

Fall 2023

Army Engineer

Magazine



HELLO!

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AEA Career Bridge.

Page 12.





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MG Bryan G. Watson, USA, Retired President, AEA



To the Regiment,

As Engineers, there is no question that we belong to one of the greatest professions inside the Army. Wherever we go, our Engineer colors fly at every post, camp, station, and district across these United States and at countless forward deployed locations. For Commanders, they mark locations where the toughest problems on the battlefield and of our Nation can be solved with the urgency of combat by a group of Soldiers devoted to the mission...all in! For fellow Engineers, they mark our rallying point...a place where you can go 24/7, be welcomed with open arms, get the support you need, and revel in the company of family that is...all in!

Your Army Engineer Association strives emulate that same spirit. To be that place where there is a free-flowing exchange of ideas and experiences – a professional dialog – that helps prepare the Army Engineer profession to answer the next call to solve tough problems! To be that rallying point that allows us to remain connected with one another on a personal level – camaraderie – and gather like family.

AEA has made great strides towards that goal. Membership is on the rise. This magazine is more widely circulated today than in decades. Engineer leaders and Soldiers are increasingly using this Army Engineer Magazine, our virtual-live Engineer Rally Point, and other professional seminars to exercise their voice about the future. I encourage you to do the same...exercise your voice for our profession's benefit.

Despite all of our gains, there remains one area that needs considerable work and, frankly, I need your help! Engineer Soldiers are joining AEA early in their careers at Fort Leonard Wood, but ironically, we lose their connection when they get to their unit. This year, my top priority is rebuilding our network of local AEA Chapters to serve as rallying points – like the engineer flags we fly – that keep us connected across our ranks, across components, and across the profession.

To do this, we need a different approach! In the past, AEA Chapters were unit-centric; they were largely sponsored and run by Engineer units. However, the vitality of a Chapter was often disrupted by Commander turn-over, training cycles, and continuous deployments during 20+ years of war. We need a more enduring model with longevity and resiliency built into the very foundation of each local Chapter. In my mind, a more successful model is a community-centric approach that leverages the resiliency of our military communities and is fueled by the steadfast passion of Army Engineer alumni living in the area.

Here is where I need your help. If you are an Army Engineer Alumni living near a military community and looking for a meaningful way to continue serving our Regiment and Army...Answer the Call! Contact AEA's new Executive Director, COL (Ret) Jim Rector at xd@armyengineer.com or use the QR Code below to express your interest in starting up a local chapter in your area. My promise is that AEA will pull alongside you to get the Chapter started, work to streamline the process, assist you with some start-up resources, and help you grow your Chapter as members move to your community. Together, we can rebuild AEA to last; it takes a partnership and I'm looking for Battle Buddies to help.

Thanks in advance for all you do for the Army Engineer Association and our Regiment of Engineers. ESSAYONS!

Lead to Serve,

A handwritten signature in black ink that reads 'Bryan G. Watson'. The signature is written in a cursive style.

**Major General Bryan G. Watson, USA, Retired
President, Army Engineer Association**



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Thank You



Linda S. Mitchell, Editor
Army Engineer Magazine

Hella!

First, we must bid a farewell to COL (Ret) Dave Theisen from his position as Executive Director. Dave's retirement marks another era and an opportunity to reflect on the profound impact he has had on AEA. I have to say, I am greatly appreciative of his unwavering dedication to our collective success, especially during the COVID-19 pandemic. Dave successfully navigated our organization through this challenging time and we have thrived. I wish Dave and Marguerite a retirement filled with relaxation, adventure, and fulfillment.

I would like to welcome our new Executive Director COL (Ret) Jim Rector. I am confident he will make a tremendous impact on AEA and he will continue to build upon the strong foundation laid by Dave, Jack, and Mike.

Lastly, I am privileged to share the stories, projects, and accomplishments of the Army Engineers Regiment. These articles are a testament to the innovation Army Engineers are using to conquer the fast advancing environments of modern warfare, infrastructure development, and technology. I know I am inspired and I hope you will be too.

Best,

Linda

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Guardians of the Castles Donors



EXECUTIVE DIRECTOR



AEA
ARMY ENGINEER ASSOCIATION

Dear AEA Members,

I am honored to have been selected as the new Executive Director of the Army Engineer Association. Having recently retired after 26 years as an Army Engineer Officer, I continue to be motivated to serve the Regiment. As the AEA Mission states: "We exist to serve the Army Engineer profession by helping Unit Commanders: Recognize excellence within our ranks, connect the Army Engineer profession, honor the Service and Sacrifice of Army Engineers, and preserve our shared history," I am steadfast in my support for all.

Replacing COL (Ret) Dave Theisen, who has served as the AEA Executive Director for the past seven years, will be a challenge. Dave and his team have done a remarkable job over the past years, building a strong and resilient Army Engineer Association. I look to build on the effort of Dave and his team through several areas:

- 1. Building local chapters within military communities. We need to increase our presence within the engineer community improving on how we serve the entire profession. One way to do that is to build local chapters to serve as an information conduit. This will help inform the engineer community on current and future engineer topics/issues.*
- 2. Kick off the new AEA Career Bridge, with a targeted release date of 11 November 2023. This supports transitioning Engineer Soldiers by linking them with Engineering firms needing their technical skills.*
- 3. Increase interest in the AEA's Educational Support Program. As stated on the AEA website, this program provides up to three Congressman David L. Hobson STEM Scholarship, sponsored by Trimble, in the amount of \$3,000 yearly. Additionally, up to three scholarships of \$1,000 for either college education that leads towards a degree (for example traditional AS, BA, BS, etc.) or education that leads towards a certification or training in a technical skill or credentials.*
- 4. Continue to improve the Regimental Store by expanding the inventory both online and at the Fort Leonard Wood Museum. As you may know, AEA is a non-profit organization which relies on funding through donations, corporate sponsorship, and the Regimental store. Each year AEA provides more than \$100,000 supporting the Army Engineer Regiment. The Regimental Store is key to continuing this effort.*

Finally, we are kicking off our annual Guardians of the Castle Program. This program allows members to donate to the Army Engineer Association. You can donate either by mail or online using our website. Your donations are absolutely critical in supporting the Regiment. I am looking forward to serving you, the Army Engineer community, and helping to improve this professional organization to better serve the Army Engineer profession. If you have any questions or issues, please don't hesitate to contact me at xd@armyengineer.com or (573) 528-4742. If I cannot answer your question or solve your issue, I'll find someone who can.

ESSAYONS!

Jim Rector

James "Jim" V. Rector
COL, USA, Retired
Executive Director, Army Engineer Association



Mack Defense Receives Order for 135 Additional Trucks for the U.S. Army M917A3 Heavy Dump Truck Program

ALLENTOWN, PA - SUMMER 2023

The additional HDT vehicles are part of the previously announced firm-fixed price \$296 million contract over seven years that the Army awarded Mack Defense in 2018. For this new order, 60 HDTs are being purchased by the U.S. Army Reserve, 74 are being funded by the presidential budget and one is being purchased by the U.S. Navy. With this tranche, a total of 446 HDTs have been ordered to date.

The HDTs are a key component in construction and maintenance missions for infrastructure assets, such as air fields, roadways, landing strips, supply facilities and motor pools.

The Army previously had ordered 311 HDTs, which are based on the commercially available Mack® Granite® model and spec'd with heavier-duty rear axles, all-wheel drive, increased suspension ride height and other ruggedized features to meet the unique requirements of the U.S. military.

The Mack Granite HDT model is a modern truck equipped with modern technology, such as ABS and other active safety systems. The Granite model is user-friendly, comfortable and safer to operate compared with other past models used by the Army, which is key to the Army's investment in the new HDTs, Hartzell said. The Granite HDTs and the production line at the Mack Experience Center (MEC) in Allentown, Pennsylvania, were both inspected by the government quality auditors to ensure both met expectations.

Production of the HDTs at the MEC began in Q1 2021, following an investment of \$6.5 million to create a dedicated HDT production line at the facility. The production line helps fulfill the M917A3 contract, while allowing Mack Defense to produce other vehicle variants.

The production line in the MEC is in Mack's former Customer Adaptation Center, where vehicle modifications occurred. The Customer Adaptation Center has since moved to Mack's Lehigh Valley Operations (LVO) in Macungie, Pennsylvania, where all Mack Class 8 vehicles for North America and export are assembled.



“With every additional order of a Mack HDT, the U.S. Armed Forces are reiterating their confidence in our product. The U.S. military puts these trucks through the paces every day, and each subsequent requisition shows that the Mack HDT is meeting the military’s demanding requirements.”

DAVID HARTZELL, PRESIDENT OF MACK DEFENSE



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Each year Trimble generously supports the AEA Educational Support Program (ESP), named for HON David L. Hobson, 8-term U.S. Congressman from Ohio.

This program has two parts. The first is to support AEA members or their family members who are pursuing a STEM - Science, Technology, Engineering, Math- degrees with a one-time award. The second part is designed to support AEA members or their family members to support courses taken in conjunction with a higher-level degree producing program that can eventually result in an Associates, Bachelors, or master's degree. Technical certifications or credentialing courses will be considered as well.

This year, through AEA ESP we have awarded \$9000. We have two STEM awards to AEA family members. Congratulations to Ms. Bailey Preston and Mr. Aaron William Jr. We have awarded 3 ESP awards that support the continuing education of 1SG Marvin Blaise for University of Maryland, SPC Zachary Hanes and CDT Miguel Morfin for Oklahoma State University.

We would like to thank Trimble for their generous support of this program and look forward to this support in the future to aid AEA members and their families in their education.

CONGRATS!

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James Saucedo

ICY

At Joint Base Elmendorf-Richardson Mr. James Saucedo assumed duties as the chief of the Engineering, Construction and Operations Division for USACE, Alaska District in June. Mr. Saucedo will lead a team of more than 200 personnel responsible for the execution of engineering, construction, and operations activities across Alaska and throughout the Indo-Pacific region. He serves as the district's dam and levee safety officer and is a member of the Alaska District Corporate Board, which is responsible for developing and implementing strategic plans for the organization. "I am very excited for this amazing opportunity to lead such a great organization," Mr. Saucedo expressed. "The Alaska District Engineering, Construction and Operations team is one of the best in the USACE, and they are vital to the success of numerous critical missions in the military, civil works, and environmental programs, just to name a few." Mr. Saucedo has more than 30 years of federal experience in leading, managing and providing technical support in the planning, design and construction of

projects worldwide. Assignments have included critical support roles with USACE and the U.S. Department of State on diplomatic, military, civil works, hazardous and toxic radiological waste, interagency and international services, and foreign military sales projects. Previously, he served as the district's chief of the Design Branch, interim chief of the Construction Branch, and interim chief of the Engineering, Construction and Operations Division. Preceding his federal service, he was a geotechnical engineer with architectural-engineering consulting firms in Alaska and California. Mr. Saucedo, earned his BS and MS degrees in civil engineering from the University of Alaska, Anchorage and is a registered professional engineer in Alaska. He is a member of the SAME and is a Fellow with the American Society of Civil Engineers. During his career, he earned the DoA's Meritorious Civilian Service and Superior Civilian Service Awards and the Department of State's Franklin Award. In 2014, he was selected as the Alaska Federal Executive Association's Federal Employee of the Year.



Happy Retirement Dave



COL (Ret) Dave Theisen, COL (Ret) Ron Dabbieri & MG (Ret) Bryan Watson

Congratulations to our 2023 Award Recipients

Senator Thomas R. Carper
Gold de Fleury

LTG Jeffrey Talley, USA (Ret)
Gold de Fleury

CSM Glenn Stines, USA (Ret)
Sapper and Miner Award of Distinction

COL Ron Dabbieri, USA (Ret)
Sapper and Miner Award of Distinction

Mr. Lloyd Caldwell
Distinguished Civilian Award

M IIn Case You Missed It!



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MG Leif J. Sverdrup Chapter Hosts AEA President

The MG Leif J. Sverdrup Chapter of the Army Engineer Association hosts a monthly Engineer Round Up at the Engineer Regimental Room of the John B. Mahaffey Museum complex. It's a venue to bring Engineers from across the installation together for professional discussion, comradery, and information exchange. In August, they hosted the Army Engineer Association President, MG (Ret) Bryan Watson. MG (Ret) Watson was introduced to the current MG Leif J. Sverdrup Chapter Board Members and spoke to a diverse audience of Engineers about Trust and what it means to the Engineer Regiment, its Soldiers and Leaders. He spoke of the elements of Trust; Competence, Commitment and Character.

MG (Ret) Watson asked, "What is the meaning of trust? Emotionally, it is to place vulnerability to someone else." To be vulnerable to another, to have faith in, or trust, one another. This, trust, is the bedrock of our leaders. Trust that they are competent, committed to the mission and their Soldiers, and have the character to give lawful and moral orders. Leaders, trust that your Soldiers are competent in their Warrior tasks and battle drills, committed to the team and that your Soldiers aren't characters but have character with morals to carry out your orders and do what is right no matter the situation.

But how do we get trust? Trust isn't something that can be bought. It must be earned. Earned by all Soldiers - leaders and subordinates. What does trust mean when on the battlefield? What does it mean for maneuver forces? It means that even before being called upon, Engineers - Sappers are already strategically in place. MG (Ret) Watson referred to Sappers as the stagehands of battle.

A stagehand, to the performer, is everything. They are the unseen supporters of the show. They don't receive recognition but without them the show couldn't go on. They know the play better than even the actors themselves, well enough to anticipate the next act. That is what the Engineers are to the maneuver force.

Engineers! We are the not so silent stagehands breaching the minefield for maneuver forces to attack; placing the obstacle to deter the enemy; emplacing the full enclosure over the gap or conducting rafting operation to allow for freedom of maneuver.

All so that combat power can fix and destroy the enemy. Sappers own the terrain and know the battlefield better than many. Maneuver forces must trust that the Engineers will have prepared the battlespace and set the terrain. Trust of competence, commitment, and character working as a single unified force. Trust, this is the bedrock of our Regiment and the Army.

By LTC Crystal Batey & 1SG (Ret) Brian Black. Photos by Mr. James Evans.

