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Experiences from Afghanistan and Beyond

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On the Cover

Members of the 577th Expeditionary Prime BEEF Squadron Consolidated-Small Maintenance and Repair Team work on installing nearly 200 feet of new polyvinyl chloride pipe at Combat Outpost Azimijan Kariz, Afghanistan. (U.S. Air Force photo/ Senior Airman Scott Saldukas)

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Thank You!

Thirty-two years ago, I raised my right hand and took an oath to serve our country and preserve our most precious values — our freedom and our way of life. Little did I know that I would be in the Air Force for the next three decades, let alone be the Civil Engineer. I have been honored to lead and serve with our nation's finest, defending our country against any and all who would do us harm.

As my time in uniform concludes, I'd like to first say thank you to the best Engineers and Airmen in the world. Serving with you has truly been an experience I will cherish forever.

Meeting and seeing our military and civilian engineers Lead the Way every day, both in-garrison and in the expeditionary environment, has been inspirational. I am amazed at what you have done and can do. As stewards of Air Force installations — our 3-D power projection platforms — we form the foundation from which every Airman defends our nation, allowing the delivery of Global Vigilance, Reach, and Power for our nation today, and well into the future.

I am proud of all of our efforts to Build Ready Engineers, Build Great Leaders and Build Sustainable Installations. I worked to ensure we never lost focus of these fundamental principles during our CE Transformation efforts.

Building Ready Engineers allowed us to emerge as the engineers of choice for joint installations in the combat zone. For more than a decade we have been in every corner of the globe supporting combat and humanitarian operations. As expeditionary engineers, I challenge you to be the best of the best.

The process of Building Great Leaders continues through formal education and training, a reemphasis on civilian development, and the daily motivation and team building you provide each other. Your leadership and mentoring strengthens the team, and shapes the future of our Air Force.

The health and condition of our installations directly impacts our national defense, so we have never wavered from Building Sustainable Installations, the third key component of our strategy. By making the right investment in the right asset at the right time, the CE community keeps our 3-D weapon system platforms ready to meet the mission at home and in the expeditionary environment.

CE Transformation has enhanced our capabilities to deliver on these fundamental principles and to re-align our organizational structures to make CE as effective and efficient as possible. Our effort has left us in a strong position to navigate the current fiscal environment, and sustained transformation provides us an opportunity to tighten our belts, sharpen our processes and intensify our focus on enterprise-wide asset management. Keep finding ways to do things smarter, faster, better and cheaper because every dollar counts.

As part of CE Transformation we consolidated our three legacy agencies into the Air Force Civil Engineer Center to best support operations world-wide. AFCEC provides a more efficient and effective organization and allows processes to be streamlined.

Moving forward, the challenges you face give each of you an opportunity to build on the foundation of CE Transformation, and strengthen it in the future. We need you to be strong, engaged leaders during these turbulent times.

Finally, I'd like to take a moment to recognize that our contributions to America have come at great personal cost and sacrifice. For more than a decade, we have annually sent more than 4,500 engineers into harm's way. Each of these men and women gave a portion of their life, their time, their families' time and their energy in service to our nation. Some of them came home wounded. Twenty-three of them made the ultimate sacrifice.

We are uniquely blessed to call such men and women our fellow Airmen. Within the hearts and minds of these Airmen, tomorrow's battles will be won, and challenges will become new opportunities for our promising future. Together we have made a difference and improved our Air Force. I am confident you will build upon our past success in the next chapter of our proud engineer legacy.

You are our promising future! Serving alongside Maj. Gen. Theresa Carter – and the unquestioned leadership she will bring the civil engineer enterprise – I know you will continue to Build to Last and Lead the Change.

Thank you for all you do, thank you for serving with me, thank you for helping me Build Ready Engineers, Build Great Leaders and Build Sustainable Installations, and thank you for helping Air Force Civil Engineers … Lead the Way!

Timothy A. Byers
Major General, USAF
The Civil Engineer

1st Expeditionary Civil Engineer Group LEADS THE WAY!

Maj. Mark Stevens
577 EPBS/TC

Even as troop numbers are reduced in Afghanistan, engineers continue to complete high priority projects. This paradox of building new to enable troop reductions keeps civil engineers engaged across the entire theater.

As U.S. and NATO forces begin troop withdrawal from Afghanistan, additional expeditionary infrastructure is required to handle the change in mission and reduction in forces. Forward operating bases must be closed, and their units will fall back to main support bases before finally moving out of theater. The challenge is providing retrograde infrastructure to battle space owners while still meeting the reduced boots-on-ground numbers dictated by the President.

This challenge has been met by expanding Air Force engineers' roles in large construction projects and integrating Prime BEEF and RED HORSE into a single organization — the 1st Expeditionary Civil Engineer Group. Established in March 2012, the 1 ECEG serves as a force enabler for the combatant command and battle space owners, allowing engineers in the combined and joint operations area in Afghanistan and surrounding Gulf nations to quickly respond to engineering priorities. Over the last year, Air Force engineers have also implemented a new way of doing business, called "Over the Horizon."

According to Col. Pat Baker, 1 ECEG commander, Over the Horizon gives commanders "the ability to move engineers throughout the theater to meet mission requirements, while maximizing manpower utilization across the area of responsibility during day-to-day ops."

As part of this new program, Air Force engineers don't spend their entire deployment assigned to just one base. For example, in the past Prime BEEF Airmen filled base-level positions to sustain airbases at deployed locations. Now they are sent to forward locations for a specific requirement, using a hub-and-spoke method that provides flexibility as current and emerging missions evolve.

The Over the Horizon construct required a new organizational approach and the 1 ECEG was retooled to meet Air Force Central Command needs. The 777th Expeditionary Prime BEEF Squadron provides technical engineering services to the Army Engineer Task Force in Afghanistan, while both the 577 EPBS and 557th Expeditionary RED HORSE Squadron provide troop labor construction and other special capabilities.

Over the Horizon has proven a successful construct for Air Force CEs to enable coalition forces in their planned troop withdrawal operations. One of the 1 ECEG's largest undertakings to date is the construction of Camp John Pratt in Regional Command North, a retrograde-focused base designed and built solely to assist units departing the AOR.

The entire camp was built with a combination of Air Force and Army engineers using troop labor along with some military construction-level building for a new strategic aircraft ramp and supporting facilities.

