally came from division assets. With the brigade as the primary maneuver unit, this mission would now become a brigade mission. The UAS capability would greatly enhance the reconnaissance element for the BrAG.

Enter the battalion tactical group

The Russian motorized rifle brigade has one permanent combined arms battalion — a regular motorized rifle battalion with an organic tank company, organic artillery battery, organic mortar battery and beefed-up logistics. The Russians call these battalion tactical groups. Eventually all motorized rifle and tank battalions in a brigade will be battalion tactical groups, but for now, there is one per brigade. There are no complete Russian brigades in or near Eastern Ukraine at present. There are the battalion tactical groups of several brigades. The brigade is represented by a forward command post, one or more artillery battalions, the UAS company and a significant logistics presence. Sometimes an artillery battalion is attached to the battalion tactical group.

Systemic difference of intelligence and reconnaissance

"In the Soviet/Russian system, the term for intelligence (razvedka) can mean "intelligence" or "reconnaissance" or a combination of both these terms. In a military context, especially at the tactical levels, the term usually refers to reconnaissance activities. In the Soviet/Russian system, the intelligence staff section directly controls dedicated reconnaissance units and other intelligence assets. At the battalion level (of maneuver units), the officer in charge of the intelligence staff section is also in charge of reconnaissance, but since at the battalion level most maneuver units

do not have dedicated reconnaissance assets, regular units from the battalion are assigned for this purpose on an ad hoc basis. This reconnaissance/intelligence officer is a career (branched) maneuver or artillery officer (as appropriate to the type of unit), whose primary responsibility is fixing the position of the enemy by way of personnel and assets under his direct control. In the U.S/NATO system, the officer in charge of the intelligence staff section (S-2) is usually a career (branched) intelligence officer, and is primarily responsible for analyzing and presenting information about the enemy and environment to the commander. A U.S/NATO S-2 typically does not control reconnaissance units (reconnaissance teams, long range reconnaissance patrols, etc.) and UASs as his Russian counterpart. In the Western system these assets are typically directly controlled by the operations section. In short, at tactical levels, the Russian officer in charge of the intelligence staff is a maneuver officer, a fellow "meat eater" that works closely with the commander, functioning as his eyes and ears by way of deploying his own subordinate assets on the battlefield. This is in stark contrast to most U.S/NATO battalion S-2s that are relegated to staff work and have a much more distant relationship with their commanders. The implication of this systemic difference between the Soviet/Russian and Western utilization of intelligence is that Soviet/Russian reconnaissance units, such

as Spetsnaz, would be normally associated with the intelligence staffs, as opposed to the operations staff as in most Western armies. Although this paper focuses on the use of artillery spotters by the Russian ground forces, Russian GRU Spetsnaz use similar, if not identical equipment and tactics for the fulfillment of their primary role of intelligence, surveillance and reconnaissance; which includes artillery spotting in any large-scale conventional engagement, such as Russia is now allegedly involved in within Eastern Ukraine.

Current status of Russian UAS development

UAS development is being pursued in the Russian Federation by all of the main and lesser branches (including the airborne forces) of the Ministry of Defense, in a variety of sizes ranging from smaller models, similar to the U.S. "Raven," to larger models similar in size and purpose to the U.S. "Predator." As for the Russian GF, officials have mentioned that the UASs will be used for communications, intelligence and electronic warfare tasks. In practice, the Russian GF appear to be focusing on the use of UASs as artillery spotters. Russia has fielded several models for this purpose (Granat, Eleron, Takhion, Orlan and Zastava), with maximum ranges

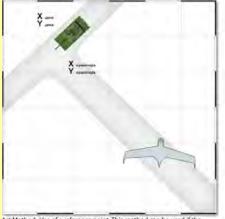*A Russain Granat-1 unmanned aerial system. (Courtesy photo)*

of about 40 kilometers, appropriate for Russian artillery systems.

In 2014, Russia added almost 200 UASs to its inventory and activated 14 UAS companies, with plans that each of Russia's motorized rifle brigades will gain a dedicated UAS company in the next few years. The Russian Ministry of Defense has also announced plans to field its first UAS regiment and set up an inter-ministerial UAS training center. At present time, the Russian Federation has no capability for placing a weapon system on a UAS, but there are plans for the introduction of such a weapon in the next few years.

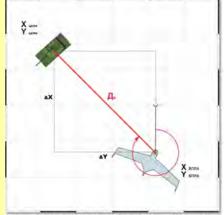# Organization and structure of Russian ground forces UAS units

There have been conflicting reports about how these assets would be controlled. Some reports have stated that UASs would be considered a brigade-level asset and assigned to the brigade's reconnaissance company or intelligence support platoon (attached to subordinate units as required); other reports state these particular UASs (artillery spotters) would be organic to the artillery companies' reconnaissance platoons. In the last few years this issue has apparently been resolved. Russia has decided the best way to organize its UAS fleet is by putting all of a brigade's UASs in a single company. The companies are divided into platoons based on the size and range of the UASs they operate. For instance, the "mini-platoon" operates the hand launched Granat-1, while the "short-range platoon" operates the larger Orlan-10 and Granat-4 airframes. One UAS company mentioned had six platoons, but this may be atypical as the unit was located at the 201st Motorized Rifle Division base in Tajikistan, and may have had a larger complement due to its unique status of serving a division in a geographically disparate location. Russia likely places all of its UASs in a single company and splits the companies into platoons based on size instead of function to more easily facilitate command and control and maintenance of these high value and limited assets.
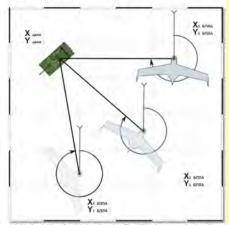

1st Method- Use of a reference point. This method can be used if the coordinates of a given reference point (landmark or intersection) are known. The disadvantage of this system is that the coordinates of the reference point must be known with certainty, requiring detailed maps and/or GIS data. In addition, target accuracy diminishes the farther the target is from the reference point. Conclusion: This method works, but is the least suitable for artillery spotting.

2nd Method- Fly above the target. The UAV flies above the target and its position is recorded. Target accuracy depends on the accuracy of the UAV's navigation system. The disadvantage of this is method is that it requires flying over the target, meaning that only a limited number of targets may be acquired and that the UAV is extremely susceptible to enemy fire. Conclusion: This method works, but is most suitable for less organized adversaries, such as insurgents.

3rd Method- Use of range finder. Requires a gyro stabilized electro-optical system with a laser rangefinder. The coordinates of the target are calculated using basic trigonometry. The accuracy depends on the accuracy of the UAV's navigation system and rangefinder. This method provides good accuracy and the capability to acquire many targets, sufficient for several batteries or battalions. The disadvantage of this is method is the use of an active sensor (the laser) which can be easily detected by modern military equipment. Conclusion: This method is very effective, but requires a sophisticated UAV and would be more susceptible to enemy fire.

4th Method- Use of multiple azimuths. The UAV takes several azimuths on a given target, while in flight. Trigonometry is than used to calculate the position of the target. This method provides good accuracy and the capability to acquire many targets. This method requires a sophisticated UAV, but is completely passive, an advantage that can significantly increase the UAV's life expectancy above the modern battlefield. Conclusion: this is preferred method for UAV artillery spotting.

Figure 1. Methods of spotting enemy artillery pieces using unmanned aerial systems. (Coutresy illustration)

Since there is mention of "payloads" on the UASs, there appears to be some capability for repurposing of mission if needed (artillery reconnaissance, electronic warfare and communications, etc.) The Orlan-10 is used for both artillery reconnaissance and electronic warfare missions.

UAS company personnel

In 2013, the Russian Air Force Academy accepted its first UAS class. Russian UAS officers will be trained in four to five year academies, which would resemble a combination of a U.S. service academy and an initial officer basic course for occupational training. Upon completion of the academy, graduates will be commissioned as lieutenants and be sent to their gaining units. Although the program is located at the Russian Air Force Academy, it would not be unusual for a Russian ground forces officer to attend such a program, as it is not uncommon for service members from other branches of service and even ministries to attend other service academies for certain "low-density" specialties such as UAS officer. Since the first 62 graduates of the academy do not graduate until 2018, current UAS unit officer vacancies are being filled by officers from other branches with other specialties, with a preference for artillery officers. These "shake-n-bake" UAS officers are sent to the Russian Defense Ministry Interbranch Center for Unmanned Aviation in Kolomna, where they receive a short course on UAS operations.

It appears that enlisted personnel operate most UASs, but officers do fly certain missions. Russia does practice a conscription system, but all UAS operators are "contract NCOs" that attend the UAS operator course at the Inter-Branch Center for the Training of Specialists for the Ground Troops in Kolomna, Russia. Conscripted soldiers do serve in the UAS companies, but they serve in support roles such as wheeled vehicle drivers.

