Air Force
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By Engineers. For Engineers.
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RED HORSE Celebrates Fifty Years

RED HORSE 50th Anniversary

On Oct. 1, 1965, the first two "Prime BEEF Heavy Repair" squadrons were activated to provide a long-term civil engineering presence and major repair capabilities in combat zones. As the 2nd Air Division Director of Civil Engineering in South Vietnam, Brig. Gen. Archie Mayes managed the activities of those first squadrons, which soon came to be known as Rapid Engineer Deployable Heavy Operational Repair Squadron Engineer, or RED HORSE. In his end of tour report, he proudly wrote, "Today with its five squadrons under command of the 1st Civil Engineering Group, I believe RED HORSE represents one of the greatest and most successful advances in the history of Air Force Engineering."

I am just as proud of RED HORSE today as General Mayes, Brig. Gen. Tom Meredith, and the other fathers of the program were at its founding. This year, with the anniversaries of both Prime BEEF and RED HORSE, we are celebrating 50 years of Engineers Leading the Way. If you didn't see last fall's edition of the CE Magazine that featured Prime BEEF, I recommend you pick up a copy (it's also available online at www.afcec.af.mil) and read Dr. Ron Hartzer's story of the creation of expeditionary engineering capabilities in the Air Force. I also hope you'll take the time to read this edition's articles on RED HORSE operations and history. Our Airmen will continue to amaze you with the great work they're doing. Today's RED HORSE is a product of the dedicated efforts by the Air Force engineers that forged the way for us. Today, we Airmen engineers are made better by understanding our own history and identifying with where we came from.

I'm inspired by the incredible work CE Airmen have completed over the last 50 years, in some of the most demanding environments. In Vietnam, the 2,000 RED HORSE troops that deployed there took over construction of vertical infrastructure, pavements and utilities from overtaxed contractors, while also completing humanitarian projects for local villages. During DESERT SHIELD/DESERT STORM, three RED HORSE squadrons completed an estimated $14.7 million worth of projects, and the equivalent of three years of work, in four months. RED HORSE units completed approximately $90 million worth of projects in support of Operation ENDURING FREEDOM, operating an innovative "hub and spoke" system from a headquarters at Al Udeid Air Base, Qatar. And during the peak of deployments for Operation IRAQI FREEDOM, 500 RED HORSE Airmen provided support for 20 or so forward operating bases in Iraq, giving combat troops and aircraft a solid network of platforms to operate from.

We are so grateful for the sacrifices made by the Airmen deployed during those conflicts, as well as the work and sacrifices of all of our CE Airmen and their families over the last 50 years. Approximately 1,800 RED HORSE and Prime BEEF Airmen are currently deployed, performing training exercises, completing humanitarian missions and ensuring the safety of our nation from distant corners of the world. While we await their return home, we can be confident in their success, knowing they have the support of the total force CE community behind them.

As we look to the future, and consider what the next phase of RED HORSE operations will look like, we can be sure of one thing. Combat aircraft and Airmen will need to get close to the fight. We will continue to rely on civil engineer expertise to open or expand airbases, maintain bases and close them as our forces return home. The future of our contingency engineering capabilities is bright. Here's to 50 more years of Can Do – Will Do – Have Done!

Timothy S. Green
Major General, USAF
Director of Civil Engineers

Features

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Sections

On the Cover

Airmen from the 557th Expeditionary RED HORSE Squadron work in a secure equipment compound at a forward operating base in Iraq during Operation Iraqi Freedom. *(U.S. Air Force photo/Master Sgt. Jim Varhegyi/Released)*

Director of Civil Engineers
Maj. Gen. Timothy Green

AFCEC Director
Randy Brown

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Training, credentialing and force development are paramount

By Chief Master Sgt. John A. Wilde
Directorate of Civil Engineers, Chief of Enlisted Matters

I'm honored and excited to be serving you as the new Chief of Enlisted Matters for Civil Engineers. I firmly believe that our unit-level personnel are our most valuable assets, and I intend to represent their interests in everything I do while at the headquarters. I also plan to communicate with you as often as possible, as I share Maj. Gen. Timothy Green's belief that "engaged leadership builds ready engineers."

I have three main priorities, which were developed with the goal of improving the personal and professional development for enlisted and wage-grade civilian Airmen, regardless of rank. With that said, my short-term and long-term priorities are focused on training, credentialing and force development.

Training will be an enduring focus for me for the next three years, and especially our formal AETC training process. Eleven of our 12 Air Force Special Codes are in the course development process, with our operations managers who started theirs in August. I think this is mostly a good process, but from start to finish, it takes too long to get our newest curriculum into the classroom. We can't change the AETC course development cycle, but we can expedite the time it takes for the field development managers and I to determine new training requirements. Today's delays mostly occur during course resource estimate development, which should only take 60 days. As of late it has been taking about 12 months. The CE Chiefs' Council is reviewing options to reduce that time back to the targeted two months, which will reduce our overall course development process from its current 24-plus months to the targeted 12 months.

Additionally, as the functional manager for our WG civilians, I plan to strengthen our WG Functional Advisory Committee initiative on developing civilian training plans. We identified a core group of WG civilians who, on their own time, are developing WG training plans. These training plans will be an option for supervisors to use as training roadmaps for our civilian employees as they progress through the apprentice, craftsman, work leader and supervisor career path. When I say "strengthen" I am referring to soliciting work leader and work supervisor interest to help develop training records. Civilian supervisors should contact the WG Functional Advisory Committee if they are interested in helping with this initiative.

Chief Master Sgt. John A. Wilde, shown teaching a class at Air Force Institute of Technology, pledges to make training a priority for enlisted and wage-grade civilian Airmen. ***(U.S. Air Force photo/Michael Madero/Released)***

This leads to my next priority, which is working alongside industry leaders on credentialing our engineers. We all know about the Air Force Credentialing Opportunities On-Line, or AF COOL, website for certificates and licenses, but I want to benchmark off the Army and take our community to the next level. The goal is to have industry leaders compare our formal AETC curriculum, and upgraded training process, to that of the civilian sector. This is about giving our enlisted personnel credit, or a military-to-civilian "skill to skill" fit, that will help Airmen transition to a career in the civilian engineering industry. The challenge is in helping industry to formally recognize our enlisted training, on-the-job training and hands-on work experience. A noncommissioned officer with nine years' experience and a few deployments, who has been a trainer, certifier and project manager, then decides to separate from service, is not the same apprentice that industry gets out of a trade school graduate.

> **"Our Airmen are knowledgeable about their jobs, are dedicated, reliable and effective, and as such should separate with a credential that is valued by industry..."**

I argue our Airmen are more qualified than the average trade school graduate, as they have formal education (similar to a civilian trade school) and, more important, work experience! Our Airmen are knowledgeable about their jobs, are dedicated, reliable and effective, and as such should separate with a credential that is valued by industry versus being forced to start from scratch to obtain a certificate or license. I plan to work closely with our CE Training Pipeline manager, our Force Development managers at AFCEC, the Army and their industry supporter, to complete a "military crosswalk" for each of our career fields that links our AFSCs with associated engineer trades. The goal is to give a transitioning Airman a craft, with a roadmap for growth in the civilian sector. The Army is in the process of doing this for their separating Soldiers. If they can do it, we can do it.

Finally, I would like to talk about force development. I'm really proud of the improvements we've made so far, but there's some more work to be done. Last year, the Chief Master Sergeant of the Air Force directed every career field manager to create an Enlisted Development Team program. Development Teams are not a new concept for our AFS as explosive ordnance disposal and fire have active DTs for their senior NCOs. I am 75 percent complete in finalizing our traditional AFSCs (3E0 to 3E6) DT, which will begin with our senior master sergeants, and our Emergency Management SMSgt DT will convene the beginning of next year.

The Air Force has now transitioned from the Career Path Tool that I hope our engineers have heard of to MyVector. I have volunteered our AFS to participate in the beta test this summer. MyVector is promised to be a tool that each Airman will use to identify their current and future desires as an Airman and as an Airman Engineer.

I need every person (active duty, Guard and Reserve) to log into MyVector [https://afvec.langley.af.mil/myvector], under "See My Experience," review their duty history (their bases, duty titles, etc.) and work with their supervisors to get it updated in MilPDS. MyVector pulls MilPDS information, and then I map (give credit) to every person based on their experiences. Although the DT panel is a senior master sergeant subject at this point, MyVector relies on 100 percent of the total force to have their information correct, so when you are eligible to meet the DT your duty history experience will be accurate. As you mature in rank, and gain more experiences, MyVector will be updated to reflect those changes. MyVector promises to be a one-stop IT tool for supervisors to mentor and develop a person and our force. It is not another IT tool that will sit idle as we have experienced in the past, but rather a tool that will track/mentor a person from airman basic to chief master sergeant, or as a CE airman to Directorate of Civil Engineers, Chief of Enlisted Matters. That is what it is all about, developing our replacements.

It's been a turbulent few years for all of us in the Air Force, but we're no strangers to change. In my 26-plus years, we have gone from Airman Performance Reports, to Enlisted Performance Reports, to now a complete change in our Enlisted Evaluation System. Our utility uniform has changed three times, our ranks structure has changed, CE merged AFSCs in '87, '91 and then again in '08 … you get the point. As a leader, I am responsible for helping Airmen understand the change and then move forward with it. I think the priorities I've laid out will help us better align with the changing shape of our organization and prepare our Airmen to meet future challenges and succeed in their careers.

Today's force is one of change, and with change comes opportunities. Take advantage of those opportunities and take care of those you are responsible for. I look forward to working with, and meeting, each one of you. Tench-HUT!

AFCEC team is the CE's greatest advocate

By Randy E. Brown
Air Force Civil Engineer Center director

Within the Air Force Civil Engineer Center, the term "change" has become a part of everyday conversation. The transformation that redefined how civil engineers support our installations also created AFCEC and set in motion a swift evolution to where we are today. From the day Joe Sciabica took the flag as the organization's first director, the AFCEC team has successfully dealt with the seas of change that come with creating a world-class organization.

Today, just shy of AFCEC's third anniversary, change has come to mean more than moving beyond the past. Change is opportunity, and the AFCEC team is earning a reputation for harnessing the innovation and creative power of change to give the CE enterprise more capability and capacity. To fully master change and put it to work for the Air Force, we must continue to find solutions and champion new approaches to overcome the realities of reduced budgets, less manpower and fewer resources.

To do this, AFCEC will focus on mastery of all aspects of Air Force civil engineering, and on being champions to and for the enterprise. AFCEC is made up of an impressive team of experts in every aspect of the CE spectrum. They have mastered their skills and will continue learning and growing to be the "on call" resource our Air Force needs.

But we must be more than a warehouse of knowledge. Our challenge is to provide the CE in the field the expertise he or she needs whenever and wherever needed. As we move forward, we will find more ways to integrate with the CE enterprise; improve access to education and training so our engineers are current with the most recent advances; and find better, more efficient ways to inform the enterprise about AFCEC's capabilities and strengths.

In my view, champions are those who not only support us, but also demand we try a little harder, reach a little further and do a little more. Champions build champions, and AFCEC will be champions for CE. CE leads the way in developing, maintaining and ensuring our installations are always ready to host the mission, and AFCEC will be the loudest voice championing CE's abilities.

Our team has been working diligently to refine how AFCEC will continue to provide for Air Force civil engineers. We are becoming more efficient, and more effective. We are mastering our craft, and championing our capabilities. In short, we are becoming the best at delivering CE solutions for the Air Force.

Nearly three years ago, AFCEC's founders launched the organization with a goal of becoming Battle Ready … Built Right. We are battle ready, and AFCEC was built right to support the CE enterprise. We know our capabilities, our strengths and our limitations. Our next job is to continue shaping AFCEC so that we are as quickly and effectively responsive to an Airman digging a ditch in a far-flung corner of the world as we would be to a senior leader in the Pentagon. Our customers wear all ranks, work in all conditions and need answers at their fingertips so they can execute their mission.

AFCEC will continue to change and evolve. Change is continuous and enduring. We do promise to listen to our customers and stakeholders, and to use their experience to improve our capabilities for the good of the entire Air Force.

I am proud to be part of the AFCEC team. This is a team of people who believe in being the best at what they do. They are already masters of their craft, but they continue learning and growing because they know the Air Force needs them at their best.

And they are truly champions. Not only do they succeed and achieve remarkable successes, but they are supportive of others and demand excellence from everyone they encounter. The AFCEC team is the CE's greatest advocate, and is working every day to ensure Air Force engineers are ready to lead the way.

AFCEC's new Director Randy Brown addressed Team AFCEC and others gathered during his assumption of leadership ceremony July 16, 2015, at Joint Base San Antonio-Lackland, Texas. *(U.S. Air Force photo/Susan Scheuer/Released)*

AFIMSC develops plan for CE reach-back support

By Capt. Erik Rauglas
Air Force Installation and Mission Support Center

The Air Force Installation and Mission Support Center will centralize installation and mission support activities. Sounds like a simple task, until you start to unravel how support is provided today. To accomplish this daunting task, AFIMSC needs your help to ensure we get it right.

"Welcome to an exercise in building an airplane while it is flying." This was the analogy Maj. Gen. Theresa Carter, AFIMSC commander, used to describe how the provisional and now-permanent AFIMSC headquarters staff would operate. This powerful image portrays the magnitude, importance and timeline associated with the standup of AFIMSC. Going from original concept in February 2014 to having full operating capability by Oct. 1, 2016, is a significant undertaking.

This timeline drives the need to concurrently develop and implement future state processes and the agility to make decisions impacting other decisions not yet finalized. The mission support community is no stranger to making the impossible a reality and this challenge will put our innovation to the test as we prepare to stand up one of the most significant headquarters reorganizations while remaining responsive to Airmen executing the mission at base level.