WE ARE TEXTRON SYSTEMS

NEXT GENERATION TERRAIN SHAPING OBSTACLES

MODERNIZING TODAY'S FIGHT

- ▶ **TOP ATTACK, STAND OFF,
ANTI-VEHICLE MUNITION**
- ▶ **AUTONOMOUS TRACKING
AND ENGAGEMENT**
- ▶ **SIGHT, EMPLACE AND ENABLE
WITHIN MINUTES**
- ▶ **REDUNDANT SELF-DESTRUCT
AND SAFETY SYSTEMS**
- ▶ **HIGH WEATHER AND
ENVIRONMENTAL RESISTANCE**



Build Bridges Not Walls

=== *Martin Luther King, Jr.*

Career Bridge...AEA's New Effort to Bridge the Gap from Military Service

Your Army Engineer Association (AEA) is wholly committed to serving this Engineer Regiment and we take the approach we are Army Engineers for Life...in and out of uniform. To be honest, a major hole in our offering was helping Engineer Soldiers of all ranks and all components find meaningful employment in the civilian sector. For some, finding civilian employment is a major challenge when we make the decision to hang up our uniform. For others serving in the National Guard or the Army Reserve, the challenge comes with every new assignment. In the past, AEA didn't help much. You asked us to do more...we are answering your call.

Announcing Career Bridge...and coming to you on Veteran's Day this year. Career Bridge will be AEA's multi-tier career transition service for Army Engineers. Any Engineer Soldier (Specialist through Colonel) seeking civilian employment can access job postings by a wide array of businesses inside and outside the engineer profession to see what jobs are available. You can upload your employment preferences, skills, and resume for companies to see. You can get alerts when your preferences match those of a prospective employer. Career Bridge will assist you in preparing your resume, contacting businesses you are interested in, and help you prepare for the all-important interview.

Career Bridge is available at no cost! The initial tier of service (searching the database of job offerings and uploading your preferences and resume so businesses see your talent) is available through AEA to all Army Engineers regardless of membership in AEA and rank. AEA Members will be able to tap into even more personal services such as resume assistance, talent matching, interview coaching, and more.

Our partner, SI Professional Search, is no stranger to the challenges the military faces when making transitions. SI Professional Search is an industry leader with over 30 years of experience helping our Brothers and Sisters start new careers in private businesses all over this country. More importantly, they have a genuine heart for assisting the military. SI Professional Search is both Veteran owned and operated; their heart of service starts at the top. I met with their leadership personally and I'm convinced this is the right company to assist my family – the Engineer Regiment.

If you are a business who is looking for extraordinary talent – and all of you are – I promise you will find exactly that among Army Engineers. So join us in this effort; give us your job postings and let us connect you with some amazing leaders.

You asked for AEA to provide this service and I know it is long overdue. So now is your chance. Starting on 11 November, go to armyengineer.com and click on Career Bridge or use the QR code below. If you are member of AEA, unlock the full power of this service. ESSAYONS!



MG (Ret) Bryan Watson
President, AEA

BERLIN AIRLIFT



PVT William Moore of Gorse, TX of the 759th Engineers levels off the base of a new 5,500 foot runway recently constructed at Tempelhof Air Force Base, Berlin as of the airlift planes, a Douglas C-54 Skymaster, is shown coming in for a landing in the background. U.S. Army engineers oversaw the construction of air infrastructure that ultimately played a key role in the success of the Berlin Airlift. Photo courtesy of USACE, Office of History.

ON JUNE 24, 1948, WITH THE COLD WAR IN ITS EARLY STAGES, THE SOVIET UNION BLOCKED ACCESS FOR ALL SUPPLIES GOING INTO PORTIONS OF WEST BERLIN. THIS CUT ROUGHLY 2 MILLION PEOPLE LIVING THERE OFF FROM THE MOST BASIC NECESSITIES. GEN LUCIUS D. CLAY WAS THE COMMANDING GENERAL OF U.S. ARMY FORCES IN EUROPE AND THE MILITARY GOVERNOR OF AMERICAN ZONE IN GERMANY AT THE TIME AND QUICKLY AND DECISIVELY CALLED FOR WHAT IS NOW KNOWN AS THE BERLIN AIRLIFT.

IT WAS AN AMBITIOUS IDEA AND INVOLVED USING WAR-TORN INFRASTRUCTURE AND LIMITED RESOURCES TO EXECUTE THE LARGEST AIRLIFT IN HISTORY TO PROVIDE BASIC NECESSITIES TO THE MEN, WOMEN AND CHILDREN LIVING IN THE SECTORS OF BERLIN OVERSEEN BY WESTERN EUROPEAN ALLIES. THE NEWLY FORMED U.S. AIR FORCE MADE THE FIRST DELIVERIES VIA THE ONE RUNWAY AVAILABLE AT TEMPELHOF AIRSTRIP JUST TWO DAYS LATER ON JUNE 26, 1948. BETWEEN JUNE 26, 1948 AND SEPTEMBER 30, 1949, THE AIRLIFT DELIVERED MORE THAN 2.3 MILLION TONS OF CARGO ACCORDING TO THE U.S. AIR FORCE HISTORICAL SUPPORT DIVISION. THIS INCLUDED EVERYTHING FROM FOOD TO MEDICINE TO COAL TO SUPPORT THOSE BEHIND THE BLOCKADE.



75 YEARS LATER

Engineering the world's most famous airlift in Berlin

BY MR. CHRISTOPHER GARDNER

It was an ambitious idea and involved using war-torn infrastructure and limited resources to execute the largest airlift in history to provide basic necessities to the men, women and children living in the sectors of Berlin overseen by Western European allies. The newly formed U.S. Air Force made the first deliveries via the one runway available at Tempelhof Airstrip just two days later on June 26, 1948. Between June 26, 1948 and September 30, 1949, the airlift delivered more than 2.3 million tons of cargo according to the U.S. Air Force Historical Support Division. This included everything from food to medicine to coal to support those behind the blockade.

It was immediately obvious that more than one runway would be needed and U.S. Army engineers began work building two additional runways at Tempelhof Airstrip right away. The first new runway, along with taxiway improvements, were in use by September 1948 and the third runway was in use by Thanksgiving that same year.

While the improvements at Tempelhof were underway, crews also began building the new Tegel Airport on the site of a former German artillery range in August 1948. In addition to two new runways, crews there also built administrative facilities, a hangar, a warehouse, a control tower and more. The first new runway at Tegel Airport was operational by Christmas 1948 and the second was in use the next summer.

MG NORMAN DELBRIDGE

MG Norman Delbridge retired as the Deputy Commanding General of the U.S. Army Corps of Engineers in 1986. In the earliest days of his career though, he was one of those Army engineers overseeing crews building and maintaining runways and other facilities at Tempelhof Airport and later Tegel Airport in Berlin. MG Delbridge shared his experiences in Berlin with the USACE, Office of History in 1991 and provided a detailed look at the unique way Army engineers delivered key air infrastructure in war-torn West Berlin to ensure the success of the airlift. "We had 20,000 (people) per shift and we worked 24 hours a day with lights, generator sets -- so there were 60,000 people," MG Delbridge exclaimed. "We had more women than men that did all of the earth moving... and they moved the earth by hand."

In all, records from the USACE, Office of History estimate that more than 9.8 million work hours went into the effort between military personnel and local Germans. Local Germans -- mostly women according to MG Delbridge -- accounted for the vast majority of that figure (more than 9.6 million work hours).

MG Delbridge said eventually they were able to incorporate small rail cars and earth movers to support operations and limited heavy equipment was also airlifted in over time. "The Germans have these little, it looks like the mine cars, that can lay these little tracks all over everything, and that was how, essentially, they cleaned up the country after the war. They'd lay these little tracks and they'd throw the bricks in these little cars and push the cars by hand," MG Delbridge explained. "Well, on this site what you did was you laid the little tracks over... we'd pull together a group of people, generally mostly women -- there weren't very men left in Berlin during that time -- and they would go out there with shovels and they would shovel this sand into the little carts and push it where we said, and then dump it and go back."

MG Delbridge also described using rubble from war-damaged Berlin as material for the base of the runways. We would find -- of course the whole city was level -- and so we tried to find as much of the bombed-out buildings that had little structural steel in it," MG Delbridge stated. "We would load these little two-and-a-half-ton dump trucks with this rubble from wherever we could... there was very very little in the way of the major buildings standing, so there was lots of rubble. But you just tried to find that which was

clean. And we brought it in and we laid it down on the runway, in 10 inch lifts." They would then use dozers going back and forth to break the material and then they would compact it and grade it. Between both airports, they brought in and used an estimated 755,000 cubic yards of brick rubble.

That initial layer was then covered with additional layers including asphalt that had to be flown in and a surface coat made from fine crushed cobblestones gathered from the cleaning up of the city followed by a "quick, fine" seal coat. Approximately 2.2 million gallons of asphalt was flown into Berlin and used for the new runways.

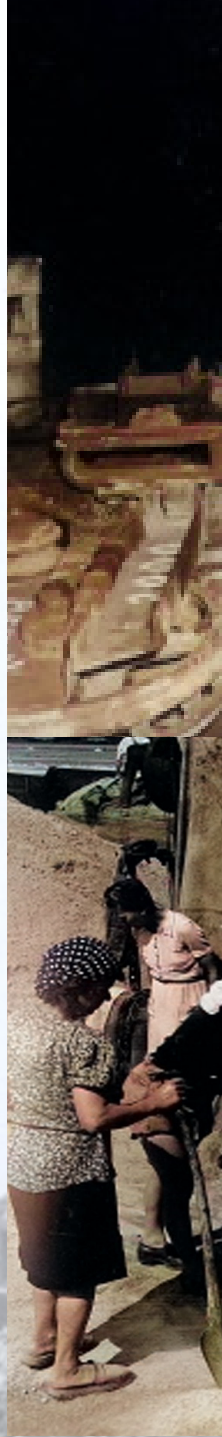
In the years after Berlin, MG Delbridge commanded several other USACE offices all over the world, including operations in Turkey (now part of the USACE, Europe District's mission) from 1960 to 1963, the Pittsburgh District from 1972 to 1975, the Europe Division (now the Europe District) from 1976 to 1978 and the Pacific Ocean Division from 1978 to 1980.

While the Berlin Airlift was near the beginning of MG Delbridge's career, the man known for calling for the airlift and administering it was wrapping up his illustrious military career at the time. Most people don't realize though that GEN Lucius D. Clay was a key leader with the USACE prior to his World War II and post-war heroics and he credits his time with the Corps of Engineers for his later successes.

GEN LUCIUS D. CLAY

Before World War II, GEN Clay was serving at the USACE, Headquarters in Washington, D.C. The 1930s was transformative for the USACE, with its mission greatly expanding as a result of the Flood Control Act of 1936. "The flood control act made the Corps of Engineers into a much broader engineering organization than it had been because it involved it for the first time in the construction of major dams and reservoirs," GEN Clay told historians in a 1977 interview. "Up to that time we had only constructed reservoirs and things of that type and kind as a part of a channelization approach and not as part of a flood control approach."

As part of that growing mission, GEN Clay was sent to Texas to oversee the construction of the Denison Dam on the Red River to supply water, hydropower and reduce flood risks near the border of Texas and Oklahoma. Then CPT Clay set up the now-defunct USACE, Denison District essentially from scratch and went to work. He revealed that experience helped prepare him for his later roles. "I think this is where you really get the experience that helps the engineer officer in war," GEN Clay told historians, referring to being assigned to Denison to build a District and a dam. "I was sent to Denison, Texas to build Denison Dam by myself. I went out and looked at a river where there wasn't any water. I immediately began to borrow men from other organizations, other Districts." He explained

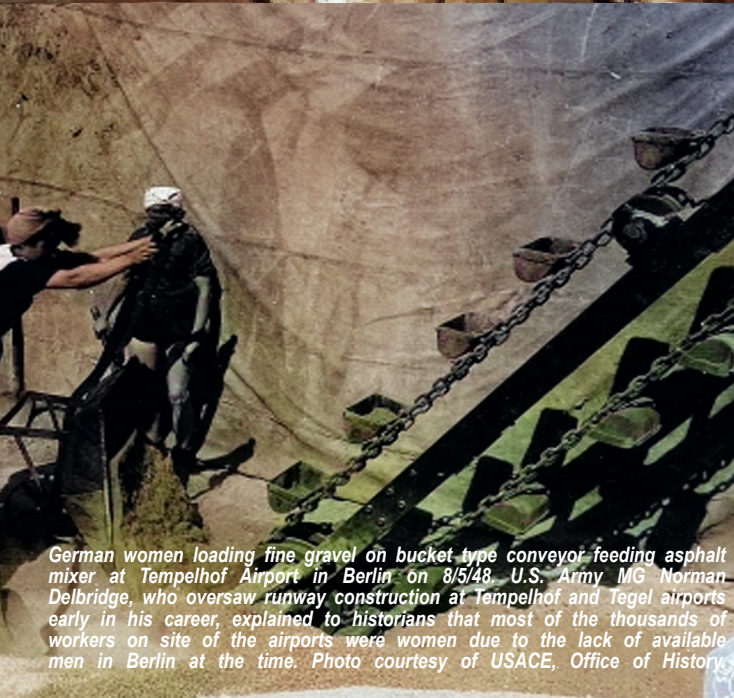




Checking over a power control unit before its assembly to tractor are CPL Lawrence Blado from Wilton, WI of 7742 Engineer Base Depot Group and Mr. Hicks Lacombe from New Orleans, LA master mechanic and supervisor of Engineers Tempelhof assembly shops from the Hanau Engineer Base Depot. Photo courtesy of USACE, Office of History. Photo circa 9/21/1948.



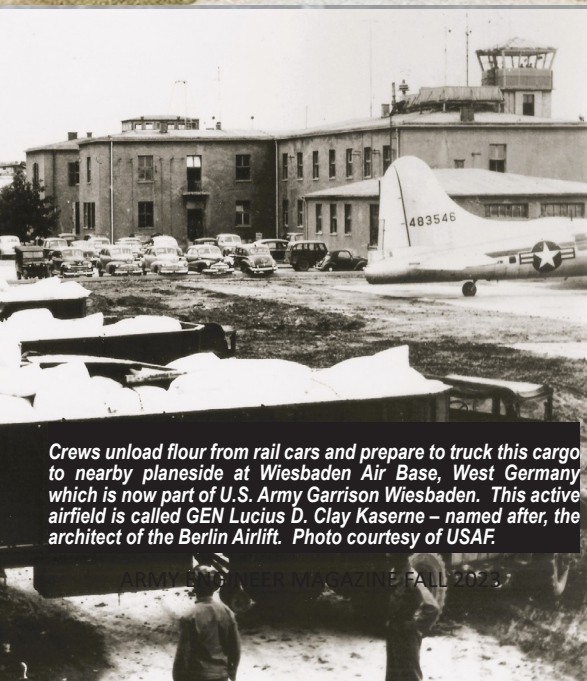
Conduit trench being excavated by German women at Tegel Airfield. Photo courtesy of USACE, Office of History. Photo circa 3/27/1948.