Artillery spotting

Since artillery systems have ranges well beyond the line of site, (the Russian MSTA-C self-propelled howitzer has a range of 29-36 kilometers) they rely on forward observers to find targets and adjust fire. In the Russian system, on the offensive, the artillery battalion commander's headquarters is collocated with the maneuver commander leading the offensive. The battalion commander's senior deputy (roughly equivalent to a chief of staff) is located with the artillery. In the batteries, the battery company commanders are in a forward observation posts directing fires, while the senior battery officer (roughly equivalent to an executive officer) is located with the battery.

The use of UASs for artillery spotting significantly supplements forward observation capabilities, a very important technological development for an artillery-centric post-Soviet army. For artillery purposes, UAS support is provided by the "mini" and "short-range" UAS platoons. Although Russia is experimenting with a number of airframes, the mini-class "Granat-1" and short-range "Orlan-10" are most frequently mentioned. It is clear from various video segments and articles that the UASs do not communicate directly with the fire control elements of the batteries. Apparently the UAS operators determine target coordinates and relay that information to forward observers on the Artillery Command and Reconnaissance Vehicles (ACRVs), who in turn relate the information to fire control element.

Due to differing ranges, it is likely the Orlan-10 operators are collocated with the batteries and their accompanying ACRVs. There have been some discrepancies about the range of the Orlan-10. The specifications list the range as 50-120 km, while articles referring to use for artillery spotting mention 40-50

km. This variance may have to do with the UAS's broadcast range of its gyro-stabilized full motion video (FMV), which may not be possible with current capabilities at distances that exceed 50 km. Due to the relatively short range of FMV transmission for the Granat-1 (10km) it is very likely the Granat-1 operators are collocated with the battalion's forward observation post or battery COP. In addition to targeting, it was also mentioned the Granat-1 had a role in providing information for damage assessments.

Methods of target acquisition

On July, 7 2015, The Tass news service published an article about the training of officers in the use of the Orlan-10 UAS for artillery spotting purposes. The following day, a Russian blogger posted his theory of how artillery spotting can be conducted with UASs, and observed the Orlan-10 is only capable of conducting the two simplest methods of artillery spotting. (see graphic) The blogger appears quite knowledgeable about Russian UAS capabilities and the modern battlefield, and his observations agree with observed Russian artillery procedures as viewed on various online videos.

Although the Orlan-10 and Granat-1 are not capable of the more advanced methods of artillery spotting, they can still be quite effective. Although less desirable than some other methods, the capability to fix a target's location by relative terrain feature (1st method) is sufficient for many Russian artillery purposes. Russian artillery batteries and battalions annihilation and destruction missions make precise target information useful, but unnecessary. In addition, the Russian Federation has a strong cartographic tradition, undoubtedly any Russian serviceman referencing terrain features for targeting purposes would have access to high quality, large scale, digital maps of most places within the former Soviet Union. Although current UAS artillery spotting capabilities may be adequate for current purposes, these capabilities are very likely to continue to develop.

Artillery spotting at night

According to a Ministry of Defense of the Russian Federation report, Russian UASs have a night-targeting capability that operators regularly practice. This capability is most likely provided by thermal imagers that are found in many short-range Russian UASs, including the Orlan-10. Thermal imagers are probably the most common since there was only one report of an infrared sensor, and no reports have mentioned or implied any radar capability. Since terrain association with a thermal imager would be difficult at best, and the risk of the UAS being shot down at night is significantly reduced, it is likely the UAS operator uses the "fly-over-the-target" method (2nd method in the above graphic) to fix the target. Target acquisition with a thermal imager is also significantly more difficult due to the reduced spatial resolution of the technology in comparison to video. There is likely not much difference in signature between a Bronetransporter (BTR) and a SUV when viewed through the type of thermal imagers that can be mounted to a small UAS. Since determining what exactly the imager is viewing is much more difficult, the acquisition of the wrong target is much more likely. Although identification of the wrong target is problematic, the Russian military does not have a "zero defect" view of various indiscretions, and any errors made in a combat situation with such a method of targeting would likely be looked upon as an accident due to the "fog of war."

Outlook for the future of UASs and Russian artillery spotting

Undoubtedly, Russia will continue to improve its UAS artillery spotting capabilities. Russia is heavily investing in UASs in general, and have claimed they will spend 9.2 billion U.S. dollars on the technology and overtake the U.S.'s position as the preeminent UAS power in the next few years. The Russian Feder-

ation is also looking at ways of reducing prices for UAS technologies, and has expressed interest in using 3D printers to "bake" the next generation of Russian UASs.

The most likely advancement will be the integration of the UAS directly into one of the new Russian C2 systems under development, the most likely of which is the "Andromeda" (the Russian version of Force XXI Battle Command Brigade and Below, or FBCB2). Russia has made frequent comments about the need to "unify the information space" and the integration of UASs into that space would be in furtherance of that goal. How likely this is to occur is anyone's guess, unsurprisingly marrying up differing technologies (Andromeda, the UAS and the existing artillery fire control system) is difficult, time consuming and costly. One aspect of Russian artillery spotters that is not likely to change, is their size. Since the Orlan-10 and its cousins are attached to the units they serve and their ranges are more than adequate for the missions they support, developing larger airframes for fire control purposes would not be advantageous, as any requirement for a takeoff/landing area would be prohibitive.

Ukrainian artillery-UAS joint use in Eastern Ukraine

The Ukrainian and Russian UAS being fielded in Eastern Ukraine are not capable of functioning as weapons platforms, and are relatively primitive by Western standards, but their capabilities are substantial force multipliers in the armies which they serve. Unlike Western armies that are somewhat infantry-centric, post-Soviet Armies (including Russia and the Ukraine) emphasize artillery. Post-Soviet maneuver brigades (or regiments) will typically have as many artillery battalions as maneuver (tank and infantry) battalions. Although, infantry and tank units are still important assets necessary for capturing and holding ground, in terms of actually causing combat damage post-Soviet Armies prefer to rely on their artillery. Since these armies doctrinally plan on their artillery severely diminishing the enemy's combat power before its maneuver units begin decisive engagement, and most artillery systems can fire more than 20 miles from their intended targets (far out of the line-of-sight), target acquisition (artillery spotting) and communications are essential for post-Soviet Armies to conduct successful combat.

Relatively low-cost UASs are becoming the preferred means for artillery spotting on both sides of the conflict. The apparent success of UASs as an enabling technology for the use of artillery in Eastern Ukraine will likely lead to organizational changes in artillery formations throughout the Russian Federation, and possibly for other armies that practice Soviet doctrine.

Yuriy Kasyanov, a founder of the SOS Army volunteer movement, was interviewed by Liga Novosti on his views of the conflict. He believes Ukraine's government and military command have been handling the Russian aggression in an ineffective way... Unmanned

Russian soldiers use a radio and computer system to control an unmanned aerial system used for spotting enemy artillery units. (Courtesy photo)

aerial vehicles of the SOS Army volunteer movement are helping Ukrainian troops along the entire delimitation line. Volunteers work with artillery and reconnaissance commanders in the field … Now, in Ukraine, he is trying to persuade the General Staff to develop aerial reconnaissance, all to no avail. Kasyanov says supplying all of the Ukrainian Armed Forces with UASs and associated equipment would cost 10 million dollars. However, the General Staff prefers old-school methods of warfare. In the meantime, Ukraine's enemy, Putin's Russia, is aiming to provide each company of troops with aerial reconnaissance assets. An extract from this interview follows:

UAS operations in the Ukrainian Army

[Liga Novosti] How many UAS groups does SOS Army have in the anti-terrorist operation (ATO) area?

[Kasyanov] There are two at the moment, but we will eventually have three. We can do more but there is a shortage of UASs, they crash and require maintenance. In addition, we do not have enough time. We both build UASs and operate them. Right now, our groups are working on the frontline. Here we have various models being prepared for operation. We are building a new UAS production workshop.

[Liga Novosti] Can you also train military officers [as UAS operators]?

[Kasyanov] We have a flying arm, people associated with us. We sell our UASs to them, and they train our own operators, as well as military personnel. The courses are based at training ranges in Kyiv.

[Liga Novosti] Is it realistic to set up a UAS detachment in every military brigade?

[Kasyanov] Of course it is. Russia is planning to have a UAS in every company. They have already built hundreds of them. It is just as realistic in Ukraine, too. We only need 10 million dollars to meet the demand on the frontline.

[Liga Novosti] To buy the vehicles and train people in their operation?

[Kasyanov] We are talking about UASs, ground equipment and spares kits. This sum does not include the training, but training is the cheapest element.

[Liga Novosti] Will 10 million dollars be enough to provide every unit in the army with UASs?

[Kasyanov] …What we need is one or two UAS squadrons, with 15 vehicles in each. This will suffice. They will be moving around just like we do: they will have ground transport, equipment, maintenance bases, UASs and operators. There is no need to set up such detachments everywhere. There is no point in reconnoitering frontline sections where nothing is happening. This would only scatter assets.