In July 2013, as the response to then-Defense Secretary Chuck Hagel's initiatives to cut headquarters staffs by 20 percent between 2015 and 2019, the Air Force secretary and chief of staff directed a plan to streamline the management framework within the Air Force for basic organization structures and business practices. Re-baselining of Headquarters Air Force responsibilities; aligning six field operating agencies from under HAF to AFIMSC; and reducing duplicative management and oversight within major commands and direct reporting units to more effectively and efficiently manage installation and mission support, or I&MS, activities were the key objectives of this effort.

As a result, AFIMSC was established under Air Force Materiel Command in February 2014. In August 2014, AFIMSC Provisional headquarters activated at Joint Base Andrews, Maryland. In October 2014, six FOAs were realigned under AFMC and attached to the AFIMSC(P). In January 2015, the Air Force selected Joint Base San Antonio, Texas, as the location for AFIMSC headquarters. Permanent staff members started to arrive in the spring of 2015, in order to fulfill the Air Force leadership direction that the 350 headquarters military and civilian staff be hired or assigned by the end of fiscal 2015. On May 5, 2015, AFIMSC was officially activated at JBSA.

To consolidate all I&MS functions and provide installation support previously provided by MAJCOM staffs required a new way of thinking. To facilitate these activities into the new AFIMSC structure, the unit conducted business process re-engineering events covering a range of functions. These events were designed to help develop efficient and standardized processes that effectively support continuity of operations and ensure proper coordination through the AFIMSC.

The intent of BPRs was not simply to identify and reassign all activities previously performed at MAJCOMs, but to design a process that eliminates waste, adds value to the customer and ensures the proper organization is identified

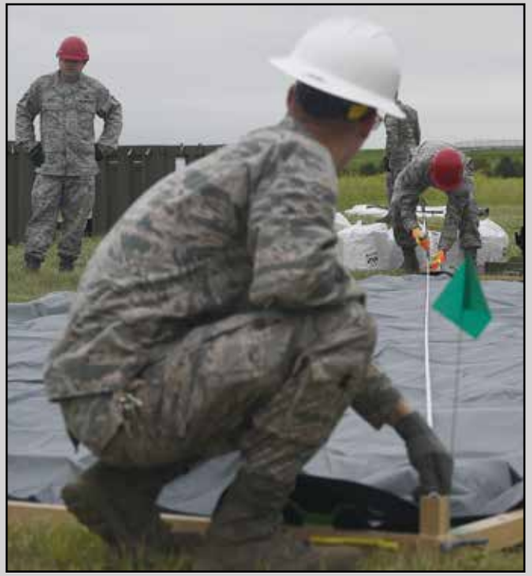
One of the business process re-engineering events was held earlier this summer at Tyndall Air Force Base, Florida. *(U.S. Air Force photo/Released)*

to support specific actions. Subject matter experts from the HAF to the installation came together to capture each current process, identifying existing "pain points" and current best practices. The existing process was then used as a baseline to design the recommended "to be" process incorporating improvement recommendations, while quantifying the impact of those recommendations.

Events covered the range of functions currently supported within the civil engineering community: emergency services, energy, execution, housing, operations and ops support, planning, programming and resources. The culminating BPR for execution took place the week of Aug. 3 at JBSA. In addition to developing a future state, the BPRs help identify areas that need to be addressed in the short term to allow a seamless transition between support being provided by MAJCOMs and support being provided AFIMSC.

This first round of process improvement will directly feed into the programming plan, explaining how IMSC will provide support. As we work through this first year, additional BPR events will be held to further define and refine how to best provide support by new and innovative methods.

Are you new to AFIMSC or want to learn more? Start with Program Action Directive 14-04, titled Implementation of the Air Force Installation and Mission Support Center. This document provides higher-level guidance about the new organization. You can view a copy on the AFIMSC milBook site's reference page at https://www.milsuite.mil/book/groups/hq-afi/content?filterID=contentstatus%5Bpublished%5D~category%5Breference%5D.



460th Civil Engineer Squadron Airmen calculate tent dimensions June 3, 2015, at Buckley Air Force Base, Colorado. AFIMSC's Installation Engineering Division provides direct technical reach-back support across the built and natural environment, providing input on programmatic issues, budget allocation and execution decisions. ***(U.S. Air Force photo/Airman 1st Class Luke W. Nowakowski/Released)***

Next, look at Appendix II, where the functional capabilities are listed and explained, as well as if they will be conducted by the retained MAJCOM staffs, HQ AFIMSC or one of its detachments.

Then functional annexes ("F" for civil engineering) expand on these capabilities, and the associated PPlan outlining the "how" is under development.

The majority of civil engineering functions reside within AFIMSC's Installation Support Directorate (office symbol IZ) in the Installation Engineering Division (IZB). IZB provides direct technical reach-back support across the built and natural environment, providing input on programmatic issues, budget allocation and execution decisions. This is accomplished primarily with two branches — Blue and Silver.

These branches are mirrored organizations focusing on support to specific MAJCOMs, allowing for equal services across all installations while providing team members who can focus on understanding the intricacies within each MAJCOM they are assigned to support. The third branch within IZB is the technical analysis branch (IZBT), which provides horizontal integration across IZB looking at ways to optimize work within the division portfolio and through its technical reach-back support. In addition to process integration and optimization, IZBT provides support to functions not specifically held within the Blue and Silver branch, such as housing, communications and pest management.

AFIMSC was born out of necessity to better utilize a smaller number of headquarters staff positions as a result of Air Force-wide manning reductions, while providing centralized and standardized installation and mission support across the Air Force. Although installations no longer have many of the MAJCOM experts they used to call on, AFIMSC will ensure Airmen at any base receive the same answer and level of support.

This first year of operations will take collaboration from installations, MAJCOMs and primary subordinate units, like the Air Force Civil Engineer Center, to ensure we support the mission and continue to lead the way in developing efficient and streamlined processes that support our installations worldwide.

AFCAP contract helps warfighters meet objectives

By Wayland Patterson
AFCEC AFCAP branch chief

The Air Force awarded a five-year, $5 billion contingency support contract to eight firms in June 2015. The contract, called the Air Force Contract Augmentation Program, or AFCAP IV, is the fourth consecutive contingency contract designed to quickly assist federal agencies needing fast acquisition across a spectrum of contingencies, from humanitarian relief missions to the Global War on Terrorism.

AFCAP is managed by the Air Force Civil Engineer Center's readiness directorate at Tyndall AFB, Florida, and the Air Force Services Activity, Joint Base San Antonio-Lackland, Texas; with warranted contracting officers from the 772nd Enterprise Sourcing Squadron at Tyndall — three separate organizations under the Air Force Installation and Mission Support Center, also based at JBSA-Lackland.

Contract task orders will be executed by the eight firms awarded on this contract:

CH2M Hill, Englewood, Colorado
DynCorp International, Fort Worth, Texas
Vectrus Systems Corp., Colorado Springs, Colorado
Fluor-Amec II, Greenville, South Carolina
Kellogg Brown and Root, Houston, Texas
PAE-Perini, Arlington, Virginia
Readiness Management Support, Panama City, Florida
URS, Cleveland, Ohio

"It is a relief to get this contract awarded on-time," said Jim Garred, 772nd ESS detachment lead at Tyndall, who served as the procuring contracting officer.

"Given the dollar amount, there were many organizations involved in ensuring we put a solid contract in place. Coordination between all of the organizations can sometimes be a challenge for sure. However, I'm very pleased with the support, advice and attention we received from Air Force leadership as well as the continued superb teamwork of AFCEC's Tyndall Detachment and 772nd ESS," he said.

AFCAP originated in 1997 as a worldwide, five-year contract worth $452 million. The Air Force, which had just finished a major drawdown of its active-duty forces, developed the program as a way to augment the support needed during emergency operations by filling gaps without draining military civil engineer and services personnel, and resources.

The second AFCAP main contract was awarded just before Sept. 11, 2001, and was supporting Operations Noble Eagle, Enduring Freedom and Iraqi Freedom. It was supposed to have been an eight-year contract but world events increased demand and quickly consumed the available $475 million contract ceiling. It took three ceiling increases before the replacement contract was ready. The third AFCAP main contract was the first DOD "CAP" contract to go multi-vendor and was awarded Nov. 8, 2005, with an ordering period set to expire Sept. 30, 2015. The new, fourth AFCAP main contract begins Oct. 1, 2015, and if all options are exercised, it will last until Sept. 30, 2020.

"AFCAP was developed as a force-multiplier for the Air Force," said Joe McNamara, AFCAP program manager from Air Force Services Activity and member of the source selection technical team. "It allows the Air Force to use fewer military resources, but retain full civil engineer and services capabilities by contracting to fill shortfalls to meet the mission."

Since inception, AFCAP has provided $3.5 billion worth of contracts helping our deployed warfighters, contingent support to humanitarian relief efforts and other tasks supporting National Command authority objectives. A recent example is the humanitarian relief efforts in western Africa in the wake of the Ebola outbreak there. Another is supporting the U.S. Marines, U.S. Air Force and British and Danish armed forces in the fight against the Islamic State in Iraq and Syria.

The AFCAP team looks forward to employing the AFCAP IV contract to help warfighters meet their mission objectives.

Editor's note: Patterson served as the source selection team chief for this AFCAP IV acquisition. He works at the Air Force Civil Engineer Center's readiness directorate at Tyndall AFB, Florida.

A group of health care workers hang signs on a fence at a field hospital in Monrovia, Liberia, Sept. 19, 2014. The workers are among volunteers from around the world fighting the epidemic outbreak of Ebola in West Africa. ***(Photo/Maj. Francis Obuseh/Released)***

Workin' at the carwash

Engineers' ingenuity saves the day when a 'simple project' takes a complex turn

By Lt. Col. Erik J. Lagerquist
1st Expeditionary Civil Engineer Group Deputy director
Maj. Ernesto B. Rada
577th Expeditionary Prime BEEF Squadron

Water is a valuable resource for today's military, especially in an austere, arid, dry desert environment where a large number of military operations are currently taking place. Vehicles are dirty and covered in dust a lot faster and more often in a desert environment, and dirty vehicles use more fuel. Therein lies a problem: how to keep vehicles clean and operating more efficiently and using less fuel, another valuable commodity, while simultaneously not wasting a lot of another valuable commodity, water? Enter U.S. Air Force civil engineers to the rescue.

Originally conceived as a minor construction project, titled Construct Vehicle Wash Rack, back in summer 2013, the idea was to purchase and install a water reclamation unit to serve as pump for a vehicle wash as well as reclaim and filter nearly all of the water used to wash a vehicle. Additional water would come from the local "city" for make-up, as some water is lost on every vehicle washed due to evaporation, spillage and drive-away.

Overall this system is quite interesting, though technology in use is not really any new breakthrough; in fact, it's very similar to what you might find in use at most "touchless" car washes back home in the U.S.

What makes it interesting is the application and ease of a plug- and-play package unit. While this unit comes at a very high price and still required an additional $300,000 to make it a complete and usable facility, the annual cost in water saved is worth it. The unit itself does not give you a wash rack, it takes some planning and preparation for a complete, usable facility.

Local base engineers developed the project from concept, through planning to final siting and approval to finally sourcing all materials. For actual construction, they turned to some additional Air Force civil engineers from the 577th Expeditionary Prime Base Engineer Emergency Force, aka Prime BEEF, Squadron, part of the 1st Expeditionary Civil Engineer Group.

The Prime BEEF Airmen conducted the site prep, fabricated a sloped concrete slab over water collection pits and a sunshade structure overhead. While the wash-rack unit itself was delayed in shipping for many weeks, once received, it was installed in just over a week. Where water is a scarce resource, these types of packaged systems are certainly a viable option. Beyond being environmentally friendly and compliant in terms of water conservation, availability of a vehicle wash rack is critical to executing the mission, with an added morale boosting benefit of more clean vehicles on base.

Capt. Lovell C. Davis, 380th Expeditionary Logistics Readiness Squadron, helps break in the new equipment by washing a government vehicle as the first of what is hoped will be many satisfied customers. (*U.S. Air Force photo/Released*)

Of course, as with any project there is always a glitch that limits full opening. This wash rack was no exception in that there was some sort of sensor malfunction that prevented the system and pumps from operating correctly. Enter Tech. Sgt. Ronald Maxwell and Staff Sgt. Aaron Carl, Air National Guardsman serving with the 577th EPBS. Carl is also a licensed electrician specialized in electronics systems in his civilian life.

After making contact with the vendor, they performed troubleshooting on the systems and explained the problem in technical detail and to the vendor. The vendor immediately sent a new pressure switch, which fixed the first problem of operating the pumps.

However, while trying to commission the wash rack, Carl uncovered a new problem. No power was reaching the pressure switch. More troubleshooting of the electrical system: Carl and Senior Airman Colin Scholl traced the problem to a piece of pinched cable causing a short. They fixed the cable in the wash rack system by cutting out a bad wire and wiring a new wire to the high-pressure switch, which fixed the problem of power being delivered to the switch.

They correctly determined the switch itself was bad; yes, a second, newly installed switch had been fried by the short prior to the repair. After close coordination with the vendor, they explained the problem in detail as well as their recommendation for a fix. Without hesitation they were given approval to make the necessary repairs without voiding the manufacturer's one-year warranty.

Finally, after many months of waiting, the new wash rack was operational and open for business. All in all, this project, which seemed simple on paper, turned out to be a very challenging job, more challenging than expected. As Master Sgt. Charles Roach of 380th Expeditionary Logistics Readiness Squadron, said, "The equipment looks easy. Not much to it. But, there is a lot going on behind the hose."

