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Front cover: A Soldier breaches a steel door with an exothermic cutting torch during training in the Republic of Korea. (U.S. Army photo by Captain Scott Kuhn)

Back cover: Combat engineers with the Regimental Engineer Squadron, 2d Cavalry Regiment, place explosives during a training exercise Agile Spirit 19 at the Vaziani Training Area, Georgia. (U.S. Army photo by Specialist Ethan Valetski)

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Clear the Way

Colonel Mark C. Quander
98th Commandant, U.S. Army Engineer School

It gives me great pleasure to return to Fort Leonard Wood, Missouri, to serve as the 98th Commandant of the U.S. Army Engineer School (USAES).

The past several months have been exciting. I had the opportunity to meet and recruit future engineer Soldiers at the U.S. Military Academy–West Point, New York. I also met our newest engineer Soldiers going through One Station Unit Training, talked to our engineer officers attending the Command and General Staff College, Fort Leavenworth, Kansas, and engaged with engineer units in the operating force.

I have had the opportunity to see in earnest how we are developing the concepts for a multidomain operation-capable force. While the multidomain operation force seems far away, the reality is that we have already begun incorporating capabilities in the current force. As we step into the future, we must not forget that our Nation expects us to be ready today.

Today, our Regiment is deployed in numerous countries around the world. Engineer units, Soldiers, and civilians continue to support ongoing operations in Iraq, Syria, and Afghanistan. However, these activities represent only a small portion of what we do for the Nation. Members of the Engineer Regiment are providing continuous support to homeland defense, disaster response, and ongoing military operations in Europe and the Indo-Pacific—and then there is the dedicated work of the U.S. Army Corps of Engineers. As battlefields are expanding across all domains and decision cycles are continually being compressed, USAES will use the opportunity to refocus training, modernization, and leader development on future peer and near-peer threats to ensure that U.S. forces can gain strategic positional advantage and freedom of movement.

As we transition to the future, we must remain mindful that we can have sufficient strength, properly configured formations, and modernized capabilities, but that it takes—and will always take—people to develop solutions to our Nation's toughest challenges. It takes all of our 90,000 engineers across the Active and Reserve Components as well as our Army civilians and our resilient Families to accomplish this mission.

As engineers, we have never been satisfied with ordinary missions; we have always sought out the extraordinary. Since 1775, our Regiment has served our Nation with an indomitable and contagious spirit.

In closing, I would like to share an excerpt that was published a number of years ago but still captures the essence and spirit of the Engineer Regiment—*Essayons*:

"They've called us many things in many armies through the years—sappers, diggers, moles, pioneers and, more lately, engineers. But no matter the name, always they have called us when they needed men skilled with shooting irons and building irons. With ax and ox, we built the road through the stark wilderness for General Braddock . . . and later built the circling earthworks at Boston. . . . In times of peace, we turned to educating ourselves for the uncharted future. . . . We built the famed long bridge across the James and the entrenchments at Petersburg. . . . Around the turn of the century, we built that ditch across the Isthmus of Panama, then first to meet the foe with rifles replacing shovels . . . first Americans to die on Flanders Fields, were the fighting breed of . . . the combat engineers. Later in Europe, Africa, and Asia, we built the roads and airfields and bridged a hundred rivers and always, we fought as we built. In distant Korea, we repeated those same jobs. In other far-off lands, we built the roads and posts and fought a wily foe. (In Iraq and Afghanistan, we went back to our roots and cleared the way as we fought an adapting foe.) Tools and weapons as well as names have changed through the years. But the spirit is the same. Always, we are builders who can fight. And we are destroyers as well, who know how to demolish enemy defenses. Proudly we wear them—emblems of the Army's Builders, Destroyers, Fighters. . . . We are the engineers."[1]

I am proud of what each and every one of you do every day for our Nation, our Army, and our Regiment.

Essayons . . .We will succeed.

Endnote:

[1]"We are the Engineers," *Army Digest*, Department of Defense, June 1968, p. 38.

Lead the Way

Command Sergeant Major Douglas W. Galick
Regimental Command Sergeant Major

During the past few months, the U.S. Army Engineer Regiment has been busy. We bade farewell to Major General Robert F. Whittle, the 97th Commandant of the U.S. Army Engineer School (USAES), Fort Leonard Wood, Missouri, and Chief Warrant Officer Five Jerome L. Bussey, the 4th Regimental Chief Warrant Officer of USAES. I would like to wish them the best of luck and thank them for their great work and dedication to the Engineer Regiment as well as the personal mentorship they provided me. While it was difficult to see such great leaders and wonderful Families depart USAES, we also had the great pleasure of welcoming the 98th Commandant of USAES, Colonel Mark C. Quander, and the 5th Regimental Chief Warrant Officer, Chief Warrant Officer Five Dean A. Registe, and their amazing Families. I am excited to be a part of this great new team and look forward to working with our new leaders to take USAES and the Engineer Regiment to the next level.

The annual Engineer Regimental Awards Board deadline is 31 January 2020, and that date will be here before you know it. I encourage all leaders to look across your formations and find those outstanding performers who are worthy of recognition. This is a wonderful opportunity to showcase the great officers, noncommissioned officers, junior enlisted Soldiers, and civilians in our Regiment; please take advantage of it. An alarmingly low number of packets has been submitted over the last couple of years, and I would like to see the number of submissions increase this year. It is never too early to start building your packets. All the information you need can be found in Fort Leonard Wood Pamphlet (Pam) 672-1, *Army Engineer Awards Program*,[1] and on the Engineer Personnel Development Office Web site at <https://home.army.mil/wood/index.php/units-tenants/USAES/Orgs/EPDO>.

We conducted a much-anticipated ribbon-cutting ceremony on the new Sapper Leader Course rappel tower on 28 August 2019. Many Soldiers have very fond memories of the original tower; however, the transition was especially welcome, as the old tower was beginning to show its age. The new, all-metal structure is extremely well-built and should significantly outlive its predecessor. The new tower will help improve the safety and quality of training that students receive when they attend the Sapper Leader Course. Much of the credit for this 5-year project goes to Sergeant First Class Timothy P. Jacobs from the Sapper Leader Course Operations Team. Great work! Additional thanks for this project goes to the leadership of the 169th Engineer Battalion, 1st Engineer Brigade, Fort Leonard Wood, and the U.S. Army Corps of Engineers, Kansas City District, Kansas City, Missouri. The new rappel tower serves as a great example of how the training quality of the Sapper Leader Course is constantly improved in an effort to train better sappers for your formations. Keep sending us your best; we will make them better!

Lastly, the Soldiers and leaders of the Regiment have been doing spectacular work across the Army. As I speak with other senior leaders, I am constantly reminded of how impressed they are with their engineer organizations and Soldiers. These comments are a direct reflection of your drive to succeed, and I cannot say enough about how immensely proud I am of what our Soldiers are able to accomplish. I would like to extend personal congratulations to Staff Sergeant Alexander A. Miller, 570th Sapper Company, 864th Engineer Battalion, Joint Base Lewis–McCord, Washington, for winning the U.S. Army Forces Command Best Noncommissioned Officer Warrior of the Year competition. Well done, sapper! Accomplishments like this and countless others continue to build upon our reputation as the most dependable and capable regiment in the Army. Thank you for what you do every day. *Essayons*. We WILL succeed.

Endnote:

[1]Fort Leonard Wood Pam 672-1, *Army Engineer Awards Program*, 8 December 2010.

Show the Way

Chief Warrant Officer Five Dean A. Registe
Regimental Chief Warrant Officer

Greetings from the U.S. Army Engineer School (USAES). I would like to take this opportunity to introduce myself to the Engineer Regiment. I am your 5th Engineer Regimental Chief Warrant Officer, replacing Chief Warrant Officer Five Jerome L. Bussey, who provided a great deal of mentorship to me during my time as the U.S. Army Training and Doctrine Command Capability Manager (TCM)–Geospatial, Fort Leonard Wood, Missouri. I am very excited to serve in this capacity as we continue to strive to modernize warrant officer efforts for the future. We must continue the vision and path set forth by my predecessors through progressive developmental assignments, to build a cohort that is deep and wide in knowledge.

Chief Warrant Officer Five Donald D. Bond relinquished command of the U.S. Army Prime Power School, Fort Leonard Wood, to Chief Warrant Officer Four Willie Gadsden Jr. on 23 August 2019. During Chief Warrant Officer Five Bond's tenure as commander of the U.S. Army Prime Power School, the U.S. Army Training and Doctrine Command accreditation rate improved to 97.3 percent. This required a great effort from an outstanding warrant officer! Thanks again, Chief Warrant Officer Five Bond for bringing the team together to accomplish this goal. I would also like to welcome aboard Chief Warrant Officer Four Gadsden and his Family as they continue to forge the way forward at the U.S. Army Prime Power School.

I would like to commend the 5th Engineer Detachment Geospatial Planning Cell, Fort Shafter, Hawaii, for executing a successful external evaluation during Exercise Pacific Sentry 19-3. The 5th Engineer Detachment Geospatial Planning Cell used this validation exercise to define the concept of strategic geospatial planning and analysis to support Army service component command geospatial requirements. The 5th Engineer Detachment Geospatial Planning Cell is working with USAES and TCM–Geospatial to create and modify current geospatial doctrine for strategic geospatial planning and analysis, which will lead to updates of Military Occupational Specialty 12Y–Geospatial Engineer training, the Advanced Leadership Course, the Senior Leadership Course, and Military Occupational Specialty 125D–Geospatial Engineering Technician Warrant Officer Advanced Course. Thanks to the leadership in the U.S. Army Pacific—Colonel Michael D. Gaffney, Chief Warrant Officer Four Erik L. Reid, and Chief Warrant Officer Three David A. Diley—for spearheading this initiative.

USAES welcomed Chief Warrant Officer Four David L. Goble to replace Chief Warrant Officer Five Stephen E. Joseph in the Engineer Personnel Development Office. The Engineer Regiment would like to thank Chief Warrant Officer Five Joseph for all of his work on creating personnel/project development skill identifiers for engineer warrant officers. He has moved on to serve as a member of the Military Support Team at the U.S. Army Geospatial Center, Alexandria, Virginia. USAES also welcomed Chief Warrant Officer Four Ryan L. Ward as the Military Occupational Specialty 120A–Construction Engineering Technician Course chief.

Lastly, I would like to echo what Command Sergeant Major Douglas W. Galick says regarding the annual Engineer Regimental Awards. The 31 January 2020 deadline is quickly approaching. I encourage all of you to represent yourselves and your units and to immediately submit your packets to ensure that they are received in time. Within our Regiment, we have a lot of great officers, noncommissioned officers, junior enlisted Soldiers, and civilians who are doing great work in the operational force and providing sound technical support to commanders every day. We want to know what you are doing, and the annual Engineer Regimental Awards board provides an opportunity for you to tell your story. All of the information that you need can be found in Fort Leonard Wood Pamphlet 672-1, *Army Engineer Awards Program*,[1] and on the Engineer Personnel Development Office Web site at <https://home.army.mil/wood/index.php/units-tenants/USAES/Orgs/EPDO>.

Endnotes:

[1]Fort Leonard Wood Pamphlet 672-1, *Army Engineer Awards Program*, 8 December 2010.

The Engineer Role in Protection—Complex, Yet Simple

By Major Steve A. Albritton

Survivability operations comprises the primary protection task of the U.S. Army engineer, yet assured mobility in support of enhanced protection dominates our time and heavily competes for engineer resources. Engineers provide protection support to the protection warfighting function in both survivability operations and the enhance protection lines of engineer support. With these competing priorities, we must understand our purpose in time and space as it applies to protection.

Engineers prepare and execute protection tasks pursuant to the protection priority list, adhering to protection principles for the purpose of preserving the force so that the commander can apply maximum combat power. Protection, executed by all units, runs throughout all warfighting functions, in all phases of an operation, and at all echelons. As the ongoing evolutions of protection needed to support an operation are provided, understand that engineer capabilities and resources will not be enough to meet the demand; prioritization and purpose of effort will set the course of action. This article describes one way that you can prepare, organize, and execute your role in protection operations.

Understand What Activities Support Protection

In addition to the engineering tasks in support of survivability operations, tasks to build, repair, or maintain fighting and protective positions to harden, conceal, or camouflage roads, bridges, airfields, and other structures and facilities in protection support archives (shown in Figure 1, page 6) are included in activities that support protection. These tasks tend to be equipment-intensive and may require the use of equipment timelines to optimize the use of low-density, critical equipment.

Align Activities by Purpose

The Army categorizes engineer capabilities into three engineer disciplines/functions—combat, general, and geospatial engineering—and employs capabilities from all three disciplines to support survivability operations. Figure 2, page 7, shows the four lines of engineer support used by the Army to help commanders and staffs combine the capabilities from all three engineer disciplines and align their activities according to their purpose. Survivability operations is most often aligned with the enhance protection line of engineer support. This line of engineer support consists of a combination of engineer disciplines to support the preservation of the force so that the commander can apply maximum combat power. It consists largely of survivability tasks but can also include selected mobility, countermobility, and explosive-hazard operations tasks.

Incorporate Enhanced Protection in the Assured Mobility Framework

Engineer mobility and countermobility tasks typically support the assure mobility line of engineer support but may also support the enhance protection line of engineer support. Examples include constructing a trail for use as a perimeter road to secure a base perimeter and constructing an entry control point for the protection of base camps. Engineer support to countermobility includes the following engineer tasks:

- Siting obstacles.
- Constructing, emplacing, and detonating obstacles.
- Marking, reporting, and recording obstacles.
- Maintaining obstacle integration.

These complementary and reinforcing capabilities protect our forces by imposing the commander's desired effects on enemy movement and maneuver and preserving combat power for combined arms operations. Countermobility tasks involving engineers include proper engagement area development, obstacle integration, and scheme of maneuver. Survivability complementary capabilities include providing support to critical fires warfighting

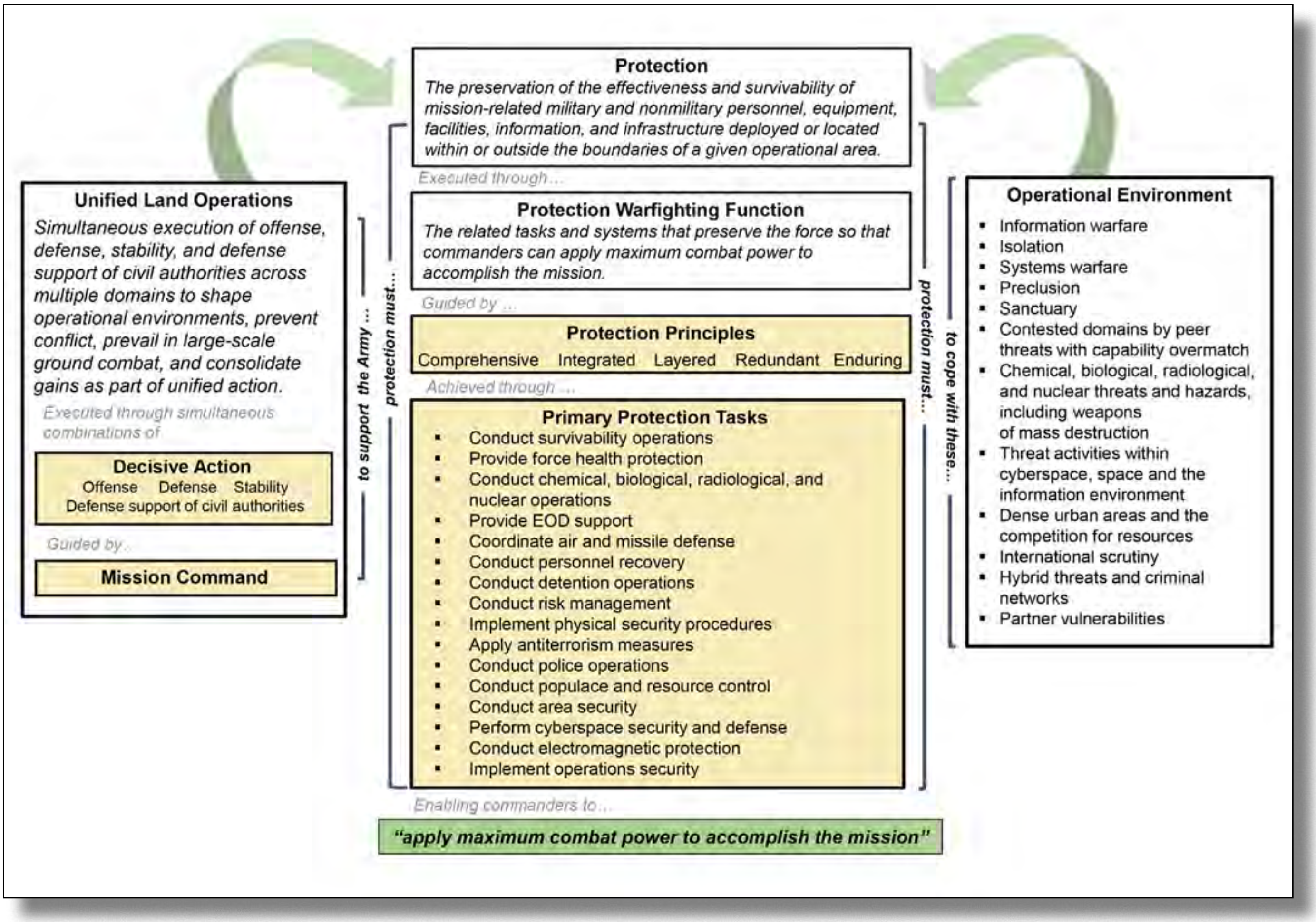

Figure 1. Protection support activities[1, 2]

function assets including radar, mission command, sustainment, and warfighting function means of execution.