German women loading fine gravel on bucket type conveyor feeding asphalt mixer at Tempelhof Airport in Berlin on 8/5/48. U.S. Army MG Norman Delbridge, who oversaw runway construction at Tempelhof and Tegel airports early in his career, explained to historians that most of the thousands of workers on site of the airports were women due to the lack of available men in Berlin at the time. Photo courtesy of USACE, Office of History.



Surveyor at work from completed end of runway at Tempelhof Airbase. Photo courtesy of USACE, Office of History. Photo Circa 8/24/1948.



Crews unload flour from rail cars and prepare to truck this cargo to nearby planeside at Wiesbaden Air Base, West Germany which is now part of U.S. Army Garrison Wiesbaden. This active airfield is called GEN Lucius D. Clay Kaserne – named after the architect of the Berlin Airlift. Photo courtesy of USAF.



Crews prepare to lift the top of the new air traffic control tower from the U. S. Army Garrison Wiesbaden Army Airfield Nov. 9, 2021. The airfield played a key role in the success of the Berlin Airlift and continues to play an important role in supporting U.S. Army Europe and Africa operations. USACE, Europe District is managing the construction of the new tower there. Photo by Mr. Chris Gardner, U.S. Army.

that he pulled engineers from construction of what is now known as the Conchas Dam in New Mexico where construction was winding down, personnel from the USACE, Little Rock District and other places and within a few months had an operational organization.

Together, the team he pulled together oversaw construction of what at the time would be the largest rolled-earth fill dam in the United States. Today, the dam is still operated by the USACE, Tulsa District and is generally better known as Lake Texoma, the name of the lake created by its impounded water. To this day the dam still supplies water for millions of people living in an arid region, produces up to 100 megawatts of hydropower energy to customers of Rayburn Country and the East Texas Electric Cooperative power companies in the surrounding communities thanks to upgrades over the years and has prevented an estimated \$844 million in damages through its flood risk management benefits.

GEN Clay credits his experience both managing large-scale infrastructure projects and having to do so with limited support to begin with for his successes later in his career. "I owe everything I have in life to the Corps of Engineers," GEN Clay told historians when asked if his time with the USACE served him well later in life.

U.S. ARMY CORPS OF ENGINEERS IN EUROPE TODAY

While MG Delbridge was working in Berlin, the materials flown there were coming from airfields in West Germany. Much of that came from the Wiesbaden Air Base, which is still in use today and is located on what is now Lucius D. Clay Kaserne – part of the larger U.S. Army Garrison Wiesbaden.

In fact, USACE, Europe District – headquartered in Wiesbaden - is currently managing the replacement of the airfield's air traffic control tower so it can continue to support U.S. military operations going forward. The air traffic control tower is just one of 100s of projects the Europe District is managing in Europe as well as in Israel and Africa supporting regional security. "From the beaches of Normandy to the Berlin Airlift through the Cold War and now through the delivery of our more than \$7 billion design and construction program across Europe – Army engineers have a legacy of delivering solutions when called upon in Europe," said Europe District Commander COL Pat Dagon. "The U.S. Army Corps of Engineers is proud of our role in that legacy and delivering for U.S. forces, allies and partners."



Spreading of asphalt top on runway at Tempelhof Airbase. Photo courtesy of USACE, Office of History. Photo Circa 8/5/1948.



ARMY ENGINEERS



Berlin Airlift

In Berlin, Army Engineers oversaw rapid expansion of the existing Tempelhof Airstrip and construction of Tegel Airport from scratch.



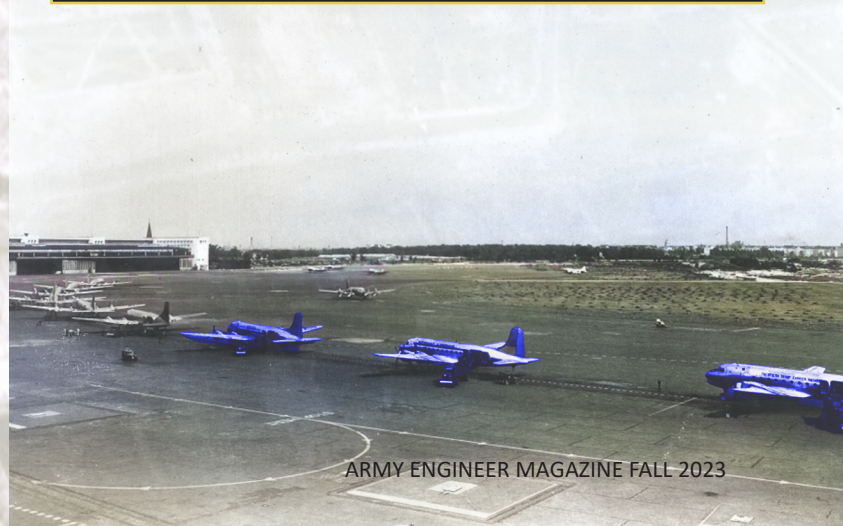
This effort involved:

- 2** new runways (Tempelhof)
- 2** runways, tower, hangar, and more (Tegel)
- 755,000 c/y** brick rubble gathered from damaged buildings
- 2.2M gallons** of asphalt flown in

Army Engineers oversaw roughly 9.8 million work hours on site, made up of mostly local German crews (mainly women, being just after WWII)



General view of the unloading ramp at Tempelhof Air Force Base, with C-54 Skymasters unloading their cargo of food and supplies. "Operation - Vittles". Photo courtesy of USACE, Office of History. Photo Circa 8/24/1948. Photo circa 1948.



Mr. Chris Gardner is a public affairs specialist with the USACE, Europe District and is stationed at Europe District's headquarters in Wiesbaden, Germany. In his role he helps engage U.S. and international stakeholders to tell the story of how Europe District delivers engineering solutions to support U.S. national security interests in Europe, Africa and Israel. Prior to Europe District, Mr. Gardner has served as a public affairs specialist with the USACE supporting a wide range of missions in their New York District, Baltimore District and Huntsville Center offices at times since 2006.

BuckEye

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Leidos provides geospatial intelligence in operational theaters around the globe with BuckEye, an integrated sensor solution for manned/unmanned aircraft that is also easily mounted to ground vehicles. Since 2004, BuckEye has collected 3+ million square kilometers of high-resolution data across 38 countries, providing customers like the U.S. Army Geospatial Center (AGC) with an accurate and precision understanding of terrain for detailed mission analysis and preparation of the environment at a tactical and urban level.

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BuckEye is available through Leidos' position on the Army's One Acquisition Solution for Integrated Services (OASIS) contract vehicle. This contract vehicle, established through a memorandum of understanding with the U.S. General Services Administration, is available for complex professional service projects such as geospatial intelligence.

WHY PARTNER WITH LEIDOS

From concept development to system integration, to design and testing of radar and sensor components, we have made radars and sensors a core part of our business. We also deliver a holistic Contractor Owned Contractor Operated (COCO) service for CONUS and OCONUS airborne missions including aerial survey, wildfire mapping, rapid integration, test, and evaluation; and intelligence, surveillance, and reconnaissance (ISR).

FOR MORE INFORMATION: leidos.com/defense

As an Engineer in the US Army, you are sure to find yourself being called “The Master of Terrain” a few times in your career. Coming out of your initial training whether that be as a private or a lieutenant you may tell yourself, “You’re right, I did find five of my seven points in land nav!” This would be a good start to your continuing journey getting to know the terrain and not only how to walk it, but how to shape it to your commander’s needs.

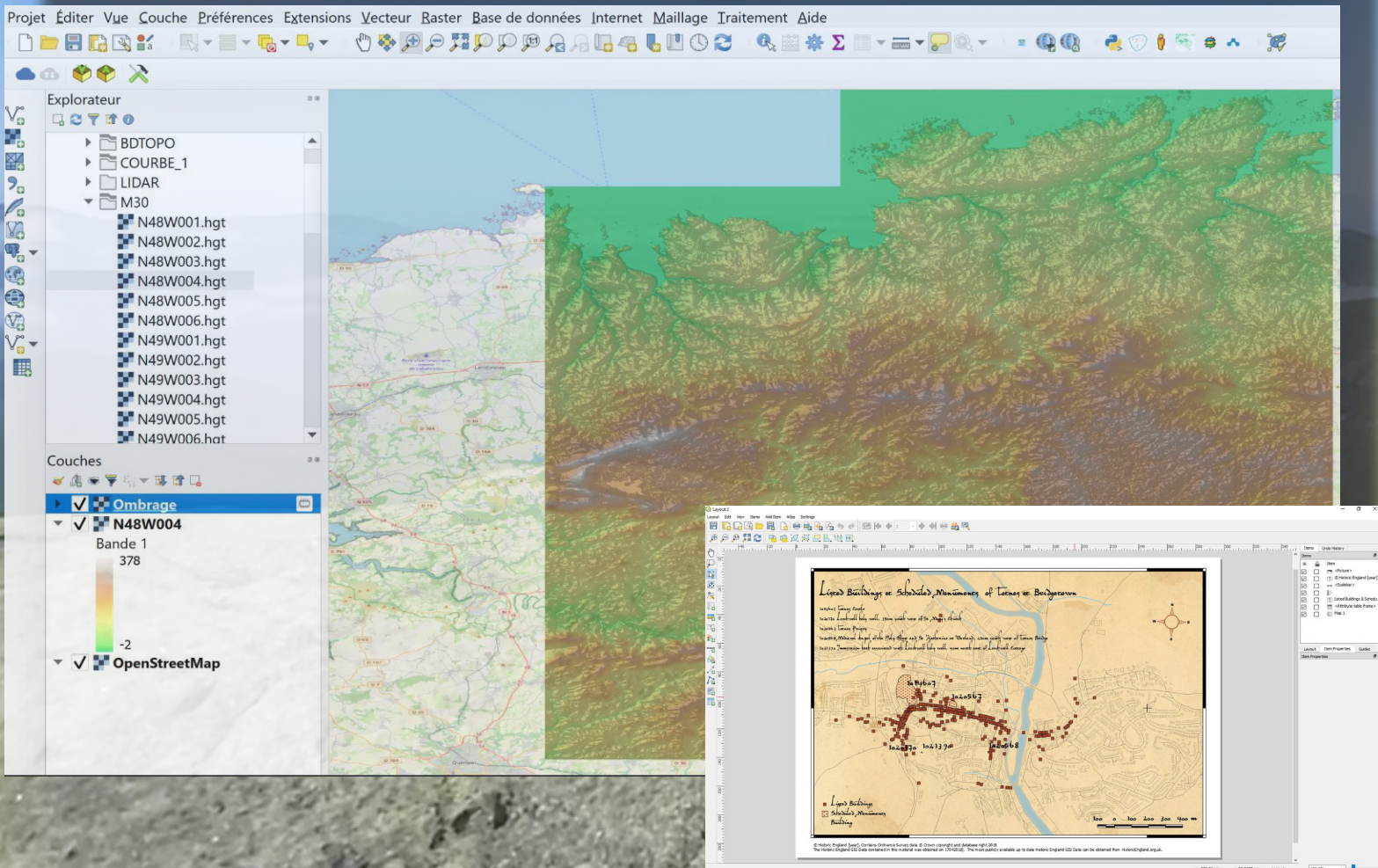
The Engineer has been called the master of terrain for hundreds of years. This means that as an Engineer you are expected to look at the land around you or possibly just a map and be able to tell a commander the best ways to navigate as well as the best ways an enemy may navigate to best defeat their efforts. In order to do this an Engineer must know all of three of the Engineering domains, Combat Engineering, General Engineering, and Geospatial Engineering. As a master you must be able to continually learn and train in each component to better support your Task Force. This article will briefly go over the three disciplines and some ways to better educate or train in these areas.

The first domain is Combat Engineering. This seems like the most straight forward as we have an entire MOS dedicated to just that, but to become more tactically and technically proficient this domain requires the most physical and hands on learning. While it is important to know your tasks such as demolition and breaching inside and out it is just as crucial to know the lay of the land and how to reach your objective. This requires practice at your basic skills to including map reading and land navigation. Once confident in these areas you must start deepening your skills past dead reckoning and onto route planning and thinking of how to best take advantage of the terrain you walk to give your force a better advantage and influence the enemy using obstacles in their appropriate intent. Route planning can require knowledge of how contour lines on a map can influence how you move as well as what it represents on the ground to keep your force in fighting shape while navigating and keep them safe from hazards. To influence the enemy, you must know how to place your obstacles as well as how to tie them into terrain so the

enemy cannot easily avoid or pass through all of your hard work pounding pickets or digging ditches. The simplest way to get better at all these things is to get out there and walk new terrain whether that be a hike in a national forest (my favorite past time) or at a school such as the Sapper Leader Course to do it under stress. All your combat engineering tasks rely heavily on your ability to read the terrain around you as well as off a map provided to you, so it is important to look for any opportunity to get behind a map and in front of your terrain.

The second domain we will cover is General Engineering. Here is where the technical element of terrain analysis comes into play. General engineering can range anything from the dig rates of your D6 bulldozers to water distribution across a forward operating base and occupies almost every other letter code of the engineer MOS. In this domain it is important to understand slopes and elevation when it comes to your knowledge of how to read a map and may require you to look at other maps than just a standard topographic map. Knowing the

Adirondack Mountains, NY. Photo by CPT (P) Zachary Donner



terrain that you are working on allows you to understand things like the slope of a hill for the construction of a road or the underlying soils and bedrock for the erection of large buildings. Even our 12Ns in a combat role still have to understand how slope and terrain can affect the creation of things like fighting positions and how the hydrology of an area can render a simple T fighting position into nothing more than a pond. A suggestion to all officers who intend to continue their education and may not have an undergrad in engineering like me would be to look into the Geological Engineering master's program from Missouri S&T with the Army's professional development program. This has given me more insight into not only the underlying earthen conditions in which we construct, but also some reference into other final domain of engineering, Geospatial.