True statement, very true statement. In the end, without a great team with positive attitudes from both base units involved and specialized experience within the Expeditionary Prime BEEF team, we never could have pulled it off.

So remember, next time you wash your vehicle, that waste water needs to go somewhere, hopefully into a reclamation unit and recycled for another day.

From left, Senior Airman Colin Scholl, 577th Expeditionary Prime BEEF Squadron provides hands-on training to Staff Sgt. Adam Hagerman, 380th Expeditionary Logistics Readiness Squadron, and Senior Airman Adam Baker, a water and fuels systems technician with the 380th Expeditionary Civil Engineer Squadron. ELRS and ECES personnel own operations and maintenance for wash-rack equipment and the adjacent wash-rack vehicle sunshade and concrete pad. (*U.S. Air Force photo/Released*)

Building the future:
The CE flight plan

By Capt. Logan Smith,
Directorate of Civil Engineers strategic analyst

In July 2014, Gen. Mark A. Welsh III, Air Force chief of staff, delivered "America's Air Force: A Call to the Future," a document in which he described his strategic vision for the Air Force. "Adversaries are emerging in all shapes and sizes, and the pace of technological and societal change is increasing," stated Welsh, "... senior leaders realize we need a single, integrated strategy to focus the way our service organizes, trains and equips the force to conduct future operations."

Alongside "A Call to the Future" is the Air Force Strategic Master Plan, or SMP, released in May 2015. It provides direction through two strategic imperatives, agility and inclusiveness, as well as five strategic vectors. The vectors state that the Air Force needs to be able to:

- Provide effective 21st century deterrence
- Maintain a robust and flexible global integrated intelligence, surveillance and reconnaissance capability
- Ensure a full-spectrum, high-end-focused force
- Pursue a multi-domain approach to our five core missions
- Continue to pursue game-changing technologies

The SMP includes four supporting annexes: strategic posture, human capital, capabilities and science and technology. These annexes provide specific guidance and direction to further align the SMP's goals and objectives to future resourcing decisions.

Integrating Air Force strategy and planning, as described in these documents, will drive the organization to transition from a program-centric budget to a planning-centric budget.

Civil engineer strategy

CE leadership responded by initiating work to translate the Air Force's strategic vision into a CE flight plan. The A4C Installations Strategy and Plans Division brought together a team from Headquarters Air Force and the Air Force Civil Engineer Center, or AFCEC, to distill the end states, SMP goals and objectives and the four SMP supporting annexes into civil engineering end states. This effort represents the civil engineering functional planning process within the strategy, planning and programming process, or SP3.

CE end states, strategic objectives

The CE end states describe the physical or behavioral environment that if achieved, meets the objectives of policy, orders, guidance and directions. CE end states are intentionally broad with a 20-year outlook. Each end state is supported by the CE strategic objectives, which provide the necessary linkages to the SMP goals and objectives.

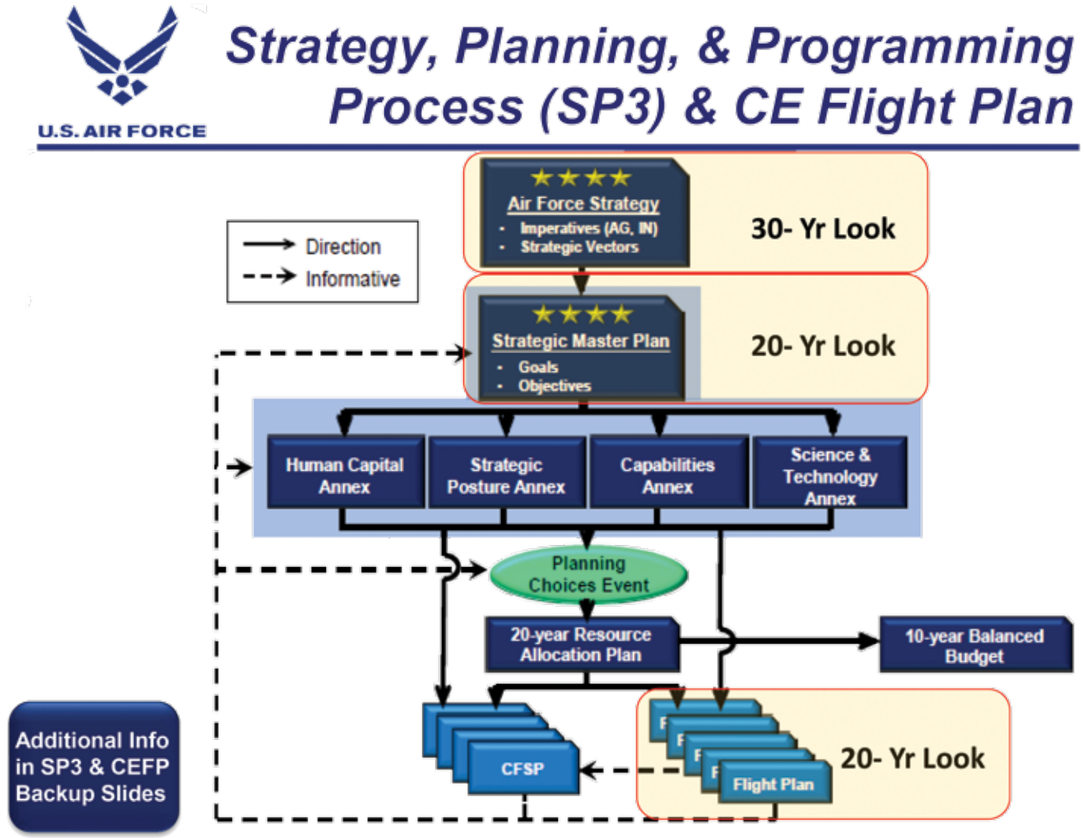
The strategic objectives will attempt to balance our current civil engineering programs with new initiatives and newly identified requirements for program objective memorandum inputs. These objectives will be informed by the execution process as well. They may also address cross-cutting issues that are not fully covered through the Agile Combat Support Core Functional Support Plan.

These strategic objectives will be developed at Headquarters Air Force with input from the AFCEC and the CE community.

Making strategy actionable

So how does this affect CE on an operational level? A forward-looking 20-year CE flight plan will help our senior leaders better advocate for critical resources and capabilities in the years we need them. This will enable a successful mission while supporting installations of the future. Planners and programmers will identify and advocate for resources required by CE program areas in the program objective memorandum to achieve the measurable and detailed end states and objectives. CE senior leaders will evaluate various courses of action to best achieve the end states and objectives, and to manage risks. New linkages built into our planning process help ensure the selected courses of action align finite resources to supporting the Air Force strategy.

All areas of investment that are essential to fulfilling the CE mission should be captured in the CE flight plan strategic objectives, which in turn support the overarching Air Force strategy. The execution support plan will then provide a transition from strategy to execution. The support plan



A forward-looking 20-year CE flight plan will assist our senior leaders to better advocate for critical resources and capabilities. ***(U.S. Air Force graphic/Released)***

will present a three-year look with execution objectives developed to carry out investments across all asset classes complied into an integrated action list.

AFCEC planners will develop the execution support plan, which will lead to implementation guidance for the affected programs to be distributed to installations. A more predictable investment plan will allow for a better design program and more effective acquisition efforts. Installations will still be able to identify emergent needs. However, communication becomes critical between installations and AFCEC to ensure the needs are linked to the existing investment strategy.

This new effort improves upon previous CE strategic plans by providing more specific, targeted guidance to inform execution while allowing for flexibility in how programs are carried out to allow for wiser investments (in facilities, equipment, services and training) that can move us toward our achieving CE strategic objectives and Air Force strategy. Stay tuned on milBook and participate in AFCEC and Air Force Installation and Mission Support Center teleconferences to learn more and provide your feedback.

CE flight plan next steps

In September, the CE flight plan end states were to be presented to the CE board for approval, after which it would be presented to the Installation Executive Council for review. Following fully integrated governance structure approval, the CE flight plan will help us refine the strategic objectives. Then they will be the basis for CE functional inputs to the fiscal 2019 planning efforts that begin in the spring as well as used to inform Corona Fall, the Air Force's conference for its highest-ranking leaders. Plans also include designating individual action officers for each objective to track progress toward completion.

CE snow, ice crews prepare for worst year-round

By Preston "Benny" Benedyk, DAF, C.E.M.
AFCEC Vehicle/Snow Control manager

Anyone who has lived in a cold climate probably has heard a winter storm warning. The 2014-2015 winter storm season was especially harsh, with many areas having seen snow accumulation in excess of 84 inches during one snow event. For the Air Force, a winter storm doesn't stop the mission. The members of the Air Force Civil Engineer Snow Control Operations are prepped and ready to handle anything Mother Nature can dish out.

CE snow and ice control crews are composed of both military and civilian members, some well experienced and some having never been in snow. Most are from the CE horizontal section, commonly referred to as "Dirt Boyz," and work in their specific career field throughout the year. During extreme winter storm events, other CE sections augment snow control operations. As the winter season approaches, preparation of the snow and ice control vehicles takes center stage.

(above)* Dump trucks equipped with snowplows are used mainly for street-side snow clearing. *(U.S. Air Force photo/Preston "Benny" Benedyk/Released)
(top of page)* The airfield uses large snow brooms, snowplows and snow blowers, which can reach 30-40 mph during operations. *(U.S. Air Force photo/Preston "Benny" Benedyk/Released)

Have you ever wondered why certain areas of the base have priority getting plowed while other areas, such as housing, often receive less attention during a winter storm? Air Force snow control follows Air Force Instruction 32-1002, Snow and Ice Control. This AFI directs installations that receive more than 6 inches of annual snowfall to maintain a snow and ice control plan, or S&ICP. Bases that receive less than 6 inches annually aren't required to maintain a S&IC plan and usually don't have the required assets for a full-fledged snow control operation.

The plan separates the base into three priorities. Priority 1 (Red) is the primary runway and associated areas including some emergency routes. Priority 2 (Yellow) includes navigational aids, mission critical facilities, roadways and most parking lots. Finally, Priority 3 (Green) covers all other areas of the base to include military family housing. Bases without a flying mission have adjusted their priority areas as needed.

Snow control crews work both the airfield side and the street side simultaneously. The airfield side uses large snow brooms, snowplows and snow blowers that weigh more than 60,000 pounds and move at speeds in excess of 30-40 mph during operations. For street side operations, dump trucks equipped with snowplows are the main vehicles for snow control operations. Large construction equipment such as front-end loaders, motor graders, backhoes, and skid steer loaders are also used to clear roadways, parking lots and walkways. It is important to note that all of these vehicles have limited visibility, especially during a snowstorm. It is essential to keep vehicle traffic to a minimum, allowing the snow control crews the opportunity to clear these areas without unnecessary traffic movement.

Snow Control Operations is more than just getting in a snowplow and pushing snow. It takes a great deal of knowledge and skill to operate the large vehicles needed to clear snow from the flight line, airfield, roadways and parking areas. Safety for the surrounding environment and the operators is critical.

In order to ensure the safest winter season possible, training the S&IC crews is part of the pre-season preparation. This consists of various training media, including formal classroom lectures, web-based training, table top exercises, hands-on operations, and day and night operations. The hands-on training allows operators the chance to gain airfield familiarization and conduct practice runs with the snow control vehicles.

As a winter storm approaches, the snow control crews are prepped and already hard at work applying an anti-icing/deicing product to the airfield surface and traction control product to the base streets. On the airfield side, the goal is to keep as much moisture off the airfield surface as possible using the large high speed snow brooms. When the storm intensifies and more snow begins to accumulate, additional snow control vehicles are employed. Snowplows move accumulated ice and snow across the pavement surface. These vehicles are designed to move the snow.

Once the snow begins to pile up, large snow blowers are used to remove the snow from the runway or airfield surface. It may not sound like much, but even an inch or two of snow equates to several thousand tons of snow lying on the entire airfield. Imagine how many tons of snow there are in a 15- or 20-inch snowfall.

Naturally the airfield takes priority during snow control operations, however, that's not to say that other areas of the base are less important. Every organization plays a part in the mission. It's unreasonable to expect that all areas of the base can be cleared at the same time. The Snow and Ice Control Committee holds two annual meetings, a pre-season meeting in September/October and a post-season meeting in April/May time frame. During the meeting, snow control priorities are discussed, organizational responsibilities reviewed, mission essential personnel are established, and lessons learned are examined. All this is critical to the base operating as close to normal as possible during the winter storm event.

Snow crews that have performed outstandingly throughout the season can be awarded the Balchen/Post Award, Military Category, Snow Control Operations, during the International Aviation Snow Symposium's annual conference. This award commemorates the achievements of retired Air Force Col. Bernt Balchen and Wilfred M. "Wiley" Post, two pioneers within military and commercial aircraft operations industry.

Winter seasons can seem to last forever, with snow from September through May. Snow control crews work long hours, in extreme weather conditions, with little rest at times, to keep the airfield and base operational. Even after the snow season ends, crews are busy cleaning and servicing the snow control vehicles, ordering replacement parts, restocking deicing material, and repairing any damage to the base infrastructure. As you can see Air Force Snow Control Operations can last all year long.

Editor's Note: The writer dedicates this article to all Air Force Civil Engineer Snow and Ice Control crews.