Consider Specialized Capabilities That Protect the Force

Engineers also enhance protection through explosive-hazards tasks. These include area and route clearance; specialized searches using engineer mine detection dogs and specialized search dogs; and the collection, analysis, and dissemination of explosive-hazards information. These efforts to mitigate the effects of explosive hazards can be performed by engineers at all echelons or by specialized units (explosive-hazards teams, area clearance platoons).

Engineers who have trained with explosive-ordnance disposal (EOD) personnel and have explosive-ordnance clearance experience play a vital role not only in the assure mobility line of engineer support but also in the enhance protection line of engineer support. Explosive-ordnance clearance personnel advise the on-scene commander concerning recommended personnel and equipment protective measures and isolate blast and fragmentation danger areas within the area of operations. Engineers trained in explosive-ordnance clearance may assist EOD personnel in disposing of explosive hazards and addressing shortages of crucial EOD resources. Battlefield and postconflict missions are associated with explosive remnants of war that are assessed, marked, and eliminated.

Firefighting teams are limited assets that provide fire prevention and fire protection services. Some of the key protection tasks provided to commanders include fire prevention inspections and investigations, fire suppression, search and rescue, and hazmat response. Additionally, firefighting teams provide first-level medical response and assistance to victims as well as technical oversight of nonfirefighting personnel when supporting firefighting operations.

Engineer divers enhance protection through force protection dives by identifying and removing underwater hazards. Engineer divers improve underwater security measures by checking for enemy tampering of ships, docks, piers, intakes, and other marine facilities. Engineer divers are trained in explosives and can identify and remove explosive hazards through sympathetic detonation. Planners and senior staffs should be aware of diver capabilities and integrate divers into early-entry operations.

Other specialized engineer support teams can be embedded at the tactical level to conduct baseline surveys and environmental assessments that enhance protection. These

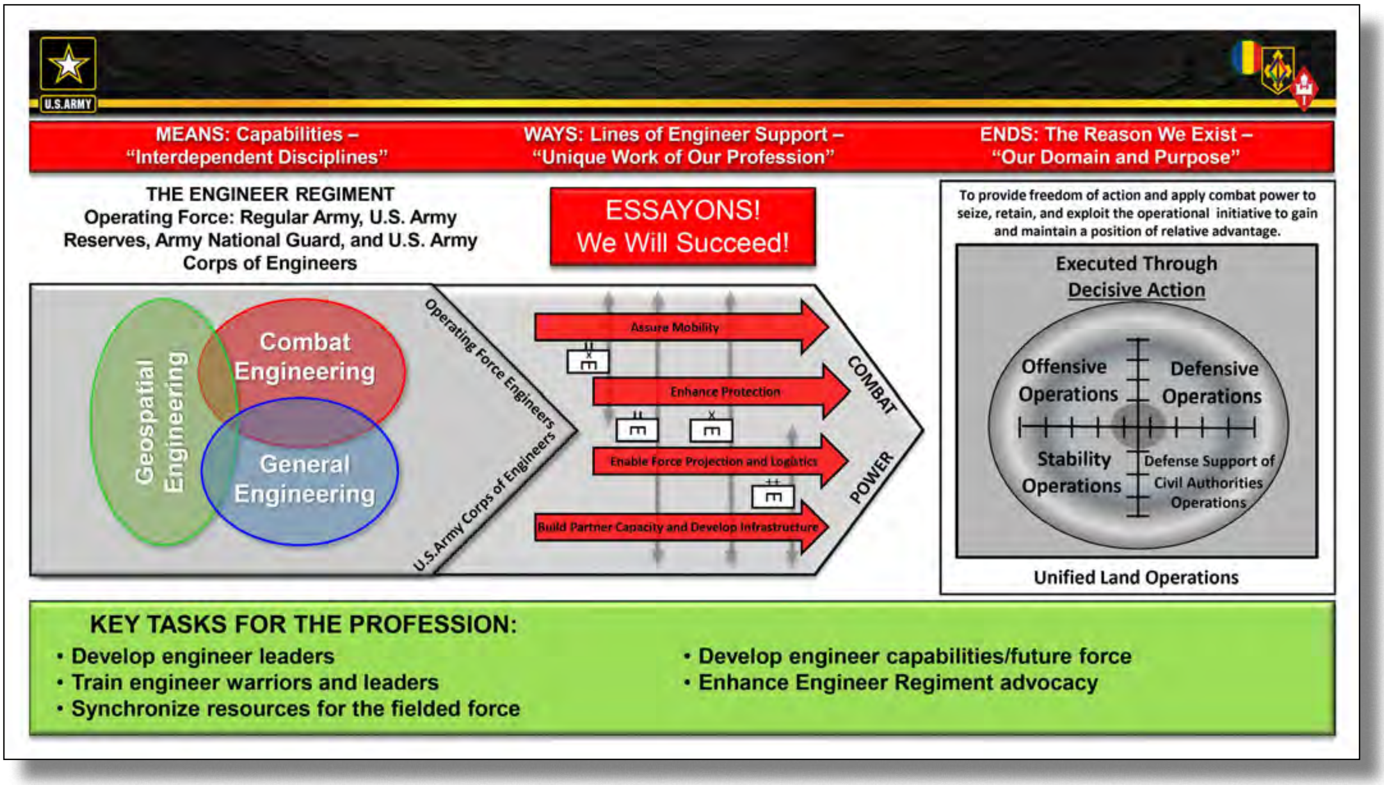

Figure 2. Army engineer profession

teams identify potential hazards before force projection and base and base camp establishment.

Participate in Protection Cell Working Groups

Protection principles fall into place in protection cell working groups. Participation in protection cell working groups is crucial to the development of a comprehensive, integrated, layered, redundant, and enduring plan.[3] The scheme of protection is developed by the cell under the direction of the protection chief. Commands utilize a protection cell and protection working group to integrate and synchronize protection tasks and systems for each phase of an operation or major activity.

It is not necessary for the protection cell to be made up of representatives from every functional element of protection. Primary members of the protection cell typically include—

- The chief of protection.
- An air and missile defense officer.
- A personnel recovery officer.
- A provost marshal.
- A chemical, biological, radiological, and nuclear officer.
- An EOD officer.
- An engineer officer.
- An antiterrorism officer.

Dedicated members should coordinate with special staff elements and other personnel, as required.

Focus and Balance Priorities

With the array of engineer disciplines and complex demands for engineers to support protection operations, the goal of supporting protection operations can seem unattainable at times. By focusing on your commander's protection priority list, aligning your activities by purpose, and employing the protection principles, you can simplify your approach to supporting the protection warfighting function.

Endnotes:

[1]Joint Publication 3.0, *Joint Operations*, 17 January 2017.

[2]ADP 3.0, *Operations*, 31 July 2019.

[3]Army Doctrine Publication (ADP) 3-37, *Protection*, 31 July 2019.

Reference:

Field Manual 3-34, *Engineer Operations*, 2 April 2014.

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By Captain Mark E. Rice

In the last 2 years, two events created a significant change in the training of the military intelligence company (MICO) in the brigade engineer battalion (BEB). First, the Army updated Field Manual (FM) 3-0, *Operations,* and refocused on large-scale combat operations.[1] Secondly, the U.S. Army Intelligence Center of Excellence (USAICoE) and the Military Intelligence (MI) branch began the process of validating the Military Intelligence Training Strategy (MITS) as the program of record for training the MICO within the BEB. These two events fundamentally changed the way the MICO trains and how units validate the training.

With the refocus on large-scale combat operations, the lethality of the force has never been more important. For the MICO, the lethality of a formation is most effectively measured by the ability of the unit to answer the priority intelligence requirements of the brigade combat team (BCT) commander. The BEB commander, BEB operations officer (S-3), and MICO commander must train the MICO to enable the BCT intelligence officer (S-2) to answer those priority intelligence requirements for the BCT commander. The challenge with this situation is that the BEB commander and BEB S-3 are engineer officers and typically have minimal exposure to all the nuances of the MICO and its training requirements. How, then, do engineer Soldiers best facilitate the training of MI Soldiers to meet the needs of the chain of command? I have some suggestions based on my observations.

Observation 1

Preparing the MICO for success in large-scale combat operations requires input from the MICO commander, BEB S-3, BCT S-2, and MI staff to properly resource and develop an effective training plan for BEB and BCT commander approval.

In early 2016, USAICoE began the development of MITS to replace MI gunnery. MITS was developed to create standardization within the force, ensuring that each BCT MICO was certified to the same level and standard. In the 39th Chief of Staff of the Army's Initial Message to the Army, General Mark A. Milley, made readiness his top priority in 2015.[2] Most recently, General Robert Abrams, Commander, U.S. Army Forces Command (FORSCOM), reinforced this message by stating, "The readiness of our intelligence formations, from small collection teams to military intelligence brigades, remains central to our ability to gain and maintain situational understanding in all phases of decisive operations."[3] MITS is the standardized certification strategy for commanders to plan training and objectively and quantifiably assess and evaluate their tactical intelligence warfighting function capabilities. FORSCOM relied on USAICoE to create a standard for MITS by developing tasks that apply across the force and are transferable and translatable across any formation.

MITS is based on training and evaluation outlines for the MICO. The MI Corps is the source of expertise for determining the training needs of MI Soldiers and units and the best means with which to accomplish certification. General Abrams specified the inclusion of BCT S-2s in the training, but units should also seek the expertise of the senior division intelligence officer (G-2) to help plan and validate the training.[4] This will alleviate some of the planning burden for the BEB S-3, allowing him or her to focus on the resourcing and coordination necessary for the MICO.

Observation 2

MITS Tier 3 (Crew Level Certification) and Tier 2 (Platform Certification) typically require resources beyond what most installations and MICOs have available.

Most installations and most MICOs are underprepared to conduct training beyond the individual level due to the

"With the refocus on large-scale combat operations, the lethality of the force has never been more important."

inability to replicate the complexities of the decisive-action training environment. This necessitates coordination within the BCT and with external organizations. Combining intelligence and electronic warfare tactical proficiency trainer scenario simulations with the Army Foundry Intelligence Training Program, mobile training teams, and collective training events, with a maneuver battalion (preferably the cavalry squadron); is necessary to replicate the intricacies of large-scale combat operations. Additionally, facilitating evaluators who are capable of validating the MITS certification require personnel from outside the BCT; expecting the MICO commanders for each BCT to resource these requirements on their own is almost unrealistic. Good communication and coordination between the MICO commander, the brigade S-2, and the BEB S-3 are imperative in order to obtain all resources required to conduct MITS Tier 3 and Tier 2 certifications.

Observation 3

Facilitating Tier 3 and Tier 2 certifications requires the establishment of upper tactical Internet networks, and this requires that a communications exercise (COMEX) be conducted prior to the training event.

Throughout 2018 and early 2019, the 82d Airborne Division, Fort Bragg, North Carolina, conducted pilot exercises to validate the Tier 3 certification of the MICO. Lieutenant Colonel Michael J. Adamski, the former G-2 of the 82d Division, and Major William J. Denn, the former S-2 of the 1st Brigade Combat Team, published a white paper that discusses the lessons learned and best practices observed during the exercises. One of the most critical aspects of preparing for the Tier 3 certification that they identified was the execution of a COMEX prior to the events.[5] It is imperative to understand that, while the MICO is capable of internally conducting a COMEX using the Trojan Communication System in a combat training center rotation or a deployed environment, it will likely need to rely on the tactical communication network established by the signal company and BCT communication officer (S-6). This creates an opportunity for the MICO to collectively train with the signal company. The level of connectivity necessary to enable the MICO training is established while several of the signal company training objectives are simultaneously met. Although, this is a benefit, it is not a MITS objective. It requires the coordination of training calendars within the BEB—a task that the BEB S-3 is best suited to undertake.

Observation 4

The importance of MICO participation in a BCT command post exercise (CPX) cannot be overstated, but should not occur prior to Tier 3 certification.

The MICO is the critical enabler that helps establish a working rapport with the bulk of intelligence agencies and BCT staff. The integration of the MICO into the BCT command post, via close coordination with the brigade S-2, is one of the most critical components of the overall synchronization of the intelligence warfighting function with the remaining BCT combat power. If the MICO is not integrated into the BCT S-2 and staff prior to the BCT field training exercises, the staff will struggle to provide the BCT commander with an accurate visualization of the battlefield. Additionally, the staff will likely maintain a marginal (at best) common operating picture of friendly and enemy activity. However, the completion of Tier 3 certification is imperative to the success of the MICO in the CPX. Without the level of proficiency and verification of the functionality of the equipment that Tier 3 training provides, the MICO adds little training value to the CPX. The brigade S-2 and BEB S-3 can serve as the drivers that ensure MICO receives the support and resources necessary for the CPXs.

Observation 5

The BEB S-3 must become the proponent who facilitates the resourcing and relationship building necessary to enable the successful training and certification of the MICO.

Training is ultimately the responsibility of the commander, and planning and prioritization are ultimately his or her prerogative. The BEB S-3, who assumes the role of the primary facilitator, creates many benefits for all parties involved. The BCT and BEB commanders gain better-trained units by incorporating the brigade and division senior intelligence analysts in the planning process. The BCT S-2 is better equipped to answer the BCT commander's priority intelligence requirements and enable his or her visualization of the battlefield. The MICO commander can focus on the execution of the training and certification events without the burden of trying to resource and coordinate for an event beyond the internal capabilities. The BEB S-3 reduces his or her own planning burden by incorporating the BCT S-2 and G-2 into the planning process. The influence of the BEB chain of command is extended by creating and building relationships with external units and organizations. The overall readiness of the MICO, BEB, and BCT can be improved through more effective training prior to MITS certification.

Conclusion

To be successful, these five suggestions resulting from my observations require the support of the BCT and BEB commanders. Only the commanders can codify the roles and responsibilities of the positions and provide the guidance necessary to lead to the desired end state for the MICO. The Engineer Regiment and USAICoE should work

(continued on page 13)

Integrating an ECC Into a Maneuver Brigade

By Captain Joost "Luke" DeMoes

The 902d Engineer Construction Company (ECC), 15th Engineer Battalion, 18th Military Police Brigade, Tompkins Barracks, Germany, participated in Combined Resolve XI from 26 November to 14 December 2018. Combined Resolve is a combat training center rotation within a joint, multinational environment exercising Atlantic Resolve rotational units while building readiness and interoperability among allies and partners. For the purposes of the exercise, the 902d was detached from the 15th Engineer Battalion and attached to the 91st Brigade Engineer Battalion (BEB), 1st Armored Brigade Combat Team (ABCT), 1st Cavalry Division. The 91st has two organic engineer companies, but does not have an organic engineer construction company. The 902d significantly augmented the existing engineer assets within the 91st with additional heavy equipment and skilled engineer Soldiers. The experience of the 902d in Combined Resolve XI provides an excellent example of how to integrate an ECC and its unique capabilities into a maneuver brigade.

There is wide construction expertise spread across the officers, warrant officers, noncommissioned officers, and junior enlisted Soldiers of the 902d. These Soldiers are organized into two horizontal-construction platoons, one vertical-construction platoon, one field maintenance team, and one headquarters section. The primary 902d engineer equipment includes bulldozers, scrapers, and backhoe loaders in addition to various excavators, rollers, graders, and dump trucks. The company is also authorized light-equipment transports and M870 trailers, which allow for the organic hauling of its engineer equipment. The vertical-construction platoon uses various carpentry; masonry; and hydraulic, electric, pneumatic, petroleum-operated equipment (HEPPOE) to accomplish its mission. The field maintenance team is equipped with mobile repair trucks as well as recovery and refueling assets. Altogether, the 902d has more than 180 pieces of equipment capable of providing mobility, countermobility, survivability, and general engineering support to the maneuver unit.

A Soldier prepares equipment for movement.

A D7 bulldozer is used to begin construction of a tank ditch.

The primary strengths of an ECC are in defense. Each of the 902d's blade teams is capable of constructing antivehicular ditches, protective berms, M1/M2 hull and turret defilade positions, and vehicle protective positions. While its effectiveness is somewhat more limited in the offense, the 902d is capable of performing mobility tasks such as clearing operations and nonexplosive obstacle reduction using bulldozers and backhoe loaders. The company uses additional engineer equipment such as scrapers, graders, and rollers (which are not organic to BEBs) for route maintenance, combat road and trail construction, and airfield repair and construction.

The field maintenance team of the 902d provides maintenance and petroleum and oil (Class III) support. However, the 902d is not wholly self-sustaining. As designed, the 902d is dependent upon a headquarters and headquarters company, engineer battalion, or other designated engineer units for mission command; field feeding; supply; communications; chemical, biological, radiological, and nuclear (CBRN) support; and coordination for engineer augmentation. The 902d is also dependent upon a forward support company for fuel and the supplemental transportation of construction materials (Class IV) and ammunition (Class V) supplies as well as limited additional field maintenance support.

ECCs are further limited in their ability to haul all table of organization and equipment (TO&E) engineer equipment, secure themselves, and communicate with adjacent units. Even if all TO&E haul assets were fully mission-capable, the 902d ECC could not organically self-haul all assigned equipment in a single lift during peacetime operations with European movement restrictions. Light-equipment transports and M870 trailers are capable of hauling only approximately half of the TO&E at any one time. Based on mission requirements, the 902d prioritizes the engineer equipment hauled organically and contracts additional trucks to transport the remainder of the equipment. This works in peacetime; however, in combat, a maneuver brigade can get engineer assets to the fight more quickly by providing dedicated haul assets to the ECC.