 On SOS Army's interaction with military command

[Liga Novosti] What can you say about your current interaction with the army?

[Kasyanov] We have no problems interacting with specific detachments in the field. I primarily mean the artillery, we reconnoiter targets for them during the active phase of hostilities. For example, our UASs adjusted artillery fire in the Donetsk Region, including during the period when our troops were withdrawing from the town. We lost one vehicle right over the battlefield. When the active phase is on, we work in the interest of the artillery. We also reconnoiter for other military detachments, such as the 17th Armor Brigade, Aydar volunteer battalion and the National Guard.

On withdrawal of artillery

[Liga Novosti] …what are the risks associated with the withdrawal of artillery [in reference to the Minsk agreement]?

[Kasyanov] You want to hear the truth? Nobody will be withdrawing the artillery, neither we nor the enemy. At the very best, it will be moved a couple of kilometers back. I have reports from our people on the other side. They say the Russian hardware withdrew towards Lutuhyne during the day but the following night it returned to new, more convenient and better protected positions. Do not take my word for it, but I suppose that we are doing the same. The thing is, artillery is not needed everywhere. Without reconnaissance and surveillance, it is a threat primarily to our population on the occupied territories. You cannot argue with statistics. Even if you know the exact location of an enemy tank, only one shell out of a hundred will hit the target. I have lost count of the times I got under artillery fire, but I am still alive and unharmed. In other words, artillery hits are very much random.

Conclusion

The Russian and Ukrainian Army share a common operational and tactical heritage, similar force organization and focus on fighting maneuver war on a large plain. Artillery is playing a dominant role in the conflict in Eastern Ukraine and after a year, the conflict can be defined as an artillery war since artillery reportedly produces the bulk of casualties. The tactical UAS is a relative newcomer to artillery reconnaissance, fire adjustment and post-strike assessment, but is doing a remarkable job as a force multiplier. The Russian Army is well ahead of the Ukrainian Army and will be adding new UAS with greater operating range, plotting accuracy and survival systems. The Russian Army does not have a Predator-type UAS that can identify and then attack a target by direct engagement, although they should field one in the future. Their use of artillery to engage UAS-identified targets is very effective. Instead of using precision fires to attack the targets, the Russians still resort to massed fire, most likely using the formulae for observed fire, factoring in the hardness of the target. Once the Russians have fielded their own Predator-type UAS, it will be used sparingly due to its expense. Artillery is comparatively cheap and quite effective in an annihilation or destruction mode. The UAS will help maintain the pride of place that artillery holds on the Eastern European battlefield.

Disclaimer: The views expressed in this report are those of the author and do not necessarily represent the official policy or position of the Department of the Army, Department of Defense or the U.S. government.

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Swarming the enemy with joint unmanned aerial vehicle attacks

By F. Patrick Filbert

As technology improves, so does the capacity to expand a defensive perimeter to ever increasing ranges both horizontally and vertically. Identifying ways to penetrate this perimeter with assets and capabilities and not more expensive solutions requires creative use of current and emerging technological advances. Potential adversaries understand the United States is extremely technologically advanced with its warfighting systems. This requires a thinking enemy to develop ways to keep America's advanced systems outside their sphere of influence; specifically, to both deny and create an inability to gain access to specific areas of operation. In the current vernacular, this is called creating an anti-access/area denial (A2/AD) environment which has, as its backbone, advanced integrated air defense systems (IADS).

A bit of history

Being able to provide a "layered" offensive capability with manned kinetic/non-kinetic payload armed aircraft has been done for some time. One example is how a joint Army-Air Force helicopter team (Task Force Normandy: comprised of U.S. Air Force MH-53J/ Pave Low III and Army AH-64/Apache attack helicopters) blinded Iraqi IADS early warning radars with non-kinetic electronic attack (Pave Low IIIs) and destroyed the radars (Apaches) with kinetic weapon's strikes (i.e., Hellfire missile, Hydra rocket, and 25 mm cannon fire) in the opening minutes of Operation Desert Storm to allow follow-on Air Force strike aircraft access through coverage "holes" in Iraqi IADS to attack key targets further into Iraq. Similarly, future use of an advanced wave of unmanned aircraft systems (UAS) equipped with electronic warfare (EW) payloads leading a subsequent wave of attacking aircraft from carrier strike groups is one potential way to enter and counter a potential adversary's A2/AD environment.

However, while emerging EW payload testing on UAS is occurring, mating electronic attack (EA) payloads onto a coordinated semi- or fully-autonomous swarm of smaller unmanned aircraft (UA) is still an emergent test environment effort. However, once such capabilities mature, being able to employ them requires that a foundational concept be in place. The Joint Unmanned Aerial Vehicle (UAV) Swarming Integration (JUSI) Quick Reaction Test (QRT) was directed on Feb. 27, 2015 by the Air Warfare deputy director under the authority of the Office of the Secretary of Defense, Director, Operational Test and Evaluation to address such a foundational approach.

The JUSI QRT was established under the Director of Operational Test and Evaluation's Joint Test and Evaluation Program on July 29, 2015. It is colocated with U.S. Pacific Command's J8 Resources and Assessment Directorate, Camp H.M. Smith, Oahu, Hawaii. The JUSI QRT reports to the AF Joint Test Program Office, Nellis Air Force Base, Nev. and receives support from USPACOM J81 (Joint Innovation and Experimentation Division). The JUSI QRT will develop, test and validate a concept of employment (CONEMP) for the integration and synchronization of swarming UA performing EA in support of the joint force against an advanced IADS. The JUSI QRT effort is focused on a 2015-2020 timeframe to research and ident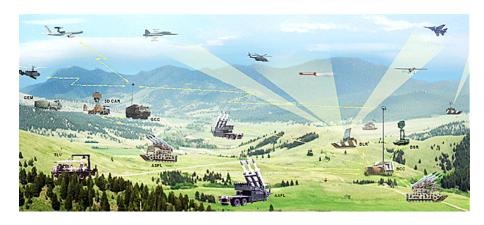ify previous and ongoing swarm-related efforts while building a swarming UA community of interest, concurrent with CONEMP development.

Advanced integrated air defenses and how to address them – the problem

Modern surface-to-air missile (SAM) systems are an integral part of advanced IADS. These IADS are, in turn, integral parts of a potential adversary's networked A2/AD environment. For the purpose of the JUSI QRT effort, IADS refers to a networked system of adversary capabilities (e.g. a series of detection and tracking radars coupled with SAMs) and not specific to one platform (i.e. an IADS on a warship by itself or a specific individual SAM such as an SA-20).

The logo for the Joint Unmanned Aerial Vehicle Swarming Integration Quick Reaction Test. (Courtesy illustration)

A photo illustration of a Notional Integration Air Defense System. (Courtesy illustration)

The joint forces do not currently have adequate ways to fully plan, integrate or synchronize the effects delivered by UA swarms. This requires development and testing of a foundational CONEMP offering an effective planning methodology for delivering integrated effects of UA swarms against advanced IADS protecting targets with threat SAM arrays.

The joint force is currently over-reliant on standoff weapons (SOW) and 4th/5th generation strike platforms to address the A2/AD challenge. UA swarms represent a potential additional approach, complementing existing platforms and weapons systems. Despite rapid technical advances in UA swarming development and demonstrations, the joint force lacks a CONEMP for operations requiring UA swarm-delivered effects. The lack of a CONEMP or other supporting documentation hinders requirements development, A2/AD countering and precludes integration and synchronization with the rest of the joint force.

The approach – addressing the problem

Combat proficient and survivable UA with the capability to perform swarming functions are a new but quickly growing aspect of modern warfare. The JUSI QRT will take the first step to characterize, develop and evaluate a CONEMP for using multiple UA of various sizes to deliver coordinated EA to enable other weapons and platforms (i.e., various types of SOWs, decoys, jammers and 4th/5th generation platforms) access to counter A2/AD approaches. With the short lifespan of the JUSI QRT—one year—the effort will focus on CONEMP development supported by a series of modeling and simulation (M&S) runs over the course of three test events.

Integrated support by Johns Hopkins University's Applied Physics Laboratory's experienced M&S personnel during each of the test events will enable the QRT to gain data collection for the equivalent of hundreds of swarm flights; thus providing a cost saving aspect concurrent with data analysis to support CONEMP development. JHU/APL will provide M&S and analysis of the execution of UA with EA payloads against scenarios developed to test the UA's ability to deliver desired effects against an advanced IADS as part of an A2/AD environment.