The 2014-2015 winter storm season was especially harsh, with many areas having more than 84 inches of snow accumulation. *(U.S. Air Force photo/Preston "Benny" Benedyk/Released)*

Graduate education program

a valuable part of a civil engineer's force development

By Maj. Vhance Valencia
Air Force Institute of Technology assistant professor of systems engineering

Members of the Air Force Institute of Technology graduating class gather in March 2015. AFIT classes are composed of U.S. Air Force, U.S. Army, U.S. Navy, U.S. Marine Corps, international and civilian students. *(U.S. Air Force photo)*

Why should civil engineers pursue graduate education? It's a fair question. Our Air Force chief of staff said in a video released late last year that we don't need a graduate degree until we compete for colonel. Possessing a graduate degree doesn't result in an immediate pay raise, consideration for the "good jobs," or even increased responsibility in your current job.

For those Airmen who have pursued night school, you know firsthand how difficult it can be managing your work, family, personal life and, on top of it all, school. Graduate studies come with a significant "opportunity cost": You trade away time, energy and maybe money toward studying when you could spend that time, energy and money on yourself and your family. Instead of reading or finishing up that paper, you could gain valuable work experience to list on your next performance report, coordinate that big important event to win CGO of the quarter or spend valuable time with your family – after all, your kids are only young once.

So why spend the effort and time on graduate education? What purpose does it serve? When you complete your graduate degree, what value does it bring to the civil engineer workforce?

Many online articles explain why graduate education is important: personal growth, greater employment opportunities, recognition and credibility, satisfying your intellectual curiosity. Reflecting back on the reasons why I attended the Air Force Institute of Technology's Graduate Engineering Management Program, these answers don't resonate. Since graduating with an engineering management degree, no one has said to me: "Oh, you're a GEM grad? You should work for me!" But they should. And here's why.

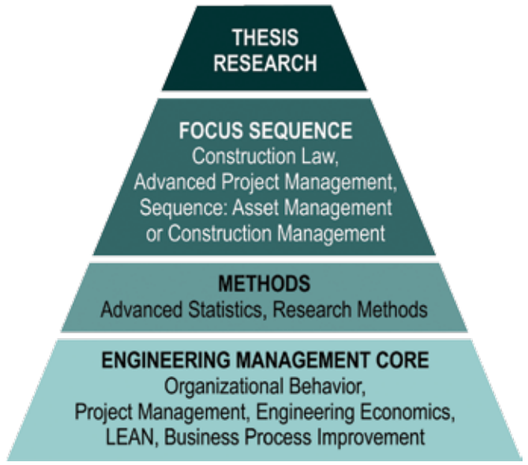
AFIT's GEM Program

The field of engineering management is a very specialized form of management. A career as an engineer manager (and yes, CE officers and senior civilians are engineer managers) requires you to apply your technical engineering knowledge alongside your organizational and administrative abilities so you can lead whatever organization is assigned to you. The field bridges the gap between the traditional engineering disciplines and the fields of management and business. I have often described the GEM program as a master's in business administration for engineers because the skills that you learn in GEM build on the math, science and communication abilities you developed as an undergraduate.

AFIT's GEM program has four main elements: engineering management core courses, methods courses, focus sequence courses and thesis research.

In the management core, students take a series of courses, both quantitative and qualitative, that include engineering management concepts such as organizational behavior, project management, engineering economics, lean concepts for engineers and business process improvement. The methods courses cover advanced statistics and research methods. These are designed to give students a strong background in probability and uncertainty, which prepares them for follow-on coursework and your research.

The focus sequence is a specialization track that provides technical depth in asset management or construction management, along with courses in construction law and advanced project management. Altogether, this coursework supports the final element of the program: thesis research. On completion of the program, every graduate will have finished a research effort that answers an important question to his or her respective career field.



Value of engineering management degree

You'll spend 18 months at AFIT working hard at both your classes and your research. You will have lots of late nights and lots of coffee trying to earn that "A" in your courses and put the finishing touches on your 150-plus page thesis. And then in the years after your graduation, you'll never work again on your thesis and will barely recall the central limit theorem from statistics (or some other important fact from your classes). You'll hear senior leaders tell you that they've never worked on their thesis topics since graduating and you'll see the Air Force clarify its policy on graduate education and promotion. All of this seems to make earning a graduate degree less important within the context of your Air Force career.

But our community keeps sending engineers to AFIT's GEM program to produce engineering managers. We've reopened eligibility to include hand-selected civilians. Our assignments officers work hard to fill every quota position for these advanced academic degrees. Our civil engineer senior leaders continue to emphasize the importance of graduate education to the civil engineering career field. So there is some value in the GEM program and earning graduate degrees. But what is it?

Graduate programs help you develop critical thinking skills, learn how to learn, develop research skills, hone your writing skills and gain in-depth knowledge in skills necessary to succeed in engineering management. Unlike your undergraduate experience, an AFIT graduate education, like all good graduate education, will expose you to problems and challenges with no closed-form solution. Just as in the challenges that you face in your day-to-day job, the course and research work that you do here will not have a single "right answer." Instead, you will apply the concepts and methods you just learned to solving and answering some open-ended question. The research you do, whether it's for a class project or the culmination of your thesis, forces you to develop these higher-level analytical skills that will help in developing your intellect long after you graduate from AFIT.

Critical thinking, life-long learning, research, writing and deep knowledge in engineering management are the important knowledge, skills and abilities that GEM graduates obtain. Aided by these, you'll be better prepared to navigate future challenges and problems as you progress through your career. The knowledge, skills and abilities that you gain here will transform you into a better engineer and effective leader and manager. This is our career field's return on investment for sending engineers to the GEM program and it's what makes the program a valuable part of a civil engineer's force development.

Whether a flight commander, squadron commander or senior civil engineer in a major command or the Air Force Installation and Mission Support Center, engineer managers reside at the intersection of technological problem solving and management. Every day, you are asked to apply your engineering technical capabilities alongside management skills. Airmen engineers are not effective if our technical and management skill sets are out of balance. Too technical of an approach and we get accused of failing to see the big picture; focusing too much on management will call our engineering competence into question.

AFIT's GEM program provides a solid foundation in engineering management. It has a long and proud history of providing this education and will continue to do so to produce great civil engineer leaders and managers. You can apply at www.afit.edu/admissions/index.cfm.

Former 554th commander reflects on his career

By Retired Col. William R. Sims
Commander, 554th RED HORSE, Osan AB, Republic of Korea, from 1979-1980

This assignment, after essentially a year in the Industrial College of the Armed Forces at Fort McNair in Washington, D.C., and five years in the Pentagon before that, was — how shall I say it? "Welcome" would be an understatement. But how would this hard-nosed, no-nonsense group of 400 officers, Airmen and 250 Koreans welcome a leader with my recent background? Going back further, they would see my job titles of manager, chief, head and deputy, but in no place would they see the title "commander."

I'm sure many, especially the senior noncommissioned officers, asked, "What did we do wrong to deserve this guy?"

For me, at least, I was where I'd always wanted to be.

First, I was back in the tactical forces, which began with the 81st Tactical Fighter Wing at Royal Air Force Bentwaters-Woodbridge, England. It was there that I made my decision to cross the threshold of my ROTC commitment and remain in the Air Force.

Second, this assignment was going to give me the opportunity to apply the leadership skills I had observed and accumulated over time.

And third, the challenges of taking command of the oldest and most decorated of all the Rapid Engineer Deployable Heavy Operational Repair Squadron Engineer squadrons was a chance for either profound success or spectacular failure. After all, the scope of work assigned at Osan, Kunsan and Taegu, our three operating locations in the Republic of Korea, also included projects at Kwangju, Naju, Pohang, Chonju, Kimhae, and eventually, Wake Island. Each was supported in varying degrees from our three permanent locations. It was a formidable menu of work, and growing.

As the commander, I soon found that construction projects assigned to RED HORSE squadrons usually came burdened with one of the following instructions, though often not enunciated with this clarity:

- It appears that there is insufficient time to finish the project to meet mission schedule requirements.
- Complete it on schedule.
- The scope of the project has not yet been fully determined but we need to get started to meet mission schedule requirements and we will determine the exact scope of the requirement later. Start it now.
- The scope of the project cannot be reduced to meet the budget, but we still need it — so figure out how to meet the budget AND mission scope requirements and proceed.
- Private contractor pricings are above statutory limitations for the category of work, and mission schedule requirements do not permit time to seek approval at the next level. Mission requirements, nevertheless, require it to be done on schedule and within statutory limitations — figure out how to get it done.
- Private contractor prices were high because the project was so complicated, or in such a location, that it could not be reasonably priced. Figure out how to get it done and do it.
- Any combination, or all of the above.

Missions impossible? Not really, because daunting as the circumstances of these projects were, the ingenuity of American Airmen is unlimited and will succeed, if allowed to flourish. I had a simple formula to pursue. Did each and every person in the 554th have the necessary tools, mobility, workplace, supply, communications, training and clear definition of what was expected to enable them to achieve success? If so, then I got out of the way.

Every single one of us, officer or enlisted, came from base civil engineering organizations at one time or another. BCE projects were predominantly maintenance and repair with "new" construction being mostly small additions or alterations to existing facilities. If, for example, you were a plumber, when driving around the base with your visiting parents or mailing photographs home showing what you were doing, it was less than glamorous to describe, for example, that you were replacing toilets in Building 657 as typical of your jobs. On the other hand, projects underway by the 554th were a new dormitory, a new elementary school, addition to the hospital, new airfield pavements, new roads and blast revetments to protect mission aircraft. On the relatively rare occasions when it was a "repair" or "renovation" project, they were large and fit into one or more of the categories above.

We also had the enormous advantage of being a design-build organization, which enabled close and continuous coordination between our own designers and our own constructors, plus we were generally building on our "own" land and the "local" approvals were far less bureaucratic in approvals and oversight than private work.

Our underlying base civil engineering motto with performance of "Can do, will do," fostered the development of Prime Base Engineer Emergency Force, or Prime BEEF, which became the precursor to RED HORSE. The generic RED HORSE motto of "Either lead, follow, or get the hell out of the way!" plus our own 554th motto of "We always lead" were indicative of the spirit and traditions of civil engineering generally, and the 554th specifically. What seemed impossible only enhanced the motivation to succeed.

I can write volumes of anecdotes about my direct and observed experiences with the 554th. They run the gamut from humorous to sad, but are mostly filled with pride and satisfaction.

When my 12-month tour with the 554th was curtailed by two months to send me to Kadena Air Base, Japan, to be commander of the 18th Civil Engineering Group there, none of the 554th members came by my office to say goodbye. Wow! I thought, that was a pretty clear message. Instead I was told that the pickup truck to take me to the airport was waiting for me. However, when I went outside, the squadron was grouped in our equipment yard across the street with the truck awaiting me.

I shook as many hands as I could, made the most sincere short speech I could muster, under the pressure of this highly emotional moment, conveying my gratitude for their support and performance — and left. When we got out of sight, I cried.

I always felt more like a cheerleader than a commander. And, the privilege, honor and fun of being the commander of the Air Force Outstanding Unit Award-winning 554th during my watch, remains some 35 years later, the highlight of my Air Force career.

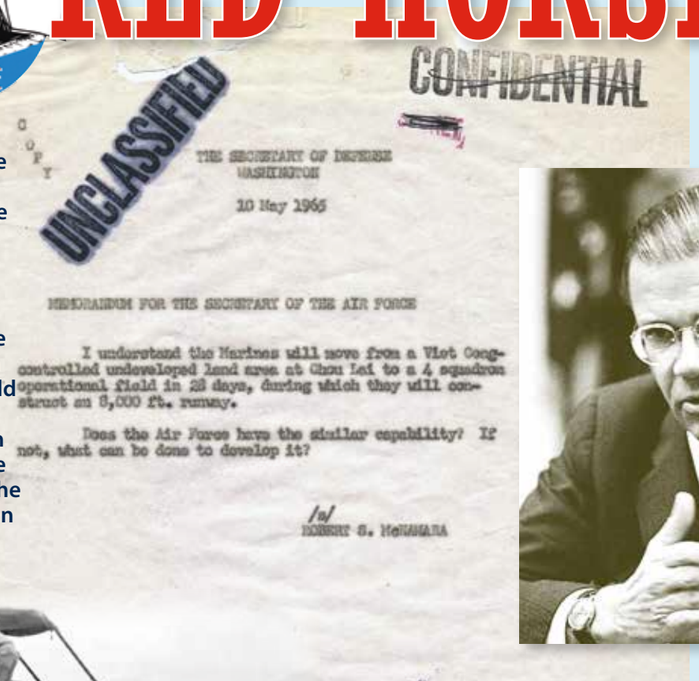
Col. William R. Sims receives the Air Force Outstanding Unit Award in 1980 on behalf of the 554th RED HORSE Squadron from Lt. Gen. James D. Hughes, then commander of Pacific Air Forces. This was the 11th outstanding unit award received by the 554th since its creation 14 years earlier. ***(Courtesy photo)***

RAPID ENGINEER DEPLOYABLE HEAVY OPERATIONAL REPAIR SQUADRON, ENGINEERING

RED HORSE

1965: Founding

In May 1965 Secretary of Defense Robert S. McNamara queried Secretary of the Air Force Eugene M. Zuckert regarding Air Force capabilities for constructing an operational airfield in Vietnam within a month. The secretary of defense had information that the U.S. Marine Corps was building a four-squadron operational airfield on undeveloped acreage near Chou Lai, Republic of Vietnam, in 28 days. The secretary of defense asked "Does the Air Force have the similar capability? If not, what can be done to develop it?" Hence, RED HORSE was born.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UNCLASSIFIED

THE SECRETARY OF DEFENSE
WASHINGTON

10 May 1965

MEMORANDUM FOR THE SECRETARY OF THE AIR FORCE

I understand the Marines will move from a Viet Cong-controlled undeveloped land area at Chou Lai to a 4 squadron operational field in 28 days, during which they will construct an 8,000 ft. runway.