The 902d is also limited in its ability to self-secure while conducting engineer operations. A lack of lasers and a limited number of night optical devices constrain the ability of the 902d ECC to fire and conduct engineer operations at night. This limits the 902d to operations in relatively secure areas where organic assets provide sufficient protection or requires the supported maneuver brigade to provide jobsite and convoy security to the ECC. Lastly, the 902d ECC is limited by its organic tactical communications systems, which restrict external communications, unless additional communications assets are obtained. Supported maneuver brigades must consider this when developing their concept of signal support in order to maintain communications with attached ECCs.

With these strengths and constraints in mind, the 902d ECC tirelessly prepared for its participation in Combined Resolve XI. The horizontal-construction platoons focused on survivability and countermobility tasks, while the vertical-construction platoon designed and prefabricated bunkers for individual and crew-served fighting positions. The field maintenance team conducted a full inventory to ensure that the company had enough parts (Class IX) on hand for the duration of the mission. Meanwhile, the company headquarters coordinated directly with the 91st BEB to ensure that the integration would go smoothly.

The effective integration of the 902d ECC with the 91st BEB began during the initial planning stages of the exercise. Once it was confirmed that the 902d ECC would be attached to the 91st BEB, the 91st immediately reached out to the 902d to bring it into the Saber Team. The 902d ECC command team briefed the 91st BEB command team to impart an appreciation for what the 902d brings to the fight. The 91st BEB also invited company leaders, including the 902d ECC command team, to participate in the military decision-making process during the Combined Resolve Leaders Training Program prior to the exercise. This was a critical step of the integration process, and it created a shared understanding of the respective roles of each unit during the exercise.

Once integrated with the 91st BEB, the 902d ECC deployed to "The Box" and provided countermobility and survivability support to the 1st ABCT during the first two phases of Combined Resolve XI. These phases encompassed the ABCT's defense during force-on-force fighting against a near-peer adversary. The 902d thrived during these phases due to its experienced, competent Soldiers, and prior integration with the 91st BEB. Upon receiving the order and obstacle overlays, company and platoon leaders immediately began preparing for execution. The 902d began emplacing antivehicular ditches, protective berms, and individual and vehicle fighting positions with the organic blade teams. The 902d not only dug fighting positions for familiar U.S. equipment, but also demonstrated flexibility and ingenuity by innovating on the fly to dig fighting positions for unfamiliar equipment fielded by the maneuver units from three different allied and partner nations supported by the 902d. For future operations with allied and partner forces, obtaining the dimensions of the foreign combat equipment prior to the mission would enable the ECC to dig fighting positions independently of the maneuver unit.

The horizontal-construction platoons and their blade teams were critical brigade assets during the defense. However, the vertical-construction platoon also soon proved its worth. Making up a unit not organic to an ABCT or a BEB, the 902d ECC's carpentry and masonry specialists quickly demonstrated the unique skill sets they provide on the battlefield. They effectively used backhoe loaders to dig individual fighting positions. To improve the survivability of the fighting positions and increase the speed of emplacement, the carpentry and masonry specialists prefabricated bunkers prior to the beginning of the exercise. These bunkers, which were designed internally by the 902d's construction warrant officer, were large enough for a three-man weapons crew, yet small enough to allow emplacement within 20 minutes of arriving on the ground. Chainsaw operators from the vertical-construction platoon also emplaced multiple abatis, denying high-speed avenues of approach to the enemy. The BEB learned of these vertical-construction skills prior to the exercise through the 902d's capabilities briefing. This enabled the BEB and the supported maneuver brigade to effectively use the 902d's assets and greatly improved the BEB's ability to develop an effective engagement area for the maneuver unit.

Delays in the occupation of battle positions by maneuver forces left the 902d ECC only 24 hours to emplace the defense and develop engagement areas within its area of operations. However, even with only a third of the expected time available, the 902d rose to the occasion and provided an effective defense. The more than 800 meters of antivehicular ditch, multiple vehicle and individual fighting positions, and multiple bunkers produced the desired obstacle and survivability effects. These efforts directly led to the enemy's decision not to conduct its attack in the 902d's area of operations.

Upon transitioning to the offense, the 902d ECC left the forward line of troops and established a tactical assembly area in the rear. While the ECC's role was somewhat diminished during the offense as compared to the defense, the 902d conducted significant mobility operations while in the offense. The blade teams reduced obstacles to allow the 1st ABCT to push forward during the attack. The graders and rollers were critical to completing a rapid runway repair mission. Repairing the runway allowed 1st ABCT unmanned aircraft system assets to continue to operate, providing valuable intelligence to the brigade. The skills and experience of personnel in the ECC allowed them to construct roads and airfields more efficiently and effectively than a BEB could have. Effectively integrating an ECC into a BEB greatly increases the ability of the BEB to provide critical maneuver support across the battlefield.

Critical to the successful integration of an ECC with a maneuver brigade is a fleet of fully-mission-capable engineer equipment, and the 902d ECC would not have accomplished its engineer tasks without the professional and competent support of the 902d field maintenance team. A field maintenance team organic to an ECC greatly increases the effectiveness of the unit. Rather than relying on battalion level assets for recovery or battlefield damage repair, the ECC can internally conduct recovery and repair operations. The mechanics are intimately familiar with each piece of equipment and its respective maintenance issues. This decreases the time required to validate faults and order replacement parts. Additionally, it reduces the response time for refuel, recovery, and repair operations. By consolidating these operations at the company level, the ECC gains additional flexibility and autonomy. When integrating into a BEB or maneuver brigade, it is essential that the ECC's field maintenance team integrate with the supported unit's forward support company. This expedites and increases the ability of the field maintenance team to provide scheduled and unscheduled maintenance support to the ECC.

The 902d ECC's success was not achieved without overcoming some substantial challenges. Two of the most significant challenges faced by the 902d throughout the exercise were security and logistical requirements. The number of weapons systems and personnel assigned to the 902d ECC are inadequate for continuously conducting countermobilty operations and maintaining security. The lack of heavy machine guns forces the company to accept considerable security risks while emplacing obstacles at multiple geographically dispersed locations or rely on external support to provide security while conducting convoy operations.

During Combined Resolve XI, the 91st BEB allocated a team of military police Soldiers with two armored security vehicles to strengthen 902d ECC security during convoys. However, this support was short-lived due to competing demands on the military police assets. Allocating additional fighting platforms (increasing the numbers of weapons systems and vehicles on which to mount them) to the ECC would enable it to fight more independently on the battlefield and integrate more effectively within the maneuver brigade. During the defense, it was necessary for the 902d to be at or near the forward line of troops while conducting engagement area development and improving the ability of the unit to self-secure was critical. While it may not be feasible to provide additional security to the ECC, the maneuver brigade must be aware of the ECC's security shortfalls and plan accordingly. Changing the modified TO&E for ECCs would be highly effective in overcoming this challenge without pulling security assets away from supported maneuver brigades.

Another critical challenge that the 902d needed to overcome was a lack of logistical support. An ECC is heavily reliant on external support from a forward support company or higher headquarters to provide the resupply of critical supply classes. ECCs are typically attached to a nonorganic unit and don't experience the same level of support that they have come to expect from parent units. To mitigate this effect, leaders within the ECC need to assert themselves and become proactive in anticipating logistical shortfalls. Additionally, insertion into the military decision-making process at the BEB level or the embedding of a liaison officer (such as a company executive officer or operations sergeant) within the BEB would enable ECC leaders to ensure that proper support and employment occur throughout the mission.

An ECC is a unique and powerful unit—arguably the most valuable asset in a maneuver brigade during defensive operations. With its vast amount of heavy equipment, skilled vertical-construction engineers, and excellent maintainers, the 902d ECC is a force with which to be reckoned. Commanders and staffs planning the integration of an ECC into a BEB must plan to provide security and limited sustainment to allow the ECC to maximize its effectiveness.

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("Training the MICO in the BEB," continued from page 9.)

to produce a brief block of instruction that mobile training teams can deliver to the BEB S-3s—or at least online training to supplement the MITS. An additional training block would improve the BEB S-3's understanding of MITS and the resources available to best facilitate it. Collectively, these actions could enhance the efficiency of training for the MICO, build unit readiness, and enhance the overall lethality of the BCT.

Endnotes:

[1]FM 3-0, *Operations*, 6 October 2017.

[2]General Mark A. Milley, 39th Chief of Staff of the Army, Initial Message to the Army, 1 September 2015, <https://www.army.mil/e2/rv5_downloads/leaders/csa/Initial_Message_39th_CSA.pdf>, accessed on 12 June 2019.

[3]*FORSCOM Command Training Guidance—Fiscal Year 2019*, memorandum, FORSCOM, 7 August 2018, p. 11, <https://atn.army.mil/getattachment/FORSCOM-Training-Guidance/FORSCOM-CTG-FY19/FY-19-FORSCOM-CTG-revised.pdf?lang=en-US>, accessed on 23 July 2019.

[4]Ibid, p. 12.

[5]Michael J. Adamski, and William J. Denn, "82d Airborne Division Military Intelligence Training Strategy Lessons Learned," *Military Intelligence Proessional Bulletin*, PB 34-19-1, January–March 2019, pp. 33–39, <https://www.ikn.army.mil/apps/MIPBW/MIPB_Issues/MIPBJan_Mar19finalforIKNupdated.pdf#page=33&view=fit>, accessed on 23 July 2019.

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Engineer Dive Detachment Supports Wet-Gap Crossings

By First Lieutenant Christopher A. Thompson

The 74th Engineer Dive Detachment, Fort Eustis, Virginia, was recently tasked with supporting wet-gap crossings of the 36th Engineer Brigade, Fort Hood, Texas, and the 420th Engineer Brigade, Bryan, Texas, during Operation Hood Strike. There were two crossing areas at the site: a 68-meter wet gap and a 450-meter wet gap. Two battalions with four multirole bridge companies (MRBCs) participated in the operation. This article discusses the possible ways an engineer dive detachment can support a crossing operation, how the 74th supported this operation, and the optimal conditions for a dive detachment involved in a wet-gap crossing.

Divers can perform river reconnaissance. Engineer divers add clarity to the gap-crossing mission by conducting a hydrographic survey and side scan sonar survey of possible river-crossing sites. A hydrographic survey paints a picture of the bottom of a river by measuring the depth at different locations; after the data is collected, commanders are notified of the depth and bottom configuration of the river. The side scan sonar survey detects all underwater obstructions, including boulders, trees, and sunken objects. Divers investigate the obstructions that could potentially pose problems for the operation.

Potential crossing sites must be identified before a unit can conduct a wet-gap crossing. Divers use a form of inflatable raft (zodiac or wing boat) to conduct surveys on potential crossing sites. During the surveys, divers gather information regarding the depths of the crossing sites, slopes of the entry and exit points, potential underwater obstructions, and potential soil composition of the banks. Once a survey is complete, the divers present the commander with a product that assists him or her in making a decision about where to cross. If the commander needs an obstruction to be removed or reduced, the divers handle it accordingly, through cutting, demolition, or lifting operations.

The next step for the divers is the execution phase. Enemy divers or swimmers may place improvised explosive devices on the bridge during bridging operations. Or the enemy may drive a boat that

Divers simulate a body recovery exercise.

is packed with explosives into the bridge. To prevent these events from happening, divers deploy defensive techniques.

A unit could potentially lose vehicles, equipment, or personnel from the bridge during crossing operations. If any assets or personnel are lost, the commander notifies the dive team and search operations are conducted. Due to the remote locations of wet-gap crossings, the assistance of local units may be needed for vehicle recovery. The divers locate the vehicle and attach a wrecker cable to it to pull it out of the compromising position. Giant lift bags are not typically available during these operations due to their immobility. If the bridge is to be used for longer than 72 hours, the dive team conducts inspections on the bridge. These inspections include checking for debris buildup and structural integrity. If a gapcrossing takes place on a bridge that is already in place, the divers conduct an inspection to determine the load-bearing capacity of the bridge. Depending on the severity of damage or wear of the bridge, divers can stabilize the underwater structure for reinforcement.

Throughout the duration of Operation Hood Strike, the 74th provided support for standby light salvage and recovery and marked a drop zone for the airlifted bridge spans. The 36th and the 420th had already completed reconnaissance and determined where they would execute their river-crossing operations. Therefore, the hydrographic survey and side scan survey were conducted to confirm what was already known: The sites chosen were sufficient for crossing. The divers used a buoy marked with Cyalume Chemlights© to mark the drop zone for the bridge spans. The 74th was there on standby in case any equipment, supplies, or personnel needed to be recovered from the river.

A diver conducts an underwater inspection.

Divers conduct training involving a simulated diving casualty.

A long-term gap crossing (lasting more than 72 hours) is the most optimal condition under which a dive team supports a wet-gap crossing. Divers can help to stabilize the bridge, conduct inspections, and remove debris buildup; these tasks are less likely to be executed if the bridge is on the water for only a short period of time. As for optimal surveying conditions, commanders must show the divers the locations of potential crossing sites. The divers then determine which specific site should be selected. In conclusion, while divers can be used for short-term bridging operations, their use for long-term crossings is optimal.

References:

Joint Publication 3-34, *Joint Engineer Operations*, 6 January 2016.

Field Manual 3-34, *Engineer Operations*, 2 April 2014.

Army Techniques Publication 3-34.84, *Multi-Service Tactics, Techniques, and Procedures for Military Dive Operations*, 2 January 2019.

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ENABLING MULTIDOMAIN OPERATIONS

THROUGH CUTTING-EDGE ARMY DIVE TEAM TECHNOLOGY

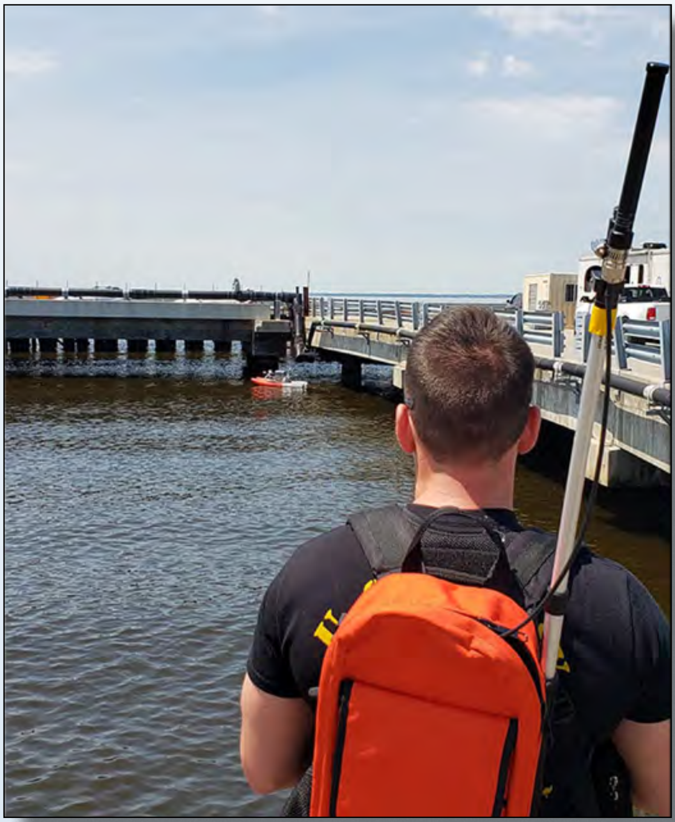
By Mr. George H. Ohanian and Mr. Matthew R. Staley

The U.S. Navy Port Improvement via Exigent Repair (PIER) Joint Capability Technology Demonstration (JCTD) conducted a third limited operational user assessment at Naval Weapons Station Earle, near Earle, New Jersey, in June 2019. Working collaboratively, the 569th Dive Team, Fort Eustis, Virginia; the U.S. Army Engineering and Research Development Center (ERDC), Vicksburg, Mississippi; the Program Executive Office for Intelligence, Information Electronic Warfare, and Sensors (PEO IEWS), Product Director Combat Terrain Information Systems (PD CTIS); the Army Geospatial Center, Alexandra, Virginia; the Coastal Hydraulics Laboratory, Vicksburg, Mississippi; and the Project Manager Terrestrial Sensors, U.S. Army Corps of Engineers (USACE), demonstrated JCTD emerging technologies in a real-world scenario. The PIER JCTD is a port rehabilitation capability developed in coordination with ERDC; the U.S. Army Transportation Command; the U.S. Indo-Pacific Command; the Office of the Secretary of Defense; and the Engineering and Expeditionary Warfare Center, Naval Facilities Engineering Command (NFEC).

Army engineer and Navy Seabee units employed the PIER technology, assessed its viability, and further matured the training construct. With PIER, modern technologies are applied to the assessment and rehabilitation of waterfront assets for use during military vessel on/offloading of equipment, supplies and personnel.

The Multifunctional Assessment Reconnaissance Vessel (MARV) is an unmanned cutting-edge commercial-technology vessel designed for surface and subsurface port inspections, obstacle detection, and precision data capture. MARV makes the ingress and egress phases of multidomain operations faster and more efficient by exploiting highly detailed hydrographic surveys in near real time. The data collected supports the determination of the selection of vessel approach vectors, required harbor and pier repairs, and the remediation of discovered obstacles. It also supports shore operations using codependent technologies resident in the PIER program.