The domain of Geospatial Engineering is without a doubt the smallest component of the Engineers with one true dedicated MOS, the 12Y. While it is the smallest branch of our engineers, people who master this space are truly the ones who can identify terrain better

than any other branch. Geospatial Engineers bring in the capabilities of mapping and GIS programs that allow them to analyze not only terrain, but the people in that area, trends, and can implement them into their mapping capabilities to better inform the fighting force. As an engineer you have the ability to take courses in this field and earn the skill identifier W2 which helps you to better step in this world. There are also multiple open sources of information and training that allow you to better harness the skills that can put you onto the path of becoming a master of terrain above those who omit this small but crucial domain.

As an engineer, you will always be looked on by any other MOS as the jack of all trades and you may be asked to do something that your occupation does not cover, but because you are an Engineer you will get it done or find a way, Essayons. Having the ability to know any terrain like the

back of your hand is a critical element to begin any task you are given from a breach to electrical hookups. Become the master of terrain by constantly training in all three domains and continue to cross train with your fellow engineers for you may need it in your next fight.

CPT (P) Zachary Donner is currently in transition from Fort Leonard Wood after conducting the Engineer Captains Career Course, earning a Masters in Geological Engineering, and moving onto Ranger School. His previous assignment was in the 37th BEB, 82nd ABD. CPT Zachary Donner's next assignment is Vicenza, Italy to the 173rd Sky Soldiers.



The Engineer: A Master of Terrain

CPT (P) ZACHARY DONNER

The short answer to the question posed by the title of this article is that Google maps is severely restricted in South Korea, primarily due to security concerns imposed by the Korean government. However, I wanted to dig deeper to understand the root cause of the issue and how someone can work around this apparent limitation when navigating on the peninsula.

Google's parent company Alphabet Inc. lost a South Korean court decision in November 2016. The court determined that the security risks of providing mapping data to Google outweighs the convenience of the company's Maps service. The government asked Google to blur sensitive information about military facilities, a request the tech giant declined. As a result, Google Maps will not be able to offer walking or driving directions in South Korea, posing challenges for tourists and business travelers. The decision has divided opinions, with proponents emphasizing the benefits for tourism and business, while the government cites concerns over national security and the potential exposure of military installations to foreign governments.

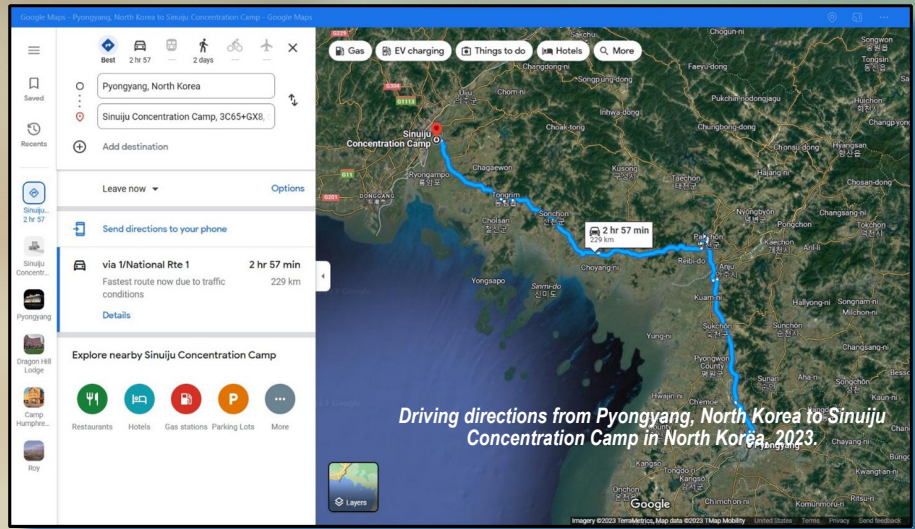
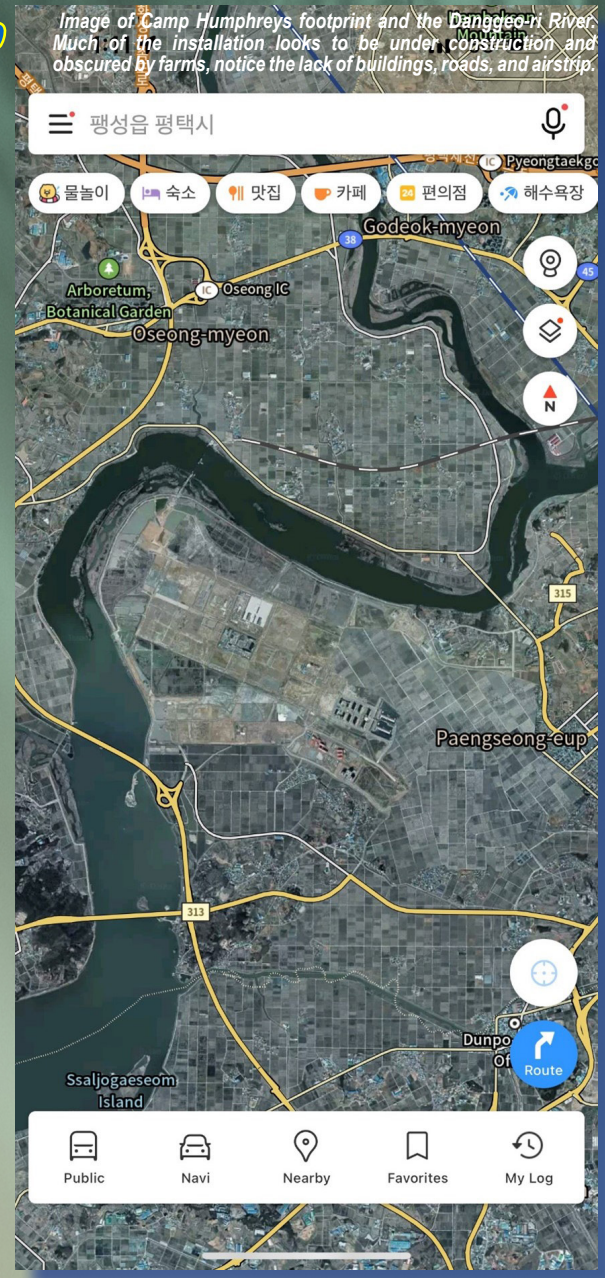
I wanted to see for myself how Google Maps stacks up, so I took some screen shots. I picked two destinations in South Korea and could only get public transit directions. No walking, cycling, or driving directions allowed. However, I plugged in two destinations in North Korea and was able to receive driving and walking directions.

How can travelers get their directions in South Korea? The Naver Map and the Kakao Map, offer a range of comprehensive services, including navigation. With smart mapping features, real-time traffic data, and voice commands, these applications provide walking, riding, or public transit directions. The app supports languages in English, Chinese, Japanese, and Korean. These mapping applications can function in South Korea because they censor sensitive locations and store the government issued map data domestically. Despite Google's attempts to negotiate access, national security concerns persist. Protectionism and strong local lobbying have further contributed to the dominance of South Korean mapping services. Examples of censorship on a U.S. military installation are evident in South Korea using imagery from the Kakao Map.

Google Maps' severe restrictions in South Korea are primarily driven by the country's stringent security concerns, leading to limitations on features like walking and driving directions within the country. Local mapping services such as Naver Map and Kakao Map have capitalized on this situation, offering navigation services. While Google faces challenges in accessing South Korea's map data, local apps continue to thrive, providing reliable navigation options for both locals and tourists exploring the Korean peninsula.

Why does Google Maps Fall Short in South Korea?

By CPT RYAN TWIGG-SMITH



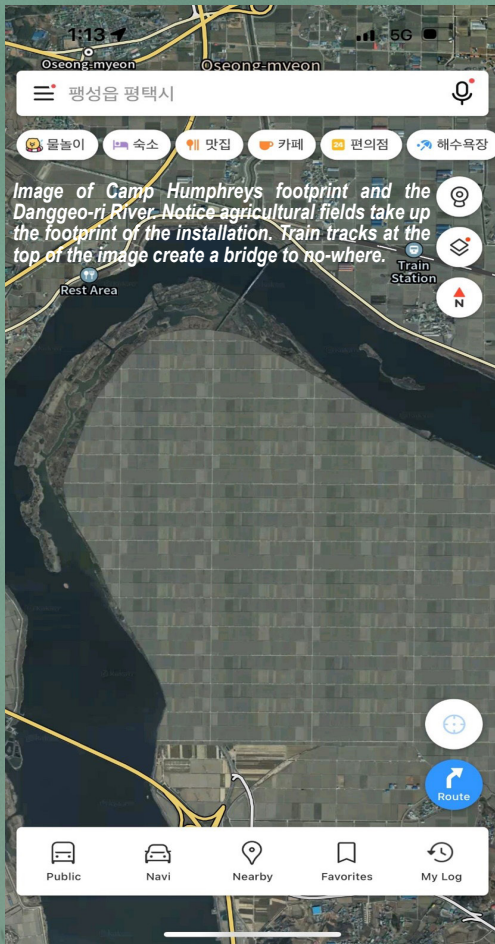
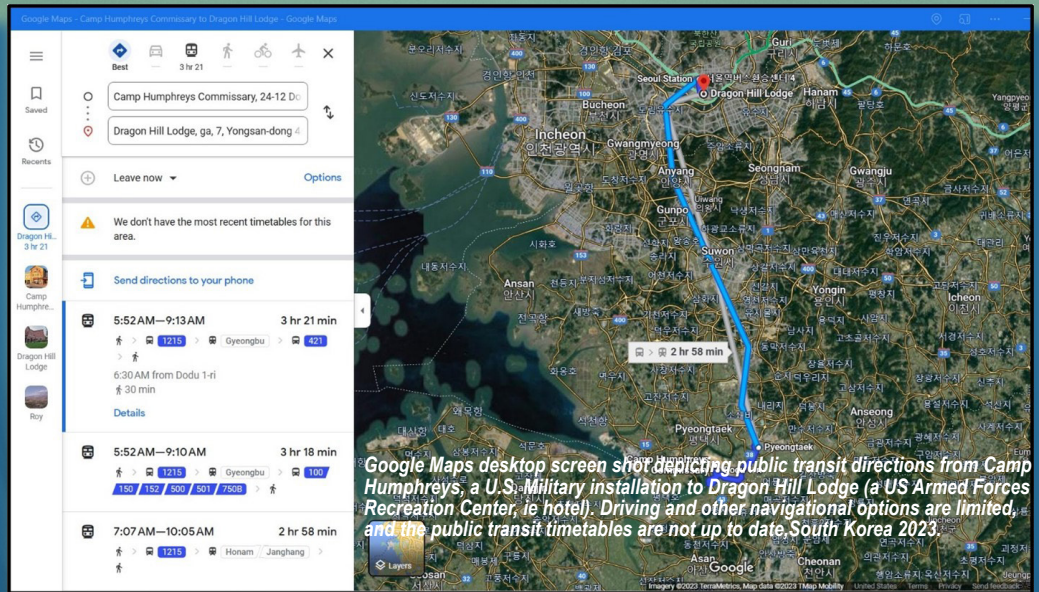


Image of Camp Humphreys footprint and the Dangeo-ri River. Notice agricultural fields take up the footprint of the installation. Train tracks at the top of the image create a bridge to no-where.



Google Maps desktop screen shot depicting public transit directions from Camp Humphreys, a U.S. Military installation to Dragon Hill Lodge (a US Armed Forces Recreation Center, ie hotel). Driving and other navigational options are limited, and the public transit timetables are not up to date, South Korea 2023.

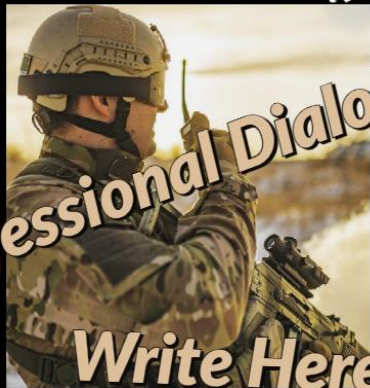
CPT Ryan Twigg-Smith is a graduate student at the University of Missouri Science and Technology under the Professional Development Program (PDP) offered through the Engineer Captains Career Course (ECCC) at Fort Leonard Wood, MO. His next duty assignment is Camp Humphreys, Korea with 8th Army.



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The Army must be prepared for conflict in a range of settings with complex strategic and operational variables. What investments in Leader Development and Modernization should Army Engineers prioritize now to ensure we are ready for the challenges of the Pacific and European theaters?



Essayons Club



ARMORED ENGINEERS PROTECTING THE FORCE WITH SERE TRAINING

By CPT Aaron A. Hughbanks

As the battlefield transitions from Large Scale Operation (LSCO) to Multi-Domain operations (MDO), military professionals must adapt to new concepts and ways of fighting. The military engineer on the frontline serves a multitude of combat roles and is one, if not, the most versatile asset on the land, sea, or air. Engineers find themselves in the midst of heavily contested breaching lanes, behind enemy lines conducting bridge reconnaissance, and even filling in maneuver locations to augment infantry forces. The dangers of being exposed on countless operations requires engineers to be prepared to safeguard information and intelligence. In the worst-case scenario, they must be prepared to protect the operation, those responsible in carrying it out, and ultimately defend the greater United States and its allies. SERE training for engineers would only bolster the efforts of their profession and amplify their value should they become a captive.

Current efforts of the Survival, Evasion, Resistance, and Escape (SERE) training do not usually extend further than a mundane digital course on Joint Knowledge Online (JKO) or some similar medium. This does not do them justice as repetition through live action of captive scenarios is proven to be more effective than what an online source can teach. The engineers serving in armored combat roles through the few heavy Divisions in the Army are very susceptible to becoming isolated. Formations are spread far apart and vulnerable to dismount enemy forces with the capability to detain personnel and remain undetected. SERE training is not a repertoire than anyone wants to execute when needed, but is a surefire defense when and if it is needed.

The value of intelligence engineer personnel can provide to enemy forces reaches no bounds. Concepts of FD3 knowledge on obstacle reduction operations gives the enemy a comprehensible approach to defeat U.S. offensive maneuvers, something very adamant in a LSCO environment into unknown territory. Engineers train and rehearse heavily on maneuver techniques through DoD institutions, and know more than their

fair share of details on the mission than just their Protection tasks. Extensive planning goes into protecting the force through MDMP and Engineer effort, making defensive posturing a very daunting and expedient task – and most definitely not one to sacrifice when numerous lives are on the line to hold ground. If apprehended and indoctrinated to support enemy forces, a combat engineer could prove very detrimental to allied forces in every aspect. Resistance training can prolong and deter unnecessary damage to the Army and its allies.