The resulting qualitative and empirical data, once analyzed, will enable the JUSI QRT team to assess findings, conclusions and recommendations to revise the CONEMP between each test event with JUSI QRT's first test event, which wrapped up on November 20, 2015. Additionally, upon completion of each test event, a Joint Warfighter Advisory Group (JWAG) will be convened to receive test event results—the first JUSI QRT JWAG occurred on Dec. 9, 2015. As the QRT process continues, it will lead to development of a finalized swarming UA CONEMP to provide the link to requirements development and capability integration for the joint force to have a distributed approach to complement existing solutions which focus on 4th/5th generation strike platforms and SOW.

The way ahead

At the end of the JUSI QRT, the resulting CONEMP will provide an effective operational context to inform requirements development, roadmaps and, eventually, tactics, techniques and procedures (TTP) in several areas, including communication, automation, UA and EA to deliver intended effects. The CONEMP will also serve to help focus future Department of Defense and industry investment. Future considerations related to swarming UA with EA payloads may include development, testing and validation of TTP for UA with EA payloads. Such TTP would further reinforce the use of swarming UA by empowering the commander to develop standards in the areas of manning, equipping, training and planning in the joint force. In the interim, the JUSI QRT developed CONEMP will provide planners, trainers and their supporters with a start point for employment of this capability.

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An artistic concept of a unmanned aerial vehicle swarm. (Courtesy illustration)

Servicemembers from the German and Netherlands Armies work together during operations at the German-Netherlands Corps' joint operations center. (Courtesy photo)

Corps Deep Operations

Developing NATO's 1st German-Netherlands Corps' Deep Operations Coordination Cell

By Maj. Derek R. Baird

The 1st German-Netherlands Corps is a multinational, NATO High Readiness Corps Headquarters comprised of 12 nations and approximately 400 personnel. The corps is transitioning from the NATO Response Force, Land Component Command to a Joint Task Force Headquarters/Land (JTF HQ/L) Component. According to NATO's Bilateral Strategic Command Conceptual Framework for Alliance Operations, a JTF HQ/L focuses on a small joint operation (SJO). This means the force is capable of planning and executing operations with land forces up to a division, maritime forces up to NATO task group, and air forces up to 350 combat and support sorties per day. Our JTF HQ/L is also supported by a special operations component command (SOCC) capable of planning and executing special operations.

In September 2015, the corps as a Land Component Command conducted testing for the new NATO Very High Readiness Task Force against a peer op- position force during a combat operation exercise named Strong Sword 2015 (STSD). The 1st GNC joint Fires cell captured lessons learned across the planning process and mission execution. The most significant lesson learned was the need to develop a deep operations coordination cell (DOCC) synchronized with the joint targeting cycle (JTC) and current operations (CUOPS). Furthermore, during the corps' JTF transition mission analysis, the command recognized the need to increase its capacity

to plan, synchronize and execute operational to tactical level joint, deep operations to shape the corps' joint operating area (JOA). The Fires cell used lessons identified from Exercise STSD and the JTF mission analysis to develop a DOCC framework, draft a DOCC SOP and conduct training. This eventually helped prepare the corps' transition with its next exercise, Truthful Sword (TRSD), in April 2016.

Exercise TRSD facilitated the corps' experimentation with its newly formed DOCC. The DOCC planned, synchronized and conducted a highly successful joint, deep operation to shape the JTF HQ/L's joint area of operation. This effort supported operational level effects and decisive conditions along the JTF HQ/L's lines of operations as part of the corps' campaign plan. The DOCC's success yielded several more lessons identified including the need for more detailed joint effects synchronization, additional deep operations training and joint Fires rehearsals. These tasks are scheduled for future events as the corps continues its JTF evaluation during Trident Jaguar 2017. Lessons also apply to an upcoming two-division exercise, Vital Sword 2017, providing additional opportunities for the JTF HQ/L joint staff and DOCC to conduct collaborative joint,

deep operations in a virtual and live fire construct.

Exercise Strong Sword provided the 1GNC an opportunity to shift focus from a low intensity and comprehensive approach mission set, to full spectrum operations with a peer opponent, all based on the changing strategic security environment in Europe. Exercise STSD's design enabled the 1st GNC to concentrate on combat operations using both wide area security (WAS) and Combined Arms Maneuver (CAM). The 1st GNC HQ, designated as a LCC during Exercise STSD, had operational control over six brigade combat teams, a multiple launch rocket system battalion, an aviation task force, an air defense task force, and an intelligence, surveillance, target acquisition and reconnaissance battalion. The corps conducted defensive operations and then transitioned into the offense with a corps counter attack. To support these operations, 1st GNC had to relearn how it shapes the environment. The joint Fires cell, with a small number of the corps staff, component command liaison officers (LOs) and subordinate Fires cells, was given the task to shape the operational area and focused on deep operations targeting the opposing forces center of gravity and follow on forces through the application of joint Fires. Corps shaping

operations are executable deep operations conducted against forces, or resources not engaged in close operations as described by Allied Land Tactics (ATP) 3.2.1. The deep operation was successful, however it was not fully synchronized with the joint targeting or current operations planning cycle. The 1st GNC recognized the need for a deep operation planning cell and tasked its joint Fires cell to develop a DOCC capable of planning and coordinating a joint, deep operation synchronized with the joint targeting cycle and current operations.

In January 2016, the 1st GNC joint Fires cell developed a DOCC SOP detailing the composition, purpose and framework of the newly formed DOCC, see Figure 1: DOCC purpose and framework. The DOCC's purpose is to provide overall management, planning, coordination and synchronization of joint Fires assets and support the execution of the JTF HQ/L deep operation. The deep operation not only shapes the battlespace for major subordinate units, but it achieves operational level effects, or decisive conditions in support of the commander's objective. The DOCC, led by the joint Fires cell, consists of the J2, a representative from Signal Intelligence and Electronic Warfare Operations Center, information operations and targeting reps and component com-

Figure 1: Deep Operations Coordination Cell purpose and framework. (Rick Paape)

Composition (Core members)
- Joint Fires (Chief joint Fires, JFires reps, ADA, AAVN, J3-TGT)
- J33/35 rep
- Targeting LNO
- J2-TGT
- J2-ISR manager
- LCC, ACC, MCC, SOCC planners/LOs
- IOT TGT/CUOPS
- IOT PSYOPS & EW

Purpose
Provide overall management, planning, coordination and synchronization of joint Fires assets and support the execution of the JTF HQ/L joint, deep operation

Lead
J3/Joint Fires

Inputs:
- CDR's guidance
- Effects guidance matrix, JPTL, PTL, NSL and RTL
- Decision Support Matrix
- High payoff target list
- Target packet(s)
- Joint assets available
- Intel collection plan
- Concepts of support
- Intel update (ENY SITEMP, weather, etc)

Outputs:
- Approved deep operations CONOP
- Detailed EXCHECK
- Deep ops FRAGO
- Recommendations for future ICP
- Updated HPTL
- Updated operations synch matrix
- Updated assessments for AWG

Timeline

Guidance (96+ hours)
- DOCC activated
- Initial staff estimates
- Joint assets available review
- Develop CONOP
- WARNO

Approve (+72 Hours)
- Intel update (continuous)
- Resource synch
- ASRs submitted
- Initial Excheck
- DCOS OPS/J3 approves initial CONOP

Validate (+48 Hours)
- NLT JTF HQ/L CDR approves CONOP
- JOC brief
- Initial Go/No-Go brief
- NLT FRAGO published

+24 Hours: Review
- Joint fires RXL
- Second Go/No-Go brief

+0-24 Hours: Execution
- Final Go/No-Go brief
- Conduct joint, deep op
- BDA

mand planners/liaison officers. Additional members (on-call) include the legal adviser and public affairs office. The joint Fires cell then developed a training strategy to integrate the DOCC into the JTF HQ/L joint targeting cycle and the CUOPS 96-hour planning cycle.

DOCC training was broken down into four phases beginning with an academic DOCC overview and a SOP brief, followed by vignette training and a group discussion on how to plan, coordinate and execute a corps-level joint, deep operation. These two training events occurred at the 1st GNC HQ and were essential for refining the SOP, ensuring all participants understood their role in the DOCC and how to integrate effects with the corps' joint targeting and CUOPS planning cycles.

The third phase of training occurred in April 2016 at Wildflecken, Germany, during the first week of Exercise Truthful Sword. Exercise TRSD, a small joint operation virtual command post exercise, was the first corps-level transition exercise enabling the 1st GNC to transition from a LCC to a JTF HQ/L capable of providing mission command for a small joint operation. The DOCC met daily, with all members present (to include the on-call members), to develop a method of attack based off a target nomination by the corps' joint targeting cell. This enhanced vignette training and allowed the component command LOs and joint staff members the opportunity to develop a joint, deep operation integrated with the joint targeting and CUOPS planning cycle, and facilitated members' understanding of their re-

sponsibilities in the DOCC. This resulted in DOCC SOP refinement and ensured all DOCC members incorporated the SOP into their training plans. The DOCC also refined its products for the main training event.