Army engineers provided a majority of the horizontal earthwork while Air Force teams from the 557 ERHS and 577 EPBS supplied the vertical expertise. Nine major projects and a host of smaller improvements encompass the majority of the effort at Camp John Pratt.

The 557 ERHS focused on direct support facilities and infrastructure to the new flightline, with construction projects that fit perfectly within RED HORSE's capabilities in heavy construction and expertise with concrete construction. An operational aircraft fuel farm and new access roads to the flightline provide support to heavy airlift operations. A fuel station, both for vehicle fueling and aircraft refueling trucks, will support vehicles and aircraft. Over 5,600 cubic meters of concrete were placed and 1,500 Hesco barriers installed to protect the fuel farm. A new fire station ensures emergency vehicles can meet response times and provide emergency services to the new strategic aircraft ramp and life support area.

The 577 EPBS took on the lighter vertical construction requirements involving an LSA and new tent facilities and infrastructure across 125 acres. A new dining facility comprising six shelters and a large area maintenance support shelter has the capacity to feed more than 2,000 personnel per meal. A LSA composed of 98 Alaskan shelters with supporting power and HVAC and 30 latrine and shower trailers will house up to 1,000 personnel as they move in from surrounding FOBs. A new 15,600-square-foot wash rack in the retrograde yard will assist with cleaning and prepping vehicles and equipment for shipment out of the country. Also, four tactical shelters were completed for the incoming KC-135 Stratotankers mission, the first time tankers will be stationed in the AOR. This saves hundreds of flight hours and thousands of dollars in fuel. With more than 1,650 cubic meters of concrete placed, the speed and capability of Air Force engineers made this mission possible.

Camp John Pratt construction proved the adage that engineers are stronger as team members than as individuals. The RED HORSE team assisted their fellow engineers with concrete work and heavy earthwork in the LSA. Prime BEEF subject matter experts assisted with building a double arch gable shelter for the fire station. The Army's 919th Engineer Brigade prepared the horizontal grading and tent pad preparation in the LSA. The cooperation and willingness to work together made the camp's construction possible at a combined cost of more than $9 million and despite the challenges the teams faced in the Southwest Asia AOR.

Site conditions changed easily and materials sometimes got diverted to other locations by the time craftsmen were ready to use them. The high mountains of northern Afghanistan are bitterly cold in the winter, which slowed construction work to a crawl. As the spring rain storms came, winds greater than 50 mph threatened to blow the new tents off their foundations, and did in one case. Temperatures soared to 85°F one day and then plummeted to 26°F the next, with freezing rain and stinging ice. Material shortages plagued some projects as specialized parts were difficult to find or had to be shipped great distances taking precious time out of the schedule. Vehicles and specialized equipment had to be repaired.

Through it all, the professional men and women of the 1 ECEG met all challenges and thrived with a can-do attitude and a resolve for problem solving. They will continue to lead the way to get the mission done, until it's done!

Maj. Stevens is the 577 EPBS Troop Construction Officer, deployed from the 99 CES, Nellis AFB, Nev., where he is the Operations Flight Commander.

(facing page) Dirt Boyz from the 577 EPBS pour the first lane of the wash rack for a retrosort yard at Camp John Pratt, at an undisclosed location in Southwest Asia. ***(above)*** Water and fuels system maintenance craftsmen from the 577 EPBS dry fit sewage lines for latrine and shower units at a life support area at Camp John Pratt. *(U.S. Air Force photos)*

AOR TROOP CONSTRUCTION: SAVING TIME AND MONEY

Taking over a significant but stalled construction project, expeditionary RED HORSE showcases skills

Capt. John Stiles, P.E.
554 RHS/DO

In the fall of 2012, the 557th Expeditionary RED HORSE Squadron was tasked with building a pair of two-story aircraft maintenance units after cancellation of a construction contract. The AMU facilities were needed to support intelligence, surveillance and reconnaissance aircraft.

A survey in October found the site extremely constrained, with hangars on one side and a fire lane on the other. The previous contractor had left multiple unmarked utility stub-ups and a partially dug foundation. These challenges, coupled with a project well behind schedule, meant an enduring building design that could begin immediately was needed.

The initial inclination to construct a pre-engineered building had two big disadvantages. First, it would take more than 12 weeks to procure. Second, once ordered, the PEB's design would be almost impossible to change.

Although a less conventional troop construction option, a concrete and masonry constructed facility was the best choice because it provided many advantages over the PEB. In the Gulf States, concrete is the primary building material and everything needed to begin construction is readily and locally available with little to no lead time. Additionally, concrete building design is more easily modified after construction begins, allowing more flexibility to deal with unexpected site conditions. Finally, concrete provides a greater level of force protection than a PEB.

With the failed contract causing the project to be more than a year behind schedule, RED HORSE's goal was an aggressive design, procurement and construct project completed in less than 150 days and delivered to the customer.

The flexibility concrete provides led to the decision to construct the AMU facilities using cast-in-place concrete columns and concrete block walls. To simplify the design, construction of these projects was broken into several subtasks: foundation and slab, columns and block, concrete decks and roof, and finish work.

The foundation consisted of a slab on grade with integrated footer. It was achieved in one monolithic pour, reducing the amount of formwork required and saving a week on the construction schedule for each facility. Each facility was designed with 12 concrete columns spaced on 10-foot centers. The columns were formed and poured using lightweight commercial form panels. Placing these panels using two-person teams without the need for a crane translated into even more time savings. The external walls of the facility were made of concrete block. Although not required structurally, the walls were reinforced and

fully grouted, adding load bearing redundancy and durability to the facilities.

Several techniques reduced design time and increased constructability for troop labor on the second floor and roof decks. The first was design of a standard section to be repeated throughout the project. The roof's live load was four times less than that of the second floor. Smaller beams and less steel could have been used to support the span. However, the extra time in design work and additional formwork made the small savings in concrete and rebar not worth it.

The second technique was to minimize and eliminate rebar splices. Reinforcing steel is available in forty-foot pieces and it costs less per ton. This also saved time during the installation process by significantly reducing the amount of ties needed.

The third technique was to use commercially available formwork shoring systems. Shoring systems cost about $2 to $4 a square foot to rent and were widely available from multiple companies. A full engineering formwork design was included in the rental package. After training, crews were able to set up 1,500 square feet of shoring on the AMU facilities in less than two days. Using stick lumber and shoring jacks would have taken four times longer. Safety was also increased with the rental system, thus reducing the largest risk factor in construction of a cast-in-place facility.