The Heavy Engineer units are very well protected with armored vehicles but often dismount to investigate IEDs/UXOs, conduct reconnaissance, and reduce obstacles in hazardous conditions. The complexity of tasks these personnel endure puts them in a multitude of positions with less security than their armored units they deploy with. The unfortunate occurrence of being captured by enemy forces is most likely to befall on engineers given their plethora of additional tasks. The multi-domain fight encompasses echelons of warfighting tasks and while the Protection cell of engineers sounds like it's behind closed walls, rest assured is not. SERE training teaches individuals to resist relinquishing knowledge harmful to their allies, and an armored Task Force with their weaknesses and plan exposed only impedes the United States' capability to succeed in a multi-domain fight.

The personal skills attained while attending an accredited SERE course further qualifies any individual, not just engineers, to remain an asset. Special Operations soldiers remain priority for SERE training as their units are high-risk for operating in austere environments. Engineers are not common in the special operations community and deserve a closer look into obtaining more opportunities to attend SERE, given their potential needing to protect intelligence at all levels. Armored engineer units face many challenges on the battlefield, but one they should not have to worry about is how to handle a situation should they become a prisoner of war.

CPT Aaron Hughbanks is a career Engineer Officer with the United States Army serving over 20 years in the military. His service includes assignments to Heavy and Light Infantry, Airborne Infantry, and Special Operations units. Current duty station is with the 1st Infantry Division at Fort Riley, KS.

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Approximately 80% of the U.S. Army engineer regiment force structure composition resides in the reserve component. The engineer reserve component is made up of engineer units from the U.S. Army Reserve and Army National Guard spread out across the globe serving primarily in a part-time capacity. Improved and sustained integration of the AC & RC is necessary for the Army and the engineer regiment to succeed. Although the reserve component has shifted to an operational reserve differing from the legacy strategic reserve role of the past, much work in training and equipment parity needs to be done to establish closer equivalency to the AC engineer forces. Large Scale Combat Operations (LSCO) demands that the engineer regiment integrate all three engineer components as a central foundation to how we train and how we will fight. It is imperative that we deliberately integrate across all spectrums to become a stronger engineer force structure who can succeed in combined arms multi-domain operations. This article will provide a high-level roadmap for key focus areas to better integrate the engineer regiment's AC & RC and be ready to "Fight and Win".

AC/RC KEY FOCUS AREAS

To digest this enormous task, we should start with an AC/RC integration strategy focused across three distinct "FOCUS AREAS" of engineer effort: Operational Plans (OPLAN) Development, "Setting the Theater" Campaigning, and "Warfighting":

ENGINEER REGIMENT ACTIVE COMPONENT (AC) – R



OPLAN DEVELOPMENT & INTEGRATION (HOLISTIC THEATER ENGINEER CONCEPT)
INTEROPERABILITY
ENGINEER C2 PLANNING
COMBINED ARMS REHEARSALS

CAMPAIGN SET THE THEATER"
GEDSPATIAL PRODUCTS AND BATTLEFIELD PREPARATION
ENABLE LOGISTICS PLATFORMS (DRAWINGS AND CONSTRUCTION)
PORT ASSESSMENTS
VISUALIZE TERRAIN AND IDENTIFY RISKS AND CHALLENGES
CONSTRUCTION PROJECTS

WARFIGHTING
BUILD INDIVIDUAL READINESS
CREW QUALIFICATIONS
WFX/NTC/JRTC/JNRC
NET GAP CROSSING EXERCISES
COMPLEX OBSTACLE BREACHING PROFICIENCY & EXERCISES
CONSTRUCTION PROJECTS

EXAMPLE OF AC/RC PROGRESS

AC/RC integration is not a new concept. We have done this in the past with successful results and continue to do so in multiple areas. We had engineer force structure including a multi-compo engineer battalion where the HHC and one line company is AC, a second company is USAR with the third company being Army National Guard. This is a concept we should seriously consider scaling up in the future engineer regiment at different echelons where it makes sense. The challenge has always been how to scale this up to the entire regiment vs. small wins and small pockets of success. In the following, we highlight what we feel "right looks like" regarding AC/RC training integration with some caveats. We must shift the paradigm from this being "too hard" and "could be done" to believing integration is "essential," "critical" and a "required" piece of the training environment.

Regimental leaders recently visited a tactical wet-gap crossing training exercise, "CAVAZOS STRIKE" that was multi-compo and joint (USMC logistical participation). We witnessed the 36th Engineer Brigade (AC) and the 420th Engineer Brigade (USAR) working as a team, fully integrated from planning through successful execution. Both organizations benefited from the exercise in sharing TTP's and gaining a better understanding of the strengths/weaknesses of each



RESERVE COMPONENT (RC) INTEGRATION STRATEGY



other's organization at echelons from platoons to the brigade staffs. We need more of this type of training to improve the fieldcraft of our engineer leaders and Soldiers. Their integration is due to a long-term partnership building a "Bridging Center of Excellence" platform for maneuver elements, engineers, and the entire combined arms team to exercise wet- and dry-gap crossing training in a challenging field setting, and ultimately be able to conduct successive river and gap crossings as part of an offensive operation.

Many units have participated in Warfighter exercises and executed various wet gap crossing missions virtually and in constructive training, but there is nothing like physically conducting this mission on the ground to understand the full array of challenges this extremely complex and difficult mission entails. For example, subordinate companies are task organized to perform missions from area clearance to bridging practicing the attachment/detachment task organization of engineer forces across different commands as part of completing engineer missions on the battlefield. This is what our junior officers need to experience and learn how to succeed in this environment. These exercises will continue to improve the practice of integrating maneuver forces, which will add another dimension to leader development of both engineer and maneuver leaders. These

exercises need to allow leaders to perform under intense stress to ensure the maneuver force maintains momentum and is not delayed while continuing to be that valued, on-the-ground engineer problem solver for the task force.

This is Where we need to be as a regiment! All planning and development actions must be as integrated as possible and include the diversity that all engineer components can provide. Effective training must be "Live" in-person unit participation vs. Limited "constructive / virtual / ghost" capabilities' in mission exercises and training. We must include and ensure enabler participation in whatever venue to practice and experience multi-compo fighting shoulder-to-shoulder. We must ensure widespread familiarization of all engineer capabilities and skillsets across the full spectrum of engineering at EN BDE and BN level with exposure and experience gained from exercises / training – integrated exercises from PLT to TEC as appropriate: our engineer leaders need to be familiar with all engineer capabilities across the multi-component regiment. Improved ability to integrate into any BDE or BN level structure with our forces as leaders understand challenges, capability/limitations, SOPs, and expectations. We must embody mutual respect for what each component has to offer and together create the strongest and most capable regimental team!

CALL TO ACTION

"TOP 5" Actions for improved AC/RC Integration in the Engineer Regiment

Goal: Build Engineer leaders' / Soldier familiarity, interoperability, partnerships, & understanding prepared to provide improved and effective engineer support to maneuver commanders.

1 TRAINING INTEGRATION: Increase Engineer training exercises/ events that include all three component Engineers as the standard for Engineer capability support. Ensure that training is maneuver-integrated and combined arms centric.

2 PLANNING: Deliberate effort at the Theater Engineer Command, Engineer Brigade and Theater Engineer staff to plan and incorporate EN capabilities from all three components into contingency planning effort. Execute combined arms Rehearsal Of Concept (ROC) drills.

3 READINESS & INSTITUTIONAL TRAINING: Ensure reserve component units have equipment parity for training and deployments. Fix interoperability issues that exist in communications and increase EN schools' opportunity to include more multi-component EN (and other service) students for sharing of experiences, Tactics, Techniques, procedures (TTP's), and familiarity.

4 MULTI-ECHELON & MULTI-COMPO EXPERIENCE: Add Theater Engineer Command (TEC), FEST-M, and EN BDE staff planners as associated audience or basis for all Engineer support efforts at Corps, Theater or Field Army level. Build more multi-compo engineer organizations at echelon to "share" capability across component and hasten RC unit capability availability.

5 LEADERSHIP EXCHANGE: Create more Engineer leadership partnership and exchange opportunities at CO, BN, BDE, and TEC levels for "multi-component" broadening experiences using existing authorities (AC to RC assignment, Exchange programs, RC ADOS at AC units) including key development and command opportunities. Introduce Soldiers who depart AC to a continued service in the RC.



BG Palmer, DCG, 412 TEC, addresses Soldiers during the planning and training events supporting CS23 at Fort Cavazos, TX. // 341 MRBC (USAR) Soldiers operate a Bridge Erection Boat during Cavazos Shrike as part of wet gap crossing training. Photo by Carina Francis. // Leaders from the 420th EN Bde (USAR), 36th EN Bde (IIIAC), Marines from the 4th Marine Logistics Group (CLB 453, USMC-R), and enablers (RSG, TTBn, MP Co, GSAB) conduct a Combined Arms Rehearsal for CS23 prior to mission execution. // Soldiers from 980th EN BN conducted Fixed Bridge Abutment training and construction. // 401 MRBC (USAR) 341 MRBC (USAR) and 478 EN BN HHC conduct IRB slingload training with 7-156 GSAB. Photo by CPT Mason.

Article and photos are courtesy of the Chief of Staff Office, Reserve Affairs Office, USACE HQ that works with key Engineer Regimental leaders and organizations to synchronize and connect Engineers across all components of the Army Engineer regiment.

ENGINEERING SOLUTIONS TO SECURE OUR NATION'S TROOPS FROM CYBER THREATS

By Mr. Christopher Biegun, COL (Ret) Jason Kirk & Mr. Dean Rock

Almost everything our US Troops do touches "the Net." In the future, multiple pieces of an Engineer Soldiers' standard "battle rattle" gear will be connected to the IoT – the Internet of Things. To gain battlefield advantage, the Army, and Department of Defense (DoD) are looking at ways to integrate smart and wearable technology into elements of field and garrison equipment. These new tools bring value to the multi-domain battlefield while also creating vulnerabilities that need to be better understood.

In 2018, a data company Strava, known as the data company for athletes, released its "heat map" on open sources. The data clearly showed where US Troopers wearing digital devices were running and operating in Afghanistan; data that was easily available to our enemies. Data that could be used to determine exact locations, patterns of life and make targeting US Troops much easier. More recently, US Troops have reported receiving free Smartwatches in the mail in the hopes that the Troops would activate the watch and provide access to their devices – and data. Analysis is still ongoing to determine who the actors are that have sent these devices to our Troops. It is clear that they are being targeted, and the question remains whether this is by malicious actors, or not. The threats seem to grow daily for our Troops and their units.

How best do we defend against these expanding threats while gaining benefit from recent technologies? Within the Army, that is the role of the U.S. Army Cyber Command (ARCYBER). ARCYBER's primary tasks are to:

- **Build, operate and maintain Army computer and information networks**
- **Defend Army and friendly networks, data, and weapons systems**
- **Conduct influence operations**
- **Execute cyber and electronic warfare attacks on adversarial nations and groups**
-

How can industry partners help provide our forces the requisite protections they need? The US Army Corps of Engineers (USACE), the entity responsible for the design and construction of most Military Construction (MILCON) for U.S. Forces worldwide. The more cyber-protected new and existing facilities are designed and constructed, the better we protect our Engineer Regiment and forces across DoD. In order to protect our troops and the cybersecurity risk to the infrastructure they plan, design, and operate, the Army Engineer Regiment —

particularly USACE, Command Staff Engineers, and Installation Public Works Engineers — must develop defenses against the rising global cybersecurity threats.


The need for a robust cybersecurity posture across critical infrastructure systems has emerged as one of the most serious challenges confronting the federal government and its partner organizations. Critical infrastructure control systems include water supply and water management systems, hydropower systems, safety control system, flood risk management control systems, dam safety systems, marine traffic control systems, utility control systems, traffic control systems, building control systems, fire/life safety systems, and other critical information systems.

Attempts to infiltrate our nation's infrastructure and both individual Troops and military organizations through cybersecurity attacks are on the rise. Fortunately, USACE is already engaged in the fight against the omnipresent cybersecurity threats. With a well-defined risk management approach and the latest available innovations, collaborating with industry, USACE in conjunction with the U.S. Commercial industry, is actively engaged to make our infrastructure cyber-resilient and strong.

The USACE Critical Infrastructure Cybersecurity Mandatory Center of Expertise (UCIC-MCX) at Huntsville, AL is at the forefront of the critical infrastructure cybersecurity battle. The UCIC-MCX help guide critical cyber components for all Troop support facilities and headquarters. Their efforts directly and positively help protect US Troops, and their families, from cyber vulnerabilities. They conduct cybersecurity and physical security assessments to help determine adherence to critical infrastructure cybersecurity controls. The assessment results help to close gaps, and pinpoint security strengths and weaknesses, improving the security posture of critical infrastructure control systems.

One example of how building scalable, secure data center infrastructure can directly safeguard the warfighter is in protection of force (and asset) tracking systems. Secure data center features are instrumental in securing the physical equipment upon which force tracking applications are built upon. Datacenter builds can be optimized for secure ingress and egress of private lines to extend encrypted, closed network connectivity to frequency and/or infrared based tracking devices in theater.





Effective application of cybersecurity principles and tools protects from identification, location and movement of troops and high value assets.

Another aspect of protecting our soldiers is automotive cybersecurity. Imagine automotive cyberattacks such as GPS spoofing, Lidar/Radar jamming and spoofing, or exploiting in-cabin microphones to actively listen in to troops as they execute missions! Proper application of cybersecurity principles long-implemented in headquarters-based datacenters can be of assistance. Encryption of long-haul communications channels to vehicle antennas (4G/LTE) in the field cuts down dramatically on adversary's ability to intercept mobile communications. Careful vetting and removal of unnecessary sensors and microphones is also a good step. Hardening of the "brain" of tactical vehicles, or ECU, should be accomplished, starting with limiting physical access to the ports that connect to it, ensuring it does not have Wi-Fi capability, and software access is password protected. "Experience and collaborative information learned from conducting assessments using a standard set of cybersecurity controls, such as NIST-800-53, allow organizations to build and adjust their overall risk management strategy," explained Mr. Dean Rock, CEO of SteelToad, a cybersecurity business. "This is especially crucial in securing critical infrastructure." "It is rewarding to be in the business of providing key infrastructure for our both Nation's critical civil infrastructure, and our Nation's Troops wherever they serve; it is even more exciting to make sure that we have designed the requisite Cyber protections into everything we do. In fact, Black & Veatch has developed an excellent partnership with one of the Nation's preeminent Cyber companies – SteelToad – to better help us provide the Cyber protections our Troops, their families and our civil and military infrastructure deserve," stated MG (Ret) Rick Kaiser, President of Black & Veatch Special Projects Corporation, the company's federal business.