Operation Baraonda (in Italian means things coming together to make a huge impact) was the culminating event, a JTF-level joint, deep operation fully integrated with the joint targeting cycle. Operation Baraonda was officially initiated when the joint Fires cell received direction and guidance to plan and coordinate a deep operation based off an approved target packet. The plan was briefed to and approved by the JTF HQ/L commander, and rehearsed and executed in the joint operations center (JOC). The intent for Operation Baraonda was to shape the corps' deep area in order to degrade adversary capabilities, achieve operational effects, and support decisive conditions across the corps' campaign plan lines of operations.

The DOCC met daily over 96 hours to plan Operation Baraonda, using the DOCC SOP as the planning framework (Figure 2: DOCC SOP and annexes), and synchronized joint, lethal and non-lethal effects and assets, culminating with support to the JOC in the execution of the operation. The Operation Baraonda concept of operation (CONOP) was approved by the JTF commander 48 hours prior to execution. The DOCC then conducted a hand over take over brief to the JOC ensuring a smooth transition from planning to execution. An abridged joint Fires rehearsal was conducted 24 hours to execution with all DOCC members

and joint Fires assets LOs participating in the operation. The rehearsal centered on the execution checklist and making final adjustments to the timeline. The final go/no-go brief was approved by the JTF HQ/L commander an hour before execution. Operation Baraonda, was executed successfully by the JOC and supported by the DOCC.

Operation Baraonda's success validated the DOCC's SOP and the JTF HQ/L's capability to conduct a joint, deep operation fully integrated with the joint targeting and current operations planning cycles. The corps proved that it could conduct tactical actions to shape the joint operating area, and achieve operational-level effects linked to decisive conditions to support operational-level objectives. The corps captured lessons identified, following the successful operation, across the planning process and mission execution.

The first lesson identified the need for a comprehensive joint effects synchronization effort to shape the battlespace for the corps and its major subordinate units. This is a holistic approach beginning with framing the corps' operations design from the operational to the tactical level, and then synchronizing effects and resources. This enables the corps to drive tactical actions that support operational level effects, decisive conditions and objectives. To accomplish this, all effects (lethal and non-lethal) and resources must be arranged along an operations synchronization (sync) matrix linked to current operations. The DOCC can then use the sync matrix in its planning
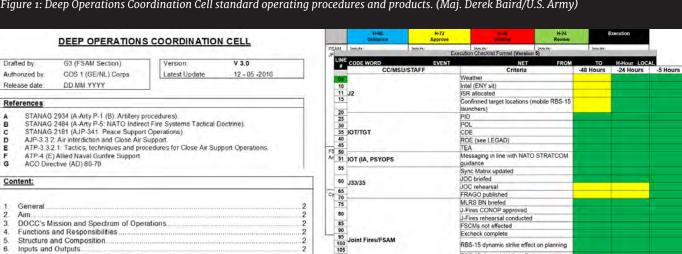
Figure 1: Deep Operations Coordination Cell standard operating procedures and products. (Maj. Derek Baird/U.S. Army)

Members of the 1st German-Netherlands Corps pose for a group photo. (Courtesy photo)

to coordinate for resources in a timely manner, and ensure its efforts are linked, enabling the corps to execute tactical operations with operational effects.

The second lesson identified was the need for additional DOCC and CUOPS deep operations training. Training the deep operations coordination cell and the broader staff is fundamental to executing corps deep operations. Training should involve the planning staff (future operations), targeting cell, current operations, and component command planners or LOs. Initial training involved DOCC members and some component command LOs, but needed to be more inclusive. Training will ensure DOCC members understand the capabilities of joint assets, and the time required to plan and prepare their portion of the deep operation. Deep operations staff training should cover center of gravity (COG) analysis, developing an operational level targeting framework to target the COG, conduct target analysis which includes high payoff target list development, using the decide, detect, deliver and assess methodology, and finally developing a deep operation to shape the battlespace. This approach, beginning with joint operations planning and ending with a fully developed CONOP with rehearsals, allows the staff

to gain a better understanding of operational- to tactical-level analysis, planning, coordinating and execution of a joint, deep operation. CUOPS training should focus on the hand over-turn over brief from the planning effort to CUOPS, JOC rehearsals prior to mission execution, and TTPs to execute deep operations.

The third major lesson identified that all players must execute a corps level joint Fires rehearsal. The DOCC conducted an abridged joint Fires rehearsal focused on final synchronization of the detailed execution checklist timeline. This helped to refine the execution timeline, but did little to ensure all participants understood the detailed synchronization involved in Operation Baraonda. It is imperative for the corps' joint Fires cell to develop a comprehensive joint Fires rehearsal SOP, and train and execute detailed joint Fires rehearsals. Joint Fires rehearsals enable the corps, and its joint Fires assets, to understand the intent of the operation, task and purpose of each joint asset, and detailed synchronization of all assets in time and space and options to execute if the plan has to change.

Corps level deep operations were identified as a necessary product of full spectrum dominance allowing the corps to shape the battlespace with joint Fires

for future brigade close operations. Exercises Strong Sword and Truthful Sword enabled the development, and the growth of the 1st GNC's DOCC as the corps transitions from a NATO Response Force LCC to a JTF HQ/L. Operation Baraonda's success and lessons learned from these two exercises facilitated a refined deep operations SOP and emphasized the need for a detailed joint Fires rehearsal plan. The exercises also proved that the corps is able to conduct deep operations to shape its joint operating area.

The 1st GNC will rely on multinational partners as it continues to enhance its deep operations capability during future NATO joint Fires training events. Building this capability is essential to the corps' ability to conduct operations across the spectrum of military operations. NATO alliance members well trained in planning and executing joint, deep operations, is essential to NATO's assurance and deterrence goals. This is particularly relevant as the alliance focuses on emerging problem sets within the European operational environment.

Maj. Derek Baird currently serves as the joint fire support officer for the 1st German-Netherlands Corps.

Greater than the sum of our parts

The stewardship of alliance

By Lt. Col. Deric Holbrook, Capt. Andrew Cotter and Capt. Jerry Hodge

The two cataclysmic events of the 20th century established one incontrovertible fact that would largely drive American national security policy thereafter and shape how the U.S. Army fights, both in doctrine and in practice. World War I and World War II shook the world to its foundation, and for the first time in history, united the world in a common cause in the pursuit to rid itself of totalitarianism. The ultimate key to allied victory was coalition, that is, sovereign nations uniting in an alliance to achieve a common goal. The legacy of this endeavor was the establishment of the North Atlantic Treaty Organization, and the formalized partnerships between the United States and its NATO allies and partners that endure even today.

The 2nd Cavalry Regiment is the steward of that legacy. The regiment has a mission unlike any other brigade-sized element throughout the entire U.S. Army and a task far more difficult to realize than those assigned to the preponderance of forward deployed formations; to strengthen an alliance on whose shoulders rest not only the national security of the United States, but the security and safety of the whole of Europe. To that end, the regiment has, over the course of the last year, deployed throughout the width and breath of Europe to train with our partners and allies, to learn and grow as an organization and to ultimately enable a more capable and stronger Europe.

Across the regiment, no squadron has had a more continuous and dynamic role in strengthening the alliance than the Field Artillery Squadron. For the last year, interoperability has been our watchword, our point of departure and our desired end-state. Fire support planning and execution have and will continue to be vital to the success of any operation. Planning for and employing fire support effectively can be challenging even across formations within the U.S. Army; doing so across a multinational formation is even more vital and far more challenging. Over the course of the last year, the Field Artillery Squadron conducted two multi-national

Soldiers assigned to F Troop, 2nd Squadron and B Battery, Field Artillery Squadron, 2nd Cavalry Regiment, use radios to communicate the current state of their Soldiers and ammunition while training with Lithuanian allies during Saber Strike 16, June 14, at Adazi Military Base, Latvia. Saber Strike is a cooperative training exercise led by U.S. Army Europe in locations throughout Estonia, Latvia and Lithuania, featuring 13 participating nations. (Sgt. Paige Behringer/U.S. Army)

Combat Training Center rotations and participated in every Atlantic Resolve rotation in which the regiment was involved; all stressing the need for fire support interoperability at every echelon. The predominant conclusion from these experiences has been that fire support interoperability can be achieved through two lines of effort. First, mil-to-mil contact using standardized and common fire support language and products, and secondly, digital systems capable of being utilized by multiple nations and agencies.

Friction is always present when conducting fire support planning and execution. That friction is compounded when working with militaries from multiple nations each with their own experience, methods and doctrine. In order to mitigate this increased friction and build a common operating picture for a multinational force we utilized common fire support documents and products derived through a process of continuous leader engagement and fire support leader development. Moreover, all analog systems were nested throughout in the language of common NATO doctrine. Inherent to the success of this effort was the utilization of analog systems, distilled to understandable graphical representations of the concept and scheme of Fires to account for the lack of a truly digital common fire support picture.