After completing the roof pour, the attention turned to completing the exterior and interior finishes. The interior was insulated and furred out using metal studs, drywall and drop ceiling products that were all locally available. The exterior was finished with a textured paint and elastomeric roof coating. The only items not constructed using troop labor were the stairs to the second story. With time savings far outweighing cost savings, these were contracted out and built off-site for installation.

After construction was finished, there were multiple areas for improvement. Following are two important lessons learned.

The project was designed in English units, but materials and formwork available locally were in metric. This made it difficult to construct a plan and led to several modifications.

Two hours of training can save several days of work: set aside time to train crews before starting a new task to ensure understanding and familiarity with procedures. For example, a key time for training would be after completing the foundation and before starting the walls.

RED HORSE completed both AMU facilities in 146 days and delivered them to a satisfied maintenance squadron. Once again, Air Force CEs proved they lead the way in supporting the warfighter, building enduring facilities in a timely manner at reasonable costs.

Capt. Stiles is the Director of Operations, 449th Materiel Maintenance Squadron, Holloman AFB, N.M. He was deployed as the site officer-in-charge for the 557th Expeditionary RED HORSE Squadron.

(facing page) Members of the 557 ERHS complete concrete block installation on the first story of an aircraft maintenance unit at undisclosed location in Southwest Asia. ***(below)*** With scaffolding and formwork in place (shown), CEs from the 557 ERHS poured the second story columns for an aircraft maintenance unit. The AMU was designed with cast-in-place concrete columns and concrete block walls. *(U.S. Air Force photos)*

"Give It to Me Fast and Cheap!"

USAFE-AFAFRICA CEs respond to AFRICOM's demand for expeditionary planning.

Capt. Jeffrey Fowlkes
USAFE/A7XO

For civil engineers in U.S. Air Forces in Europe - Air Forces Africa, based at Ramstein Air Base, Germany, the 2013 New Year rang in with calls from the command battle staff. As news broke about French efforts against extremists in Northern Mali during the first week in January, contingency planning in U.S. Africa Command swung into gear. Multiple parallel planning efforts got underway in AFAFRICA as combatant command taskings flowed in to develop concepts of operations for six different countries.

The AFAFRICA planning machine quickly ramped up with daily operational planning team meetings and months of 12-hour days focused on contingency planning and execution. In the current financial environment, an overarching — and valid — question for every CONOP was "How much does it cost?" and decisions were based on need versus "nice to have." The name of the game was "Give it to me fast and cheap!"

It was an exciting time to be part of the engineer team in USAFE-AFAFRICA's Readiness Branch. While continuing to support existing operations in Europe and Africa we were also conducting multiple airfield surveys across both continents and planning numerous beddown CONOPS. While some of the planning efforts were shelved, some re-opened and shelved again, and others implemented, one effort in particular highlights the results of the long hours put into planning.

In response to a request by the government of France, AFAFRICA was tasked to beddown aircraft in Niger. The unit assigned, a highly expeditionary team that could quickly deploy when tasked, was already in Europe performing another mission. The accelerated timeframe and immediate need for the asset resulted in more of a deployment coordination than a full-fledged beddown planning effort. Within a week, the team and equipment were packed, loaded and on a plane heading for Niger.

As the team arrived on station, the reality of the operating environment quickly hit home. The initial concept of using a make-shift maintenance shelter of containers and tarps would be insufficient for protecting aircraft from jet blast on the nearby ramp. After negotiating temporary access to an existing host nation hangar, the team immediately resumed planning to determine means and methods to protect the aircraft.

Engineers and logisticians worked in concert to identify and source a large area maintenance shelter from Holloman Air Force Base, N.M. In a matter of days the 49th Material Maintenance Group loaded the LAMS on a C-17 bound for Niger by way of Ramstein. At Ramstein,

Det 2 Civil Engineers Senior Airman Thomas Bailey, Senior Airman Matthew Wallis, Airman 1st Class Ryan Ishmael, Tech. Sgt. Anthony Zhuckkahosee *(left to right)* prepare to modify the existing water system to increase storage availability. *(U.S. Air Force photo/Capt. Jeff Fowlkes)*

Airmen from the 435th Construction and Training Squadron, tasked to erect the LAMS, met the plane and then loaded enough tents, equipment, water and food to sustain them and headed for Africa.

At the same time, AFAFRICA engineers developed a statement of work and secured funding and a contract for local construction of a concrete slab and taxiway for the LAMS. With the deadline to vacate the host nation hangar just days away, operators and engineers teamed together to develop an expedited construction phasing plan so the LAMS could be erected and used while allowing the contractor to continue work on the concrete pad and taxiway.

The contract was awarded and construction began in less than 24 hours, with the first task to prepare the area where the LAMS would be installed. As the CTS team arrived and began inventorying and laying out the parts in preparation for construction, the contractor was finishing up the grading and compaction in the area for the soil anchoring system. The CTS engineers fell in right behind the contractor's completion, working to meet the required construction timeline of only 10 days. At the same time, the contractor began forming and pouring the taxiway that would eventually connect the LAMS to the existing taxiway. Exceeding expectations, CTS completed the build two days early, just in time to allow the team to move into the back part of the LAMS before getting "evicted" from the borrowed hangar.

The next piece of this puzzle may be one of the most expeditionary means of operating the particular platform seen to date. Aircraft were now under cover but did not have paved access to the taxiway. To solve this problem, 65 sheets of plywood were procured and laid on the dirt to create a make-shift taxiway leading to the back side of the LAMS. Wing walkers carefully guided the aircraft to and from the structure for several weeks while concrete was poured and cured. The quick planning and execution resulted in zero missed sorties, and proved that cooperation between engineers and operators can overcome all obstacles. The quick team work meant the mission was now operating without the risk of degradation failure.

AFAFRICA staff began working options to replace the on-ground assets and the 435 CTS team, which was scheduled to redeploy. All the assets supporting the original package had to be packed up and taken, to reconstitute for their next short-notice mission. Planning efforts resumed, identifying the moving pieces that needed to fall into place to ensure uninterrupted missions while redeploying the departing unit. The replacement unit would be larger than the existing team, sourced with different assets to complete the mission.

As CONOPs were developed, presented and ultimately approved, equipment sourcing was already underway by AFAFRICA engineers leaning forward to support the mission. Three C-17s packed full of beddown equipment soon

Tech. Sgt. Jeremiah Celis conducts topographic survey adjacent to the life support compound *(U.S. Air Force photo/Capt Jeff Fowlkes)*

arrived at the site, accompanied by Airmen from the 52nd Civil Engineer Squadron ready to work night and day to continue the mission. Two 435th technicians with in-country experience stayed to help the team.