Throughout its history, the Army Engineer Regiment has brought innovations to the planning, designing, building, of our Nation's critical defense and civil works infrastructure. By implementing the latest Cybersecurity defensive tools and processes, we can maximize the operational value of increased connectivity provided by the Internet of Things, while ensuring we protect our US Troops from ever-growing cyber threats.

Mr. Christopher Biegun serves as Black & Veatch's Federal Integrated Services Customer Executive and Principal Program Manager. He is Program Director for Threat Reduction and IT/Cybersecurity Solutions. He is a highly experienced Senior Program Manager with a 34+ year career spanning operations, intelligence, training, testing and evaluation, system engineering and integration, strategic planning, project and product development, and management. Prior to his private sector career, he served in the USAF for 24 years spanning 5 years enlisted service as an Operations Intelligence Specialist and 19 years as a commissioned officer with several Program Manager and Chief roles for the Air Force Research Laboratory (Warfighter Training Research); National Reconnaissance Office (Chief of Network Engineering); Defense Threat Reduction Agency (Chief, Electronic Biologic Detection Systems) and the National Geospatial Intelligence Agency (Director of Military Readiness). He is Certified Cyber Professional (CCP), Certified Information Technology Infrastructure Library (ITILv3) and Project Management Professional (PMP).

COL (Ret) Jason Kirk serves as Black & Veatch's Federal Solutions Director and Resilience Programs Liaison. Prior to his private-sector career, he served in the Engineer Regiment for 26 years from Sapper Platoon Leader to USACE District Commander. Jason has been a JungleCat (11th Engineer Battalion at Ft. Stewart, GA), a Proven Pioneer 299th Engineer Battalion at Ft. Cavasos, TX and a Battering Ram 40th Engineer Battalion in Baumholder, GE and Iraq. He also served as Sidewinder 07 at the National Training Center with the New Orleans District USACE and commanded the Jacksonville District and Charleston District. He is a registered Professional Engineer in Florida and Missouri.

Mr. Dean Rock is the founder and CEO of SteelToad Consulting, with more than thirty years of IT industry experience and extensive knowledge in the cyber technology field. Dean is a highly driven business and technology leader working at the intersection of business leadership and technology solutions delivery, including cloud services, project management, cybersecurity, training, and software development. He continues to evolve with the ever-changing Tech space, leveraging cutting-edge technology to navigate, solve problems, and simplify complex issues for his valued clients. He manages and supports the mission of enterprise and data-driven applications for a range of clients in the federal and private sectors. He is a Certified Information Systems Security Professional (CISSP), an accredited ISACA professional instructor for Certified Information Systems Auditor (CISA), Certified Information Systems Manager (CISM) and Cybersecurity Maturity Model (CMMC) Instructor. His professional certifications include SCRUM master, CMMC Assessor, CMMC Instructor, CMMI Instructor, CMMI Lead Appraiser for Medical Device Discovery, Development, Services Supply Management, Data Management, and CMMI Enterprise Data Management Expert, ISO 9001, ISO 20000, ISO 27001 Lead Auditor.

Is Pervasive Understanding on the How should the military adapt?

The battlefield is fundamentally human activity, where soldiers fight to advance and withdraw over the complex and dynamic environment whilst opposing commanders' situational awareness informs their decision making. Humans are involved at all levels, and the rate at which they can understand and convey information is crucial. Pervasive understanding refers to the ability of military personnel at all levels to have a comprehensive knowledge of the battlefield environment, enabling them to make informed decisions and execute their tasks with precision. As an Officer in the British Army, I will use the UK military as a basis for my argument, but due to the close links between our forces and yours, many of my points will translate well to the Armed Forces of the U.S.

The British Military currently approaches a shared understanding of the battlefield which is not truly pervasive. In the military context, the Commanding Officer relies on their planning cell to generate a shared understanding of the battlefield. Due to time limitations, each individual cannot communicate the full extent of their understanding of the battlefield to their commander to inform their decision making, with the approach instead seeking to communicate the most important pieces of information. Although the military's current system of delegated planning approaches effective shared understanding, it does not provide the commander with a true pervasive understanding of the battlefield.

Framing a battlefield using Actor-Network Theory demonstrates the scale of the task of achieving pervasive understanding of the battlefield. Actor-network theory (ANT) is a theoretical framework proposed by Bruno Latour, an anthropologist of science and technology who emphasizes the importance of relationships between actors in shaping reality. Latour defines human and non-human actors as not just individuals, but any entity such as objects, the environment, or abstract entities like ideas, which interact with one another, forming a network. In the battlefield context, examples of these actors include military personnel, equipment, information systems, terrain, weather, and enemy forces. These actors impact each other through bilateral links, such as equipment affecting the movement of personnel, and personnel depleting equipment over time. To gain a pervasive understanding of the battlefield would require an understanding of this complex and dynamic network, including an understanding of the interaction of the multitude of different actors. The scale of this challenge also grows exponentially with the number of actors included, and so with the size of the battlefield at hand.

In his 1976 work, John Boyd draws from the experience of fighter pilots in the Vietnam war to separate the decision-making process into four distinct phases: Observe, Orient, Decide and Act (OODA). The first two phases involve the collection of information and processing it, preparing for a decision to be made. In the context of ANT, this equates to establishing all the actors: Observe; and conceptualizing the network around them: Orient. Understanding is therefore contained by the Observe

and Orient phases of the OODA loop, and both phases face significant challenges.

The first key challenge to pervasive understanding is the Observation of an ever-increasing quantity of actors in modern warfare, producing a network too great to be fully Observed by human commanders. This complexity makes it difficult to identify and understand the networks of relationships that are necessary for achieving pervasive understanding. The increasing prevalence of unmanned aerial systems (UAS), for example, has resulted in an exponential increase in the amount of ISR data available to military personnel. In their 2016 article, Boury-Briset suggests that the rate of data produced should be measured not in MBps, but in GBps or TBps. Despite being written only 7 years ago, both Ehrhard and Boury-Briset clearly suggest that the "jungle of information" will continue to increase. Recent events in Ukraine confirm this, with surveillance footage from commercial drones being used on an unprecedented scale. For true pervasive understanding of the battlefield, the commander would therefore need to "Observe" Terabytes of data per second.

The second key limitation to human understanding is the brain's Orientation. Once the information has been Observed by the individual, only a fraction can be processed by the human brain to Orient the individual and complete their understanding. Works in neuroscience estimate that the human eye can Observe up to 10 megabits of visual information per second, with further experiments showing that the conscious visual Orientation capacity of the brain is only 60 bits per second. However, this capacity can vary depending on the complexity of the visual stimuli and the cognitive load of the task. It is likely that in contention with the effects of sleep deprivation in conflict, the Orient phase of understanding may be further limited. Purves and Li therefore identify an upper bound of working limit of human Orientation anywhere between 30 and 60 bits per second. The fact that these Orientation rates are substantially less than the Observation rates illustrates the limited ability of the human brain to process data on the scale required by the battlefield. This is further illustrated through consideration of the military commander's ability to Orient written or spoken information.

Rate of Orientation has a greater variance in written and oral comprehension and remains a limiting factor to Pervasive Understanding. In their 2014 work in experimental psychology, Rayner estimates that the average individual can process between 120-200 words per minute when listening to speech, and between 250-500 words per minute when reading. Whilst this does not reflect the pressures acting on service personnel such as sleep deprivation, and issues with communications equipment, this study is taken from a civilian sample group, where individuals were not well rehearsed in the task-specific communication in which the military excels. Rayner's low estimates of 250 words per minute, and Li's 60 Bps, shall therefore be used as upper bounds for the rate of

Battlefield Achievable or a Fallacy....

By Lt Benedict Thom

human Orientation. This is not limited to the English language, with Rossi's research into the 17 most widely spoken languages determining that information is transferred at an average of 39 bits per second. The human brain's ability to Orient and process Observed data is therefore the limiting factor on human understanding, with the rate of human Orientation determining human bandwidth.

Finally, the reliability of data on the battlefield is decreasing with the rise of information warfare, further limiting the commander's human bandwidth. For networks to function effectively, there must be a high degree of trust between the actors involved. Given that "All warfare is based on deception" all data must not only be processed as part of the Orient phase, but it must also be verified to avert enemy deception. Focused attention increases the processing capacity of the brain, whilst "divided attention or multitasking can decrease" it. Military commanders must multitask by nature of their role, balancing decision-making and running their operation whilst communicating their own commanders and subordinates, and this effect is therefore amplified on the battlefield. The increasing unreliability of data increases the burden on the commander's OODA loop and decreases human bandwidth further.

So far, this essay has established three key limitations to Pervasive Understanding on the modern battlefield: The quantity of data is too great to be Observed; the data, once Observed, is too complex to Orient; and that the increasingly unreliable data requires more robust systems. The British military must adapt to these key challenges in order to remain competitive on the global stage, and several innovations and emerging technologies lend themselves to these three key challenges.

Using advanced technologies such as sensors which can collect and analyze data in real-time would reduce the quantity of data presented to the human Observer. These sensors would perform a preliminary Orientation on their Observed data, reducing the strain on human observation and alleviating the strain on human bandwidth. Integrating the observation and Orientation at the data collection level would allow only the most critical information to be transmitted to the commander, which would both reduce the quantity of data to be Observed and reduce the Electromagnetic (EM) signature. The limitation to this technology is the automated Orientation which, once analyzed by the third parties, would become predictable and therefore could be vulnerable to enemy cyber capabilities.

As the principal limitation on human bandwidth, improvements to Orientation would vastly improve the commander's ability to achieve Pervasive Understanding. McKinsey's 2022 review of Artificial Intelligence (AI) capabilities states that AI is embedded in 34% of computer vision systems, making it a proven tool for the processing and Orientation of large quantities of data. Writing in Nature, Chai states that AI "in-sensor computing for machine vision" can process images and videos more than 20 times faster than convention computers. As the main limitation to the human bandwidth,

the rate of Orientation is the greatest limitation on pervasive understanding. The integration of AI into the Orientation phase is therefore the most important adaption the military should make. If unsupported, however, these systems are vulnerable to EM threats.

Finally, the military must adapt to the democratization of warfare, responding to an increased EM threat, and produce a more robust communication system. The proliferation of technology and access to information has resulted in non-state actors having access to sophisticated jamming technology and cyber capabilities on par with the conventional military capabilities of states. Writing for the Swedish Defense University, Sigholm outlines how "non-state actors as hacktivists, patriot hackers, and cybermilitia [have] proved to be a usable model for conducting cyberattacks". To achieve situational awareness, the military must develop a robust and resilient communication network that can operate in a degraded or denied environment. This will require investment in technologies such as mesh networks, satellite communications, and alternative communication methods, such as using unmanned aerial vehicles as communication relays, cognitive radio networks and dynamic spectrum access technologies. The military must, therefore, invest in technologies that allow them to operate in a contested and congested EM spectrum environment.

Achieving pervasive understanding on the modern battlefield is a complex and challenging task stemming from three key factors: the sheer quantity of data present in warfare; the complexity of modern warfare; and the reliability of data in an EM denied battlespace. Applying ANT to the battlefield emphasizes the need for a comprehensive and dynamic understanding of the network of the actors involved. John Boyd's Observe and Orient phases are crucial to achieving understanding on the battlefield. However, the quantity and complexity of data being Observed, along with the limited capacity for human Orientation, make achieving pervasive understanding virtually impossible. Whilst the human brain can Observe a substantial amount of data, it is limited in terms of its capacity to Orient and make sense of the information. This is the human bandwidth.

The single greatest way in which the military could adapt to this problem is through the implementation of AI systems to pre-process data at the sensor level and minimize the information load on commanders. AI can prioritize the most relevant and mission-critical information to the commander, enabling commanders to make better-informed decisions whilst minimizing their EM signature. Achieving pervasive understanding on the modern battlefield is a daunting task, but by embracing the potential of AI, the military can take a significant step towards achieving this goal.

Lt Thom is a British Army Officer, Royal Engineer, and Army Commando serving at 24 Commando Royal Engineers, where he commands 3 Troop. Having received a master's degree in aerospace engineering from the University of Bristol in 2017, Ben completed the 44 week commissioning course at the Royal Military Academy, Sandhurst. As a Second Lieutenant, he completed the All-Arms Commando Course before completing specific training as an Engineering Officer.



OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) AND MILITARY STANDARD

BY CPT LESLEY-ANN D. JACKSON

The indomitable priority of national security and defense is to protect and preserve human life. Although workplace security and military roles appear to be premised on divergent sides, closer scrutiny of the two spheres shows that both are bound to a common need to enhance human welfare. The relevance of OSHA, a federal agency tasked with safeguarding the well-being of employees in all businesses, extends beyond the conventional workplace to incorporate military standards. The connection between the military standards and provisions stipulated under OSHA guidelines emphasizes the commitment to defend the individuals serving the country. It also underscores the importance of converging different methodologies towards attaining a common end, which in this case is the holistic safety of personnel.

To understand the connection between OSHA and military standards, assessing how OSHA principles resonate with the structures stipulated under the military standards is essential.

The military has a web of roles occupied by devoted people whose well-being is a key priority. The OSHA regulations, which came into effect in 1970, offered an excellent solution to the myriad of cases and concerns about the security and safety of employees in the workplace over injuries, health risks, and mortalities. The responsibilities of OSHA include developing standards, training workers, enforcing the set regulations to ensure safe and healthy working conditions, and offering supportive services, including training and outreach. Although the original premise of OSHA was designed to cover civilian personnel, the standards stipulated under OSHA regulations translate impeccably to the military setup, where the civilian workforce is equally exposed to workplace hazards and risks.

Military personnel face several hazards which include operating machines, combat and sleep deprivation. The mundane of military daily operations without proper mitigation can quickly

turn into a serious safety risk. The goal of OSHA is to improve safety in the workplace, minimize fatalities, infection, and injuries, and promote a sense of responsibility for one's wellness as well as the well-being of coworkers.