The MARV is under development by ERDC, in partnership with NFEC and PD CTIS, which fields the instrument set, reconnaissance and surveying equipment (ENFIRE©), and the Global Positioning Systems–Survey (GPS-S). The ENFIRE software application is designed to leverage advances in technology and Army reconnaissance tools supporting a wide variety of mission profiles through easy-to-use peripherals and integrated commercial and government software including PIER, laser range finders, and full-motion video. GPS-S provides a precise position location on the water, thus allowing extreme accuracy during hydrographic and terrain assessments. ENFIRE and GPS-S are currently fielded to U.S. Army dive teams and used in conjunction with their above and below surface data



An Army diver remotely operates a MARV.

"With PIER, modern technologies are applied to the assessment and rehabilitation of waterfront assets for use during military vessel on/offloading of equipment, supplies, and personnel."

collectors, facilitating the seamless integration of data and real-time functionality of the MARV as a plug-and-play capability. Army dive teams were selected to assess this advanced capability due to their knowledge and experience in hydrography and their operationally relevant experience with ENFIRE, coupled with the underwater construction sets that are fielded by the Program Manager for Sets, Kits, Outfits, and Tools. Furthermore, Army dive teams deploy globally and perform diverse engineering missions—and the MARV is designed to be packed into Pelican™ cases for extreme portability and rapid response.

A MARV performing survey operations

The collaboration between ERDC; PD CTIS; the Program Manager Sets, Kits, Outfits, and Tools; and the Army dive team is further enabled by the Army Geospatial Center, which established and maintains the geospatial standards adopted by Army systems, thus allowing the seamless exposure of collected data across Army mission command systems to enable information sharing in support of multidomain operations. The collaboration also reflects the adoption and incorporation of the new Army paradigm to deliver commercial technologies that can be easily integrated, deliver enhanced capabilities, and support multiple missions now, instead of years down the road.

The remotely controlled MARV provides dive teams with rapid hydroreconnaissance survey capabilities, minimizing human exposure to hazardous conditions and allowing operators to fully focus on mission accomplishment. The technology onboard the MARV is highly configurable to support mission requirements and allows sensor relocation to manned vessels, decreasing the need to procure additional hardware. MARV brings forth new capabilities and leverages existing commercial, off-the-shelf (COTS) technology to enable military hydroreconnaissance. The MARV's light detection and ranging (LiDAR) sensor uses light in the form of a pulsed laser to measure variable distances and the sizes of objects that may impede maneuver. The LiDAR improves measurement accuracy and decreases time spent collecting data. The multibeam echosounders are coupled with GPS-S equipment to provide subcentimeter-accurate position locations of vessels moving on the water to enable the placement of sensors, identify hazards, and provide data to improve vessel landing. The high-definition video, in conjunction with all of the other sensors, collects and displays integrated clear and vivid underwater views of obstacles, eliminating the need to send a diver into the water. With LiDAR, video, and multibeam echosounders working simultaneously, the MARV can detect objects above and below the water surface, identifying subsurface obstacles that would have otherwise impeded or negated ingress/egress operations. As MARV evolves, modernization plans will expand on the current COTS configuration and incorporate artificial intelligence to automate the obstacle detection and avoidance integration of tethered or untethered drones and other sensing devices (such as those for sound and weather). These tools will exponentially expand the capabilities of cross-service reconnaissance, military hydroreconnaissance and shore engineering, and decision management within the multidomain operations construct.

The final operational user assessment for the PIER JCTD and MARV systems was conducted at Naval Weapons Station Earle in the late summer of 2019. Following all remaining training and testing, ERDC—in collaboration with PD CTIS, U.S. Army dive teams, and U.S. Navy Seabees—will field six MARV systems throughout the next 12 months. Collaborating across multiple organizations to adopt and deploy COTS technology delivers enhanced capabilities to support multidomain operations and creates a paradigm for continuous modernization.

As the Army moves into the future and becomes more dependent on easy-to-use COTS technology, hydrographic surveys, terrain and infrastructure reconnaissance, will increase data collection and sharing efficiency, allowing the seamless sharing of data to any approved system or device. Relevant data can be fused into multiple views for rendering and visualization to humans and or autonomous machines to support current and future multidomain operations.

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Mr. Staley provides engineering and training support and is the lead hydrographic subject matter expert at the Army Geospatial Center, System Acquisition and Support Directorate, Alexandria Virginia. He holds a bachelor's degree in geomatics from the College of Engineering, University of Florida, Gainesville. He is a licensed surveyor in Florida.

Introducing Lieutenants to the Tactical *Art*

By Captain Joseph F. O'Donnell

As engineer officers, our ability to integrate with maneuver elements and assist in the development of solutions to problems depends on our ability to effectively communicate. It also determines if we get a seat at the table or if the supported unit relegates us to the corner of the tactical operation tent.

The first place we learn to understand the common doctrinal language of the brigade combat team is at the Engineer Basic Officer Leader Course, Fort Leonard Wood, Missouri. The first time in our careers that we are expected to frame problems, evaluate, and select correct tactical mission tasks is when we arrive at the Captain's Career Course (CCC). We have to assume the roles of fictional battalion and brigade staff officers, and struggle with the broad concepts of the tactical art. We receive an abrupt awakening to how little we actually learned as lieutenants.

Company commanders should place more emphasis on training platoon leaders in the tactical art. Platoon leaders can relay orders to their platoons verbatim; however, this represents a missed opportunity for the commander to impart a better understanding of how engineers support the maneuver battalion. By better developing our lieutenants' understanding of the tactical art, we can produce platoon leaders who better understand their mission, more effectively exercise disciplined initiative, and better provide support to their habitual maneuver units.

According to Army Doctrine Publication (ADP) 3-90, *Offense and Defense*, "A tactical problem is solved on its own merits. Leaders apply the art of tactics to solve tactical problems within their commanders' intent by choosing from interrelated options, including—

- Types and forms of operations, forms of maneuver, and tactical mission tasks.
- Task organization of available forces and allocation of resources.
- Arrangement and choice of control measures.
- Tempo of the operation.
- Level of necessary risk."[1]

First, a commander should allow engineer platoon leaders a behind-the-curtain view of his or her intent and, more specifically, the desired end state. The commander's desired end state should not consist of a prefabricated set of conditions that is merely attached to every offensive or defensive operation. It should define the real conditions of mission success and serve as a guide for platoon leaders attempting to achieve it through disciplined initiative. For example, given the task of seizing a multispan bridge over a wet-gap obstacle designated as key terrain (Objective Clinton in ECCC), the commander's desired end state should specify that the bridge remain intact and be held by friendly forces. Platoon leaders should understand that a successful enemy

"Understanding the mission and resources available for the operation dictates what level of effect we can achieve."

defense of the bridge or an enemy retrograde, including demolition of the bridge, constitutes mission failure.

The second and third aspects of the tactical art are derived from the concept of the operation—specifically, the decisive point and tactical risk. The commander's decisive point should reflect "a geographic place, specific key event, critical factor, or function that, when acted upon, allows a commander to gain a marked advantage over an enemy or contributes materially to achieving success."[2] Tactical risk should represent a deliberate exposure to a probable and potentially severe loss in order to expose enemy weakness and create opportunities to seize, retain, and exploit the initiative. If platoon leaders understand the tactical risk that the commander is underwriting, then they can better prepare themselves and their platoons for a breakdown in the plan. Senior platoon leaders should be able to anticipate and plan for losses of communication; enemy electronic warfare; enemy close air support; chemical, biological, radiological, nuclear, and explosives attack; and a host of other contingencies. Thorough preparation allows them to better exercise disciplined initiative and carry the fight to and beyond the decisive point—especially if the commander cannot effectively command and control them.

With a firm understanding of the commander's intent and concept of the operation, the final aspect of the tactical art for platoon leaders is the selection of the tactical task for the mission statement.

The first consideration in selecting a tactical mission task is to frame the tactical problem as enemy-focused or terrain-focused. Ensuring that platoon leaders understand the fundamental reason that they are seizing an objective is preferred to destroying the enemy that is occupying it. For those who have moved beyond ECCC, this might be obvious. However, to platoon leaders who are fresh from the Engineer Basic Officer Leadership Course (EBOLC), the connection might not be so apparent; they may misunderstand why a commander selected the tactical mission task. There are always several ECCC students who opt to destroy the enemy platoon on Objective Clinton due to route memorization of that tactical task from past exercises. They do not realize that destroying the enemy unit does not necessarily seize the objective.

To best serve and translate capabilities into the desired effect for maneuver elements, we must understand the difference in effect and resources required for tactical mission tasks. Understanding the mission and resources available for the operation dictates what level of effect we can achieve. If our supported maneuver unit has a mission task to defeat an enemy, we should understand that it is trying to prevent the enemy from accomplishing its mission. Often, the best way for us to support the mission is to install a resource-intensive block obstacle group in the engagement area. If the task force mission is to destroy, we should support maneuver by fixing the enemy in the engagement area, allowing our maneuver force to inflict grave casualties on the enemy force. Similarly, we must understand the different postures and resources that are required to control, secure, or seize terrain, as well as when to mark and bypass a route as opposed to clearing it. When we understand where our forces and resources fall on the spectrum, what our maneuver brethren require of us, and the considerations that must be taken into account with regard to sustaining fires and battlefield mobility, we can make informed recommendations regarding mobility, countermobility, and survivability capabilities and limitations.

The final consideration in selecting a tactical mission task is nesting the tasks vertically and horizontally. As engineers, our platoons and companies enable, not fulfill, our supported maneuver force's decisive operation. Understanding that we need to identify our supported battalion's decisive operation and align our mission and key tasks to enable the success of the battalion is of utmost importance to engineers. If we vertically nest our first platoon leader in our mission, which horizontally nests to the assault force in the combined arms breach, then we should ensure that the platoon leader understands how to directly enable the battalion decisive operation, which further supports the brigade decisive operation.

Company commanders can improve platoon leader understanding of tactical art through company and battalion leader professional development sessions. By presenting platoon leaders with a tactical problem, such as a battalion defense, and providing them with the commander's desired end state, the lieutenants should be able to deduce the decisive point, determine the ways in which the commander will accept tactical risk, and select an appropriate tactical task for the mission. The mentor may ask why the platoon leader designated the decisive point, accepted the risks, and chose the tactical tasks. The mentor should also help the platoon leader consider horizontal and vertical nesting and terrain-versus enemy-focused tactical tasks.

Endnotes:

[1]ADP 3-90, *Offense and Defense*, 31 July 2019.

[2]Joint Publication 5-0, *Joint Planning*, 17 June 2017.

Captain O'Donnell is the Team A small-group leader for Cell 2, ECCC, Maneuver Support Center of Excellence, Fort Leonard Wood, Missouri. He holds a bachelor of science degree in mechanical engineering from the University of Pittsburgh, Pennsylvania, and a master's degree in engineering management from the Missouri University of Science and Technology at Rolla.

Training Management: Linking Platoon Training Plans to Objective-T Success

By Second Lieutenant Garrett R. Wilke

In the fall of 2016, the U.S. Army began testing a new system to evaluate unit readiness to deploy. Although personnel and equipment readiness evaluations have followed rather strict guidelines, the training component has been a more subjective-based report than calculated commander assessment. To improve this component, the new Objective-T system was implemented.[1] Each element, or objective task, is evaluated in an evaluation criteria matrix to determine "task proficiency more accurately and more objectively."[2] The matrix rates each unit mission-essential task (MET) on a scale of untrained (U) to fully trained (T). For each MET, there are several factors that must be considered and requirements that must be satisfied in order for a unit to achieve a T. These include a complete list of the company METs, the type of training and operational environments that exist, and the percentage of leaders and unit members present during training.

The first and most important aspect of training to achieve a status of T in METs is to identify all METs and assign personnel responsible for ensuring that each MET is trained. The list and the assignments are first established and

902d ECC Soldiers construct a wet-gap crossing during Saber Strike 2018.

"There are several options for determining the best-suited training and operational environment for METs. The training environment is 'live, virtual, or constructive,' while the operational environment consists of several different levels of threats and complexity."

communicated during weekly training meetings, which serve as a means to "validate the tasks (collective and individual) to train for upcoming events, focusing on the METs."[3] This allows the company commander to prioritize tasks that are U or need additional practice (P) by planning, coordinating, and/or assigning relevant training. In turn, "Subordinate leaders . . . ensure tasks trained at platoon level . . . support the tasks the company must train."[4] Due to the often large number of METs that must be fully trained in a company, it is imperative that subordinate leaders "synchronize unit METs with training events."[5] The best way to accomplish this is to conduct training on numerous tasks at once. By including several METs in a single training event, multiple collective tasks may be worked simultaneously. Synchronization is accomplished primarily through the selection of the appropriate training and operational environment for the METs that are being trained.

There are several options for determining the best-suited training and operational environment for METs. The training environment is "live, virtual, or constructive," while the operational environment consists of several different levels of threats and complexity.[6] Based on the nature of the 902d Engineer Construction Company (ECC), 15th Engineer Battalion, 18th Military Police Brigade, Tompkins Barracks, Germany, the best-suited training environment is live training. In order to train toward many, if not most, of the METs for the 902d ECC, the company participated in Resolute Castle 2018 and Saber Strike 2018 exercises. Combined, these exercises created a live training environment and provided a hybrid threat in a complex operational environment.

The first exercise, Resolute Castle 2018, provided the 902d ECC with the opportunity to train primarily toward providing general engineer support for mobility operations and performing construction operations. Many of the company METs involve large-scale projects that require a great deal of time, resources, and personnel to accomplish. Building such projects in a training environment often requires dismantling or destruction upon completion. However, Resolute Castle 2018 offered the epitome of a live training environment, as the majority of the projects built were intended for permanent use. Several structures were left behind and will continue to be used for real-world purposes. This meant that the training environment was as live as possible, which provided motivation for all trained tasks to be completed correctly and to standard. This also saved time since Service members were not required to dismantle the projects. In addition, due to the scale and number of projects constructed during Resolute Castle 2018, most collective tasks from the METs that were trained satisfied the requirements to obtain a T status. The presence of foreign allies during Resolute Castle 2018 added another aspect of training by providing difficulties in terms of communication. In order for the 902d ECC to construct a road or similar structure it needed to follow the collective tasks established in the company mission-essential task list (METL) as well as meet the needs of the forces to be using the structures. Each road must be able to support the type and volume of traffic for which it is intended, while other structures must be durable enough to withstand the load requirements for planned usage. Therefore, tasks were not simply trained during Resolute Castle 2018—they were also adapted to meet the intent of their benefactors.

In contrast, Saber Strike 2018 trained toward the 902d ECC MET of providing general engineer support for survivability operations. The exercise represented a more combat-focused approach, as it established a complex operational environment with a hybrid threat. The operational environment was complex due to the fact that it had a "minimum of four . . . or more operational variables."[7] The same operational variables were established for all units participating in the exercise; they included the military, social, information, and physical environments. The exercise provided a hybrid threat due to the fact that it had a "diverse and dynamic combination of conventional forces . . . irregular forces."[8] In addition, each component of Saber Strike "builds a near-peer competitor into the training scenario."[9] Platoons of the 902d ECC faced near-peer adversaries in the 2d Cavalry Regiment and opposing forces in Lithuanian forces. The setting provided a challenging and realistic scenario. Due to facing such a competent foe, the 902d ECC was forced to practice a combination of most collective tasks in the METL in order to accomplish the mission of defending the airfield in the Rukla Training Area, Lithuania. As a result, the task of providing general engineer support for survivability operations is currently the most trained company MET in terms of the status for each collective task. Platoons were required to construct defensive obstacles, protective structures, and fighting positions in order to prepare the defense for themselves and allied forces. Similar to Resolute Castle, tasks were not simply trained, as they also needed to be adapted to meet the needs of the forces. In addition to assisting partnering forces, platoons were also placed under strict time restraints, adding further difficulties to their missions and collective tasks. The timeline for the preparation of the defense, as well as the attack, was shared among all forces and, therefore, provided real-world constraints, testing the units' ability to perform correctly even when under pressure.

Deployment from the Grafenwoehr, Germany, training area to Poland for Resolute Castle 2018 provided an additional opportunity for the 902d ECC to train for the final MET of conducting expeditionary deployment operations. By simulating deployment in circumstances that were as close to real as possible, the company was able to train on tasks that are normally required for a unit prior to and during the initial phase of a deployment. This included performing predeployment supply, maintenance, and training activities and directing the mobilization of the unit. In order for these tasks to be accomplished, it was important for as many Soldiers and leaders to be present as possible. This not only simulates a real-world deployment scenario for each platoon but is also a requirement for achieving a T status in METs. More than 85 percent of leaders and 80 percent of Soldiers are required to be present in order to receive a T in any MET.[10] It was imperative that all available personnel were deployed to Resolute Castle and Saber Strike to ensure that this minimum standard was maintained. In contrast to a garrison environment, the field environment allowed the platoons to easily maintain the minimum required percentage of leadership and Soldiers present. Due to the priority of Service members' presence, platoon leadership fluctuated little throughout the exercise. Despite the opportunity to perform most METs, a T status was still not achieved for all tasks. In order to improve performance of some METs but also maintain the T status of others, it is important that training opportunities be identified in training meetings.