Regardless of nationality, language or fire support platform, artillerymen armed with a map and fire support overlay can understand, be understood and ensure truly coordinated and effective Fires. Furthermore, rigorous and repetitive rehearsals, both technical and tactical, leading up to execution ensured a common understanding for all members of the international force. Only through the use of these common products, analog systems and constant rehearsals were we able to account for the varying methods of Fires employment inherent to a multinational formation.

Another vital aspect of achieving fire support interoperability is the challenge of leveraging the specific skillsets and capabilities unique to the multinational formation, all while maintaining the ability to meet the commander's intent for Fires throughout an operation. No member of an international force conducts operations, communicates or

is organized identically. Expectation management, with regards to command relationships and methods of fire control for both subordinate and higher headquarters is essential to achieving desired effects on the battlefield. This fact was made evident during the Field Artillery Squadron's participation in Operation Allied Spirit I, a joint and combined decisive action training exercise involving service members from the Dutch, Hungarian, British, Canadian and U.S. armies. During this operation, fire support planners from the Field Artillery Squadron were faced with the challenge of integrating multinational fire supporters, trained to conduct direct support artillery at the company and battery level, into a scheme and concept of Fires dedicated to the delivery of massed regimental Fires at the decisive point. However, as with gaining a common understanding and operating picture, the use of standardized products,

procedures and artillery-specific terminology derived from NATO doctrine ensured that fire supporters at all echelons understood where and how they fit into the overall scheme and concept of Fires. The regiment's success during Operation Allied Spirit I was due in no small part to the integration of both the centralized method of fire control, enabling massed fires and the tempo gained from more direct support artillery used by our multinational partners. The balance between the multitude of experience, methods and doctrine across the multinational force was achievable only through the direct input of a single senior fire supporter; operating in the space between fire support planning, target acquisition, and Fires delivery: the fire support coordinator (FSCOORD). As the multinational formation's senior artilleryman, and commander of the formation's direct support artillery battalion, the FSCOORD's role was made paramount in the effort to ensure product, planning, rehearsal and procedure standardization and functionality across all elements dedicated to the delivery of Fires. The FSCOORD's responsibility for all artillery Fires as the Field Artillery Squadron commander made this effort vital to his squadrons, and more broadly the regiment's success. Personal contact and relationships between the FSCOORD, fire support planners, observers and firing batteries formed the bedrock of this effort. Only through utilizing liaison teams at all echelons were we able to enable the direct communication necessary to gain commonality from across the formation.

Gaining fire support interoperability in the aforementioned line of effort is largely achievable through increased and continued training across NATO. However, in order to achieve more effective Fires across the multinational force, digital fire control systems interoperability is paramount. The communications and digital fire support infrastructures heretofore used throughout NATO are not compatible for truly effective fire support interoperability. Up to this point, Analog systems have been effective tools for fire support interoperability, however, the speed and accuracy demanded by future conflicts will require a fully interoperable digital system. This challenge impacts all aspects of fire support at every echelons.

Observers must be able to communicate with their higher headquarters, who must in turn communicate with firing units in order to rapidly and accurately deliver Fires. Moreover, given that the multinational formation must employ a holistic approach to Fires, utilizing every platform available, joint Fires observers must be able to effectively communicate with both fixed and rotary wing assets conducting detailed coordination for the employment of close air support and close combat attack. Often, these echelons are from different nations utilizing different communications platforms and systems. As such, in order to ensure the multinational formation achieves overwhelming joint and combined effects at the decisive point of the operation, we have undertaken an effort to further enhance our understanding of digital fire support operations across NATO. The Field Artillery Squadron has developed an enduring partnership with the 131st Field Artillery Battalion in Weiden, Germany and the 13th Field Artillery Regiment in Jince, Czech Republic. Through these partnerships, the squadron has greatly increased our understanding of digital operations via the Artillery Systems Cooperation Activities (ASCA) program. ASCA is an interface that can translate a digital call for fire from one nation's digital fire support system (i.e. Advanced Field Artillery Tactical Data System) into the digital fire support system of another participating nation. Currently, ASCA is utilized by only a handful of NATO members and the full potential of this vital system is not yet realized. It is imperative now, and will be made even more imperative in the conflicts of the future, that ASCA be fully implemented across the entire alliance and training and resources be dedicated to its employment and diffusion throughout NATO. These partnerships and efforts have already greatly increased the interoperable digital capability of the squadron and can, and will, vastly reduce fire mission processing time on the multinational battlefield of the future.

On a recent mil-to-mil engagement between the Field Artillery Squadron and the 13th Field Artillery Regiment outside of Karlovy Vary, Czech Republic, we had the opportunity to speak to the 13th Field Artillery Regimental commander, Col. Jan Trinacty,

U.S. Army Staff Sgt. Gerson Castillo (right), B Battery, Field Artillery Squadron section chief, stationed out of Vilseck, Germany, hows his Estonian counterpart how to verify the grid location of the M777A2 howitzer using a gun laying and positioning system during the survey portion of a combined arms live-fire exercise May 19 at Tapa Training Area, Estonia. (Staff Sgt. Steven M. Colvin/U.S. Army)

about our continued partnership. Trinacty said that our partnership was about more than just training alongside one another, it's about building capacity and capability.

"I as a commander want to be able to pick up my radio and talk to my howitzers firing in support of American observers for a German maneuver force. That's the kind of strength that succeeds, that's the kind of strength that wins wars."

It is apparent that fire support interoperability can be achieved. This is evident in the accomplishments of the

Field Artillery Squadron, and those of our NATO allies through Operation Allied Spirit I, Operation Saber Junction and Operation Atlantic Resolve over the last year. Distilled to its most vital aspect, interoperability is about mutual respect, shared understanding and an overriding reliance on the basics of fire support.

Aristotle said "the whole is greater than the sum of its parts." As long as fire supporters and artillerymen, regardless of nationality, strive to master the basics of their craft and seek out opportunities to train together, fire sup-

port interoperability will continue to be realized and our alliance will continue to truly be greater than our individual parts.

Lt. Col. Deric Holbrook is the commander of the Field Artillery Squadron, 2nd Cavalry Regiment.

Capt. Andrew Cotter is the operations officer of the Field Artillery Squadron, 2nd Cavalry Regiment and has served as the regiment's lethal fire support officer.

Capt. Jerry Hodge is the fire direction officer of the Field Artillery Squadron, 2nd Cavalry Regiment and has served as the regimental assistant fire support officer.

Pacific visitors in the *Land of the Morning Calm*

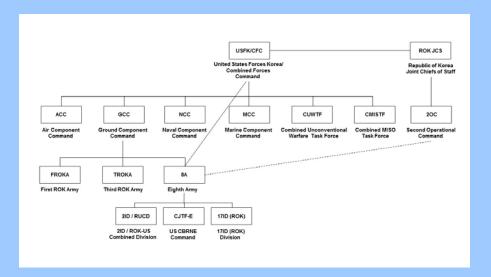## Army, joint and combined targeting in Key Resolve '16

By Col. Marcus Jones, Lt. Col. Bryan Batson, Chief Warrant Officer 4 Wayne Hart, Chief Warrant Officer 3 Leonardo Cargil and Chief Warrant Officer 3 Bogdan Burduselu

This article outlines the joint and combined nature of operational Fires and targeting in the Korean Theater of Operations (KTO). The focus throughout is the target development and nomination procedure centered on the Eighth U.S. Army Target Effects Working Group (TEWG) and its counterparts at Ground Component Command (GCC), Combined Forces Command (CFC), and the 7th U.S. Air Force's 607th Air Operation Center.

The Soldiers of the 8th Army Target Effects Working Group, settled into position around the table or connected into the working group via video teleconference or Cisco Jabber feed. The Consequence Management Exercise ended abruptly at the beginning of March. Attempts to negotiate a return to armistice conditions failed. The North Korean government continued a provocation cycle with our South Korean allies that pushed the peninsula onto a wartime footing. North Korean army forces completed massing along the Demilitarized Zone, with reserve unit mobilizations beginning farther north. Ballistic missile forces left their garrisons and begin to disperse to their assigned ballistic missile operation areas across North Korea's mountainous country-

United States Forces Korea, Combined Forces Command unit structure. (Courtesy illustration)

side. North Korean Special Forces soldiers began trying to flood into the south via mountain trails, aerial insertion and semisubmersible craft. U.S. and Republic of Korea (ROK) forces assumed their highest state of readiness and prepared for a resumption of war. An armistice that lasted for over six decades came to an end. Existing operational plans (OPLAN) became the basis for action as the combined land, air and sea forces of South Korea, the U.S. and 13 United Nations Sending State partners prepared to blunt and then roll-back a North Korean offensive. Eighth Army elements prepared for four simultaneous missions: joining ROK forces establishing the Counter-Fire Task Force; establishing noncombatant evacuation operations (NEO) nodes throughout the country to process and move designated civilians through the evacuation process; supporting naval forces by patrolling costal waterways by air; and assisting the air component by providing Fires to support the Air Tasking Order. The Joint Targeting Toolbox (JTT) was open and operating on a laptop. Next to it another laptop displayed the 8th Army Share-Point site with the first round of targets for the TEWG's consideration. The targets considered today would be for execution after the prepositioned asset air tasking order, which was worked out months in advance. The TEWG always focuses several days ahead of current operations.