The CEs from the 52nd hit the ground running, setting up ops and living tents, electrical distribution and much-needed HVAC in less than a week. Challenged by soaring temperatures and seeping "moon dust" soil, the engineers had to troubleshoot faltering HVAC units and generators daily. Engineer ingenuity was at its best, however, and sun shades and wind screens quickly reduced environmental effects on the equipment.

The engineers' tireless efforts to enable mission success in the hard environment earned them the highest praise from the deployed commander. As the African rainy season approaches, the team is prepared for the moon dust to turn into a muddy mess and the focus to turn to drainage and water-proofing equipment. As the mission evolves in an austere land in an austere environment, the engineers' expeditionary skill-sets are up to the challenges.

Capt. Fowlkes is a USAFE/AFAFRICA Operations Engineer, HQ U.S. Air Forces Europe, Ramstein AB, Germany.

AIRFIELD DAMAGE REPAIR: THE FUTURE

Capt. Benjamin E. Carlson
AFCEC/CXXM

For more than 50 years, there's been little change in the Air Force's airfield recovery techniques, but a team of engineers at Tyndall AFB, Fla., is steadily working to field capabilities for tomorrow's fight. Along the way, the term "airfield damage repair" has replaced "rapid runway repair" because ADR better describes the newer, more holistic approach that encompasses runways, taxiways and aprons.

While many civil engineers may be largely unaware of the revolutionary changes set to take place in ADR, they will soon see updated Silver Flag curriculums and home-station training requirements. This will soon be followed by the fielding of thousands of new vehicles and millions of pounds of repair materials world-wide.

Background

Air Force engineers have trained since the 1960s to repair up to twelve 50-foot diameter craters with crushed stone in four hours or less. This largely Cold War-based strategy has its merits, but our tactics, techniques and procedures needed to evolve along with those of our adversaries. In 2009, efforts to provide a solution capable of being fielded became serious, with experts at the Air Force Civil Engineer Center at Tyndall taking the lead.

The challenges posed by today's weapons and the logistical constraints of a leaner Air Force are driving ADR modernization. Instead of tens of craters and hundreds of unexploded ordnance, newer technologies allow adversaries to inflict damage to the tune of hundreds of craters while littering the airfield with thousands of UXOs and submunitions.

Air Force leadership understands modernization must incorporate a holistic base recovery after attack strategy that results in revitalization of airfield damage assessment teams, explosive ordnance disposal and crater repair. To field such a capability, AFCEC teamed with the Army's Engineer Research and Development Center and Air Force Research Labs to test hundreds of pieces of equipment and a plethora of repair materials. Five years later, testing is drawing down and traditional RRR is set to experience a facelift. The availability of new technologies allows Air Force Civil Engineering to field a capability integrating ADATs and UXO removal with the ability to make semi-permanent repairs on up to 120 craters in less than eight hours.

Capabilities

Developing a top-to-bottom modernization of ADR did not occur overnight. Millions of dollars of research and thousands of man-hours were invested to ensure continuity of operations and flexibility for combatant commanders. Quite possibly the greatest innovations came in the assessment of airfield damage and the removal of UXOs. Using existing geospatial software and technology, AFCEC developed the Geospatial Expeditionary Planning Tool, which not only provides a common operating picture to UCCs and the EOC, but also selects a minimum airfield operating strip in a matter of minutes as opposed to up to half an hour when done manually. GeoExPT also integrates the Rapid Airfield Damage Assessment, Recovery of Airbases Denied by Ordnance, and Multiple UXO Removal System technologies, providing EOD teams the capability to render safe thousands of munitions in the span of a few hours. Integration of these technologies cuts assessment and clearing time by 500 percent, giving the ADR teams more opportunities to recover the airfield between attack volleys.

Once a MAOS is selected and EOD teams clear a safe area of the runway, the crater repair teams to take over. Traditional RRR is based on providing more equipment to a single team for crater repair depending on posturing. Unlike legacy capabilities, ADR is modular and scalable. Capabilities are fielded in small, medium, large and very large configurations, each composed of a different number of teams. Each team of 37 personnel and their equipment is capable of conducting full-depth repairs of 18 craters. For example, a very large capability can repair 126 craters in 6.5 hours.

Achieving this level of performance relies not only on new TTPs and team composition, but heavily on new equip-

ment as well. Over the coming years, the Air Force will purchase about 2,000 new vehicles, ranging from the versatile compact track loader to an innovative volumetric mixer that blends repair materials with water on site. Numerous attachments for the CTL means a more extensive capability: one vehicle can clear and load debris, saw-cut through 24-inch concrete, sweep foreign object debris, serve as a forklift and even operate a roller to compact backfill material and asphalt. Other new equipment includes asphalt recyclers that can turn parking lots into crater capping materials in a pinch, as well as pneumatic excavators that don't damage airfield pavement during operation.

New and better materials provide the final breakthrough in ADR modernization. Traditional repair materials are limited in their resiliency after repetitive aircraft passes (less than 100 passes) and thus are temporary. New, quick-curing materials allow CEs to conduct semi-permanent repairs supporting all airframe types through thousands of passes. Using a method coined as "slash-and-splash," 3,000-pound bags of flowable fill are suspended over the desired repair and cut with a knife. As the dry material flows into the hole, water is applied and the fill cures to a low-grade concrete base course, similar looking to coarse sandstone. This base cures after only a few minutes, making way for the 9,000-psi rapid-set concrete placed by the volumetric mixer. This concrete sets up so quickly, it can be walked on within 30 minutes and full aircraft operations can commence within two hours of cure time. If these repair materials run low, the capability for traditional crushed stone repair remains, and the aforementioned asphalt recyclers can be used to recycle roads, parking lots or similar areas to cap craters.

Fielding

The future of ADR is closer than you think. Most CEs will see the new equipment and techniques at Silver Flag and other training sites before it arrives at operational bases. Modernized equipment such as the Sustainment Pavement Repair, or SuPR, Kit will be delivered by early fiscal 2014 (Tyndall's Silver Flag site will receive the first kit). New crater repair kits will also come to the three Silver Flag training sites in fiscal 2014, while bases in Pacific Air Forces, U.S. Air Forces in Europe, and U.S. Air Forces Central Command, can expect to see crater repair capability beginning in fiscal 2016 and continuing through fiscal 2025. The ultimate goal is to field the Silver Flag and home-station training curriculums prior to operational fielding in order to teach today's Airmen for tomorrow's fight.