Does the Air Force have the similar capability? If not, what can be done to develop it?

/s/
ROBERT S. McNAMARA

1966: First RED HORSE Units

Director of civil engineering, Maj. Gen. Robert H. Curtin presided over the creation of the first two RED HORSE units, the 554th and the 555th. Both were transported to South Vietnam by military aircraft in February 1966. The 554th, called "Penny Short," was deployed to Phan Rang and the 555th, called "Triple Nickel," was sent to Cam Ranh Bay. Those first RED HORSE squadrons were awarded outstanding unit awards, as well as Bronze Stars and other honors for their outstanding service during the conflict.

TIMELINE

2001: Airborne RED HORSE

The formation of an airborne RED HORSE capability began in 2001. The first Airborne RED HORSE squadrons deployed to three sites in Iraq during 2003. The teams were formed from portions of the 819th, 820th, and 823rd RED HORSE squadrons. Each airborne team had 35 airborne-qualified airmen comprising 21 with a range of engineering skills, 6 EOD personnel, 6 fire prevention and rescue personnel, and 2 nuclear, biological and chemical specialists.

2002: Operation Enduring Freedom

During their 180-day deployment as part of OEF, the 200th/201st ERHS deployed more than 350 personnel to 13 bases in 10 countries, including Afghanistan.

2002: Plane Crash Memorial

On March 3, 2001, three members of the Florida Army National Guard and 18 RED HORSE engineers from the 203rd RED HORSE flight lost their lives in a plane crash in southern Georgia. In 2002, a 30,000 square-foot memorial was dedicated to the guardsmen at the 203rd RED HORSE headquarters at Camp Pendleton, Virginia Beach. A kneeling RED HORSE statue was placed in front to honor the fallen RED HORSE engineers.

2001: Operation Iraqi Freedom

RED HORSE personnel were organized as the 1st Expeditionary RED HORSE Group comprising the 823rd ERHS, the 819th/219th ERHS and the 307th ERHS. After more than seven years of combat operations, the last elements of the 557th ERHS departed Iraq on Aug. 20, 2010. At the peak of operations, 500 RED HORSE personnel were deployed, providing engineer support to approximately 20 forward operating bases throughout Iraq.

RED HORSE at 50, still going strong!

By Lt. Col. Erik J. Lagerquist
1st Expeditionary Civil Engineer Group deputy director

It's hard to believe that 50 years have passed since Maj. Gen. Robert H. Curtain, as the U.S. Air Force director of civil engineering, directed Tactical Air Command to stand up and equip two new units for training and then swiftly field their deployment to the jungles of Vietnam. It's harder still to remember that as a nation we have effectively been at war in the Middle East for the past 25 years, with a strong, nearly continuous Rapid Engineer Deployable Heavy Operational Repair Squadron Engineer, better known as RED HORSE, presence there since day one.

I've spent over 22 years as an Air Force civil engineer, traveling the world over as directed, starting from my time as a junior engineer, through field-grade officer jobs, a few deployments and remote assignments and finally staff work. Most of my travels were in support of various conflicts around the globe; even a few as a RED HORSE engineer. I served in Korea, Iraq, Haiti, Albania, Qatar and numerous other places in between.

I can personally attest that Air Force civil engineers are always in high demand, especially RED HORSE engineers who have, and continue to build, a very proud legacy. I was very fortunate to be able to serve with RED HORSE out of Hurlburt Field in Florida in the late '90s with the 823rd, a unit that was first stood up in October 1966 at Bien Hoa Air Base, Vietnam, as one of five original RED HORSE squadrons.

We occasionally forget that not all RED HORSE projects involve combat support. They also are widely known for many humanitarian missions, like New Horizons, where they construct schools, refugee camps, drill water wells and the like.

One fond memory from my time with that unit took place in Haiti. We had just finished drilling the first of three water wells in the very poor, northern part of the country. Our lead well driller was just finishing attaching a pump handle to the wellhead as the rest of the crew and our U.S. Marine security detail were busy removing concertina wire surrounding the drill site. A small crowd of villagers gathered, curious to see what the Americans had been up to for the past two weeks.

When it was ready, our NCO beckoned for one of the young boys to come over and help him man the pump. He was about 10 years old, and naturally a bit shy, but he finally gathered enough courage to step forward. After about two minutes of heavy pumping together, water started to flow and the crowd rejoiced! There were hugs and high-fives all around, and lots of smiles and laughter. Shortly after, the line of people waiting to fill up with fresh water had grown to a few hundred yards long. Days like that make me feel great to be an Airman engineer.

The next year, my unit deployed to support Operation Allied Force and 823rd members were fanned out across Europe supporting the usual slate of bed-down projects. My task was to survey potential refugee campsites. One such place involved a farmer's field in the middle of central Albania. Armed with only my side arm, a helmet, no ballistic vest and a rather large digital camera, off we went riding in the back of a U.S. Navy CH-53 helicopter. Halfway there, the loadmaster tapped me on my helmet and asked me to come up front. The pilot had no idea where we needed to be, and all he had for reference was a map I created in PowerPoint. Looking out through the windscreen, I located the field we were to survey and pointed to his left. He made a very quick, very steep bank and 90 seconds later we were on the ground.

As I was busy taking measurements of dirt roads and various terrain features and sketching out a more accurate map, a couple of curious farmers came by to see what we were doing. My Albanian was about as good as their English, but I managed to smile and nod reassuringly for them, even posing for a picture. In the end, we never built a camp there. The whole situation was very surreal and it has stayed with me for many years. You can't learn an experience like that in engineering school.

Weeks later, I found myself up north, in Kukes, Albania, to survey a 3,000-foot runaway built by engineers from the United Arab Emirates. While the runway was very wide and stable, it was built from compacted clay. Though nice in a dry climate for a short term, clay cannot stand up to a potentially around-the-clock, rain-or-shine assault from heavily laden C-17s and C-130s. I took my fair share of soil samples, conducted more dynamic cone penetrometer tests than I care to remember and made a bunch of field sketches. However, after eight-plus hours on the airfield, we no longer had a helicopter flight available to take us back to our base in Tirana. With no satellite or worldwide cellular phone, we had no way to communicate our situation.

Fortunately, the UAE engineers had a small support camp outside their refugee camp and allowed us to stay the night. The next morning, we awoke and curiously noticed all the Yugos parked on the sides of the road were turned around and now headed north, back toward the mountains. It wasn't until we got back to our main base that we learned how much things had changed in one night: Milosevic surrendered, peace was at hand.

Many years have since passed, and I have been there, done that and gotten quite a few T-shirts along the way. I was even here at Al Udeid temporarily, in 2002 when my old unit the 823rd was finishing up its first post-9-11 deployment, and again in 2003 to help build what is now known as Coalition Compound. Originally built for three to five years of use, those trailers are still in use today. I know, because I am here at Al Udeid again, this time as deputy for the 1st Expeditionary Civil Engineer Group. Working with ECEG I see firsthand all the great and wonderful things the 557th RED HORSE and 577th Prime BEEF Squadron engineers do on a daily basis. If I've learned anything in my 23-plus years as an Air Force engineer it's this: Do what it takes to accomplish the mission and remain flexible.

RED HORSE has come a long way since General Curtain first envisioned its future as a heavy construction, troop labor capability. While technology has improved both in terms of much better personal protective equipment and much smaller electronics for communications and photography, the mission is still the same.

From the humid, dense, vegetation-covered jungles of Vietnam to the arid, dusty, barren deserts of the Middle East, RED HORSE has come a long way. I am very confident that regardless of where our nation is headed, to counter whatever enemy rises up next, the men and women of Air Force civil engineering will continue to live up to the motto of "Can Do, Will Do, Have Done!" for at least another 50 years and beyond. To the HORSE!

Editor's Note: Lagerquist is a career civil engineer who has served over 22 years on active duty. He is deployed as deputy commander, 1st Expeditionary Civil Engineer Group. He should return home to his family at Joint Base Andrews, Maryland, this fall to resume his duties with the Air National Guard Readiness Center.

(above)* Haitian villagers gather at the first of three water wells during a RED HORSE New Horizons mission in October 1998. *(U.S. Air Force photo/then-Capt. Erik J. Lagerquist/Released)

(right)* Lagerquist at left, stands outside a Ukrainian BTR armored personnel carrier, somewhere in the southeastern desert of Iraq while on a site survey of Iraqi border forts. *(U.S. Air Force photo/Released)

554th RED HORSE Squadron Silver Flag training flight

First class with a partner nation a resounding success

By Capt. Vuong Tran
Chief Master Sgt. Howard Yard
554th RED HORSE Squadron

The Pacific Air Forces' Regional Training Center Silver Flag Training Site opened approximately a year ago in October 2014 at Northwest Field, Guam, after eight years of preparation.

The 554th Rapid Engineer Deployable Heavy Operational Repair Squadron Engineer Squadron, better known as RED HORSE, at Andersen had been working since 2006 to build up the Pacific Air Forces Regional Training Center, or PRTC.

Although all service components have worked on the project, the 554th dedicated 8,000 man days in fiscal 2014 alone to it.

"The troop labor significantly reduced the estimated cost of the project from $251 million to $200 million and enabled the center to reach initial operational capability two years early," said Lt. Col. DeRosa, 554th RHS commander.

Silver Flag, previously known as "Commando Prime," was established in 1985 and located at Kunsan Air Base, Republic of Korea. The program moved to Kadena Air Base, Japan, in 1989 and concluded its final Silver Flag at Kadena in May 2013. The entire flight moved in March 2014, transporting 1,000 tons of equipment and 61 vehicles to Northwest Field. By October 2014, after the construction of classrooms, warehouses and training areas, the training site opened for classes.

Silver Flag is part of the expanding PRTC at Northwest Field. The first course in over a year and a half consisted of 111 Airmen from bases across the Pacific. Since the initial course, the Silver Flag Flight has trained over 1,200 engineers and force support personnel from 14 different Air Force career fields in subjects ranging from airfield damage repair, base recovery after attack, technical rescue and bare base beddown. Additionally, the flight has incorporated the "Total Force" concept into its mission, training engineers from the Army, Navy, Marines and our Pacific Command partner nations.

(above) **Pacific partner nation engineers perform crushed stone crater repair as part of a Silver Flag ADR field training exercise.** ***(U.S. Air Force photo/Jamie L. King/Released)***

(left) **Water and fuels systems maintenance personnel from NMCB 133 Detachment, Guam, repair a water break during the Silver Flag base recovery after attack exercise.** ***(U.S. Air Force photo/Tech. Sgt. Roshia D. Johari/Released)***

One of the first steps in opening Silver Flag to all of the Pacific Command was to invite personnel from Naval Mobile Construction Battalion, or NMCB, 133, Detachment Guam, to participate in the training. In August 2014, before the official opening of the site, 14 Seabees, working alongside 50 Air Force engineers and force support Airmen completed eight days of expeditionary training. The Air Force's equipment is much the same as the Seabees but the terminology and techniques were different. It took a couple of days for participants to familiarize themselves with the terms and each other but once that phase was passed, everyone integrated efficiently, and the training was considered a success. The overall experience was beneficial to both services because the military continues to become more oriented toward joint operations; thus, interoperability is becoming an invaluable asset.

The relocation of Silver Flag from Kadena to Northwest Field served two purposes. The first was to reduce the Air Force's footprint on Okinawa, and the second was to increase engagement opportunities with our Pacific partner nations. This enables us to meet the PACAF commander's strategic lines of operation and also support our national security strategy at the same time.

Our first partner nation engagement was conducted at the PRTC the first week of June 2014 and involved Airfield Damage Recovery, or ADR, training with a partner nation and the RED HORSE Squadron Silver Flag cadre. Forty-one engineers were trained on Air Force civil engineer tactics, techniques and procedures for command and control, mobile aircraft arresting systems, emergency airfield lighting, airfield damage assessment, spall repair and crushed stone crater repair.

Air Force civil engineers pull folding fiberglass matting over a crushed stone crater repair during a Silver Flag airfield damage repair exercise at the Pacific Regional Training Center on Northwest Field, Guam. ***(U.S. Air Force photo/Airman 1st Class Emily A. Bradley/Released)***

Despite the language barrier and some unforeseen challenges, the first partner nation Silver Flag training class was a tremendous success. Throughout Silver Flag, partner nation engineers excelled during each phase of training, completing 100 percent of essential training tasks proficiently. From small shelter set-up to the final ADR field training exercise, they exceeded all expectations. In the process, our Silver Flag cadre forged lasting personal and professional relationships. Moving forward, we stand ready to build on this experience through additional Silver Flags as well as other logistic engagements such as Pacific Unity, Pacific Angel and Pacific Agility.

Moving the Silver Flag Flight to Guam from Kadena completes a significant milestone in the buildup of the PRTC. It further enhances the expeditionary combat skills capabilities of our Airmen, sister service engineers and our joint regional partners that are integral to the strategic rebalance to the Pacific.

Seaman Jessica Couviller, NMCB 133 Detachment, Guam, assists in bare base beddown planning with Silver Flag Instructor Staff Sgt. Jared Sinchak. ***(U.S. Air Force photo/Tech. Sgt. Michael T. Tewes/Released)***

820th RED HORSE Squadron builds on successes of the past

By Capt. Joe Miller
Capt. Zachary Stanton
820th RED HORSE Squadron

The legacy of the 820th Rapid Engineer Deployable Heavy Operational Repair Squadron Engineers, or RED HORSE, began more than 50 years ago as the 820th Installations Squadron at Plattsburgh Air Force Base, New York.