As outlined in Field Manual (FM) 7-0, *Train to Win in a Complex World*, training meetings are held before and after training events in order to "assess performance [and] modify the plan if needed."[11] This provides the company commander and platoon leaders with an overview of the tasks that have yet to be trained, those that need to be retrained, and those for which Soldiers are fully trained. In turn, plans that incorporate the tasks that still need to be trained can be made for the next company level event. Using the 902d ECC experience as an example, METs specifically supporting individual tasks were evaluated directly following Saber Strike 2018 in order to establish a focus for the tasks that platoons still needed to train, as well as relevant tasks for the upcoming Hohenfels, Germany, rotation. In response, training that directly supported specific tasks or prepared platoons for deployment to Hohenfels were incorporated into the training calendar via training meetings. This created a shared understanding of what platoon leaders needed to plan to strengthen the status of their objective tasks. For example, due to the large number of new Soldiers who arrived during Resolute Castle 2018 and Saber Strike 2018, several supporting individual task requirements no longer had a status of T. Although not Department of the Army requirements, these supporting individual tasks are high-payoff tasks necessary for the conduct of additional training. Also due to the large number of new Soldiers, driver's training was planned and executed at the company level and a battalion level M4 range was conducted to improve the status of each supporting individual task. Following completion of the training, the T status of each task was reassessed and updated for dissemination at following training meetings, thus restarting the cycle for achieving and maintaining MET proficiency by using training meetings and events.

There are several prerequisites for training to achieve T status in each MET at the platoon level prior to implementation. Foremost, all METs must be identified and prioritized by the company commander and disseminated and communicated at company training meetings. Then, platoon leaders must ensure that the METs are trained. This involves ensuring that the appropriate operational and training environments are established and that the required percentages of leaders and Soldiers are present. Following training, tasks are reevaluated during training meetings, continuing the cycle toward achieving MET proficiency. For the 902d ECC, Resolute Castle 2018 and Saber Strike 2018 provided opportunities for all platoons in the company to train, perform, and assess nearly all of their relevant METs. The exercises provided the setting necessary to meet the criteria established for objective tasks and additional pressures and training benefits. Taking full advantage of training meetings and the training exercises, all platoons in the 902d ECC ensured that nearly all METs were trained to a T status.

Endnotes:

[1]Michelle Tan, *Objective T: The Army's New Mission to Track Training*, 11 October 2016, <https://www.armytimes.com/news/your-army/2016/10/11/objective-t-the-army-s-new-mission-to-track-training/>, accessed on 6 August 2019.

[2]FM 7-0, *Train to Win in a Complex World*, 5 October 2016, para. B-17.

[3]Ibid, para. C-1.

[4]Ibid, para. C-3.

[5]Ibid, para. C-4.

[6]Ibid, para. E-49.

[7]Ibid, para. B-19.

[8]Ibid, para. B-19.

[9]Ibid, para. B-19.

[10]Ibid, para. B-5.

[11]Ibid, para. C-2.

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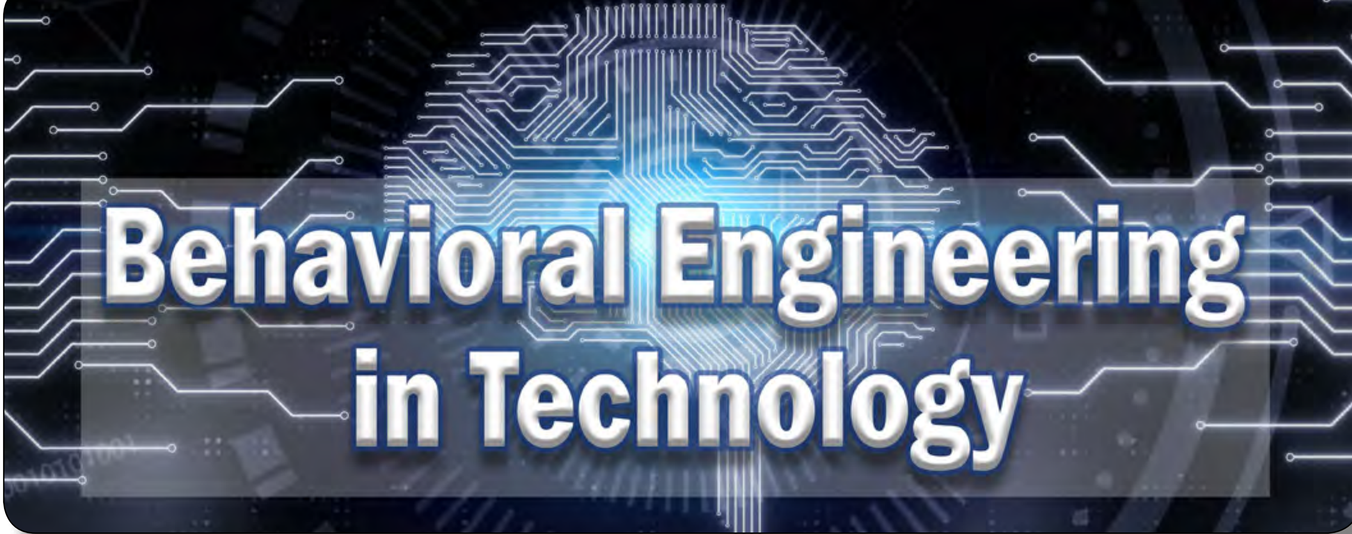


Behavioral Engineering in Technology

By Second Lieutenant Michael K. Forlife

The rapid growth of technology has provided the Army with more capabilities than ever before. Technological advancements enable force multiplication and improved logistics at all levels, from units as a whole down to the individual Soldier. Some improvements simply provide an upgrade to existing equipment, while others provide completely new capabilities. As we utilize new technology, it is crucial that we be aware of behavioral consequences to Soldiers and that we adapt training as necessary to ensure that we maintain adept and reactive Soldiers.

The goal for the implementation and use of any technology in the Army should be to empower Soldiers while also maintaining their skill sets. Part of this goal is embedded in product design, but another part is embedded in product use—and the specific method of use that the Army decides to train. Behavioral engineering addresses the interface between technology and human operators. Responsible manufacturers in the private sector engage in their own behavioral engineering analysis regarding the design and use of a product; but when introduced into an established system with existing doctrine and protocols (such as the military), the receiving organization should also conduct an internal analysis to guide integration with respect to individuals.

Soldiers begin their career training on individual warrior tasks and battle drills. Next, they move on to team/squad movements, job/equipment training, and unit standard operating procedures. There is a large gray area between basic Soldier skills and the skills needed for the future use of technical equipment. Situational awareness and operational security must be considered when determining when, why, and how to use a given capability. While a weapon upgraded with more power is not likely to have any significant behavioral influence on Soldiers who have been trained to use it, the risk for reliance, overuse, or complacency becomes apparent when a completely new type of capability is introduced. Awareness of the resulting behavior is required in order to take the initiative in counteracting it.

Moving into the future, we can expect examples of such issues to arise in numerous areas, including the automation of artificial intelligence (AI), command methods of drones, and overtrust in cybersecurity. In the robotic age, it is easy to turn to robots, AI, and other forms of automation when the respective technologies yield better results in less time and with less effort than their human counterparts. However, when the combat processes become fully automated, humans become followers and technology takes the position of a leader. Many situations warrant a human decision-making process that includes Soldier-led tactical foresight and trained intuition. It is when human traits and skills are empowered and enhanced that the individual becomes a super-Soldier and force-multiplied leader.

"Moving into the future, we can expect examples of such issues to arise in numerous areas, including the automation of artificial intelligence (AI), command methods of drones, and overtrust in cybersecurity."

Teaching a specific task is the foundation of training, but it is much more than that; it makes up part of the greater psychological infrastructure of the Soldier as a whole. The need for cognizance of behavioral consequences applies to all branches and disciplines of the Army. The prevention of the desensitization of Soldiers as sensors, thinkers, and warriors is an ongoing effort that all leaders should consider when introducing new capabilities to their units. As all branches of the Army continue to gain new technological advancements, it will become increasingly important to guide the method of use for that technology for the greatest benefit and for the development of the ideal Soldier.

Second Lieutenant Forlife is a student in the Engineer Basic Officer Leadership Course, U.S. Army Engineer School, Fort Leonard Wood, Missouri. He holds a bachelor's degree in anthropology (with minors in psychology and philosophy) from Queens College, New York, and a master's degree in environmental engineering and science from Johns Hopkins University, Baltimore, Maryland.

Engineer Doctrine Update

U.S. Army Maneuver Support Center of Excellence
G-3/Directorate of Training and Doctrine (DOTD)

Publications Currently Under Revision

Publication Number	Title	Description	Tentative Publication Date
ATP 3-34.22	*Engineer Operations–Brigade Combat Team and Below*	This update, while incorporating the Field Manual (FM) 3-0 focus on large-scale ground combat operations, will include task force engineer tasks, enabler integration, and updates to brigade engineer battalion and echelon above brigade unit capabilities.	3d quarter, fiscal year (FY) 2020
ATP 3-90.8/ MCWP 3-17.5	*Combined Arms Countermobility Operations*	This multi-Service publication will be updated with and will and follow current U.S. mine policy that restricts row mining.	4th quarter, FY 20

How can you provide feedback on doctrinal publications review?

As Soldiers and civilians, you have the opportunity to provide feedback on our doctrinal publications as well as those staffed across the Army. For existing publications, please e-mail us directly with your feedback. For doctrinal publications that are under assessment or revision, the staffing process includes a 45-day period for comments, which are accepted regardless of rank or position. However, there are requirements associated with the *level* of comment. Below are the descriptions associated with *critical*, *major*, *substantive*, and *administrative* comments. Additional notes annotating the rank equivalent associated with the level of comment, are included.

C—**Critical.** Contentious issue that will cause nonconcurrence with the publication; requires general officer level backing.

M—**Major.** Incorrect material that may cause nonconcurrence with the publication; requires colonel level or above backing.

S—**Substantive.** Factually incorrect material.

A—**Administrative.** Grammar, punctuation, and style issues.

Regardless of the level of comment, we welcome feedback to ensure that the information that we are capturing for the Regiment is current, relevant, and useful for the force.

"Doctrine is indispensable to an army. Doctrine provides a military organization with a common philosophy, a common language, a common purpose, and a unity of effort."

—General George H. Decker,
U.S. Army Chief of Staff, 1960–1962

Engineer Doctrine Update

U.S. Army Maneuver Support Center of Excellence

G-3/Directorate of Training and Doctrine (DOTD)

New Engineer Publication Highlights

Army Techniques Publication (ATP) 3-34.84, *Multi-Service Tactics, Techniques, and Procedures for Military Diving Operations,* was published to the Army Publishing Directorate Web site, <https://army pubs.army.mil>, on 2 January 2019. It serves as a reference to ensure effective planning and integration for diving operations. It updates U.S. Army, Marine Corps, Navy, Air Force, Coast Guard, and special operations forces capabilities and operations organization charts. It includes underwater construction and maritime disablement operations as dive mission areas, and it lists capabilities for contaminated water while maintaining and planning dive mission areas.

Older Department of the Army forms for engineer reconnaissance were converted to Department of Defense (DD) forms. The following list of relevant DD forms is outlined in ATP 3-34.81, *Engineer Reconnaissance*:

- DD3008, *Explosive Hazards Clearance Report.*
- DD3009, *Route Classification.*
- DD3010, *Road Reconnaissance Report.*
- DD3011, *Bridge Reconnaissance Report.*
- DD3012, *Tunnel Reconnaissance Report.*
- DD3013, *Ford Reconnaissance Report.*
- DD3014, *Ferry Reconnaissance Report.*
- DD3015, *Engineer Reconnaissance Report.*

Doctrine writer's note: Army doctrine publications and army doctrine references publications are being combined into one version and will be designated as Army Doctrine Publications.

Relevant Center for Army Lessons Learned (CALL) engineer resources are available on the CALL Web site at <https://usacac.army.mil/organizations/mccoe/call/publications>.

If you have any questions or recommendations concerning engineer doctrine please contact:

Lieutenant Colonel Carl D. Dick, Telephone: (573) 563-2717; Mr. Douglas K. Merrill, Telephone: (573) 563-0003; Engineer Doctrine Team, e-mail: <usarmy.leonardwood.mscoe.mbx.engdoc@mail.mil>.

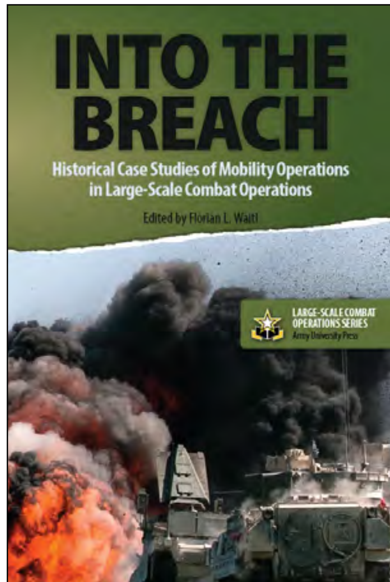
Large-Scale Combat Operations of the Past
and Implications for the Future

By Mr. Florian L. Waitl

The operational environment faced by the U.S. Army has significantly changed in recent years. Emerging regional threats from Russia, China, North Korea, and Iran resulted in a need to shift U.S. Army doctrine to address possible future large-scale combat operations (LSCO) against peer or near-peer competitors. We have been bogged down in counterinsurgency and stability operations in Iraq and Afghanistan for the last 18 years, and our potential adversaries have studied our existing doctrine and capabilities with the intent to develop means to counter our once-guaranteed domain overmatch.[1] For the first time since the end of the Cold War, the U.S. military and coalition forces face adversaries that have the ability to compete and, in some instances, even outmaneuver and overmatch our forces.

Field Manual (FM) 3-0, *Operations*, provides a doctrinal approach for U.S. Army theater armies, corps, divisions, and brigades to address the challenges associated with large-

scale ground combat; FM 3-0 states, “Historically, battlefields in [LSCO] have been more chaotic, intense, and highly destructive than those the Army has experienced in the past several decades.”[2] Large-scale exercises like those conducted in Europe in the 1980s have not been conducted for decades. The skills to participate, lead, or fight in such LSCO as those described in FM 3-0 have atrophied; and as a consequence, the Army needs to rebuild itself. Institutional and cultural changes are needed to successfully fight the multidomain operations of tomorrow.



What does a historian have to do with the Army’s need to rebuild itself and the need to effect an institutional and cultural change in the Engineer Regiment? Well, history, of course! We can gain valuable insight through the study of history. This is the reason that Lieutenant General Michael D. Lundy, commander of the U.S. Army Combined Arms Center, Fort Leavenworth, Kansas, specifically instructed the Army University Press to produce a *Large-Scale Combat Operations* book set.[3] The purposes of this initiative are to introduce Army commanders and their staffs to some of the challenges they might encounter in LSCO, teach situational critical thinking, and open a discussion about warfighting issues of mutual interest to the Army and joint community.

“The purposes of this initiative are to introduce Army commanders and their staffs to some of the challenges they might encounter in LSCO, teach situational critical thinking, and open a discussion about warfighting issues of mutual interest to the Army and joint community.”

Without mobility, maneuver forces go nowhere; therefore, the LSCO book set would not be complete without a volume that specifically addresses mobility operations. As the command historian for the U.S. Army Engineer School (USAES), I immediately volunteered to lead this endeavor and bring this project home to the Maneuver Support Center of Excellence at Fort Leonard Wood, Missouri. Volume 6 of the LSCO book set, “Into the Breach: Historical Case Studies of Mobility Operations in Large-Scale Combat Operations,” examines 10 historical case studies of mobility and countermobility operations from World War I through Operation Desert Storm.[4] The case studies take an in-depth look at mobility and countermobility successes and failures in LSCO against peer or near-peer threats. The chapters highlight several insights, themes, and patterns of which current commanders and doctrine developers must be aware when discussing or conducting mobility operations. The final chapter addresses mobility and countermobility developments that the U.S. Army will face against peer and near-peer adversaries in multidomain operations of the future. This volume is by no means a comprehensive treatment of the subject; however, professionals and instructors alike will hopefully gain a better understanding of the historical context and appreciate the importance of history when looking toward the future. We love to discuss lessons learned; yet, we tend to make the same mistakes over and over again. Although we can gain many insights from the battlefields of the past, we should not forget that lessons are only truly learned if problematic behaviors change! As an Army historian, my purpose is not to teach history for history’s sake but to improve the warfighters of today so that they can overcome the challenges of tomorrow.

I hope that you will read and enjoy “Into the Breach” as well as the other volumes of the LSCO book set, several of which will be published in the coming months. Even though not engineer-specific, these volumes will inform the reader of important aspects of the LSCO fight. History matters! The personal study of history is an essential component for every Army professional, and I hope that the case studies will ignite or renew your commitment to our profession of arms.

“Into the Breach: Historical Case Studies of Mobility Operations in Large-Scale Combat Operations” is available for download at <https://www.armyupress.army.mil/Portals/7/combat-studies-institute/csi-books/into-the-breach-lsco-volume-6.pdf>. The entire LSCO book set is available at <www.armyupress.army.mil/Books/Large-Scale-Combat-Operations-Book-Set/>.

Endnotes:

[1]*Multi-Domain Battle: Evolution of Combined Arms for the 21st Century—2025–2040*, Department of the Army, October 2017.

[2]FM 3-0, *Operations*, 6 October 2017, pp.1–2.

[3]*Large-Scale Combat Operations*, Combined Arms Center, Army University Press, 2018.

[4]Florian L. Waitl, “Into the Breach: Historical Case Studies of Mobility Operations in Large-Scale Combat Operations,” Vol. 6, *Large-Scale Combat Operations*.

Mr. Waitl is the USAES command historian. He holds a master’s degree in military history from Norwich University, Northfield, Vermont.