Future

AFCEC recognizes that a continual advancement of technology and ADR modernization is postured to reflect the changes in available equipment into perpetuity. During fiscal 2013, AFCEC will test robotized CTLs, with the ultimate goal of reducing risk to Airmen in the field. As automation increases, the number of our Airmen in harm's way decreases. AFCEC will look towards automation in EOD as well as repair equipment. New repair materials under development also allow more capable and flexible mobilization of assets to areas currently out of reach of ADR due to logistical constraints.

From perforated steel plank to rapid-set concrete, ADR has progressed through conflict and technology advancement to meet today's threats. As these threats evolve, civil engineers' innovation will allow our Air Force to fly, fight, and win for decades to come.

Capt. Carlson is Expeditionary Modernization Branch Chief, Air Force Civil Engineer Center, Tyndall AFB, Fla.

During a wet-weather airfield damage repair test in 2012, crater repair team members prepare an asphalt cap for compaction at the Silver Flag site, Tyndall AFB, Fla. *(U.S. Air Force photo/Scott Smith)*

CE Regains Airbase Systems Mission

Marshall "Doc" Dutton
James A. Hurley
AFCEC/CXA

In October 2013, the Air Force Civil Engineer Center will stand up a research, development and acquisition division for a new mission to develop airbase systems, ensuring that the civil engineering enterprise is ready to deliver current and future expeditionary- and fixed-base capabilities.

In the minds of many civil engineers, the Requirements and Acquisition Division, located within the Readiness Directorate at Tyndall Air Force Base, Fla., moves the program management of airbase systems RD&A back where it belongs.

Civil engineers have always been responsible for the "life" of an airbase, establishing, sustaining, protecting, recovering and, finally, closing it. To do this, they need airbase systems (the individual components that come together to create a functioning airbase) that ensure zero capability gaps now and in the future. Systems need to be reliable, sustainable, and provide seamless integration with all other airbase systems, as well as with the weapon systems and personnel they support.

Over the past three decades, the responsibility for airbase systems RD&A has changed (see article on p. 26) as the Air Force's business and organization has changed. Originally RD&A was managed directly by the Air Force Civil Engineer, but over time the roles and responsibilities transferred to Air Force Materiel Command, the acquisition arm of the Air Force.

Now, AFCEC will assume a leadership role for the life-cycle oversight of airbase systems on behalf of the Air Force Civil Engineering enterprise. Primary responsibilities include the following:

- Collect and compile the expeditionary- and fixed-airbase mission needs of the installations, or A7, community including Civil Engineering, major commands and joint combatant commands.

- Document and support corporate decisions regarding airbase system requirements and prepare resource plans, programs and budgets for airbase systems development, procurement and sustainment.

- Manage system development programs to produce and deliver essential future agile combat support mission capabilities

Several factors or events drove the establishment of a new division for RD&A , including:

- CE Transformation, which moved some MAJCOM CE responsibilities to AFCEC;

- changes in Air Force resource planning and budgeting, now associated with the new Core Function Master Plan process;

- elimination of the Agile Combat Support Program Office; and

- elimination of the Airbase Technologies Division of the Air Force Research Laboratory, which conducted research and development of advanced airbase technology. These events put at risk the ability of the CE enterprise to continue to ensure essential future installation operations.

A Total Life-Cycle Perspective.

During the past two decades the development of future installation and basing capability plans and the development and procurement of airbase systems to deliver these capabilities have taken a backseat to dealing with urgent and compelling needs driven by overseas contingency operations. To ensure the continued availability and supportability for deployed airbase systems, the solution approaches for these operational needs have lacked the necessary life-cycle implementation strategy. The enterprise for developing installation requirements and programs, advocating for budgets, and executing system and equipment development programs also became fragmented and diffused. Factors contributing to this include resource constraints; changes in Air Force policy and procedures; distributed responsibilities; and organizational restructuring.

Back to the Future or Forward to the Past?

In the 1970s and 1980s, the Civil Engineering community benefited from having the direct responsibility and authority, within the former Air Force Civil Engineering Center and Air Force Engineering Services Center, to develop new airbase system capabilities; test and qualify advanced commercial systems and equipment; and procure and manage CE airbase systems.

However, in the early 1990s, the responsibility shifted to Air Force Materiel Command. AFMC's Air Force Research Laboratory Research managed and executed research and development and the Agile Combat Support Program Office at Eglin AFB, Fla., managed system development and acquisition. This has changed within the past five years.

In 2007, AFMC decided to eliminate the ACS Program Office because the CE enterprise, with a focus on the current war, lacked sufficient validated system requirements to continue to support a full program office. This forced the CE community to seek system development and acquisition support from other sources, including the Army. This posed significant acquisition risk due to constraints, conflicting priorities, limited execution capacity and lack of synergistic technical competency. This "alternative" approach, while workable, was certainly less than optimal and in many cases caused significant delays in fielding new technology.

In 2011, AFRL decided to divest of the laboratory element that supported airbase systems and technology development. This action, coupled with the loss of the ACS Program Office, brought airbase system development and acquisition to a critical juncture. The lack of any organized and focused RD&A for airbase systems meant that future installation and basing capability requirements could not be met. As such, warfighters, working with legacy and outdated equipment and systems could not adequately support airbase capabilities essential for evolving threats and missions. Make-shift, work-around solutions were no longer acceptable.

So, in early 2012, the Civil Engineer, Maj. Gen. Timothy Byers, raised these issues to Air Force leadership for resolution. In response, the AFMC commander, Gen. Donald J. Hoffman, transferred authority and responsibility for RD&A for airbase systems to the Civil Engineer and it was readily accepted. The new mission and organizational structure was written into the guiding document for CE Transformation, Program Action Directive 12-03.

Almost immediately, preparations began to plan, organize, and implement a provisional capability using former AFRL and AFCEC readiness personnel. For official stand up on Oct. 1, 2013, several actions have occurred: the organization established; personnel hired; facilities and equipment and ongoing technology contracts transferred from the AFRL mission to AFCEC, and operating budgets developed.