This was the environment at the beginning of Key Resolve 2016, one of the two annual exercises designed to test the readiness of the ROK-U.S. alliance and validate the OPLAN for the defense of South Korea. Key Resolve in the spring and Ulchi Freedom Guard in the fall, provide the primary means of evaluating the joint and combined force operating in the KTO. The OPLAN is a joint and combined product that directs the CFC in its operations. Combined Forces Command consisting of the Ground Component Command, Air Component Command, Naval Component Command, Marine Component Command and other organizations in support of the combined and joint force. Eighth Army is an element of GCC with most of the ground forces. Some ROK organizations remains under direct control of ROK Joint Chiefs of Staff. There is ROK augmentation provided to U.S. Army formations. One thing that is unique to the KTO is that the force structure relies on joint and combined operations from the lowest organizations up. Joint processes dominate operations on the Korean peninsula, including joint targeting.

The environment

Eighth Army serves as a forward deployed field army designed to carry out several missions to include three main missions: reception, staging, onward movement and integration (RSOI) of ground forces entering the KTO; Non-combatant Evacuation Operations; and on order, 8th Army forms a Combined Joint Task Force to conduct unified land operations. In order to accomplish these missions, unity of effort is essential. This unity is achieved through command and support relationships established during both armistice and conflict. During armistice, 8th Army falls under United States Forces Korea (USFK) and commands all U.S. Army forces in Korea. Eighth Army carries out both these missions by standing up a rear command post. During conflict, 8th Army has the mission of counter weapons of mass destruction (CWMD) and other unified land operations by supporting the Ground Component Command.

The 8th Army fire support element (FSE) provides support to both the RSOI and NEO missions, but the main effort for the FSE is to integrate and synchronize combined/joint Fires through the joint targeting process in order to achieve the commander's objectives and end state. The FSE accomplishes this by nominating targets to defeat North Korean long range artillery and tactical ballistic missile threats, as well as nominating targets supporting CWMD operations.

Eighth Army builds its target set against the forces of the North Korean People's Army, the fifth largest military force in the world. It has ballistic missiles, a developing ballistic missile submarine program, a large special operations force and a nuclear, biological and chemical weapons equipped force. The North's forward corps expands to become armies at the initiation of hostilities. The North Korean force has thousands of pieces of artillery, with some that can range the Greater Seoul Metropolitan Area at the initiation of hostilities.

Planning, decision, execution cycles: Operations feeding into targeting

The tasks and functions that support the 8th Army targeting process rely heavily on the established armistice and conflict planning, decision, execution (PDE) cycles, which consist of several linked boards and working groups. The 8th Army targeting process begins with guidance and intent from OPLANS, as well as guidance received from three different PDE events- the USFK/CFC Combined Joint Target Coordination

Board, the GCC Executive Target Board (ETB) and the 8th Army Target Confirmation Brief (TCB). During armistice, the boards and working groups meet on a routine and scheduled basis; however, as events move through the provocation cycle towards a resumption of wartime activities, the frequency with which these working groups convene increases.

From the guidance received out of the CJCTB, the ETB and the TCB, various functionally aligned working groups meet to coordinate aspects and elements of the target set. Planners develop future operations or plans that provide direction for the targeting process. Working groups develop priorities that are approved during boards to focus the warfighting functions. Working groups meet to develop lethal and non-lethal target nominations to support 8th Army commander's guidance and intent. The functionally aligned groups at the field army level have similar groups that meet in the major subordinate commands (MSCs) as well as at higher echelons (GCC and USFK/ CFC). Each functionally aligned working group at each echelon has the potential to generate multiple targets for further development and coordination.

The flow of the targeting process in 8th Army starts with the MSCs. These provide targets to 8th Army through submission as target nominations. The target nominations are submitted to the 8th Army Target Effects Working Group for conducting initial collection, consolidation and prioritization of targets and synchronization of target planning and coordination on behalf of the 8th Army commander. Eighth Army combines the target list from the MSCs with 8th Army's internal targets generated in the various working groups to form a target nomination list (TNL) which is sent to GCC to form a component TNL. The component TNL is then submitted to CFC where the TNL is combined with the other component's nominations to form the draft joint integrated prioritized target list (JIPTL). The draft JIPTL is then approved at the CFC Combined/ Joint Target Coordination Board (CJTCB). After the draft JIPTL is approved, it officially becomes the JIPTL and is used for allocating resources and inclusion to the air tasking order (ATO). The ATO is then resourced through the Master Air

Attack Planning process where all of the components align available resources against prioritized targets in accordance with the strategic guidance the CFC commander provided.

Approval of targeting coordination tasks are accomplished through the 8th Army commander's established TCB. The TCB facilitates and coordinates combined force targeting activities with the MSC's schemes of maneuver to ensure that the 8th Army commander's guidance and intent are met through the approval of 8th Army target nominations. From this point targeting information from the PDE cycle routes via the GCC ETB for eventual approval at the USFK/CFC CJTCB to ensure that the CFC's priorities are met.

In addition to keeping targeting centered on operations, the PDE cycle provides for the routine publishing of fragmentary orders (FRAGOs) that supports continued planning and target development. When decisions are made or targeting guidance is given at boards, this information is distributed back into the cycle of working groups and boards to inform subsequent products and shapes future operations. As target sets are worked onto the TNL and eventually the JIPTL they are communicated into the joint air planning cycle (JAPC) for resourcing at the joint level.
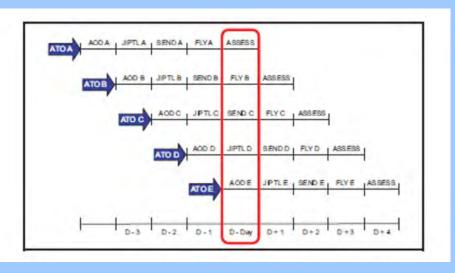
The JAPC, displayed as an ATO progression chart, shows how five consecutive ATOs run concurrent in various stages of planning, execution and assessment. In the example above ATO Alpha is in the assessment phase, while ATO Bravo is in the process of execu-

tion. ATO Charlie is being prepared for the next day's missions with final coordination between components while it is going through the Master Air Attack Plan (MAAP) process as it already has an approved JIPTL. ATO Delta is completing the planning, coordinating and approval process as it is at the CJTCB for JIPTL approval, and ATO Echo is just being constructed at the TEWG. The end result of the assessment phase determines whether a target set has been adequately serviced or requires reengagement in subsequent ATO cycles. During the MAAP process, the KTO ACC develops the best weaponeering solutions for targets. In this process, they determine if an operational target will be struck by ground, naval or aerial Fires for lethal effects, as well as coordinate time and space aspects of Fires. The MAAP process synchronizes delivery systems for all operational Fires.

The process of the Target Effects Working Group

Eighth Army has a unique mission and task organization, with complex command relationships which change and adapt through different phases of the operation in order to ensure proper execution of various lines of effort. In order to meet and support the commander's guidance for the development, planning, execution and assessment of targeting, 8th Army staff uses the joint targeting cycle. Additionally, the 8th Army uses the joint air tasking cycle to

Air tasking order (ATO) cycles. (Courtesy illustration)

ensure its targeting requirements are integrated into the demanding battle rhythm of the KTO. Due to its complex command relationships and divergent responsibilities, 8th Army does not use a traditional joint coordination board. Instead, the staff relies heavily on the TEWG and uses a Target Confirmation Brief to seek further guidance from the commander as well as gaining approval of targeting recommendations.

Both events are shaped by well-established requirements and clearly delineated guidelines. The TEWG is the principal instrument to meet the targeting requirements for 8th Army. Intelligence, operations and fire support staff officers form the core of the targeting working group. Representatives to the TEWG are essential to the execution of targeting, and other members of the staff may aid them in the planning and execution phases of targeting. Representatives from many other working groups, as well as representatives of major subordinate commands, both U.S. and ROK, provide analysis, coordinate and identify critical target subsets that when effectively actioned, significantly reduce enemy capabilities and build towards the desired 8th Army commander's end state.