The primary goal in both the civilian and military spheres is to minimize risk, promote safety, and foster a sense of accountability among employees. These objective stresses the importance of integrating military operations with standards stipulated under OSHA regulations and with a solid plan that ensures worker safety while upholding operational efficiency. Therefore, the principles of identifying hazards, assessing risks, and proactively preventing hazards align with the OSHA principles and military standards, in which the need to ensure worker safety is paramount in both sets. Both standards embody the commitment to safeguard lives by enhancing safety in the workplace.

In any organization, safety is crucial in all situations where people are involved in activities that can expose them to hazards. Over the years, OSHA standards have been used to provide guidelines to guarantee the welfare of employees in a civilian working environment. Military operations, though distinct, focus on enhancing the security of different personnel performing various tasks. The commonality between OSHA and military standards is that both ensure a safe working environment for their employees by identifying hazards. OSHA stipulates that all employers must thoroughly assess the working environment to detect possible hazards and take appropriate steps to address the problem. Similarly, the military performs comprehensive assessments of all missions and operating environments. The military should take appropriate measures to reduce injuries or accidents to their workers.

The cornerstone of both OSHA and military standards is employees

understanding the rules and regulations, potential hazards, how to differentiate equipment safely, and how to respond to emergencies appropriately. Adherence to these regulations, should be done through training the employees and military personnel to equip workers with the necessary skills to handle any impending situations. OSHA encourages a culture of safety and awareness in the workplace. The military fosters an attitude of readiness and situational cognizance among the employees. Another notable similarity is that both standards stipulate the appropriate personal safety equipment

Another notable contrast is regarding the tolerance level. OSHA focuses on preventing and reducing risks. The military may require employees to accept certain risks depending on the nature of the operation. The success of a specific mission outweighs the need to prevent or reduce risks, which means the safety approach is different compared to approaches fronted by OSHA.

OSHA regulations are designed to cover a vast array of working environments and jurisdictions. The stipulated regulations cover a broad spectrum of risks, allowing for flexibility in implementing the regulations since the environments are distinct in each case. Military standards are rigid and adopt a uniform approach because workers must conform to specific stipulations when running certain errands. Additionally, the primary focus of OSHA is for employees to be aware of hazards, to ensure a safe working environment, and to provide appropriate responses when faced with specific situations. Military standards cover a broader area that includes readiness for combat, proficiency in using specific weapons, and, at the same time, personnel security.

The OSHA and Military Standard assessment reveals an explicit interplay of priorities and tactics that underline the complex connection between safety and operational efficiency. Although OSHA and military standards have a common objective of preserving human life, they also have explicit divergences, reflecting the operating environments' distinct nature. Maintaining safety in the work environment is paramount, irrespective of the environment.



Fort Shafter fitness pit construction project executed by 2nd platoon, 523rd Engineer Support Company in Hawaii circa 2019. Pictured are SPC Resiling, SPC Slank, SPC Brock and inside operating the Skid Steer is SPC Lamp. Photo by CPT Lesley-Ann Jackson.

and kit to reduce the risks associated with specific tasks. For example, OSHA enumerates the appropriate personal protective equipment (PPE) to be used in the work environment, such as helmets and gloves. The military provides special gear tailored for specific tasks or threats that personnel may encounter.

Comparing the working environments of civilians and the military is intriguing, as both face distinct challenges and hazards. OSHA governs the working environment in a civilian, while the military follows specific operating standards. For instance, the military operates under a chain of command where directions are passed from higher-ranking officials to individuals occupying the lower cadre. OSHA encourages collaboration among employees and supports worker involvement in the decision-making process.

CPT Lesley-Ann D. Jackson currently serves as the Headquarters and Headquarters Company and Alpha Company Commander for 2nd Battalion, 60th Infantry Regiment at Fort Jackson. Her passion for safety and environmental compliance began when she attended the environmental compliance officer course as a platoon leader in Hawaii. CPT Jackson has then gone on to achieve her Master of Science in Occupational Safety and Health/Environmental Management.

Challenges with Splitting Engineer Battalions Between Different Duty Stations

CPT Shane M. Marit

There are many challenges faced today among US Army Engineer units. The changing of warfare tactics to Multi-Domain Operations introduces a set of difficulties on the battlefield to be expected with our Regiment. Focusing on overcoming these challenges is at the forefront of our Army. However, there are also more issues within the Regiment that frankly are unnecessary. One of these issues is the splitting of our Engineer Battalions between different duty stations.

I was a part of an Engineer Battalion that was separated from our Brigade headquarters. While this presented a few challenges, it was not very difficult to overcome. However, within that Battalion, there was a single Company located at a completely separate duty station over 150 miles away. There were times while I was a part of Battalion Staff where that Company was neglected. Battalion social functions, unit morale events, training exercises, and other operations were all very restrictive for that Company to attend.

Funding was another concern for the isolated Company. Training funds are usually distributed at the Battalion level. This meant that the isolated Company needed to be funded through the Battalion headquarters at the other duty station. Issues resulted when any last-minute training funds needed to be distributed for unforeseen events, which happens more than anyone would like to admit. That Company was located in a different time zone, meaning that many last-minute needs occurred after the Battalion Staff had already completed their scheduled time shift. Additional Battalion funding was also required any time that Company needed to be present in person at the Battalion's duty station, whether that be for Leader Professional Development events, training exercises, or other odds and ends. This results in an uneven distribution of funds between different Battalions within a Brigade.

Unit morale and cohesion is a major determinant of an individual Soldier's morale and will leave that Soldier with a lasting impression of his or her personal Army experience. This may lead to whether or not that specific Soldier extends his or her contract, decides to end his or her time in service, or even does something negative that requires that Soldier to be separated from the Army. The isolated Company lacked camaraderie with its fellow Battalion brothers and sisters. This was due to not being able to participate in many of the functions of the rest of the Battalion.

Our Army has always and will continue to always overcome any challenge in its way. However, we also create many challenges that do not need to exist. Separating Engineer Battalions between different duty stations is one of these unnecessary challenges and we need to collocate our Battalions to reduce additional

CPT Shane M. Marit is a recent graduate from the Engineer Captains Career Course and is currently working on a graduate degree in Geological Engineering through the University of Missouri Science & Technology.

The True Cost of Troop Construction

By CPT Casey Vreeland

\$uccessful troop construction projects on military installations, such as Schofield Barracks, depend on effective communication, synchronization of efforts, and availability of resources. Before the start of any troop-construction, it should be common practice to assign the correct type of unit to do the job, and leaders should be allocated enough time to acquire critical certifications. When these things are not done properly, there are associated costs with regard to morale, money, time, resources, and environmental considerations. I hope to use an experience of mine from when I was a new Platoon Leader in charge of a troop-construction project to raise awareness for future

generations to prevent the same mistakes from happening.

I took over an Engineer Support Platoon (ESP) back in January of 2021. We were immediately tasked with excavating and then constructing a section of a brand-new troop trail for Soldiers and their families to safely use. The expectations were clear, and I immediately began planning the execution of the project with my platoon and stakeholders. It was obvious at the time that leadership expected construction to begin relatively soon after the directive was given. This caused us to expedite our planning process so that we could begin excavation. During this planning period, I recognized that we would be required to work concrete. This is something that ESPs are not equipped for. We also didn't have anyone skilled at concrete. After communicating this to my leadership, we were told that a mistake was made, but that we just had to 'Figure it out'. Normally, a vertical engineering platoon would be tasked with this type of project because they have the necessary equipment to work concrete. Either way, we managed to get the project done. Through the extended and painful learning experience I realized that troop-construction may be cheaper than going through contractors, but its grueling costs can leave more negative impacts later.

The first and most important cost that should be mentioned is the negative effect on the morale of the troops. My Platoon was undermanned for most of the duration of the project. This meant that we had to work longer hours for a longer duration of time to get this project done. In effect, they were not able to train and get better at their jobs for close to seven months. They knew we weren't supposed to be doing the project and there was no diplomatic approach to convincing them otherwise. We had essential equipment consistently breaking down, which led

to several delays in the project. These delays led to raised questions about our competence. The only thing I could do was coordinate outside of our brigade to borrow equipment and tell my Soldiers that they were doing a great job. The lesson I took away from this that when Soldiers are given the tools needed to succeed, they are more inclined to work harder for you.

We were given this project instead of DPW with the intent of saving a significant amount of money. Had everything gone according to plan, it would have done exactly that. What I feel wasn't taken into consideration was the quality of the product expected for using troop labor. Using troops that are unskilled in laying concrete to make a sidewalk to be used by Soldiers and families across the installation will not typically yield great results. Though I am proud of the work we accomplished, it was obvious that the finished product could have been better as we were learning along the way. When the initial billing of materials was signed off on for the project, there were various additional things we needed that we did not know at the time. This led to more delays in the project and having to acquire more funds to accomplish the mission as well as accommodate for environmental considerations. The lesson I learned from this was to always talk with subject matter experts to ensure a materials list for a project makes sense.

The last cost I want to raise awareness of is the cost to our environment. As a naive platoon leader, I received my mission and naturally want to begin construction as soon as possible. Environmental standards and considerations weren't even taken into consideration by any of the stakeholders for this project. No one was required to attend environmental classes or anything. Because of this, we ran into endless speed bumps in our project which caused us to halt construction each time. We were unknowingly violating environmental standards and were repeatedly threatened with fines that would have cost our unit a fortune. Luckily, we fixed the issues and we learned quickly what right is supposed to look like. However, this all could have been avoided if all the platoon leadership were required to attend an environmental course prior to the start of construction.

The purpose of sharing my experience is not to push blame on any particular entity for a long list of avoidable mistakes made, but rather to show how I learned from them. Troop construction is a good thing when handled with care and proper supervision. Bringing the right people to the table to plan projects and certifying leaders to empower them to lead projects is crucial to avoiding these types of costs. Boost morale by giving projects to Soldiers within the scope of their MOS, don't make them work ridiculously long hours, set aside additional funding for things not originally identified in the BOM, and make sure leaders are qualified to accomplish the task at hand.

CPT Casey Vreeland is a GEO EN working on graduate courses at MS&T.

The Geospatial Development Program (GEO-DP) is an Engineer Regiment Program that leverages senior lieutenants/junior captains to provide additional officers to geospatial units while developing the officers' geospatial skills, thereby increasing the geospatial competencies within the Engineer Regiment.

The Engineer Regiment offers two highly sought-after development programs, Technical Engineer Competency (TEC-DP) and Engineer Special Operations Forces (ENSOF-DP). For the Engineer Regiment, degreed engineers are about 50% of each year group. Those with engineering degrees tend to prefer TEC-DP as it allows them to apply their expertise in assisting a USACE district. For those who aspire to serve in elite units, ENSOF-DP offers the opportunity to act as a Special Forces assistant group engineer or assistant Ranger battalion engineer.

GEO-DP allows you to serve in one of the seven geospatial planning cells (GPCs): the 5th GPC aligned to USINDOPACOM at Fort Shafter, HI the 60th GPC aligned to USEUCOM at Wiesbaden, GE, the 64th GPC aligned to USSOCOM at Fort Liberty, NC, the 132nd GPC aligned to USCENTCOM at Shaw Air Force Base, SC, the 512th GPC aligned to USSOUTHCOM at Joint Base San Antonio, TX, the 517th GPC aligned to USAFRICOM at Caserma Del Din, IT, or the 543rd GPC aligned to USNORTHCOM at Joint Base San Antonio, TX, the TRADOC Proponent Geospatial (TPO-GEO) office at Fort Leonard Wood, MO, or the National Geospatial-Intelligence Agency (NGA) in either Springfield, VA or Saint Louis, MO. Each GPC is unique, and experiences will vary. At the 132nd, we had a MAJ, a MSG, a CW3 125D (Geospatial Engineering Technician), a CW2 125D, twenty-five 12Ys (Geospatial Engineers), a team of 5 contractors, and an NGA data steward.

In 2018, I was commissioned out of Texas Christian University as an Engineer Officer. My degree was in Biology, and my geospatial background was a single GIS class. I served as a sapper platoon leader and executive officer in the 54th BEB, 173rd IBCT (A), from January 2019 to June 2021. I didn't even know my brigade had a GEOINT Cell until after I arrived at the 132nd. Openly, I didn't choose GEO-DP because I was interested

in the Army's geospatial capabilities. I chose it because I wanted to reunite with my wife. At the time, she was a recruiting XO in Towson, MD.

The change from a sapper company to a GPC is jarring. They call working at an Army Service Component Command (ASCC) Army corporate. The hours are 0900-1700 and PT for E6s and above is on your own. As the detachment XO, your role is like that of a company XO. You will be responsible for tracking maintenance, taskers, personnel actions, property, supply, and any other tasks assigned by the commander.

However, the level of impact your unit has and the nature of the problems you face will be significantly different. Plans at ASCCs are made

As an officer, don't focus on creating visually stunning products. Instead, it's essential to understand the tools at your disposal and utilize them to their fullest potential. Your primary responsibility is to effectively convey how the GPC can benefit your commander and their staff.

It is important to acknowledge that you may have the least amount of knowledge about GIS in your detachment. However, don't let this discourage you. Instead, challenge yourself to learn more. Start by understanding the difference between a raster and a vector and make it a habit to interact with your Soldiers and Warrant Officers every day. Warrant Officers are a valuable source of knowledge and expertise, so don't hesitate to seek their advice. Remember to speak up if something is unclear, and don't be afraid to ask questions, no matter how basic they may seem. As a leader, take the initiative to observe your Soldiers and their work to get a better understanding of how they accomplish their tasks. Hone your skills through courses and TDYs. Enroll in NGA College (NGC) classes, namely Fundamentals of Geographic Information Systems, Intermediate GIS for Analysis, and the Geospatial Information and Services (GI&S) Officer Training Course (GOTC.) Most importantly, study for and pass the GEOINT Professional Certification (GPC) – Fundamentals and earn your W2 ASI (Geospatial Leader.)

I strongly recommend the GEO-DP program, but it is not for everyone. If you are a lieutenant who has already completed their platoon leader time and you want to continue to jump out of airplanes and blow things up, GEO-DP is not for you. However, if you enjoy being pushed out of your comfort zone and learning through immersion, GEO-DP is the perfect fit for you.

My GEO-DP time was rewarding. Not only was I able to increase my geospatial knowledge, but I got to meet and work with great people, I was able to learn and experience a relatively unknown part of the Engineer Regiment, and I had the privilege of becoming a Detachment Commander. Given the opportunity, I would do it again, and I implore any lieutenant to consider it.