Way Forward

There is still much work yet to be done, including defining and achieving a full operational capability within 2–3 years. Following are some of the major objectives that will be addressed in the months to follow:

- Establish/designate oversight of the CE-airbase systems Milestone Decision Authority Program to the AFCEC/CL
- Stand up a system program office dedicated to CE-airbase systems RD&A
- Build a comprehensive installation and basing modernization program, integrating AFCEC and MAJCOM corporate roles and responsibilities, which integrates directly into the Air Force processes for
    - Requirements (Joint Capability Integration Development System),
    - Planning, programming and budgeting,
    - ACS Core Function Master Plan, and
    - Program execution (Defense Acquisition System)

When complete, the new R&A Division for managing the life-cycle of airbase systems and equipment will ensure that the Civil Engineering community will be positioned to deliver critical airbase capabilities against new and emerging threats, now and long into the future.

Mr. Dutton is the acting Chief, Requirements and Acquisition Division and Mr. Hurley is the Chief, Airbase Acquisitions Branch at the Air Force Civil Engineer Center, Tyndall AFB, Fla.

20 Years and Beyond

DOD Fire and Emergency Services Certification Program continues to be the world's largest accredited entity.

John Smith
AFCEC/CXF

This year, the Department of Defense Fire and Emergency Services Certification Program celebrates 20 years of accreditation with the International Fire Service Accreditation Congress, or IFSAC. The Fire Emergency Services Division at the Air Force Civil Engineer Center at Tyndall Air Force Base, Fla. is celebrating as well. For the same 20 years, the FES division has been accredited for testing and certifying firefighters and other emergency responders as the managers of the DOD FESCP, also known as the DOD Administration Center.

The program began in 1992 as the vision of now retired Chief Master Sgt. Hugh Pike, considered a pioneer within Air Force Fire Emergency Services. Pike recognized the need for a "standardized training program" for DOD firefighters that would not only professionalize the military fire service, but create a more capable force and a safer work environment. Standardized training would also benefit military firefighters who wanted to work in the civilian sector following separation or retirement.

On April 5, 1993, a Directorate of Personnel Programs memo authorized the change from the customary 5-level and 7-level career development courses to accredited certification-based skill levels. Along with the Fire Fighter Certification System Implementation Guide, this memo also authorized the U.S. Air Force Fire Protection Division (now the FES Division) to create the DOD Administration Center and seek its initial IFSAC accreditation site visit in May of that same year.

The DOD Administration Center received its first certificate of accreditation on Oct. 20, 1993, and was officially accredited to test and certify DOD FES personnel in the following nine levels: Fire Fighter I and II, Airport Fire Fighter, Driver Operator, Fire Instructor I, Fire Inspector I and II, and Fire Officer I and II.

As anticipated, the implementation of a new certification program created a lot of concern. To ease the transition, the DOD Administration Center grandfathered all DOD civilian and military firefighters into the levels they needed (per the implementation guide) to remain in the civilian duty position or at the military skill level they held at the time. The grandfathering period lasted until February 1994. After that, DOD firefighters were required to complete the certification courses through the CDC program at Air University at Maxwell AFB, Ala., or through the Louis F. Garland Fire Academy that had just opened at Goodfellow AFB, Texas.

The publication of two documents brought the vision of a nationally recognized training and certification program across the DOD to fruition. In December 1994, DOD Instruction 6055.6, Department of Defense Fire and Emergency Services (F&ES) Program, mandated the use of the Fire Fighter Certification Program by all DOD components and identified the Air Force Fire Protection Division as the lead agent.

One year later, in December 1995, the Fire Fighter Certification System Implementation Guide became DOD Manual 6055.6, DOD Fire and Emergency Services Certification Program (DOD FESCP). With publication of the DOD FESCP

"Firefighter certification... means that when someone dials '911' they can count on someone who's trained, qualified and certified."

manual, IFSAC certifications through the DOD Administration Center became a condition of employment for all DOD civilian firefighters and an integral part of military upgrade training. In June 1999, a change to DODM 6055.6 made IFSAC certifications mandatory qualification requirements to hire or promote all DOD civilian firefighters, requiring them to have all required certifications just to be eligible.

By the end of 1997, the DOD Administration Center had added certifications for Driver/Operator Pumper, D/O Aircraft Rescue Fire Fighting, D/O Aerial, Fire Instructor II and III, Fire Inspector III, Fire Officer III and IV, Hazardous Materials, or HazMat, Awareness, Operations, Technician, and Incident Commander, bringing the total number of accredited levels from nine to 20.

(facing page and above) Air Force firefighters train in conditions that simulate real-world fire situations. *(U.S. Air Force photos)*

Student testing methods also changed. The DOD Administration Center developed a computer-based certification testing program, called CerTest. Questions used the standard multiple choice format as well as true/false, matching and fill-in-the blank. Interactive scenarios with graphics were also included. Students received immediate test results, allowing them to quickly move to part two of the certification process —the performance test. Taking advantage of technology, multimedia courseware quickly followed CerTest, as the demand for certification increased.

In 2003, the program became dual accredited with IFSAC and the National Board on Fire Service Professional Qualifications (ProBoard). And, in 2008, the Army Chemical School at Fort Leonard Wood, Mo., came under the DOD Administration Center's accreditation for their HazMat Awareness, Operations, Incident Commander, and Technician courses taught at the Chemical, Biological, Radiation, and Nuclear School, Air Force Emergency Manager Technical School, and Technical Escort School.

Today, the DOD FESCP is the largest IFSAC and ProBoard accredited program in the world. The DOD Administration Center manages the accreditation for 63 separate courses for 42 IFSAC and ProBoard accredited levels available through three major venues. The center has issued more than 570,000 accredited certificates to more than 160,000 firefighters, emergency managers, security forces, civil support team members, bioenvironmental engineers, and other federal emergency responders representing not just the DOD, but the Veterans Administration, NASA and the Departments of Energy, Homeland Security, Interior, and Justice.

"Firefighter certification is about the individual firefighter, their qualifications and abilities, but there are bigger benefits that many people may not realize," said James Podolske, the Air Force Fire Chief. "It means so much more for the Air Force and the public. It means that when someone dials '911' they can count on someone who's trained, qualified and certified."

Mr. Smith is the Program Manager for the DOD Fire Emergency Services Certification Program at the Air Force Civil Engineer Center, Tyndall AFB, Fla.