After a brief deactivation, it was reactivated on April 8, 1966, as the 820th Civil Engineer Squadron, Heavy Repair. Within a year, the unit deployed to Tuy Hoa Air Base, Vietnam. In support of Operation Turnkey, the unit completed nearly 50 percent of all construction at Tuy Hoa, the only air base in Southeast Asia built by the Air Force. Members of the 820th constructed 170 aircraft revetments, 120,000 square feet of wooden structures and 175,000 square yards of AM-2 mat. In addition, the 820th operated a rock crusher 9.5 miles from the base and hauled the aggregate through enemy-held territory to the base, the first version of today's combat logistics patrol team.

After its service in Vietnam, the 820th returned to the United States on April 15, 1970, to its permanent station, Nellis Air Force Base, Nevada, Area II (formerly the Lake Mead Naval Base). On March 10, 1994, the unit was designated the 820th RED HORSE Squadron.

Over the last decade, the 820th RHS has supported multiple contingency operations in Southwest Asia. In 2002, in support of Operation FREEDOM, they completed the largest construction project assigned to the RED HORSE since the Vietnam War, a $17.6 million MILCON ramp construction project at Al Dhafra AB, United Arab Emirates. At the time of this writing, members of the 820th RHS are deployed as part of the 557th Expeditionary RED HORSE Squadron headquartered at Al Udeid, Qatar. As part of a hub-and-spoke operation, the 557th ERHS has 15 active construction projects worth $12.7 million across four locations (Al Dhafra, Ali Al Salem, Al Mubarak and Iraq). In addition, the 557th ERHS has 17 projects in design, one of which expands the Erbil Aerial Port parking apron by 115,000 square feet.

Besides their role in supporting contingency operations, the 820th RHS is heavily engaged in numerous troop training projects, which provide RED HORSE craftsmen with the opportunity to hone their skills before their next deployment. Nine projects currently are in design with another six in active construction. Members of the 820th are completing a $12.4 million construction project at Joint Base San Antonio-Randolph's Seguin Auxiliary Airfield, one of the largest troop training projects in RED HORSE history. This project involves the demolition and replacement of the 10,000 foot runway, grading the entire airfield and construction of a new taxiway and parking apron.

Recently, the 820th RHS completed construction of a $4.4 million hangar and sunshade facility to bed down three C-27Js for the U.S. Army's Special Operations Aviation Command, aka Airborne, at Yuma Proving Ground, Arizona. Additionally, the 820th completed construction of a $1.2 million fire station, decreasing the emergency response time and ensuring the protection of over 800 family homes.

Furthermore, members of the 820th RHS always have been ready to assist communities recover from natural disasters. When a series of tornadoes devastated Xenia, Ohio, in 1974, they postponed construction at nearby Wright-Patterson AFB and reported to the damaged area within two hours to assist with cleanup efforts.

The 820th RHS participate annually in U.S. Southern Command's joint exercise New Horizons. This exercise provides various South and Central American countries with new health care clinics, wells and schools, as well as medical treatment for local residents. In 2011, while deployed to Suriname, the 820th RHS conducted the first New Horizons security training, conducting three 30-day classes to train 105 Surinamese personnel. Currently, the 820th RHS is designing four health care clinics and one women's vocational training center for communities across the Dominican Republic. Construction of these facilities is tentatively scheduled for spring 2016.

Following the legacy of HORSE men and women in Vietnam, 820th RED HORSE personnel have been continuously deployed to the U.S. Central Command area of responsibility supporting Operations Enduring Freedom, Iraqi Freedom, New Dawn and Infinite Resolve since 2001. The men and women of the 820th RHS have epitomized the motto of "Can Do, Will Do, Have Done" for the last 50 years and will undoubtedly continue to do so into the future.

(facing page)* Civil Engineers from the 820th RED HORSE Squadron work to seal a K-Span at an unknown location. *(U.S. Air Force photo/ Mark Hanley/Released)

(right)* Members of the 820th RED HORSE Squadron take a group photo Feb. 24, 2015. *(U.S. Air Force photo/Senior Airman Jonathan Warren/ Released)

Operation Silver Steed

A paradigm shift in field training exercise protocol

By Master Sgt. Sean Allen
823rd RHS Fire and emergency services superintendent
Master Sgt. William Cameron
823rd RHS Explosive ordnance disposal superintendent
Tech. Sgt. Michael Chancey
21st CES Emergency management NCOIC

U.S. Air National Guard Airman 1st Class Edgar Maldonado, 184th Civil Engineer Squadron structural, cuts into metal tubing with a plasma cutter during a Silver Flag exercise at Detachment 1, 823rd Red Horse Squadron, Tyndall Air Force Base, Florida, Aug. 11, 2014. *(U.S. Air Force Photo/Tech. Sgt. Maria A. Ruiz/Released)*

Over the past several years, the Air Force specialties that attend Silver Flag at Tyndall Air Force Base, Florida, have been drifting away from the team-based culmination field training exercise, or FTX, to accomplish their wartime task standard objectives in a more stove-piped manner. This has limited the student leaders' ability to command and control their forces during the field training exercise.

At the beginning of fiscal 2015, a new, reinvigorated course structure was introduced to students — something we call Operation Silver Steed 2.0. This new structure enables the command and control element to develop and lead their Airmen through the exercise instead of following a rigid standalone structure by specialty code.

Silver Steed 2.0 completely redeveloped field training exercise guidance, expeditionary site plans and operations orders, providing students with better tools and information on bed-down planning and the employment of civil engineer and force support squadron forces in the early stages of a major contingency operation. Additional training on developing and employing a common operational picture with an emergency operation center also was implemented. This gives commanders the ability to disseminate their intent, execute decisions and adjust operations to reflect constantly changing operations, enemy actions and any other incident as needed.

Additionally, injects are introduced in the master scenario events listing in a more streamlined manner. As injects, such as unexploded ordnances or casualties, are dropped from the field, they are expected to flow upward to unit control centers and occasionally to the emergency operation center or crisis action team, if warranted. Students then work out the problems in the field in real time, using any and all resources available, based on their training and leadership's directives to meet the objectives. This natural process drives students from various crafts to work together and accomplish the mission. The process will vary from class to class based on their abilities, knowledge and leadership's decision making, versus the rigid format used in the past.

Empowering the students to run their exercise is a real paradigm shift for students and cadre alike, but it provides the most realistic training opportunity for our Airmen. We have received a lot of positive feedback from the changes and have implemented many student recommendations to improve our process as well. Recurring hot washes are now held among cadre to cover training gaps and lessons learned to further improve integrated training.

Another big development at Silver Flag is the reintegration of explosive ordnance disposal, or EOD, students. It has been eight years since the call "fire in the hole" has been shouted on field training exercise day. Some may think that EOD is a newcomer to Silver Flag but that couldn't be further from the truth. EOD was participating in Silver Flag back when it was at Field 4, at Eglin Air Force Base, Florida, even before it was a part of the civil engineer community. Over the past eight years, EOD Airmen weren't attending Silver Flag, but the capability still had a presence at the training site. Silver Flag Tyndall became the home of Air Force EOD's Combat-Orientated Battle Ready Airmen, or CoBRA, and Base Recovery After Attack, or BRAAT, courses.

In 2014, with Operation Enduring Freedom and Operation Iraqi Freedom ending, Air Force EOD deployments decreased and the decision was made to incorporate EOD back into Silver Flag. The last BRAAT class was held Jan. 12-17, 2014, and the last CoBRA class graduated in March 2014. A total of 1,960 EOD techs went through CoBRA, and 242 attended BRAAT. After that break in attendance, the CoBRA Cadre was tasked with integrating EOD back into Silver Flag. Step one was what to teach? The decision was made to utilize the lessons learned from Operations Enduring and Iraqi Freedom, focusing on tactical casualty care, small-unit tactics and dismounted improvised explosive device operations. These were CoBRA points of instruction that are not easily replicated at home station and for which experts were in place to instruct. Airfield recovery lessons were pulled straight from the BRAAT class, which originated from Silver Flag, and naturally fit right into Operation Silver Steed field training exercise.

In June 2014, the reintegration of EOD back into Silver Flag took place. The curriculum is designed to be ever-changing and adaptable to the introduction of new technologies or real-world contingencies. Today, Silver Flag remains the premier Air Force EOD pre-deployment training venue and retains the ability to spin up CoBRA to ensure that Air Force EOD is ready to operate anytime, anywhere.

The Silver Flag cadre has created practical exercises driven by home-station training requirements under which students should be already be qualified to operate. This puts the emphasis on the integration with the other crafts as opposed to trying to use a new piece of equipment correctly. The learning objective is communication. Now students have to communicate with one another to accomplish the overall mission. At home station, they may just practice their portion within their flight and that's it. Here at Silver Flag, they get to see how their actions affect everyone else's. It can be an eye-opening experience for some, especially if things aren't going quite as planned. If you haven't attended Silver Flag in a few years, now is the time to check it out. Contact your unit deployment manager for more info on getting scheduled.

Author's Note: We focused on recent improvements to the CE side of Silver Flag in this article, but the cadre from finance, services, manpower and personnel support for contingency operations worked hand-in-hand with their CE counterparts to develop the exercise. This partnering adds to the realism of the exercise as it reflects how we would actually operate in the field. Additionally, it improves the training for all the career fields involved. We have been contacted by contracting personnel to assess their potential return to Silver Flag as well.

Civil engineers participating in a Silver Flag exercise at Tyndall Air Force Base, Florida, place runway matting down to establish a temporary airfield to support simulated F-16 and C-130 operations. Twenty-nine 507th Civil Engineer Squadron Reservists "deployed" to the location to set up and establish a fully operational base in a contingency environment. *(U.S. Air Force Photo/Lt. Col. Patricia Pettine/Released)*

819th RED HORSE Squadron's accomplishments raising the bar

RHS Airmen are making a molehill out of a mountain in Alaska; 15 other projects are underway

By Capt. William Bentley
819th RED HORSE Squadron Engineering Flt. commander

Since returning from an Air Force Central Command deployment in the fall of 2013, the 819th RED HORSE Squadron has executed projects in 13 different states. From horizontal (roads and airfields) to vertical (K-spans and pre-engineered buildings) projects, the 819th RHS has planned, designed, constructed and completed 32 projects valued at over $19 million.

In 2014 alone, the 819th RHS completed 16 different projects supporting Air Force Global Strike Command, Air Combat Command, Air Mobility Command, Air Education and Training Command, the Bureau of Land Management and the U.S. Army. To highlight a few of the 819th RHS's largest projects in 2014, Airmen built three K-Spans at Yuma Proving Grounds in Arizona supporting the Military Free Fall School. Also in the Southwest, the 819th RHS constructed and repaired portions of the flight line at Holloman Air Force Base in New Mexico, supporting daily F-16 fighter aircraft missions.

In addition to supporting the Department of Defense, the 819th RHS forged a relationship with the Bureau of Land Management and took a team to North Dakota to construct government housing to support regulation of the Bakken oil fields. Summarizing 2014, it was crucial that the RHS Airmen tasked to the 16 different projects continued striving forward in providing quality and sustainable products.

After setting a new standard in 2014, the 819th RHS looked to continue building upon its reputation for high caliber construction in 2015. Our team of engineers once again planned and is currently executing 16 projects supporting AFGSC, ACC, AMC, Air Force Materiel Command, Air Force Space Command, Pacific Air Forces, the U.S. Army and the Great Falls International Airport in Montana. After building a great relationship with the U.S. Army at Yuma Proving Grounds, and specifically the John F. Kennedy Special Warfare Center, the school requested the squadron build a special operations medical training compound at Fort Bragg, North Carolina. A team of 50 RHS personnel will be constructing four new buildings over the course of five months this fall. The 819th RHS is also working at Joint Base Elmendorf-Richardson, Alaska, where 30 Airmen are currently removing a small mountain at the end of a runway. To date, the team of RHS engineers has moved over 1 million cubic yards of earth; which is the equivalent of removing 515 1-foot-deep football fields. Overall, the JBER RHS team is on pace to remove over 1.8 million cubic yards of earth this year, which will double the volume a contractor completed in the previous year. With the 819th RHS's construction season of 2015 well on its way, our Airmen will have gained additional knowledge and training, continuing to support missions across the Department of Defense.

As a result of the Air Force's reduction in manning, the 819th RHS has decreased its manpower over the last two years from 411 to 246 personnel, which has fundamentally driven the squadron's need to be more streamlined and efficient. With 16 projects completed in 2014, 16 projects under construction in 2015 and 11 projects currently being planned for 2016, the leaner and meaner 819th RHS will continue to lead the way in the Air Force engineering community. 8-1-9 … TO THE HORSE!

Senior Airman Daniel Torres, a member of the 819th RED HORSE Squadron structures shop, performs pin welding to install new insulation on a storage facility at Malmstrom Air Force Base, Montana, May 20, 2015. The 819th RHS provides heavy repair capability and construction support when requirements exceed normal base civil engineer capabilities and where Army engineer support isn't readily available. ***(U.S. Air Force photo/Chris Willis/Released)***

The future RED HORSE

working toward more responsive, agile force

By Lt. Col. Brandon H. Sokora
Commander, 100th CES
Capt. J. Brandon Balskus
HQ AFIMSC Commander's Action Group

Since its inception, Rapid Engineer Deployable Heavy Operational Repair Squadron Engineer, or RED HORSE, has been a high demand/low density theater-level asset providing worldwide heavy construction capability at a moment's notice. RED HORSE continues to meet combatant commander requirements by providing these capabilities to enable contingency operations, support Homeland Security and provide humanitarian assistance. These opportunities — along with an aggressive troop training program, special capabilities training and contingency construction training — keep the Airmen of RED HORSE running at full throttle. Thus, the RED HORSE enterprise demands and deserves superb program management.