Russian Deliberate River Crossings: Choreographing a Water Ballet

By Dr. Lester W. Grau

The Russian army is primarily a regional force, intended for employment in Eurasia; consequently, its equipment is designed specifically for that environment, which includes large expanses of woodlands and tundra intersected by broad rivers and massive swamps. Large rivers, canals, and lakes dominate Eurasia and have long served as major arteries of commerce and industry, defensive barriers, lines of communication, and avenues of advance.[1] In central and eastern Europe, an advancing or withdrawing force can expect to encounter a 6-meter-wide water obstacle every 20 kilometers, up to a 100-meter-wide water obstacle every 35–60 kilometers, a 100- to 300-meter-wide water obstacle every 100–150 kilometers, and a water obstacle more than 300 meters wide every 250–300 kilometers.[2] Consequently, most vehicles used by Russian ground forces have some amphibious capability and can, at least, ford reasonable water obstacles. Troop carriers and infantry fighting vehicles are amphibious and can be propelled across the water using tracks or wheels for forward momentum. Russian tanks can be driven across water obstacles of less than 5 meters deep and 1 kilometer wide using a snorkel to provide oxygen to the crew and engine. Weather and seasons also affect water crossing. Russia is a northern country, and severe winter weather is a normal condition for training and combat. Therefore, Russians regularly train to deal with crossings during spring and autumn flooding (with floating ice), under conditions of low water levels and high banks in summertime, and during winter freezes.

Bodies of water usually hinder and impair an attacking force but supplement the efforts of a defending force. The attacking force must suppress a ground defense force covering the crossing site and/or enemy aviation.[3] The number and types of crossing sites depend on the nature of the water obstacle, the composition of the crossing forces, the available crossing means, and the intentions and laydown of the enemy force. The purpose of a crossing attack is to seize a lodgment on the far bank and penetrate enemy defenses. If tanks are unable to ford, they cross by submerged snorkeling or via ferries or pontoon bridges. Second-echelon forces, artillery, support vehicles, and follow-on forces cross on ferries and on pontoon bridges.

Russians prefer to cross water obstacles from the march to avoid any major halts and massing of forces within enemy artillery range. Crossings are attempted at multiple points along a broad front in order to overwhelm enemy defenses and maintain tempo. The crossings are preferably conducted at night; however, this is difficult (and, in the case of tank snorkeling, forbidden). Particulate smoke and electronic masking are used extensively to cover assault crossings, particularly those conducted during daylight hours.

Russians train for two types of water crossings—unopposed and opposed. An unopposed (hasty) crossing is conducted against a lightly held enemy defense, and an opposed (deliberate) crossing is conducted against a prepared enemy defense.

A hasty water crossing involves the rapid crossing of forward combat forces with an accompanying air assault or an attack from the march to seize and secure a far shore bridgehead. The lead battalion pushes its main body across using amphibious vehicles with snorkels and quickly bridging or ferrying the remainder of the force to resume the offensive. Fording vehicles are more likely to be used in a hasty crossing than in a deliberate crossing because they allow the force to continue across the river without pausing to acquire other crossing means. The hasty crossing is discussed in the May–August 2018 issue of *Engineer*.[4] When the enemy is defending the river with well-prepared defenses, much more force is required to overcome the defenses and a deliberate crossing is necessary.

A deliberate water crossing is conducted when an enemy has established sufficient defense to offer significant resistance to the crossing of a water obstacle. The deliberate crossing is considered the most important and complex part of an offensive action.[5] It is generally conducted at a site where the enemy defense is weaker than general but

"A deliberate water crossing is conducted when an enemy has established sufficient defense to offer significant resistance to the crossing of a water obstacle."

still supports the overall scheme of maneuver. A deliberate crossing is normally conducted as an attack from the march. Should the initial attack fail or situations dictate, the main force may need to close on the water bank to prepare for the crossing.[6] Should a Russian attack be stopped at the edge of the water, the deliberate crossing may be conducted by those stalled forces that are in contact or, preferably, by a follow-on force attacking from the march through the stalled Russian force (since tempo is easier to maintain than to initiate). Artillery support is essential for a deliberate crossing. Where possible, artillery is moved forward, where direct fire and low-trajectory fire can be provided.[7]

The engineer battalion that is organic to the Russian maneuver brigade has four heavy mechanized bridgelayer (TMM-3) or truck-mounted scissor-bridge (TMM-6) sets for bridging up to 40 meters and a PP-61 pontoon bridge capable of carrying 60 tons on a 268-meter bridge, 90 tons on a 165-meter bridge, or 120 tons on a 141-meter bridge. It takes less than an hour to emplace a PP-61 pontoon bridge. Six BMK-255-1 cutter vessels are used to help assemble and maintain the bridge position. The vessels can also serve as tugboats, should pontoon sections be used as ferries. The battalion also has seven PTS-2 tracked amphibious transports. Additional bridging assets are available at army level.[8] The PMM-2M tracked amphibious bridging ferry has also been introduced into some engineer battalions. It can carry 42.5 tons and can be linked with other vehicles to form a bridge. A 210-meter-long PMM-2M bridge was constructed under fire across the Euphrates River in Syria in 2017. The bridge remained in position until February 2018, when it was dismantled by spring flooding.[9]

The steps in conducting a deliberate river crossing are—

Step 1. Destroy the defending enemy, which is facing the water obstacle.

Step 2. Approach the water obstacle, and seize the crossing or far bridgehead by air assault and/or vehicle fording attack.

Step 3. Cross the main body using table of organization and equipment (TO&E) systems, and develop the offensive on the far shore.

Step 4. In the event that the offensive begins on the near shore, cross under cover of artillery and aviation support to break through the enemy defenses and develop the offensive into the depth and flanks of the enemy.[10]

Coordinating a deliberate crossing requires—

- Choreography of artillery preparation and supporting fire.
- Aviation strikes.
- Air assaults (to seize the far bank).
- An attack, from the march, that puts the first-echelon infantry fighting vehicles and/or personnel carriers on line shortly before reaching the near bank so that they can cross simultaneously.
- A separate tank crossing conducted by snorkeling or crossing on a pontoon bridge or on ferries.
- A camouflage and deception effort.
- A bridging effort.
- The development and continuation of the advance on the far shore.

The bridging effort requires—

- Engineer reconnaissance support.
- Crossing sites.
- Route selection.
- Construction.
- Traffic control.
- Vehicle and casualty evacuation.
- Mine clearing.
- Camouflage.
- The continuation of the attack (and the next water obstacle).

The goal of river crossing is to maintain the tempo of the attack—not to stall on the near or far bank.[11]

Air defense assets are positioned forward to provide cover for hasty and deliberate crossings to prevent aerial interdiction of vehicles on or in the river, where they are most vulnerable. The initial attack is conducted by air assault and/or motorized rifle forces crossing the water with wheeled infantry personnel carriers (similar to the Stryker) or tracked infantry fighting vehicles (similar to the Bradley) firing onboard weapons as they cross. Air support during the crossing of a water obstacle often varies from the standard Russian airborne and air assault pattern. Russian airborne and air assault forces are 100 percent mechanized, and infantry carriers, artillery, and support vehicles accompany the assault. The airborne or air assault force usually drops some distance from the objective, assembles, mounts its vehicles, and conducts a march and mounted attack against the objective. This may not be possible in a company or battalion size parachute drop or air assault, and many vehicles may need to join the force later. Consequently, the main force should cross and link up with the company or battalion size air assault force within 2 hours of insertion.

The main ground force advance is usually led by a battalion size advance guard, with a mission of rapidly crossing the obstacle and developing the beachhead for the main body. The force often resorts to reconnaissance by battle in order to determine the parameters and strength of the enemy defense.[12] The advance guard may be stopped at the edge of the water or may succeed in crossing. Depending on the success of the advance guard, the first echelon of the main force may swim across the obstacle in attack formation or in platoon columns. Figure 1 shows an example of engineer support on an assault crossing. In this example, there is no airmobile insertion; rather, artillery forces are conducting heavy fire against the enemy on the opposing shore. The brigade launches an attack from the march using its advance guard battalion. Two motorized rifle companies, led by two tank platoons, conduct the attack. The tank platoons take up firing positions and engage enemy targets. The brigade's MT-12 "Rapira" 100-millimeter antitank battery takes up firing positions to the north and south of the crossing sites and engages enemy targets. The advance guard battalion commander sets up a command post in a central location for observation and control. Brigade traffic controllers are in position to direct crossing traffic where it needs to go—and when. The mounted companies arrive in attack formation and cross the river while firing their on-board weapons. Emerging on the far bank, the companies engage enemy shoreline positions and, at the southern crossing site, breach a minefield using the standard vehicle mine plow or the UR-83 Mine-Clearing Line Charge System.[13]

The remaining motorized rifle battalions are capable of fording; however, tanks, artillery, supply and support vehicles and many of the air defense assets need to cross by bridging or ferrying. Tanks, howitzers, and ammunition are high priorities for expanding the bridgehead and destroying the enemy. If the water depth and bottom composition permit, tanks can ford the water obstacle; however, they do not normally do so if close combat is ongoing on the far shore. Tanks are often ferried on pontoon sections. It normally takes a half hour to ferry a tank battalion across a medium-size river. The PTS-2, which can carry up to 10 tons, is used to transport trucks and smaller vehicles, while PMM-2M bridging ferries can carry 42.5 tons each and are used to transport tanks and heavy artillery. A well-trained engineer company can span a 268-meter river in less than an hour. The brigade commander decides whether to cross by bridge or ferry or both. The commander's decision is based on maintaining the tempo of the advance of the brigade and the counterattack capability of the enemy. Crossing a wide river under broad daylight is risky, and it is best not to ferry across until a large bridgehead has been established. Bridges are vulnerable and demand intensive air defense artillery coverage and effective counterbattery fire. Ferry crossings are less vulnerable than bridge crossings, but take longer. During conflict, temporary bridge sites need to be frequently shifted. Ferry crossing sites can be shifted rapidly. Russians usually cover their bridging sites with particulate smoke.[14]

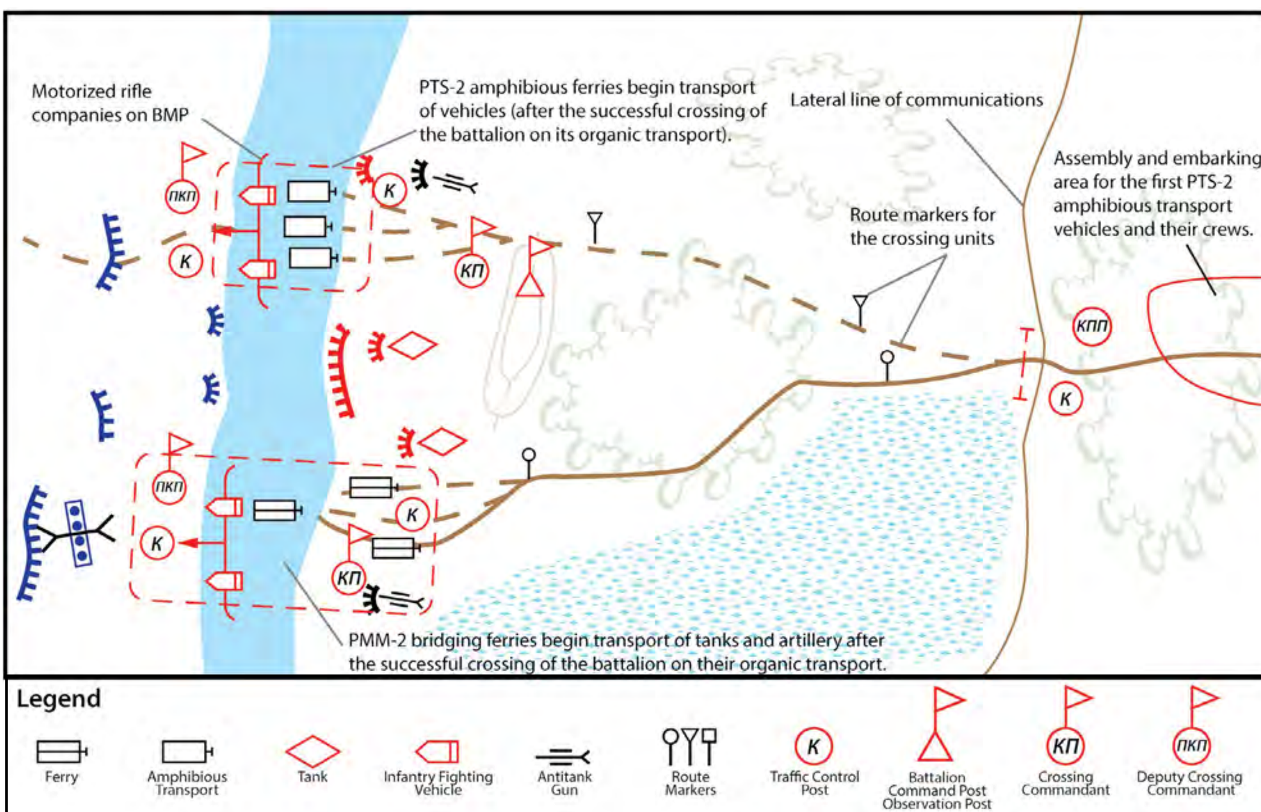


Figure 1. Engineer support of an assault crossing

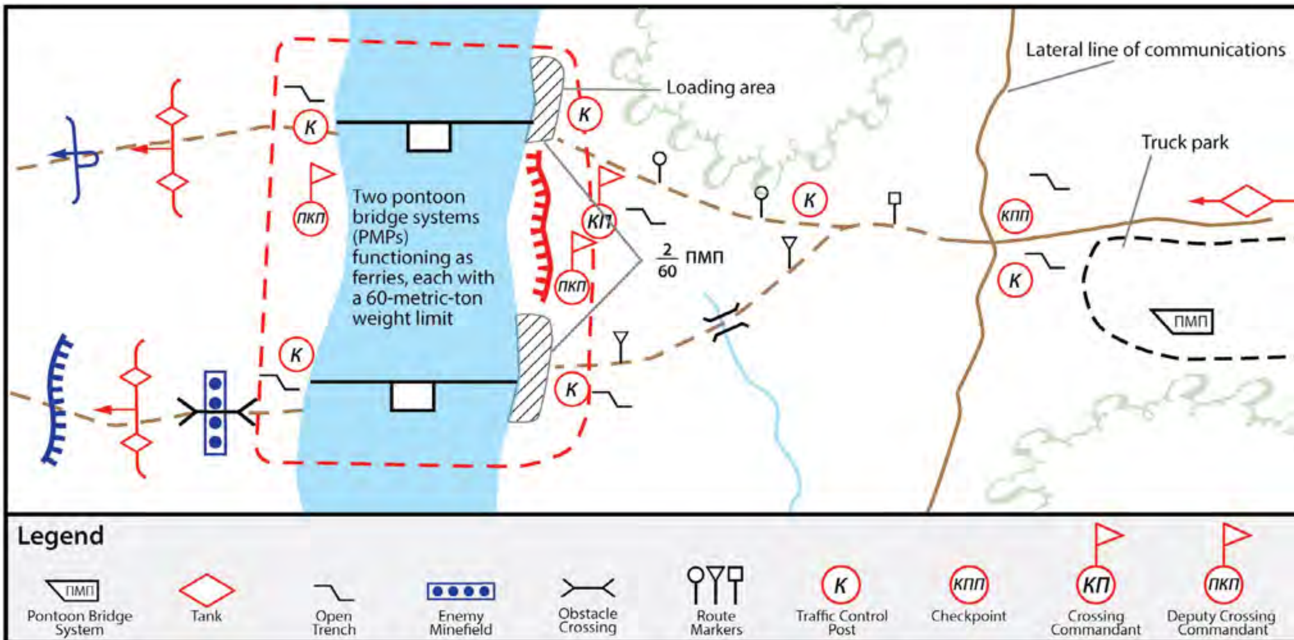


Figure 2. Engineer support of a ferry crossing using PMPs

In the scenario shown in Figure 2, the commander decides to send the remaining two motorized rifle battalions across the river and ferry the tank battalion across during the next half hour. PTS-2 moves air defense batteries, a battery of BM-21 truck-mounted multiple rocket launchers, the electronic warfare company, and a medical company platoon across the river. Once the tank battalion has crossed, the bridging company continues reduced ferrying operations.[15]

The ferry effort involves using the pontoon bridge systems to transport the tanks across the water obstacle to build up firepower and mobility on the far shore. The crossing entrance and exit points should be no narrower than 5 meters, and the bank at these points should have no more than a 10 percent slope.[16] Traffic control regulates the movement of vehicles to the loading sites. Two ferry sites are normally selected for traffic control and to lessen interdiction by enemy artillery. If a combination of wheeled and tracked vehicles is being ferried across, the tracked vehicles are often directed to one site, while the wheeled vehicles are directed to another site since tracks tend to tear up the banks. Route markers are posted on the trails leading to the loading sites.

The goal is to spend as little time as possible loading and unloading vehicles to avoid loitering in the open while waiting to cross. Units waiting to cross should disperse into waiting areas of up to 1.5 square kilometers for a company and up to 10 square kilometers for a battalion. The waiting areas should support camouflaging and include nearby areas in which to hide crossing reserves and unloaded trucks. Patrols and dug-in outposts from the units secure the waiting areas.