132nd Geospatial Planning Cell

years in advance, presenting complex challenges that require long-term solutions. Quick fixes are rare, and you will work closely with your Chiefs to develop and implement systems that ensure the GPC can overcome any issues that arise. Creating a culture of problem-solving will require training and dedication from you and your Soldiers, but it is essential to staying on track toward success. The 12Ys work tirelessly to develop products that aid the ASCC and combatant command staff in decision-making. Their tireless efforts have a direct impact on the warfighter.

CPT Troy Marshall is a ECCC Graduate and University of Missouri Science and Technology Geological Engineering Master's Degree Student, Fort Leonard Wood, MO.

A CASE FOR GEO-DP

BY CPT TROY MARSHALL

The year was 2019, I was learning what it took to be an engineer officer in the United States Army.

Instructors from Fort Leonard Wood would make note how important our jobs were to a changing world. We were taught that our jobs understood how to analyze terrain and how to manipulate it in order to win wars. As training had ended and I was at my first duty station ready to train with Soldiers who were versatile in combat and in construction.

I was hit with reality when my Battalion asked me to work on a construction project. We were tasked with providing new sidewalks and a bridge over a stream on base. My Soldiers were not experienced enough, and my NCOs did their best to walk them through the process. Although our project was successful, what caught my attention was DPW. They were not only there to ensure we were compliant with state and local regulations, but they pushed to do part of the construction within their own terms. This affected our ability to let Soldiers make mistakes and be able to give them experience on construction. As time moved on a more projects were placed on the Platoon, it became very evident that the base primarily relied on DPW and contractors to come in and work rather than using the engineer units at its disposal.

When a unit does receive a project, you are left in the enigma which is that Soldiers leave to different units, and you are always starting back to teach how to do basic tasks rather than upholding what was taught in AIT for these Soldiers. With the lack of use for engineers to develop on or the surrounding base, our Soldiers are not getting necessary experience outside of DIGEXs. Recently E30F, an initiative to cut down on Engineer Units, has been placed into effect. By the year 2030, tactical battalions will be cut from 43 to 25. So where does this leave the Engineer Corps? A solution to this is taking away projects from contractors and allowing units to work on their skills. At my first duty station, I was witness to a two-year project of a contracting company building new barracks. This work can be given to units which would maximize value and their time. I believe that perhaps, the army is downsizing due to lack of available work but if there are no opportunities then Soldiers cannot fight for the right to work, and they appear obsolete. As we peer into the future, Large scale combat operations are on the horizon and Engineers will play a role but to what degree?

CPT Andres Lopez is working on graduate degree at University of Missouri Science and Technology.



KEEPING ENGINEERS RELEVANT IN A CHANGING WORLD

BY CPT ANDRES LOPEZ

CONSTRUCTION MANAGEMENT CREDENTIALS: A PATHWAY TO SUCCESS

Army combat engineers play a critical role in meeting our nation's strategic objectives. These soldiers build, maintain, and safely demolish battlefield infrastructure that provides mobility to allied forces and impedes enemies to accomplish the mission. This mission requires some soldiers to have specialized knowledge and skills in construction management.

The Construction Management Profession

Construction management is a professional service that involves controlling the schedules, budgets, and quality of a construction project or program. In other words, a construction manager (CM) is a leader who ensures that the work is done correctly, on time, and on budget. A CM uses their expertise to help select a construction site's location, determine a budget, coordinate the design, procure materials and services, and manage the construction (or demolition) process. Soldiers in construction management are force multipliers for their units and their country. These combat CMs understand how to plan, design, procure, build, and demolish battlefield structures, including roads, bridges, tunnels, firebases, airfields, utilities, and much more. CM soldiers also understand how to coordinate with other military branches, civilian agencies, and private sector vendors. For example, an Army CM can develop a project's requirements, evaluate vendors, and administer contracts.

How CMAA Helps Soldiers

CMAA also offers online and in-person courses to help soldiers prepare for the tests at each level.

Training and Test Preparation

CMAA offers additional resources to help soldiers prepare for the examinations at every level. Optional courses are offered both online and in person, and groups may request to schedule their own personalized courses with CMAA. Courses also include access to study materials, such as CMAA publications.

How CMAA Helps With Career Transitions

CMAA's credentials are in demand. In 2022, CMAA conducted an industry salary survey that showed that the average (median) base salary for a CMIT was \$92,500/year. Meanwhile, the average (median) base salary for a CCM was \$145,000/year (not including bonuses and other benefits). Many employers and clients also require their CMs to have a CMAA credential. Other organizations have also endorsed or accredited CMAA's credentials. For example, the CCM is endorsed by the Society of American Military Engineers, which says the CCM, "clearly identifies the most experienced and effective professional construction managers." The CCM is accredited under the ISO/IEC 17024 standard, which protects the certification's integrity and demonstrates that the CCM meets the international standard for openness, balance, consensus, and due process. For more information contact: www.CMCertification.org.

The infographic details the requirements and exam topics for each level of the Construction Management Institute of Training (CMIT) credential:

- Level 1:**
 - At least 18 years old
 - Supervisor, instructor, or superior officer signs letter of support.
 - Pass Level 1 exam on basics of construction management
 - Basics of construction management:
 - role of the CM, project delivery methods, and legal issues
- Level 2:**
 - Completed Level 1
 - Pass Level 2 exams:
 - Professional Practice
 - Quality Management
 - Cost Management
 - Completed Soft Skills training:
 - Emotional Intelligence in the AEC Industry: Part 1
 - Killer Communication Skills
 - Emotional Intelligence in the AEC Industry: Part 2
 - Supervisor(s) verify the candidate has 6 months of experience in Professional Practice, Quality Management, and Cost Management*
- Level 3:**
 - Completed
 - Level 1
 - Level 2
 - Pass Level 3 exams:
 - Contract Administration
 - Time Management
 - Safety and Risk Management
 - Completed Soft Skills training:
 - How to Present with Power and Influence
 - Primal Safety: A Gut Level Approach
 - Time Management Using Lean Principles
 - Supervisor(s) verify the candidate has 6 months of experience in Contract Administration, Time Management, and Safety and Risk Management*
- Level 4:**
 - Completed
 - Level 1
 - Level 2
 - Level 3
 - Pass Level 4 exams:
 - Project Management
 - Sustainability
 - Value Engineering
 - Completed Soft Skills training:
 - Stress Management for Peak Performance
 - 12 Steps to Great Relationships
 - From Head to Heart: How to Differentiate Yourself in the Marketplace
 - Supervisor(s) verify the candidate has 6 months of experience in Project Management, Sustainability, and Value Engineering*



NEW EXPLOSIVE ORDNANCE DISPOSAL TECHNOLOGY COMPLEX

AIMS TO SAVE LIVES PICATINNY ARSENAL

By JoAnne Castagna, Ed.D.

The Master Sergeant Alan Richwald Explosive Ordnance Disposal Disassembly and Robotics Complex was designed and constructed by USACE, New York District and is new to Picatinny Arsenal. In the spirit of his motto: "So others may live" MSG (Ret) Richwald fought for the U.S. and his fellow Soldier by becoming the foremost expert in rendering safe unexploded or live foreign ordnance on the battlefield. The complex is the first of its kind in the Army.

The goal of the complex's personnel is to research and develop ways, including using robotic technology, to render safe live foreign ordnance on the battlefield. This aims to protect Soldiers who are responsible for recovering them and those performing missions down range. Former District Commander COL Matthew Luzzatto commented that "The complex really highlights the diversity of missions that we, as a District, provide in support of the military. It's not just barracks and airfields: It's that unique capability we have to help protect Soldier's lives."

Picatinny Arsenal, a U.S. Army installation, sits on over 6,000 acres in Morris County, NJ, and has over 6,000 scientist, engineers, and support personnel with the unique responsibility of developing virtually all of the Army's weaponry. To support this mission, the Army Corps was asked to create the new complex. This was done in collaboration with the Baltimore District, USACE, New Jersey Department of Environmental Protection, Picatinny Enhancement Coalition, contractor Mason and Hanger Group, Inc. of Lexington, KY, and contractor Benard Associates of Wayne, NJ.

The new state-of-the-art complex has three functions that includes a 10,234 sq ft concrete facility that uses specialized equipment to safely disassemble and analyze conventional foreign ordnance such as grenades and land mines; a 10,040 sq ft robotics building that tests, researches, and develops robotic devices to retrieve explosives from battlefields; and five earth-covered concrete ordnance-storage magazines, covering 6,000 sq ft of land, that are designed to contain an explosion within a designated area. Not only will this complex work to save Soldier lives, but it was constructed with robust features to make it a safe work environment for the personnel performing the research and development.

Mr. Brent Donahue, U.S. Army Combat Capabilities Development Command, Armaments Center, Picatinny Arsenal explained "The goal of my team is to make as many operations related to the explosive ordnance disposal mission remote, often with the use of robots that can be sent downrange instead of a person. Our priority is reducing or eliminating the amount of time an actual person has to be within range of the explosive hazard." He added, "The work from this complex will help to save the lives of soldiers in two ways. First, the complex will be used to engineer and test robotic systems which will lessen the number of times trained explosive ordnance disposal soldiers will have to physically approach explosive hazards. Second, the more explosive hazards we can detect and render safe remotely on the battlefield, the more soldiers we will save from unexpected explosions."

The work this complex performs is extremely important to the Army. According to the Wounded Warrior Project's Annual Warrior Survey, 84.2% of its members reported being injured during military service including blast or explosions experiences. In addition, 73.2% of these individuals experienced head-related trauma immediately following these events.

The Army Corps got a taste of what Soldier's deal with on the battlefield. Workers discovered unexploded ordnance while excavating during the project. The project was halted and explosive ordnance disposal professionals from the Army Corps' Baltimore District were called in to safely remove them. This did not come as a complete surprise to the project team because years ago the Arsenal was a major producer of weapons for World War I and World War II. "It was sort of a reminder of the importance of why we were building this facility," explained Mr. Andrew Andreeko, project manager, New York District, USACE.

MSG (Ret) Richwald who has passed, devoted most of his life, almost 60 years, to developing ways to defeat and neutralize the hazards presented by live ordnance. This included traveling to dangerous war zones such as Bosnia, Iraq, and Afghanistan to personally recover explosives. The engineers at Picatinny believe he would be proud of this new complex that is using the latest robotic technology to make explosive recovery even safer for the men and women in uniform who protect the U.S.

Dr. JoAnne Castagna is a public affairs specialist and writer for the U.S. Army Corps of Engineers, New York District. She can be reached at joanne.castagna@usace.army.mil.

CW2 Maksym Zymin, power mission commander, oversees contracted personnel performing a load bank test on a FEMA generator at the generator staging base in Kahului, HI, 9/19. USACE Temporary Emergency Power Planning and Response Team continues to work with FEMA and local, state and federal partners in support of Maui and the Hawai'i wildfires response. Photo by Katie Newton, U.S. Army.



USACE Power Mission Continues Long After the Lights Come Back On

By Ms. Katelyn Newton

After devastating wildfires left communities across Maui without electricity, the U.S. Army Corps of Engineers Temporary Power Team arrived on the island to begin the important work of restoring power to critical facilities. Following natural disasters, temporary emergency power teams—comprised of trained USACE personnel—can be quickly deployed to assist with assessments, maintenance, and generator installations at critical facilities, such as hospitals, wastewater treatment plants, and fire and police stations.

At the request of FEMA, Honolulu District's temporary emergency power team deployed to provide support to Maui County and the State of Hawai'i. As part of the FEMA mission assignment, the team installed 20 generators at critical public facilities across Maui. Now, 40 days later, the need for temporary power continues to decrease and the mission is powering down. "There are currently only 13 generators left in the field," explained CW2 Maksym Zymin, power mission commander, "Five are still running to provide power to essential services and another eight have been installed at critical facilities as a backup where the utility power was unreliable."

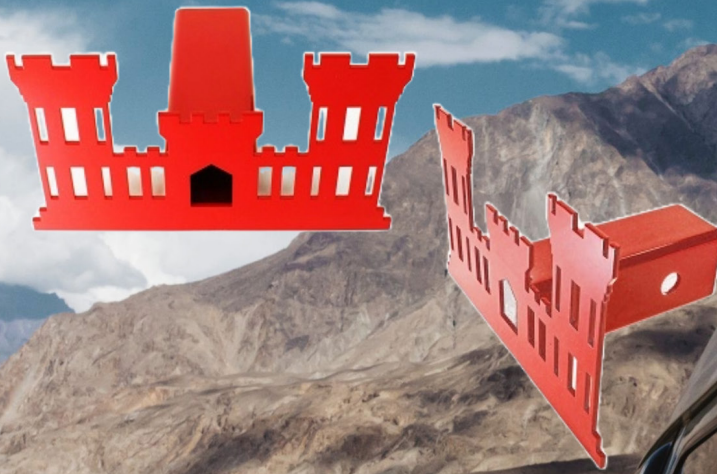
Although nearing completion, this is the point in the mission that often gets overlooked as there are still behind-the-scenes requirements such as service and maintenance, inspections, and inventory of generators that must be completed. "Once we know that we're getting close to the end of the power mission, we prepare the

generators, inspect them, inventory them, and then, at the conclusion, they are signed back over to FEMA," expressed CW2 Zymin. The power team is currently a nine-member team and will see the mission through to completion. "We ensure all of the generators are properly maintained and continuing to operate efficiently," he continued, "We are also required to perform service and maintenance on each generator before it is returned back to FEMA."

If a generator has more than 97 hours of service on it, then load bank testing must be performed. Load bank testing involves connecting the generator to a load bank—a special machine that imitates the electrical demands that would be placed on the system—and running the generator at full capacity for more than two hours. "During the load bank test, they are monitoring the parameters to ensure they stay within the normal operating range," CW4 Zymin added, "If the generator is not able to run or it fails, then they will troubleshoot it, identify the cause, repair it, and retest it again. Basically, we want to make sure the generator operates as required and identify any issues that may need to be fixed or remedied before turnover." If no issues are identified during the tests, the generator is deemed fully mission capable and can be returned to FEMA. Once all 20 generators are returned, the power team will pack up and return home. "The team is honored to be part of the disaster response and being able to contribute to helping people of Maui during such a tragic and critical time," stated CW2 Zymin.

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