Current structure

RED HORSE is a self-sufficient, cross-functional, specialized heavy construction force designed to support the commander, Air Forces, by providing civil engineer construction capability across a theater of operations. A standard RED HORSE squadron consists of 404 Airmen postured in 20 Unit Type Codes and the associated vehicle and heavy equipment assets postured in 24 UTCs. The force package includes organic civil engineer, logistics, force support, security forces, emergency management, medical, communications and financial management. Each component (active duty, Air Force Reserve Command and Air National Guard) fields RHS, which are typically led by an O-6. The Total Force RED HORSE enterprise has the ability to posture the equivalent of nine 404-person RHS to meet combatant commander requirements. Historically, RED HORSE squadrons have deployed as full 404-person units with the agility to increase or decrease to meet demand. When more than 404 Airmen are required, the squadron is augmented with Airmen from other RED HORSE units or Prime Base Engineer Emergency Force, or Prime BEEF, squadrons.

New look of program management

With the stand down of headquarters Air Combat Command's Installations and Mission Support Directorate, or ACC/A7, previously tasked with the lead command program management of RED HORSE forces, and the subsequent activation of

Airmen with the 567th RED HORSE from Seymour Johnson Air Force Base, North Carolina, construct a tent during a field training exercise Nov. 3, 2014, at Fort Smith, Arkansas. ***(U.S. Air Force photo/Airman 1st Class Brittain Crolley/Released)***

the Air Force Installation and Mission Support Center, the RED HORSE program has taken on its own transformation initiatives to remain responsive and increase agility. While flexibility remains key to air power, optimization has become the goal for the Air Force's premier rapid response, heavy construction capability.

In the future, we will employ a more centralized and streamlined process to manage the RED HORSE program. The bulk of program management responsibilities will reside with the Air Force Civil Engineer Center to properly train and equip RED HORSE Airmen to ensure the capability remains agile and responsive in the years to come. The commander's inspection program postures RED HORSE units to provide critical feedback via the management internal control toolset on the status of self-inspection requirements.

Headquarters Air Force will continue to provide program oversight, policy and engagement, to include coordination with the office of the Assistant Secretary of the Air Force for Installations, Environment and Energy, or SAF/IE, and Congress, as well as advocacy for the RED HORSE program and resources. At the major command-level, civil engineer staffs will focus on defense chemical, biological, radiological and nuclear response force coordination, deployment coordination and coordination of Air Force Reserve Command RED HORSE mobilization. The Air Force forces component MAJCOM staffs are responsible for coordinating with joint and coalition partners. AFIMSC will leverage functional area managers to influence designed operational capability statement coordination, manning and other Air Force Personnel Center coordination, and trend analysis of RHS readiness reporting.

Improvements to troop training program

The RED HORSE enterprise is required to conduct wartime heavy construction training. The troop training program provides the primary means for this training for the active component through the execution of real-world construction projects. In order to integrate the training program into the Air Force Comprehensive Asset Management Plan, training program projects are added to the integrated priority list, or IPL, thus allowing RED HORSE to accomplish necessary training while completing high-priority projects already selected to receive funding. If IPL projects selected for funding don't fully satisfy RED HORSE training baselines, RHS is able to reach below the funding line in order to select projects offering appropriate training value. While this relationship offers many benefits to the consolidated facilities sustainment, restoration and modernization, or FSRM, program, the RED HORSE enterprise must overcome significant challenges to timely and efficient execution of RED HORSE training.

Tools for success

Projects must follow business rules for the execution of Air Force comprehensive asset management plan, or AFCAMP, and fiscal 17-21 activity management plan, or AMP, processes (Para 1.C.7), approved on Jan. 7, 2014.

- Project acceptance and funding documents submittal to AFCEC must occur in a timely manner in order to garner FSRM financing on a first-come, first-served basis

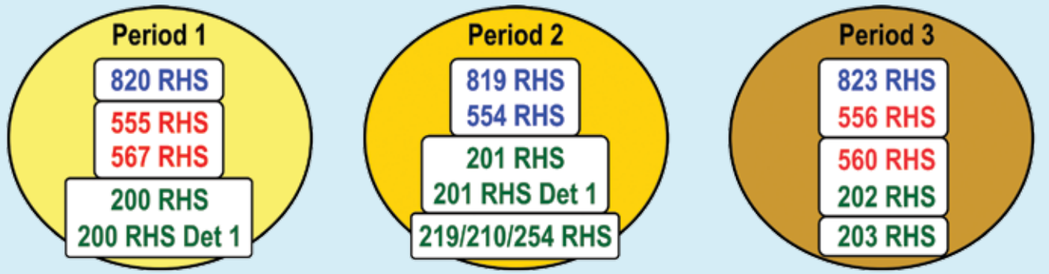
- Project order financing: Per Department of Defense 7000.14-R, efforts in which an entire need generally exists, which is not reasonably separable between fiscal years, are eligible for project order financing

- Integration of this training requirement with the IPL, in conjunction with the centralization of FSRM funds at AFCEC, offers RED HORSE the ability to satisfy annual training requirements by completing high-priority construction projects. However, in order to ensure timely execution of RED HORSE training requirements, it is imperative that RHS and bases ensure the necessary coordination and preparation is accomplished in order to posture project approval and funding documents for first quarter fiscal year funding consideration. Additionally, the implementation of multi-year project order financing will alleviate the risk of project stoppage previously attributed to delays in current-year project carryover funding distribution.

Impact of manpower authorization cuts

The fiscal year 2015 president's budget cut the active-duty RED HORSE enterprise by roughly 25 percent, resulting in two 404-person squadrons, one 252-person squadron and one 158-person squadron. Similarly, the Reserve RED HORSE capability was cut by 33 percent, leaving four Reserve squadrons designed to operate together to provide the equivalent capability of two 404-person active-duty squadrons.

While the 820th RHS at Nellis Air Force Base, Nevada, and the 823rd RHS at Hurlburt Field, Florida, present the full capabilities and capacity of what we traditionally desire a standard active-duty RHS to have, the Air Force recently considered what efficiencies could be gained by consolidating the 819th and 554th RHS into one 404-person squadron located at either Malmstrom Air Force Base, Montana, or Andersen Air Force Base, Guam. Ultimately the secretary of the Air Force decided a smaller presence at both locations provides the greatest benefit to the Air Force and our combatant commanders. As part of this decision, she approved "linking" the two squadrons, so that together



	1:2 D2D Cycle 1			1:2 D2D Cycle 2			1:2 D2D Cycle 3		
	Period 1	Period 2	Period 3	Period 1	Period 2	Period 3	Period 1	Period 2	Period 3
AD Unit	820	819/554	823	820	819/554	823	820	819/554	823
ARC Unit	555	219/210/254	560	567	201	202/203	200/200 Det	201 Det	556
Capacity	613	808	613	613	611	808	808	601	611

The graphic shows an example course of action that meets the intent of habitual relationships among active-duty, Air National Guard and Air Force Reserve Command RED HORSE squadrons. ***(U.S. Air Force graphic/Released)***

they provide the capacity and full set of capabilities of a 404-person active-duty squadron.

Distributed operations allow the units to remain in place and continue providing support to Northern and Pacific commands for peacetime construction and partnership building while still presenting a single force package for contingency operations. As we move forward we expect to present the 819th and 554th RHS for deployment together in a lead-and-follow construct in a single vulnerability window.

Force presentation

Presentation of RED HORSE forces for combatant commanders and the establishment of predictability for Airmen and planners have been difficult in the enabler posture we currently maintain. This was highlighted last year when planning for a critical combatant command, or COCOM, project resulted in the identification of a capability gap based upon unit commitments rather than intentional Air Force planning. As a result, Maj. Gen. Timothy Green, director of civil engineers at headquarters Air Force, asked the team to put together a plan that would create:

- Predictable COCOM vulnerability periods for active-duty RHS at a 1:2 deploy to dwell tempo

- Predictable COCOM vulnerability periods for Reserve Component RHS at a minimum of 1:5 D2D that is actually closer to 1:7 when considering mobilization

- Habitual relationships between the active, guard and reserve squadrons in their vulnerability periods. These relationships across RED HORSE units may in turn create an opportunity for these teams to establish relationships with specific COCOMs when supporting non-request-for-forces requirements.

One possible example of habitual relationships that met the intent is shown in the graphic above. Though no decisions have been made, key stakeholders in the RED HORSE enterprise and specific squadrons have been asked to evaluate whether it would make sense to take another step in cementing the habitual relationships and capabilities. The stakeholders are developing courses of action and a detailed analysis in order to make an informed decision on the way forward.

In conclusion, RED HORSE continues to provide critical capabilities to COCOMs on behalf of our nation, whether supporting combat, partnership or humanitarian operations. It is this value that has prompted significant attention from the Air Force's senior leaders as we seek to maximize the impact of RED HORSE units in the field while creating training and organization efficiencies for garrison and employment. These are exciting times for the HORSE, with more changes likely coming. All with the express purpose of ensuring the HORSE continues its incredible operational legacy for the next 50 years!

TO THE HORSE!

3D printing makes EXPLOSIVE headway

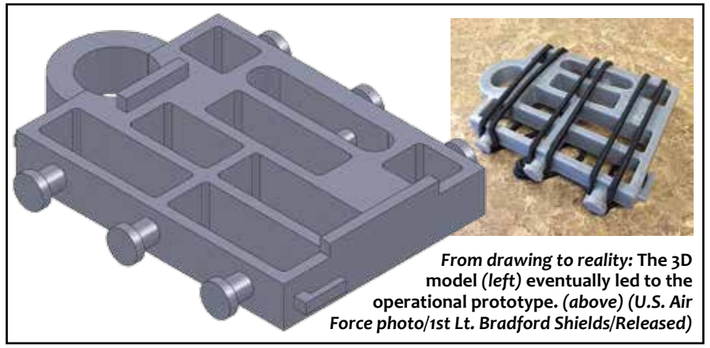
By 1st Lt. Bradford Shields and Maria Meeks
Air Force Institute of Technology Students

In a time of declining budgets and increasing demands, Air Force civil engineering is searching for more efficient technologies and innovative processes to complete mission requirements. Additive manufacturing, commonly known as 3D printing, is a burgeoning technology that offers cost-effective and flexible methods to produce unique objects on demand. For high-value, low-demand items, AM can offer significant cost savings, reduce logistical time and increase flexibility in configuration management. The importance and role of AM cannot be underestimated in austere environments, especially for military applications that often utilize systems made of one-of-a-kind components.

The opportunities for AM within civil engineer squadrons are endless; however, very few applications have been researched. Explosive ordnance disposal operations afforded us this opportunity. A graduate research effort at the Air Force Institute of Technology demonstrates one possible application of AM technology to military operations. Specifically, students researched the mission of the 88th CES EOD flight at Wright-Patterson Air Force Base, Ohio, to attach environmental sensors to a remote-controlled robot.

EOD robots

EOD technicians at Wright-Patterson employ the Northrup-Grumman Remotec® unmanned ground vehicle for hazardous duty operations, which include field inspection and detonation of explosive devices. In some operations, the vehicle must be fitted with environmental sensors to detect chemical and radiological threats. Both the vehicle and sensors are specialized equipment and are uniquely paired on a case-by-case basis. Currently, technicians use adhesive tape to secure these sensors to the vehicle's arm and spend valuable time removing each sensor from the robot. Although this is an effective, low-cost solution, it takes a significant amount of time to change sensors in the field and during post-mission clean-up. A universal bracket would reduce that time and effort, but no bracket capable of mounting differently shaped sensors to the UGV is commercially available.



From drawing to reality: **The 3D model *(left)* eventually led to the operational prototype. *(above)* *(U.S. Air Force photo/1st Lt. Bradford Shields/Released)***

At Wright-Patterson, EOD technicians typically utilize four different sensors for environmental sampling and ordnance testing. All sensors operate independently; there is no recurring need to attach more than one sensor to the robot at any one time. Because of its size, the Victoreen® Fluke® Biomedical 451P sensor was used for the universal bracket prototype design.

In the lab

The laboratory equipment used for the design and production of the EOD bracket prototypes included a 3D Systems® ProJet™ 1500, printer, polycarbonate solvent washer and a UV lamp for curing. The design and production process began with an initial design created in a 3D modeling program. The software allowed the design team to have a firm grasp on the exact shape and dimensions of the bracket before actually creating the prototype.

The driving factor in print time for all machines is the total height of the print, or depth in the z-coordinate direction. The rule of thumb for printing with the ProJet® 1500 is approximately four hours per inch printed in the z-direction. The actual print time changes based on the part's geometry.

The final step, and one that is often overlooked, is post-processing, which follows three basic steps. First, a solvent wash is employed to remove uncured material from the prototype's surface. Then, curing in a UV lamp cabinet increases the strength of the prototype. Finally, support structures are cut away and the surface is smoothed.

Results

Unmanned ground vehicles help EOD technicians identify ordnance through cameras and video feeds. The vehicle also is used to disarm ordnance. Because these two capabilities are critical to neutralizing threats, the research team determined that any AM solution also must maintain these capabilities. Full range of motion of the UGV arm assembly and visibility of the sensor display were key design drivers.

The research team used the spiral process model commonly used by systems engineers, to ensure all factors were considered in the design. The team designed, analyzed and manufactured four prototypes in nine weeks.

The process also allowed the team to address and resolve two AM development factors: poor tolerances from the 3D printer used and printing time reduction. The design of the operational prototype resulted from the various successes and failures of the first three prototypes. The final design concept employs a base plate to cradle the sensor and integrated studs with commonly available bungee fasteners attached to hold the sensor in place.