The TEWG is chaired by the G3, operations officer, and led by the fire support coordinator (FSCOORD), and some of its key tasks are to recommend 8th Army commander's targeting priorities, produce a draft 8th Army TNL, as well as recommend changes to the Restricted Target List or No-strike List. For administrative actions and when current operations demand the presence of the G3 and FSCOORD, the deputy FSCOORD/ Targeting Branch chief directs the activities of the working group and supervises the work of the various action officers. The targeting working group outline is divided and briefed between current and future operations based upon where the various targets are within the schedule of the joint air planning cycle. Detailed synchronization among all cells is critical for a constructive targeting effort. The targeting agenda includes the following inputs:
- Current situation and disposition of friendly forces
- Current enemy situation/ collection plan
- Current targeting / operational priorities
- Review Attack Guidance Matrix (AGM) and High-Payoff Target List (HPTL)
- Special staff and MSC considerations
- ATO forecast
- Target nominations

Successful targeting requires synchronization of information related capabilities, intelligence, maneuver, fire support systems, nonlethal effects and special operations forces to attack and eliminate critical target(s) using the most effective system. The outputs of the TEWG are:
- Recommended TGT guidance, objectives, priorities
- Updated AGM and HPTL
- Draft Target Nomination List (TNL)
- Draft targeting FRAGO

In order to validate the TEWG recommendations and ensure integration into the theater targeting cycle, the TCB is provided to the 8th Army deputy commanding general, operations (DCG-O). During this brief, which is in lieu of the more customary Joint Target Coordination Board, recommended 8th Army targeting priorities are confirmed, approval of target nominations for submission to the GCC ETB or CFC Combined Joint Target Coordination Board is obtained, and guidance to the staff is provided. The TCB is headed by the G3 and FSCOORD and key members of the principal staff attend and provide advice and recommendations to the DCG-O.

The targeting process is continuous at all levels of command within 8th Army and its major subordinate commands. The KTO is staffed on a short rotational structure, and as a result the stability and efficiency of its targeting process is achieved through parallel development by targeting working groups from brigade through the field army and then transferred to component and combined force for resourcing. Furthermore, targeting is not viewed just as a wartime function, but as a process which must be exercised during armistice as well. The members of the 8th Army TEWG must be familiar with both their roles and those of the other team members, a practice observed through staff training which occurs during monthly armistice TEWGs or during the bi-annual Fires University Conference, a three-day event designed to train and prepare the staff for combined and joint level targeting.

Electronic target packets, the target nomination portal and the Joint Targeting Toolbox

As mentioned previously, 8th Army is faced with unique command relationship challenges. Furthermore, its layout of forces across the entire Korean peninsula adds to the mission command complexity and increases the need for long-distance cooperation among various staffs or participating agencies. As a result, 8th Army FSE developed a collaboration tool designed to bring information to all the targeting members regardless of their location, and also facilitate teamwork by enabling them to provide input to the process.

The target nomination portal allows representatives from the targeting working group to submit information for discussion and development. This affords the targeting community the opportunity to review the nominations earlier than the otherwise traditional timeline. As a result, the targeting members can assess the impact these nominations may or may not have on their operations, and provide concur, concur with comments or non-concur standings.

Their comments do not constitute approval of a respective nomination, as further discussion and review is conducted during the TEWG and final approval is gained during the TCB. However, having the early opportunity to review the nomination enables the staff to come more prepared and attend the TEWG fully aware of what input is needed from them. Additionally, the approved targets are assigned to their respective air tasking order and maintained for future reference, aiding the staff with their assessments and re-attack recommendations. Moreover, as the targets navigate through the approval process, input is provided and captured from the approving authori-

ties. This activity facilitates refinement and improved understanding of what the commander is aiming to achieve through his targeting objectives.

Joint Targeting Toolbox (JTT) is a suite of interoperable tools designed around the joint targeting cycle and used to support operations and intelligence targeting requirements. JTT stores the electronic target folders (ETF) for the Joint Target List used on the Korean peninsula for nomination of facility and unit targets. The ROK/ U.S./ CFC employs the JTT as its primary targeting application for the KTO, allowing complete targeting interoperability within the joint, combined community. Imagery, collateral damage estimation (CDE), weaponeering solutions, battle damage assessment, etc. are found within the JTT for each identified target, and information is fed directly from the Modernized Integrated Database. Additionally, air operations directive and campaign plans are uploaded into JTT and associated with each target list facilitating a streamlined prioritization process.

As an MSC to GCC, 8th Army is required to use JTT to develop and create its TNL for inclusion into the GCC's TNL and for presentation to the GCC ETB and CFC CJTCB. Eighth Army FSE has a well-established battle rhythm complementing the 8th Army, GCC and CFC targeting PDE cycle to guarantee timely information is available for nomination. Use of JTT begins during armistice training events sponsored by 8th Army FSE and offered to members of the 8th Army staff and subordinate commands, both U.S. and ROK, as well as outside participants to the targeting process. The goal is to achieve a level of staff proficiency that supports informed decisions. Additionally, subordinate commands are given a responsible production code, allowing them to create target lists which would eventually be merged under an 8th Army TNL. This will be done at the conclusion of the TEWG and presented to the DCG-O for approval during TCB. A final approved 8th Army TNL is then entered into JTT and submitted for nomination to GCC.

Assessment

A target's operational importance is determined by conducting an assessment to determine if engaging the target is consistent with planned operations and will help achieve the commander's objective(s) and the end state. Assessment remains a challenge to all levels of operations. After the targets are nominated in the TEWG, the field artillery intelligence officer and G2 targeting section begin to develop intelligence gathering, exploitation and analysis of each approved nominated target. The G2 targeting section also works in close coordination with information collection/ISR section to develop each collection requirement. The collection requirement includes indicators to achieve the desired task or effect and a timeframe when the collection is conducted. As mission results are received, they are disseminated to the information collection and the G2 targeting sections to update the targeting lists. These targets are then briefed in the next TEWG or briefed deskside to the FSCOORD if the desired effect is not achieved. The FSCOORD uses the commander's guidance to determine if a target needs to be reengaged immediately using dynamic targeting, if sufficient effects have been achieved to re-engage the target in the next ATO cycle or if the target has subsequently been overcome by events to the point that it is a lower priority.

Conclusion

Due to the nature of its mission set, 8th Army uses joint doctrine as the basis for its targeting cycle. With a diverse mission set due to its role as both an Army Forces and a field army, 8th Army uses assets from across the joint and combined force in the execution of its target sets. With allied ROK units combined into 8th Army organization from the tactical to the operational echelons and individual Korean augmentees embedded in all of 8th Army units and staff elements, joint and combined operations are a way of life. The joint and combined nature of target development in the KTO requires resourcing across services and components. Additionally, the mature nature of the ROK-U.S. alliance ensures that all operations are multinational in execution. The distributed mission command environment requires the ability to do targeting development in an asynchronous and desynchronized way, while still bringing the complete team together at specified points for coordination and guidance to ensure unity of action. From its structure, to its manning and processes, and through its execution, 8th Army is in all aspects joint, interagency and multinational. Eighth Army remains "Pacific Victors! We Fight Tonight!"

Col. Marcus Jones is currently the 8th Army fire support coordinatorand director of the G3, Fires Directorate at Yongsan, Republic of South Korea.

Lt. Col. Bryan Batson is assigned to 8th Army, Yongsan Army Garrison, Republic of Korea, where he served as the chief of targeting and is currently serving as the deputy fire support coordinator.

Chief Warrant Officer 4 Wayne Hart is assigned to Headquarters, 8th Army at Yongsan, Korea, where he is currently serving as the Army targeting officer.

Chief Warrant Officer 3 Cargill Leonardo Cargill was assigned to the Intelligence and Sustainment Company, Headquarters and Headquarters Battalion in the Republic of Korea. Cargill currently serves as the 8th Army G2 field artillery intelligence officer.

Chief Warrant Officer 3 Bogdan G. Burduselu is assigned to Headquarters, 8th Army at Yongsan, Korea, where he currently serves as the 8th Army targeting officer.

Figure #. The Target Effects Working Group (TEWG) voting tool. (Courtesy illustration)

In the next issue of Fires

September–October 2016, The Human Dimension: Team Building and Enhancing Performance. The Army has always maintained its strength is in its diversity and the human element. This issue will look at how the Army is optimizing the human dimension by taking the best we have and making them better through intellectual optimization and advancing creative and critical thinking. Optimizing cognitive, physical and social strengths allows us to achieve advantage over a situation or adversary in ambiguous, chaotic and complex operating environments. Improved leader development and educational modernization are needed for cohesive team building; our force needs to win and move beyond the fight against sexual harassment, achieving gender equality and removing discrimination in military occupational specialities.

Submissions are due by August 1, 2016. Send your submissions to usarmy.sill.fcoe.mbx.fires-bulletin-mailbox@mail.mil or call (580)442-5121 for more information.

Soldiers from 2nd Infantry Division participate in a three-legged race during the Sexual Harassment/Assault Response and Prevention scavenger hunt hosted by Area I Morale, Welfare and Recreation team and SHARP representatives April 22, 2015 at Camp Casey, South Korea. The event was organized to build teamwork and trust with each other for deterring sexual offenses.

PIN: 105272-000