Active Vehicle Barriers

Jeffrey Nielsen,P.E.
AFCEC/COSC
Tracy Coughlin, P.E.
AFCEC/COAT

Active vehicle barriers are one of the quickest and most effective deterrents available to help security forces maintain secure perimeters for Air Force installations. AVBs are so named because they are armed and actively ready for deployment if vehicles attempt to bypass entry control points.

AVBs have been in the Air Forces arsenal for many years. Initially they were simple ECP devices that deployed when a guard, reacting to a threat, activated the barrier, usually with the press of a remote button. Unfortunately, there were few safeguards employed to protect non-threat vehicles, leading to many inadvertent barrier activations with injuries to innocent drivers and damage to vehicles.

Over time, AVBs have transitioned to a modern, safe system that combines traffic control with reliable vehicle denial. However, the potential for significant injury and damage to innocent drivers remains, inherent in an AVB's design to forcefully stop a threat vehicle. Specific guidance from the Department of Defense outlines minimum requirements for safe AVB operation. With few significant changes to basic ECP design, improvements to the overall system include use of standard traffic control lights, safety devices, vehicle presence detection, standard AVB controls and sufficient advance warning to motorists.

AVB Activation

Using fast-acting electric or hydraulic actuators, AVBs can raise in less than 2 seconds to a height of 2-3 feet and present an obstruction that will either stop or completely disable a threat vehicle. A typical barrier activation sequence involves the following actions:

- Threat vehicle approaches the ECP and is identified as a threat by the guard,
- Guard responds by activating the emergency fast open, or EFO, button at the ID checkpoint,
- The solid green or flashing yellow lights immediately turn solid yellow for minimum of 3 seconds to warn motorist of the impending red stop light and barrier deployment,
- Yellow warning lights (wig-wag lights) begin flashing also warning motorist of the impending barrier deployment,
- Vehicle-presence detection within the roadway detects innocent vehicles stopped over the AVB
- 1 second after the lights change to red, and if no signal is received from vehicle-presence detector, the barrier deploys into the full up position.

Air Force AVB Guidelines

In an effort to reduce injuries to innocent motorists and property, the Air Force Civil Engineer Center was tasked to develop guidelines to identify substandard AVB systems and certify barrier installations throughout the Air Force. Three critical safety issues were identified:

1. Minimum of 4-second (3 +1) safe driver reaction delay prior to AVB activation

2. Vehicle presence detection preventing all AVB operations, including EFO button

3. Barriers never activating automatically (i.e., without human direction)

These issues required immediate attention and necessitated the decertification of all barriers until the installation mission support group commander re-certified compliance. Subject matter experts in AFCEC's Engineering Division, Tyndall Air Force Base, Fla., developed checklists, safety standards, certification process, technical resources and oversight guidelines. Distributed through MAJCOMs, the checklist served as a standard guide every installation with AVBs was required to use to determine needed safety improvements. It also served as a basis for project programming. As installations identified and corrected these safety requirements, monthly reporting, through the MAJCOMs and AFCEC, was provided to senior leadership for compliance and situational awareness.

Safety Features

Minimum safety features include the following:

■ Compliance with the Manual of Uniform Traffic Control Device Standards, which requires minimum safe driver reaction delay for traffic control signals. The most common traffic design requires a minimum of 4-second safe driver reaction delay during warning light transition from solid green to continuous yellow and then to continuous red that allows motorists time to react and avoid a collision.

■ The use of vehicle presence detectors that override all barrier activation commands, including inadvertent and intentional activation of the EFO button. This safety feature protects vehicles unable to clear the AVB prior to activation.

■ The use of a cover over the EFO button, which creates a two-step process by the guard to initiate AVB deployment (this simple improvement has significantly reduced inadvertent barrier activations).

Bottomline

AVBs remain one of the most effective deterrents against unauthorized access to military installations due to their reputation and demonstrated capabilities. With the additional safety systems now required for AVBs, barriers remain just as effective while providing increased safety for innocent motorists. When ECPs are designed in accordance with Unified Facility Criteria and Unified Facility Guide Specifications all the required safety and threat reduction features will be incorporated, tested, and certified prior to operation.

Because of the inherent hazard with AVBs, daily operational testing of AVBs is required of the operators with any anomalies reported immediately to maintainers. Installations should regularly provide awareness information to the base populace that includes adherence to the warning lights and speed limits within the ECP area, and potential injuries or damage that can be caused by failing to observe these systems.

Editor's note: In the next issue of the magazine the author will discuss design considerations for active vehicle barriers.

Mr. Nielsen is the Antiterrorism-Force Protection Subject Matter Expert, Engineering Division, and Mr. Coughlin is a general engineer in the Transportation Branch at the Air Force Civil Engineer Center, Tyndall AFB, Fla.

(above top) Experts inspect active vehicle barriers according to manufacturer's recommendations and schedule. ***(above bottom)*** A cover over the emergency fast open button creates a two-step process for initiation by gate security forces to reduce inadvertent AVB activation.
(U.S. Air Force photos)

Maj. Gen. Timothy A. Byers retired in a ceremony held June 20, culminating a career of more than 32 years of service to the U.S. Air Force and the nation. The last four years were distinguished by his position as the Civil Engineer, Headquarters U.S. Air Force, Washington, D.C. As the Civil Engineer, he was responsible for installation support functions at 166 Air Force bases worldwide with an annual budget of more than $12 billion.

Byers entered the Air Force in October 1981 as a distinguished graduate of the ROTC program at the University of Kentucky, where he earned a B.S. in civil engineering with high distinction. Since his first assignment with the 2750th Civil Engineer Squadron at Wright-Patterson AFB, Ohio, he held positions at the squadron, major command and Air Staff headquarters levels. He commanded both a squadron and a support group and served as the Civil Engineer for Pacific Air Forces and the Director of Installations and Mission Support for Air Combat Command.

As the Civil Engineer, Byers led an Air Force career field of 60,000 during a time of accelerated transformation that encompassed significant changes for Civil Engineering at Air Staff, MAJCOMs and squadrons, as well as the establishment of a new field operating agency. He challenged everyone to "make a difference and make it better" despite reductions in funding and manpower.

CEs continued their high level of support to the warfighter, establishing the 577th Prime BEEF Group in 2009 and 1st Expeditionary Civil Engineer Group in 2012 with the combined power of expeditionary RED HORSE and Prime BEEF squadrons. Through his efforts, military CEs were better prepared to deploy and taken care of when they returned. On the home front the civilian workforce had even greater career development opportunities. Under Byers' leadership, civil engineers accomplished their goals to "Build Ready Engineers, Build Great Leaders and Build Sustainable Installations."