The bridging effort may initially involve clearing bridging sites of mines. During initial engineer reconnaissance missions, special attention is paid to the banks and reconnaissance team members look for easy access to the water and a gently sloping entrance/exit. They examine the ground along the shore to determine whether it is firm enough to support the passage of heavy equipment. A narrow width and reasonable current are desirable. The selected area should be fairly compact and contain sufficient roads to quickly move traffic.

Traffic controllers are posted where needed to keep the forces on the correct road, properly spaced, and moving at the prescribed speed. Truck columns, mountain vehicles, snow vehicles, swamp vehicles, and mixed track, and wheeled-vehicle columns move at the rate of 15–30 kilometers per hour. The distance between battalion columns is usually 2 to 3 kilometers, and the distance between vehicles is 20 to 25 meters. However, if the enemy has high-precision weapons, the distance between battalion columns is decreased to 1 kilometer and the distance between vehicles is increased to 100–150 meters. Recovery vehicles are posted on both sides of the crossing and assigned the mission of keeping the columns moving (see Figure 3, page 32). They are later used to tow inoperable vehicles to repair sites.[17]

Bridging allows second-echelon, artillery, supply, and support vehicles to cross in march column. Once a functioning pontoon bridge is in place, nonmaneuver brigades will want to use it. It is tempting and usually expedient to leave the pontoon bridge in place and continue to use it in support of the operation. Pontoon bridges can function effectively for months; however, they are prime targets and easily taken out of commission by artillery and aviation attacks. Furthermore, the brigade will not want to lose its bridging assets, so arrangements need to be made to either transfer assets or exchange engineer pontoon bridge companies to continue the advance. The optimum solution is to replace the pontoon bridge with a more permanent bridge from an army level

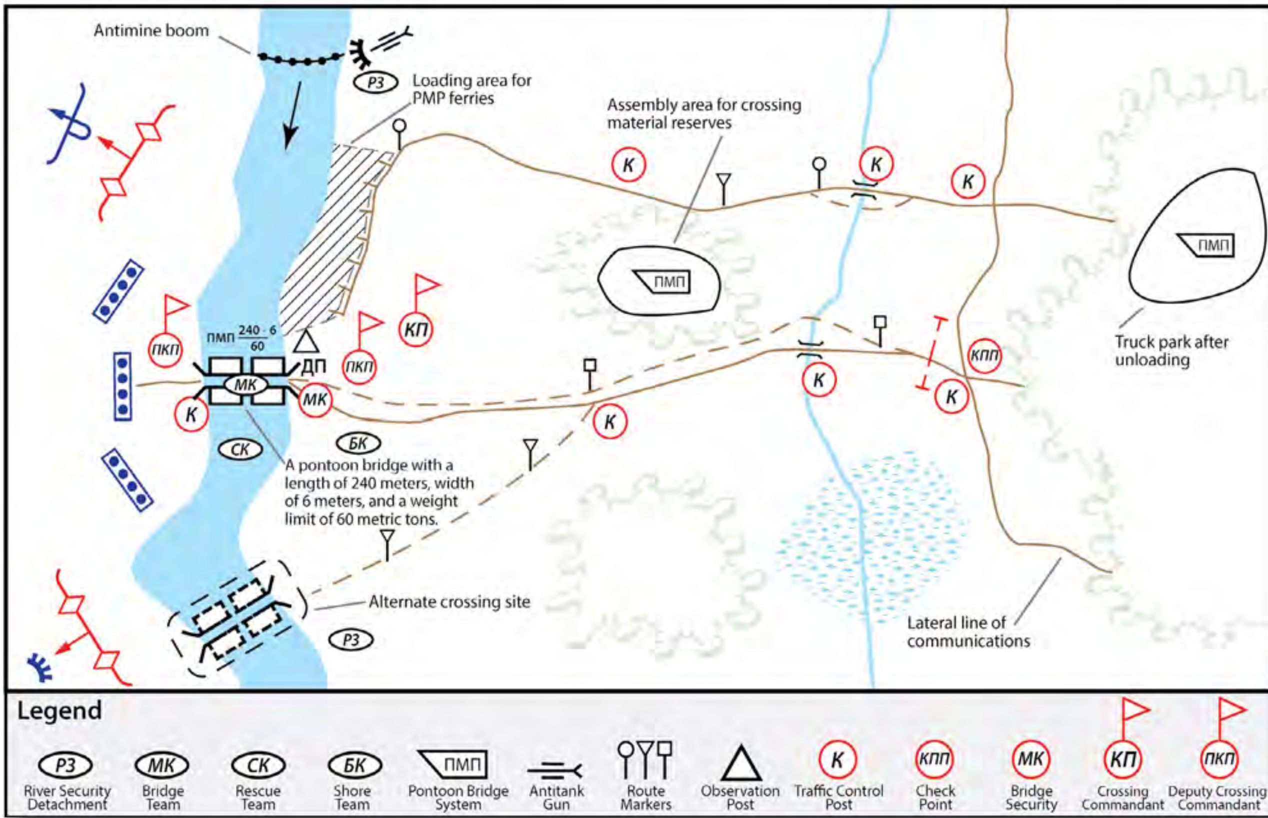


Figure 3. Engineer support of bridge crossing

engineer brigade as soon as possible. This, of course, would require a long-term deployment of air defense assets for protection.

Endnotes:

[1]Lester W. Grau and Charles K. Bartles, *The Russian Way of War: Force Structure, Tactics, and Modernization of the Ground Forces,* Foreign Military Studies Office, Fort Leavenworth, Kansas, 2017, p. 309.

[2]Ibid, p. 311.

[3]Dimitri V. Shunyakov et al., *Water Crossing: Student Textbook*, Ural University Press, 2017, p. 3.

[4]Charles K. Bartles, "The Russian Approach to a Battalion Hasty River-Crossing Assault," *Engineer,* May–August 2018, pp. 57–61.

[5]A. F. Bulatov, "Forcing Water Obstacles," *Military Encyclopedia*, Vol. 8, Ministry of Defense of the Russian Federation, Moscow, 2004, p. 276.

[6]Shunyakov et al., p.18.

[7]It is difficult to simultaneously conduct close air support and artillery support in the same area. Mortar fire must be shut down and air defense fires checked or curtailed. Direct fire and low-trajectory artillery fire permit the simultaneous use of close air support under emergency conditions. Direct artillery fire normally works quicker and more accurately than indirect fire.

[8]Grau and Bartles, pp. 312–313.

[9]"Russia has Deployed PMM-2M Amphibious Bridging Ferry in Syria," Army Recognition Group, September 2017, <https://www.armyrecognition.com/september_2017_global_defense_security_news_industry/russia_has_deployed_pmm-2m_amphibious_bridging_ferry_in_syria.html>, accessed on 10 September 2019.

[10]Bulatov, p. 277.

[11]Ibid.

[12]For further exploration of reconnaissance by battle, see the article entitled "Reconnaissance in Force Russian Style," by Lester W. Grau, *Armor,* Winter–Spring 2018.

[13]Shunyakov et al., p. 60.

[14]Ibid, p. 68.

[15]Ibid, p. 69.

[16]Ibid, p. 66.

[17]Ibid, pp. 69–75.

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Editor's Note:

Map illustrations provided by Mr. Charles K. Bartles.

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Enabling Maneuver in a Near-Peer Fight: 30 Days in Lithuania

By Captain James B. Wasson

In April 2018, the 902d Engineer Construction Company forward-deployed to the Zagan Training Area, Poland. The company's primary missions were to construct a forward arming and refueling point (FARP) and improve roads. These projects enabled U.S. Army Europe (USAREUR) and the North Atlantic Treaty Organization (NATO) to project more than 60 rotary-wing aircraft, 1,000 vehicles, and 18,000 Soldiers into four countries in June 2018, demonstrating credible deterrence as part of Exercise Saber Strike. As the task force engineer, my mission was to clear obstructions to enhance mobility, dig obstacles and positions to fortify survivability, and build structures to enable training. Additionally, my assignment required that I supervise the clearance of obstructions to communications, research U.S. Army and NATO doctrine, and build a company maneuver support team.

The 902d began enhancing mobility for maneuver forces in Poland prior to deploying to Lithuania to support Exercise Saber Strike. The Zagan Training Area, a premier training area within Poland, is often used by the regionally aligned armored brigade combat teams to conduct gunnery exercises during rotations to Europe. While in Poland, the 902d completed the construction of two projects critical to enabling movement of NATO forces and sustainment of operations throughout the security area. The 902d conducted road improvement and constructed a turning pad to enable the rapid mobilization of armored forces from the environmental inspection point to the primary railhead on the Zagan Training Area.

Additionally, the company constructed a FARP to extend the operational reach of NATO rotary-wing aircraft. The FARP was to consist of two Chinook CH-47-capable landing

A Soldier uses a bulldozer to dig an antivehicular ditch during engagement area development.

A Soldier conducts embankment improvements with a backhoe loader.

pads, two rearming pads, a refueling pad, and an ammunition holding area. Successful completion of these projects required close coordination with the supported maneuver units. Coordination for the projects began months before execution. Throughout construction, Soldiers from the 902d communicated with the supported units and agreed upon scope changes based on resource constraints. The nature of mobility support in the security area often prevents the supported maneuver commander from being present at the project site until project completion. This resulted in a miscommunication regarding the amount of fine material acceptable in the aggregate used for dust abatement on the FARP, which required additional work to prevent visibility issues with rotary-wing aircraft. Upon completion of these projects, the 902d received an alert to deploy to Lithuania to provide defense support against a near-peer enemy to the Lithuanian Griffin and Iron Wolf Brigades.

Over 3 days and 1,000 kilometers, Polish and Lithuanian military police cleared the way for the 902d patrol to travel from the Zagan Training Area to the Rukla Training Area in Lithuania. Host nation military police assets conducted main supply route regulation enforcement to ensure uninterrupted use of the main road networks despite heavy civilian traffic. Communication between the company and host nation military police units was vital to ensuring that the road networks could support the width and weight of the equipment. Military police units often worked with engineers in conducting hasty route reconnaissance to determine alternate routes around obstructions. Upon arrival at the Rulka Training Area, the 709th Military Police Battalion assumed tactical control of the 902d and the company received a mission to provide general support to the Lithuanian armed forces. Within 24 hours of arrival in Lithuania, the 902d began construction of a combat road and trails to support maneuver forces across Lithuania. To enable the gap crossing of more than 100 wheeled vehicles in Kaunas, Lithuania, the company built a 200-meter road from the river embankment to an existing improved road. The company simultaneously cut a 1.5-kilometer road through a forest to support armored vehicle movement in Pabrade, Lithuania. To further support the mobility of maneuver forces within the area of operations (AO), the 902d received tactical control of one military police squad from the 527th Military Police Company. The integration of military police assets within the engineer construction company proved key in enhancing mobility for maneuver forces within the AO. The military police squad integrated engineers and created a reconnaissance team to conduct deliberate route reconnaissance. This team played a critical role in the planning process by providing detailed conditions of existing road networks into and within the AO. Shared maneuver support doctrine provided a foundation for the communication of mission requirements and unit capabilities that aided the integration of military police and engineers. To

Soldiers construct a main command post on Rukla Training Area.

effectively clear impediments to mobility for the maneuver force, maneuver support elements must be prepared to establish clear communication channels.

Following the identification and construction of mobility corridors into the AO, Task Force Iron Wolf infilled to the Rukla Training Area. Upon arrival, a liaison officer (LNO) was embedded in the battalion headquarters. As the task force engineer, I began planning countermobility and survivability support.

Task Force Iron Wolf was tasked to conduct a deliberate defense of the airfield in Rukla, against a near-peer, mechanized force. In order to achieve the Task Force Iron Wolf commander's intent, it was essential to create a successful obstacle integration plan, reinforce battle positions, and ensure economy of force for maneuver support elements. The embedded LNO assisted in the development of the obstacle integration plan, allowing time for me to conduct parallel planning and reconnaissance to validate critical planning assumptions.

The early reconnaissance of the engagement area (EA) enabled the 902d to provide feedback to the task force headquarters to refine the obstacle overlay, integrate the terrain into the obstacle plan, and assist maneuver commanders in selecting battle position locations throughout the planning process. During joint reconnaissance with maneuver commanders, the 902d provided immediate feedback regarding the development and location of battle positions, the integration of obstacles, and direct and indirect fire. The joint reconnaissance also enabled 902d leaders to understand the capabilities and survivability requirements of each support unit. The task force had less than 36 hours for EA development prior to the arrival of enemy reconnaissance elements. The heavily forested terrain and the mobile nature of the Task Force Iron Wolf main command post and critical assets enabled the 902d to achieve an economy of force by focusing engineer efforts on priority battle positions and the EA. Additionally, the 527th simultaneously conducted operational area security, focusing on line of communication and convoy security. The area security mission of the 527th was imperative in achieving an economy of force for engineer assets by reducing security requirements when operating behind the forward edge of the battle area. The use of military police assets to secure the AO aided in the completion of nearly 2 kilometers of antivehicular ditch, more than 40 vehicle fighting positions, and numerous block obstacles on key avenues of approach within the 36-hour defensive preparation period. The effective integration of maneuver support assets into the Task Force Iron Wolf plan required the understanding of U.S. Army and NATO doctrine.

Members of Task Force Iron Wolf had little experience in integrating maneuver support forces and no organic engineer or military police officers on staff. This required the supporting and supported units to delve into doctrine and learn from it. Task Force Iron Wolf, the 527th, and the 902d conducted numerous combined arms missions during the integration period, allowing a shared understanding of NATO doctrine and unit-specific tactics, techniques, and procedures. During rehearsals and integration training, it was determined that, due to the limited number of armed vehicles in each patrol, the ability of the 902d to conduct organic security patrols through the heavily wooded terrain was limited. The integration of 527th elements for convoy security and area security mitigated this limitation. The inclusion of the 527th's mounted crew-served platforms within the 902d patrol enabled critical engineer assets to move on the battlefield. The aggressive use of mobility, lethality, and robust communication platforms while conducting area security behind the forward edge of the battle area mitigated threats throughout the AO for the 527th. Without the doctrinal use of military police units to provide security and mobility support, the Task Force Iron Wolf commander would have had to commit additional maneuver forces to security tasks, preventing him from concentrating his forces on the EA. The use of common terminology enabled the rapid integration of the 527th and the 902d into the Task Force Iron Wolf planning process during Exercise Saber Strike. In addition to the use of common NATO terminology, LNOs must be prepared to clarify orders or tasks. Clear channels of communication and a common understanding of doctrine allowed the 902d to build structures that achieved mutual training objectives.

In addition to clearing mobility corridors and digging obstacles, the 902d supported maneuver units by building a wood frame structure and numerous bunkers. The 902d vertical-construction platoon constructed a 32-foot by 16-foot building to function as a main command post or airfield operations center. The vertical-construction platoon faced numerous special-purpose forces attacks attempting to disrupt the mission during construction and resupply operations. To mitigate the risk of attacks, the platoon increased its security posture, which extended the construction timeline. Additionally, military police escorts conducted convoy security for critical resupply operations.

During EA development, the 902d constructed numerous bunkers to increase the survivability of dismounted antitank and crew-served weapons systems. Task Force Iron Wolf had a limited number of mechanized platforms and relied heavily on static dismounted fighting positions in the defense. To increase the survivability of these crucial dismounted weapon systems, the vertical-construction platoon prefabricated bunker walls, facilitating the rapid assembly and construction of bunkers in the field. Prefabrication significantly decreased the time required to construct a bunker and enabled multiple bunkers to be constructed simultaneously. Upon installation of the bunker retaining walls and roof sections, the platoon assisted the maneuver unit in camouflaging the position. The time saved by prefabrication enabled the platoon to emplace subsequent and supplementary fighting positions for the supported maneuver units. The 902d was capable of emplacing more fighting positions by concentrating engineer forces and using military police and maneuver units to augment security.

Engineers commonly conduct 24-hour operations during EA development to maximize the obstacle and survivability effort. The platoon must operate the equipment; secure the assembly area, equipment, and work site; and conduct rest and resupply operations. Creating a maneuver support team with military police assets enabled the 902d to augment area and convoy security with military police forces and reallocate all available engineers to the EA development mission. The robust mobility, lethality, and communications of a military police squad allowed the unit to secure a significantly larger area than an engineer platoon could have. Additionally, augmenting labor-intensive tasks with maneuver forces increases the amount of obstacle efforts the engineer platoon can apply. When constructing protective wire obstacles, Task Force Iron Wolf maneuver units augmented the engineer platoon. This allowed the maneuver unit to reinforce obstacles and fighting positions throughout its battle position. The establishment of key relationships is fundamental to effective mutual support among units. When building relationships with allied, partnered, and external units, leaders must discuss key capabilities and limitations of their organizations to gain a shared understanding of support requirements. After gaining this shared understanding, leaders must then consistently communicate with supported commanders to assess changing requirements and identify priorities of effort. The LNO was a key component of building a team with Task Force Iron Wolf. The LNO provided the commander with engineer status updates and communicated changing requirements to the company. The continuous task of building key relationships should begin as early as possible.

The 902d cleared, dug, and built in support of maneuver units during Exercise Saber Strike. The successful support of maneuver in a near-peer fight requires that maneuver support units build relationships and identify requirements early in the planning process. Throughout the operation, maneuver support units must continuously maintain relationships and validate assumptions through open and clear communication. Impediments to clear communication and mobility must be eliminated. Leaders must build relationships to fully understand support requirements and ensure that projects are built to meet the needs of the supported unit. Units must share a common doctrinal framework to enable economy of force when digging obstacles and survivability positions. Combined arms integration enables units to provide the mutual support necessary for success.