The team encountered several challenges during the final stage of development. An imperfect method of detaching the printed part from its supports often left uneven surfaces that required additional tooling. Also, thinner dimensions on the printed part were at risk for breakage. Interior supports were not easily accessible and sometimes required much effort to remove completely. Finally, the printing mat — the surface where the part is produced — was extremely difficult to remove from the printer plate and required rigorous cleaning between prints.

The new bracket exceeded expectations during testing, saving EOD technicians 60 to 90 seconds when changing sensors. *(U.S. Air Force photo/Maria Meeks/Released)*

A successful preliminary test of the final bracket was performed in March 2015 at the 88th CES EOD flight. In early August, the 88th CES EOD flight set up a challenge course to test the bracket under normal field and operating conditions. For this test, EOD training aides were placed in locations similar to those where explosives might be found in an operational situation. The bracket performed exceptionally well, saving between 60 and 90 seconds in switching to different sensors. During all situations, except when in a low-lit area, the robot's main camera was able to capture the readings from each of the EOD biological and HAZMAT sensors. With 3D printing, Airmen can easily design a simple mount for a camera and light to overcome the low-light challenge.

Along with the four different sensors, the EOD Airman conducted an unplanned test of the bracket. A PDX/2 LRM radionuclide sensor, weighing 15 pounds that's used for searching large shipping containers, was strapped to the bracket. Normally, an Airman would wear this sensor while sweeping an area; however, the printed bracket securely held the backpack and found the hidden training aide. Overall, this final round of testing resulted in the bracket exceeding expectations, cutting the time required to switch sensors, and possibly saving EOD flights around the world from having to send their Airmen into harm's way. The design team will make a few minor changes and then present the 88th CES EOD flight with its very own 3D printed EOD HAZMAT sensor mount.

Outlook

AM could revolutionize operations within the Air Force CE community. This research demonstrated that a universal bracket for unmanned ground vehicles could be designed, analyzed and manufactured within nine weeks using systems engineering principles and relatively low-cost 3D printing equipment. The digital file for the operational prototype could be shared with EOD units across the Air Force.

The overall method and parts produced could be duplicated Air Force-wide at a relatively low cost.

We foresee AM being an integral part of CES operations. With simple file sharing, engineers worldwide could collaborate to solve problems encountered in the field. The process of developing and testing prototypes in the field would be greatly expedited because design, production, transportation cost and time requirements are reduced or eliminated. This research demonstrates that AM could provide a solution to the growing demands for CE capabilities and long-term budget constraints within the U.S. Air Force.

Editor's Note: Shields and Meeks are students at the Air Force Institute of Technology Department of Engineering Management and Systems Engineering. The adviser for the authors was Maj. Vhance Valencia.

AFCEC construction in Afghanistan provides valuable contract lessons

By Capt. Ryan M. Hoff
Air Force Institute of Technology student

All military engineers know it is very difficult to execute construction projects in wartime environments. Afghanistan was no exception. The Air Force Civil Engineer Center coordinated a program for more than $2 billion in construction; nearly all of it for NATO Training Mission Afghanistan. However, this was only a small part of the overall construction mission in Afghanistan.

To execute the projects, AFCEC used both firm fixed price and cost plus fixed fee contracts. Both contract types experienced significant challenges. As the program came to a close, there were many questions that needed answering to have adequate continuity: What are the root causes from which construction challenges originate? Which performance factors are predictive of project performance? Are there performance differences between FFP and CPFF projects? We developed a research effort to help government managers answer these questions.

Using a dataset of 25 Afghan wartime projects, we addressed two separate, yet related questions regarding these Department of Defense construction activities in the Afghan theater of operations. The questions were: What factors affect the success of construction projects and how do project outcomes differ based on the contract type?

Concerning critical success factors, current literature suggests wartime projects may face the same cost and schedule factors (e.g. cost/schedule growth, quality management) as peacetime projects, with some notable additions. To gather data, we used daily construction reports from the projects to count important construction deficiencies identified by quality assurance engineers. Then, using peacetime factors as a baseline, we tested project factors, health and safety compliance, quality of work, technical performance, work productivity and external environmental factors with contingency tables to determine if they were predictive of schedule or cost performance.

We found that external environmental factors, to include weather and wartime security, were not predictive of unique project performance. For weather, this was likely because the projects were all within the same country and there may not have been enough variance in weather among locations. We couldn't find a reasonable explanation for security concerns being predictive of performance. However, cost and schedule performance were found to be significantly dependent on government-issued excusable delays. Moreover, project management deficiencies were predictive of poor schedule performance but not cost performance.

The Afghanistan Ministry of Defense Headquarters is the country's Pentagon. Between it and supporting facilities, the project involved over 1 million square feet. ***(Courtesy photo/Released)***

When testing contract types, we used the Mann-Whitney test to find performance differences between contract types. We found that reimbursable contracts had significantly greater cost and schedule growth. Additionally, fixed price projects were found to have more problems with design performance and contract management. There was no significant difference in overall project quality.

Ultimately, we were able to distill our research down to these five primary lessons:

1. Minimize time extensions. We found that schedule extensions given by the government were associated with the contractor taking even more time to finish. This tended to be very cyclical. Time extensions led to delays, and delays led to time extensions. Therefore, we recommend that contracting officers scrutinize initially proposed schedules and ensure they award accurate period of performances on contracts. This may help to minimize additional schedule time granted to contractors.

2. Scrutinize financial background and project managers. Current literature shows there is a significant correlation between the success of a project and the scrutiny that the owner places on the contractor's financial history, as well as the job performance background of the contractor's project manager. Granted, it has generally been government policy to leave personnel selection up to the contractor. However, previous students at the Air Force Institute of Technology have written about the benefits of government/contractor partnerships. The bottom line is that increasing evaluation and open discussion with the contractor in these two areas can reduce the risk of failure.

This building is the headquarters for the Afghan National Police in Kabul. ***(Courtesy photo/Released)***

3. Find rework with the design review process. While this was not statistically part of the study, we observed many instances of design resubmissions because the contractor neglected to address a comment from the government. Finding a way to minimize review steps and resubmissions may save time in the design process.

4. Review all tasks and create accurate productivity indices within reimbursable projects to ensure no time or money is lost on inefficient construction. It was very difficult for quality assurance engineers to quantify the progress and percentage complete of the contractor on a weekly basis. Many tools are available to accomplish this goal for large projects. The government should consider learning these systems and providing them to quality assurance engineers on future large projects.

5. Consider all contract types to balance distribution of risk between owner and contractor in wartime projects. Although it isn't traditional for the government to use incentives, which require contingency funding and can be difficult to negotiate, it is critical that — in contingency environments — there be mutual risk-sharing. FFP contracts may be too harsh for contractors to turn a profit in wartime environments. On the other hand, the high-risk nature of wartime construction means the government is likely to lose a lot of funding on CPFF projects. Incentive contracts provide a healthier middle ground.

The purpose of this research is to provide construction agents, firms and military leaders alike with information that will help curb waste and aid strategic decisions regarding future military construction and nation-building projects. All of these results underline the rapidly changing environment that is wartime construction. We learned from this research that reimbursable contracts are likely to have more cost and schedule growth, fixed-project contractors may be more concerned with on-site construction than submittals and design submissions, and that, just as in peacetime projects, schedule growth, cost growth and project management problems may be predictors for ultimate performance of wartime projects.

Editor's Note: This article is a summary of a thesis completed as a requirement for graduation from the Air Force Institute of Technology. The author's research adviser was Maj. Gregory Hammond. The complete thesis document is publicly available through the Defense Technical Information website, www.dtic.mil. Specific accreditation is included in the body of the actual academic document and the bibliography.

Gardez Special Forces Kandak is the home of the largest special forces battalion in Afghanistan. It is near the dangerous Afghan/Pakistan border. ***(Courtesy photo/Released)***

from the SCHOOLHOUSE

I'm an Airman engineer: Defining my purpose

By Staff Sgt. Cassandra Braga
49th Civil Engineer Squadron
noncommissioned officer in charge,
EOD Training Section

Being a woman in a civil engineer squadron, I feel as though I stand out a bit. This feeling is rooted in the fact that there are significantly fewer women than men in my squadron. That said, I don't feel as though I am treated differently, especially as an EOD technician. Both male and female Airmen are all held to the same standard. While the expectation to meet these standards is equally shared, no two EOD technicians will accomplish any given mission the same way. Being aware of my strengths and weaknesses offers me different perspectives on how to accomplish difficult tasks and overcome challenges. That's what being an EOD tech is all about.

I face the same challenges as most people in the military, but as a female EOD technician in a primarily male-dominated career field, I feel as though I have something to prove. I believe that I have a responsibility to hold myself to an even higher standard. The best advice I can suggest to anyone who wants to follow in my footsteps is to never give up on yourself. We all fall down at times but success comes from picking yourself up and moving forward.

I joined the Air Force in August 2007, soon after graduating high school. My first assignment after basic training was at Eglin Air Force Base, Florida, where I attended and graduated from the Naval Explosive Ordnance Disposal School.

Then Senior Airman Cassandra Cooper stands beside a mine-resistant ambush protected, or MRAP, vehicle during her second deployment to Afghanistan. *(Courtesy photo/Released)*

In 2008, I arrived at Holloman Air Force Base, New Mexico, my only duty station as of yet. While stationed at Holloman, I have had the opportunity to travel abroad for several missions and training assignments.

When I enlisted, I was only 18. I was a young, naive, insecure Airman who lacked direction. It left me wondering what I was doing for the first three years of my career. This lack of maturity manifested into procrastination at work. I was convinced at the time that I had made a mistake and should not have enlisted; but then I deployed and things changed. Both of my deployments took place in Afghanistan: one in 2010 and another in 2012. Not only did I deploy, but I have also provided presidential support in India and Cambodia. Because of these experiences, my leadership now entrusts with me the difficult task of training our newest EOD technicians and preparing them for the challenges ahead.

I had no concept of what to expect for my first deployment, even after hearing numerous stories of combat and the EOD mission in Afghanistan. Leading up to my deployment, I participated in briefings and practical training exercises that emphasized what improvised explosive devices were, and how to deal with them; specifically, that they were commonly made with yellow plastic jugs full of explosives. One of the most important aspects of that deployment dealt with the application of heightened situational awareness.

As I was performing my first EOD response in Afghanistan, it became clear that this mission was the beginning of a six-month long educational experience. As I was driving my team's armored vehicle "outside the wire" on the way to disarm an IED, I began to concentrate on my training. My mind had formed an association of yellow jugs as being IEDs. One thing I didn't realize was that yellow jugs are used because they are so readily available. As we were driving into Kandahar City, I saw hundreds of yellow jugs all over the city. Just looking out my window, I could see them everywhere: on rooftops, on the ground, as well as people just carrying them around to haul water or fuel. They were everywhere I looked. I turned to my team leader and thought, "we are all going to die!"

Of course, it was obvious that these jugs weren't actually IEDs, but my inexperience and training led me to that conclusion. As the deployment progressed, I learned what constituted a significant threat and what didn't: rocks stacked on the side of the road, scraps of cloth secured to a telephone pole and freshly dug up earth were common indicators of IEDs and their emplacement.

When EOD technicians deploy, we normally operate as a three-person team. In the lead position is the team leader. He or she is in charge of every EOD operation and is responsible for the safety of all personnel involved. The other two members, typically alternating between driving and being the demo monkey, are called team members. One TM will drive the team's armored vehicle and the other will operate the EOD robot, prepare explosives and generally set up any tools and equipment that the TL may need to use during a response. The TMs' biggest responsibility is to keep the TL alive. To do that, they must be able to effectively operate the robotic platforms we use. Utilizing a robot allows us to operate remotely, thereby reducing the risk involved with IEDs. If the TM can't maneuver the robot effectively, or allows the robot to blow up, the TL will then have to approach the IED and work on the item by hand. In this case, the TL has to expose him or herself to the bomb, which involves substantial risk.

Speaking from experience, the worst feeling in the world is watching your TL walk up to an item, and, in the blink of an eye, become enveloped in a black and gray cloud of smoke and dust from an explosion occurring right where he was standing. The events leading up to that incident weren't my fault. However, during every response we conducted after that incident, I made it my job to question my TLs if I believed they were about to do something risky. As EOD, we work as a team; we are dependent on each other to get home safe. That deployment changed my outlook dramatically, and redefined my purpose. I came back to Holloman with a new sense of confidence from the experience I gained during that tour. I did a lot of growing up on that deployment.

When I first joined, my goals were simple. I wanted to see the world and be a better person. Since returning from that first deployment, my path has become clearer and I feel more focused. Since then, I have completed my Community College of the Air Force Associate Degree in Applied Science in Explosive Ordnance Disposal, attended Airman Leadership School and I am currently pursuing my bachelor's degree in nursing.

Staff Sgt. Cassandra Braga poses for a photo beside an EOD vehicle at her home station, Holloman Air Force Base, New Mexico. *(Courtesy photo/Released)*

What I love most about my job is I get to destroy things with high explosives, and not go to jail. On a more serious note, one of the best things about EOD is the sense of camaraderie; we all come together and support each other constantly and consistently. We are a family and we help each other out regularly. I'm not implying that we're all best friends and always get along, but if I ever need help, I know I have people to turn to. When I tell people that I'm an EOD technician, they usually pause for a second, look me up and down, and then say something like "I didn't know that women were allowed in EOD," or "Are there a lot of women in EOD?" To these people, I exclaim that yes, there are women in EOD, and no they aren't delicate little flowers.

*Editor's Note: This article is part of the **"I'm an Airman Engineer"** series for CE Magazine and CE Online. The series focuses on individual CE Airmen to highlight their careers and the diversity, knowledge, career fields and people within our community. Visit www.afcec.af.mil for more articles.*

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