References:

Army Techniques Publication 3-90.4, *Combined Arms Mobility*, 29 June 2017.

Field Manual 3-39, *Military Police Operations*, 9 April 2019.

"Saber Strike 2018," USAEUR, <http://www.eur.army.mil/SaberStrike/>, accessed on 6 June 2019.

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THE MISSION and the Mission

By Chaplain (Captain) Benjamin J. Newland

As chaplain to the 84th Engineer Battalion, I had the opportunity to observe the overseas mission of U.S. Army engineer Soldiers this year. Through my training as a professional clergyperson, I am also aware of the history of Christian overseas missions. It has occurred to me that there are similarities between these two missions; both the military engineer mission and the Christian mission are ideally suited for winning in a gray zone of subconflict competition between nation states via the spread of ideologies through cooperative and constructive means.

In a session held at the Reagan National Defense Forum, Simi Valley, California, on 1 December 2018, panelists discussed "Winning in the Gray Zone: Countering Russia and China Below the Level of Armed Conflict" and the Honorable Jim Langevin, U.S. Congressman from Rhode Island, defined "winning in the gray zone" as "confronting challenges without letting the confrontation morph into a full-blown war" and emphasized a need to eliminate siloed capabilities, taking a "whole-of-government approach so that we're using all assets and tools of state power to confront in the gray zone."[1]

The concept of gray zone competition is timely. The United States faces multiple challenges on the world stage. At most, open military conflict should be considered as a means of engaging these challenges only as a last resort. Indeed, the existence of a nuclear capability on both sides of several of these challenges suggests that open conflict might become a final resort. Yet, leaving challenges

Siapan roof work

unanswered may actually increase the risk of open conflict down the road.

Congressman Langevin suggests that a whole-of-government approach below the level of open conflict might be the appropriate response. Furthermore, the best solutions may go beyond a whole-of-government approach to a whole-of-society approach as diplomatic, military, and political pressures are applied by the government alongside economic and cultural tools wielded by nongovernmental organizations.

In this article, I consider one important piece of such a whole-of-government approach: the mission of the engineer Soldier, who is already well-suited to compete in the gray zone. Additionally, I inject the perspective of Christian missionary work, which has a long history of competition in the gray zone arenas of foreign aid and cooperative endeavor to promote a way of life and build connections between disparate peoples.

Yutu Disaster Relief

On 25 October 2018, Super Typhoon Yutu swept through the Commonwealth of the Northern Mariana Islands, causing severe damage to the homes and infrastructure on the islands of Saipan and Tinian. While initial relief efforts utilized Army National Guard and U.S. Army Reserve units from Guam and Hawaii, funding provided under Title 32 of the Code of Federal Regulations expired and was not renewed.[2] Contracting efforts by the Federal Emergency Management Agency were exhausted, leaving a disaster response gap that would be filled by Regular Army forces under Title 10 of the Code of Federal Regulations, as directed by the Secretary of Defense.[3, 4] U.S. Army Pacific, through Joint Task Force West, ordered the 84th Engineer Battalion to provide Department of Defense support to Federal Emergency Management Agency disaster relief operations by emplacing temporary roofs for the people of Saipan and Tinian.

With a compressed timeline in which to work, the 84th planned and executed the mission, sending approximately 70 engineer Soldiers to provide a headquarters for the Joint Task Group Engineer and construction teams to continue to build on the work of the U.S. Navy Seabees and U.S. Air Force engineers. In total, the joint engineer force installed 550 roofs as part of the disaster response effort.

The primary purpose of the mission was to provide humanitarian aid. A secondary purpose was to compete in the gray zone. Due to their locations, Guam and the Commonwealth of the Northern Mariana Islands serve as a strategic hub for joint forces in the Pacific region.[5] Strategic partnerships are a primary tool for gray zone subconflict competition, and U.S. Army engineers are well equipped to wield that tool.

Skilled personnel and relief efforts in the wake of disaster and funds to accomplish reconstruction and life support have long been the providence of national militaries and religious organizations. Evidence of Christian relief efforts can be traced back to the New Testament of the Bible, where St. Paul refers to a collection that he was charged to take up for new Christians in Jerusalem.[6] Christians are not alone in their endeavors; Jewish, Muslim, Buddhist, and other faith-based relief agencies have been active around the globe for centuries—and they continue to be so today.

Pouring concrete

Religious relief efforts, like their more nationalistic counterparts, are dual-purposed. First, most religions incorporate an element of compassion, charity, or other obligation to assist those in need. Humanitarian aid meets that obligation of faith. Second, to a greater or lesser extent, religions seek to spread their ideologies. Humanitarian aid provides that opportunity as well—either in an overt fashion or through the building of positive regard.

That national and religious ideologies would use similar means to propagate their ways of life and build networks of strategic partners should come as no surprise. The pitfalls and possibilities in such ideological outreach have long been recognized by political and religious leaders alike.

In his 1912 classic text on Christian mission, *Missionary Methods: St. Paul's or Ours?*, Church of England priest Father Allen criticizes the failures of missionary practice, which he identified during his two deployments to China (from 1895 to 1900 and in 1902), and recommends a return to the ancient missionary techniques of the Apostle Paul—and then notes that Paul's methods are not only effective but generalizable beyond the establishment of churches in new lands, stating, "St. Paul's missionary method was not peculiarly St. Paul's . . . it is, indeed, universal and, outside the Christian church, has been followed by reformers—religious, political, social, in every age and under most diverse conditions."[7]

Gray zone competition for hearts and minds has been employed throughout human history. Modern engineer Soldiers are engaged in work that St. Paul would have recognized.

Balikatan 2019

Beyond disaster relief, engineer Soldiers and Christian missionaries have another tool in their kits when competing in the gray zone: building partner capacity.

On 1 March 2019, the 84th Engineer Battalion deployed the vertical-construction platoon of the 561st Engineer Construction Company and its equipment to Pag-asa, Bataan, Philippines, in support of Balikatan 2019, the annual bilateral U.S./Republic of the Philippines exercise. Participating in the stability portion of the operation, the engineer Soldiers of the 561st Engineer Construction Company, in a joint effort with Armed Forces Philippines (AFP) service members, constructed a two-room classroom building in Pag-asa.[8]

"Skilled personnel and relief efforts in the wake of disaster, and funds to accomplish reconstruction and life-support, have long been the providence of national militaries and religious organizations."

The construction project provided the students of the village with increased opportunities for learning, built partner capacity between the soldiers involved in the project and their respective militaries, and supported the U.S. Army Pacific commander's Pacific Pathways initiative. I witnessed the building of this partner capacity in real time, as U.S. Army engineer Soldiers taught AFP soldiers to place relief lines in the concrete sidewalk adjacent to the new classroom to avoid the cracking that could be seen just feet away in the sidewalk along older classroom buildings. Moments later, AFP soldiers coached U.S. Army engineers in the mixing, slinging, and smoothing of concrete stucco used on the walls of the new building—techniques with which they had much more experience. Balikatan 2019 strengthened existing relationships of joint operability and created new ones. These are relationships that may be used as a resource in future gray zone competition.

Christian missionaries have, likewise, built a form of partner capacity in their work of spreading religious beliefs. Numerous hospitals and schools across the United States and in many other countries are the result of Christian missionary efforts to contribute to the well-being of the people whom they sought to evangelize.

However, like any other tool, these tools can be abused. Schools can house teachers who teach native people the language of their colonizers, while their native language is repressed. Hospitals can contain doctors who not only treat illness but also impose a medical system with values that do not mesh with local healing practices. In their attempts to do good, Christian missions throughout history have done much harm.

Father Allen was a firsthand witness to, and strong criticizer of, the deficiencies of Christian missions in China. He notes three principle shortcomings in the results of missionary work in his day:

- Christianity remained an outside ideology in the cultures in which it was placed.
- Christian missions continued to be dependent upon external support—sometimes for decades.
- Christian missions appeared to be identical, regardless of the country in which they were planted. They failed to adapt to local culture, much less effect any changes for the better.[9]

Allen blames these issues on cultural arrogance, as modern Westerners tend to assume that an ideology that is compatible with ours at the core must also be similar to ours at the margins—or, in his words, "We naturally expect our converts to adopt from us not only essentials but accidentals. We desire to impart not only the gospel, but the law and the customs. With that spirit, St. Paul's methods do not agree because they were the natural outcome of quite another spirit—the spirit which preferred persuasion to authority. St. Paul distrusted elaborate systems of religious ceremonial and grasped fundamental principles with an unhesitating faith in the power of the Holy Ghost to apply them to his hearers and to work out their appropriate external expressions in them."[10]

Like his endorsement of St. Paul's missionary methods for realms outside of Christianity, Allen's criticism of the failures that he saw apply beyond the realm of early 20th-century missionary work. A Christian missionary cannot arrive in a foreign country, build an institution without consulting the local population or government, and then expect the local people to spontaneously adopt a worship style identical to that from which the missionary was derived. Neither can a national military arrive in a foreign country, erect a building where it thinks best, and expect to have its policy decisions supported by the government of that country. Building partner capacity means truly working with partners. There won't be perfect agreement, and the results won't be precisely predictable—but the capacity is invaluable nonetheless.

When competing in the gray zone, Father Allen would encourage us to do so with humility of purpose and flexibility of expectation. Whether as engineer Soldiers or as Christians, the effectiveness of missions carried out in the gray zone depend on our adaptability to the circumstances of our partners and our readiness to embrace the results of our partnerships.

Conclusion

It would be perilous to conflate the mission of spreading Christianity with the mission of ideological political competition in a gray zone of subconflict engagements with international rivals; and indeed, such conflation has historically led to a variety of failures. I am merely pointing out similarities in means and practices available to those engaged in each of these types of missions. The comparison, as far as it goes, applies to those who are deeply engaged in the work of spreading an ideology that they believe will create a better world—whether the ideals are of democracy or Christianity.

Christians seek to fulfill the divine commander's instruction to "Go therefore and make disciples of all nations, baptizing them in the name of the Father and of the Son and of the Holy Spirit and teaching them to obey everything that I have commanded you."[11]

As engineer Soldiers, the National Defense Strategy of the United States of America guides our efforts; there, we find a directive to "strengthen alliances and attract new partners."[12] To engage on this task, we are to "deepen interoperability" and "expand Indo-Pacific alliances and partnerships," both missions that the 84th Engineer Battalion has executed through Yutu Disaster Relief and Balikatan 2019.[13]

Endnotes:

[1]Julian Barnes et al., "Winning in the Gray Zone: Countering Russia and China Below the Level of Armed Conflict," Reagan National Defense Forum, 1 December 2018, <www.youtube.com/watch?v=4VrQQ1YLmso&t=0s&index=11&list=PLHNOi2zcxo7sBx M7HfhmB_tf6QXeqj48K>, accessed on 27 September 2019.

[2]Title 32, U.S. Code (USC), *National Guard*.

[3]Title 10, USC, *Armed Forces*.

[4]Fragmentary Order 02 to Operations Order 006-19, 84th Engineer Battalion, 12 October 2018.

[5]"Indo-Pacific Strategy Report: Preparedness, Partnerships, and Promoting a Networked Region," Department of Defense, 1 June 2019, <https://media.defense.gov/2019/Jul/01/2002152311/-1/-1/1/Department-Of-Defense-Indo-Pacific-Strategy-Report-2019.PDF>, p. 23, accessed on 5 August 2019.

[6]1 Corinthians 16:1–4; 2 Corinthians 8:1–9:15; Galatians 2:10; and Romans 15:25–31.

[7]Roland Allen, *Missionary Methods: St. Paul's or Ours?*, Eerdmans Publishing, 1962, p. 6.

[8]Fragmentary Order 02 to Operations Order 006-19.

[9]Allen, p. 110.

[10]Ibid, p. 9.

[11]Matthew 28:19-20a (New Revised Standard Version).

[12]"Summary of the 2018 National Defense Strategy of the United States of America," Department of Defense, 2018, p. 8.

[13]Ibid.

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Deployed Environments Allow for Unique Staff Rides

By Major Jonathan R. Browning and Captain William H. DeRosa

Staff rides are recognized as a powerful tool for developing U.S. Army leaders. Units in the continental United States visit Revolutionary War or Civil War battlefields for an education. Unfortunately, these sites do not address all aspects of the operational environment that are relevant to modern warfare, such as simultaneous air, land, maritime, cyber, and space threats. Military doctrine now focuses on large-scale combat operations aimed at defeating enemy forces in a multidomain environment. As the military has transitioned from counterinsurgency operations to decisive action, we must improve our understanding of our capabilities. There are limited opportunities to visit sites where multidomain campaigns were fought in the continental United States, making overseas deployed environments valuable for visiting and discussing topics that are not easily covered with traditional stateside staff rides.

The 20th Engineer Brigade, Fort Bragg, North Carolina, was deployed to Kuwait as the U.S. Army Central Command Theater Engineer Brigade from August 2018 to April 2019. In February 2019, leaders had the unique opportunity to conduct an Operation Desert Storm staff ride, visiting multiple historical sites. By conducting a staff ride focused on a recent, large-scale, multidomain, coalition-based combat operation, leaders were able to gain valuable insight into modern operational- and strategic-level influences and their impact on the human dimension of war. Coupled with simpler logistic concerns and a more fiscally responsible solution for staff rides, the Operation Desert Storm staff ride conducted by the 20th Engineer Brigade is an excellent blueprint for future engineers on Central Command deployments.

Minefield signs in southern Kuwait mark areas where Iraqi forces established defensive fortifications.

The brigade prepared for the staff ride by coordinating with the U.S. Army Engineer School (USAES), Fort Leonard Wood, Missouri, command historian, Mr. Florian L. Waitl. Due to the limited publicity and lack of advertisement of historical battlefield sites in Kuwait, the staff ride required extensive preparation to determine specific locations that

Participants discuss the impact of coalition efforts at the Highway of Death in Kuwait.

would be relevant, provide valuable experience, and facilitate leader discussion. During preparation, the brigade and Mr. Waitl focused on engineer operations, beginning with a Desert Storm era military map reconnaissance to identify the location of the obstacle belt built by Iraqis during their occupation of Kuwait.

Mr. Waitl helped organize the staff ride by breaking it into the three traditional staff ride phases—the preliminary study, field study, and integration phases. The preliminary study phase involved a combination of individual study and classroom instruction to prepare the students for the field study phase. During the field study phase, the participants visited historical sites, battlefields, and museums to apply the knowledge learned from the individual study and classroom instruction. The integration phase consisted of a joint reflection in a classroom environment, where the participants gained additional insight by sharing their staff ride experience with their peers. Leaders improved the educational experience by executing all three phases, analyzing decisions that had been made by commanders throughout the conflict, and imparting insight gained on the ground.

The preliminary study phase prepared the participants for the upcoming site visits and provided historical context for the battle. This phase began with company command teams and staff section leaders from the 20th Engineer Brigade receiving recommended reading assignments and ended with a classroom discussion at Camp Buehring, Kuwait. The foci of the readings and lectures were on large-scale combat operations and impacts and changes from the recent nonconventional fight in Iraq and Afghanistan. This phase concluded with historical Gulf War news footage for context and an overview of the events of the subsequent days, setting the conditions to maximize learning throughout the staff ride.

During the field study phase, the Soldiers visited numerous locations throughout Kuwait, including the site of the Battle of the Bridges, al-Qurain Martyrs Museum, Ahmed al-Jaber Air Base, and the Highway of Death, each of which

Remnants of an Iraqi obstacle

Staff ride participants discuss the Battle of the Bridges from a nearby observation point.

provided a different perspective on the conflict and the decisions made therein. The visit to the Battle of the Bridges site in central Kuwait resulted in a discussion about the effects of terrain on ground movement and the importance of mission command during complex military operations. The al-Qurain Martyrs Museum in Kuwait City served as a somber example of how war affects the national identity of a country and provided insight on nations using information operations to support their cause. The visit to Ahmed al-Jaber Air Base provided firsthand validation of the importance of aerial campaigns and logistics in large-scale combat operations. Finally, the infamous Highway of Death provided a powerful visual reminder of the human dimension of war and its influence on command decisions. These sites facilitated an active discussion that enhanced the participants' understanding of the previous day's lectures regarding operational and logistical considerations, highlighting the importance and impact of the major elements of a large-scale conflict.

"By conducting a staff ride focused on a recent, large-scale, multidomain, coalition-based combat operation, leaders were able to gain valuable insight . . ."

The integration phase was the final and most important phase of the staff ride, as students organized and discussed insights gained during the site visits. This enabled the group to reflect upon their experience, discuss current and future engineer operations, draw conclusions, and solidify lessons learned from the event. Mr. Waitl said, "I wanted the Soldiers to draw parallels between military history—in this case, Operation Desert Storm—and the contemporary issues they are facing. After observing their discussions and the various insights the group gained from this staff ride, I am confident that these Soldiers not only realize that history matters, but they now have a better understanding of the potential lethality, chaos, and accelerated tempo of the multidomain battlefield if we are, in fact, forced to face a peer or near-peer adversary in the future."

Colonel Patrick J. Sullivan, commander of the 20th Engineer Brigade, noted that "Units should maximize the value of serving in a deployed environment, to include creating unique opportunities for professional development and team building, such as the Operation Desert Storm staff ride. The proximity [that] units have to the recent large-scale combat operations while serving in any major Army command outside the continental [United States] presents a rare opportunity to develop and educate professional leaders. The events illustrated the importance of history's numerous applications to modern warfare and how its lessons and insights can shape future conflicts."

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