BUILD TO LAST

LEAD THE CHANGE

JOAX emphasizes JOINT MISSION

Capt. Joseph Miller
Capt. H. Leo Kim
820 RHS

In late February, members of the 820th RED HORSE Squadron participated in the Joint Operational Access Exercise at Fort Bragg, N.C. The JOAX is a quarterly joint and coalition exercise with two practice objectives: 1) contingency air drops of both cargo and personnel and 2) the use and maintenance of dirt field landing strips. The exercise involved Army, Air Force, and Canadian personnel and culminated in a 1,700 personnel parachute drop.

The JOAX was a successful learning experience for the 820th RHS members. They were able to see first-hand the Army's light airfield repair package, or LARP, compared to RED HORSE's mobile airfield repair equipment set, or MARES. While the two kits provide comparable equipment and capabilities such as certification for both airdrop and sling loads, they are not identical (see Figure).

The Airborne RED HORSE's MARES kit uses different sets of equipment to target a lighter payload. The skid steer and attachments provide flexibility to compact and conduct earthwork. The ancillary vehicles are possible modular additions to the MARES for scenarios where integrated emergency management, firefighting and explosive ordnance disposal capabilities are necessary, such as in a post-attack situation.

Senior Airman James Morris and Technical Sgt. Michael Shannon take a break during the JOAX, next to the 820 RED HORSE equipment laydown yard. *(U.S. Air Force photo)*

Fifteen members of the 820th RED HORSE Squadron airborne flight participated in a parachute jump with members of the 161st Engineer Company, based out of Fort Bragg, and utilized their LARP. The two units completed a joint airfield repair training exercise where they compared airfield damage repair techniques and trained each other on best practices. For example, the Airmen demonstrated the use of the phantom light kit, which is a lightweight remote-controlled set of LED lights used to mark out a landing strip.

The JOAX also gave the Airborne RED HORSE engineers the opportunity to participate in and witness large-scale personnel and equipment drops, providing a frame of reference for what real-world operations could look like. Most of the jumps that Airborne RED HORSE participated in consisted of only a small fraction of the number of jumpers in JOAX.

Throughout the exercise, Airmen from the 820th also participated in drop zone safety operations, providing a ground safety presence during both day and nighttime jumps and immediate first aid for jump-related injuries ranging from scrapes and bruises to compound leg fractures.

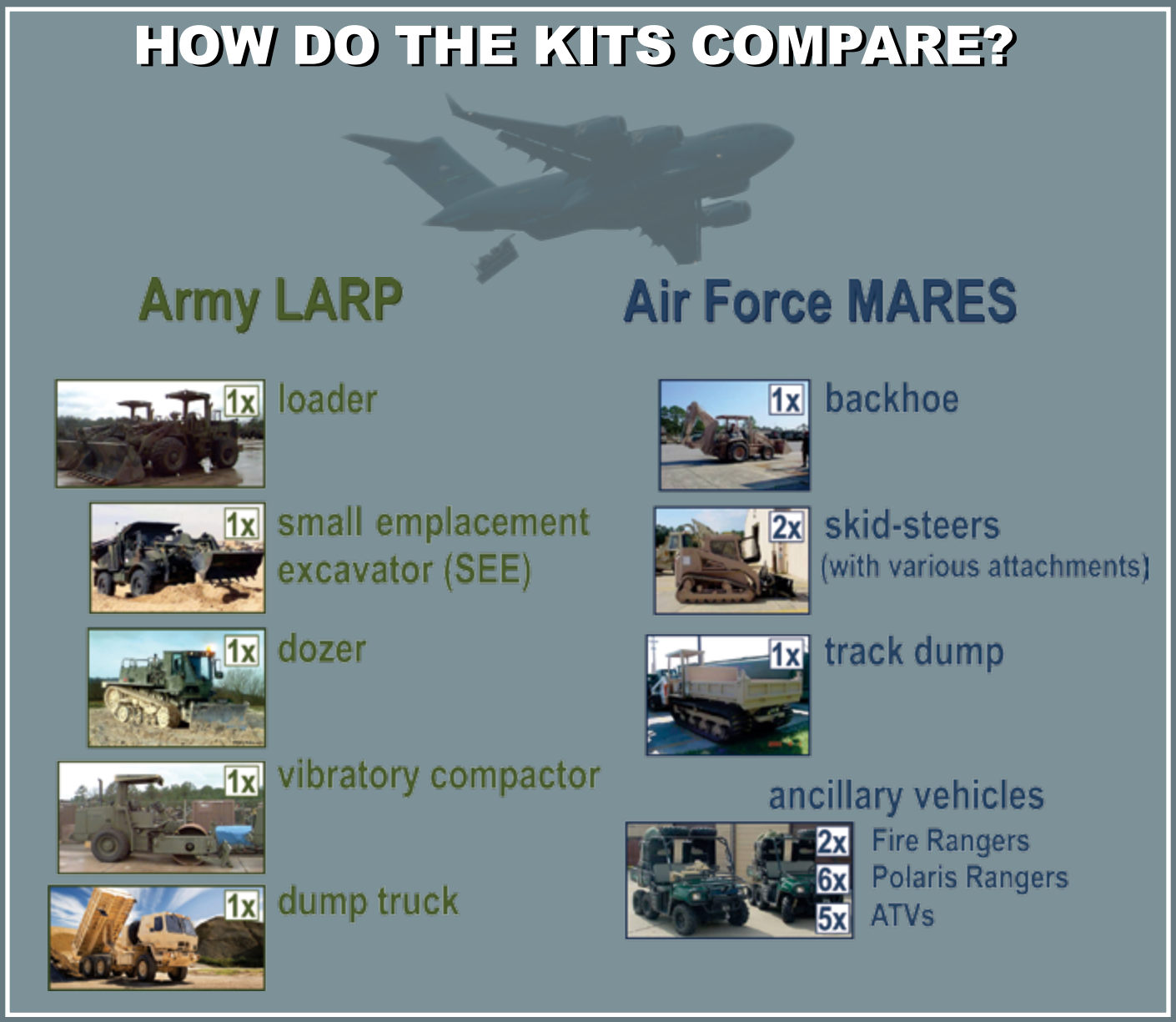
Members of the 820th RED HORSE Airfields were also tasked to maintain the field landing strip at the main exercise site on Fort Bragg. Because of inclement weather, no

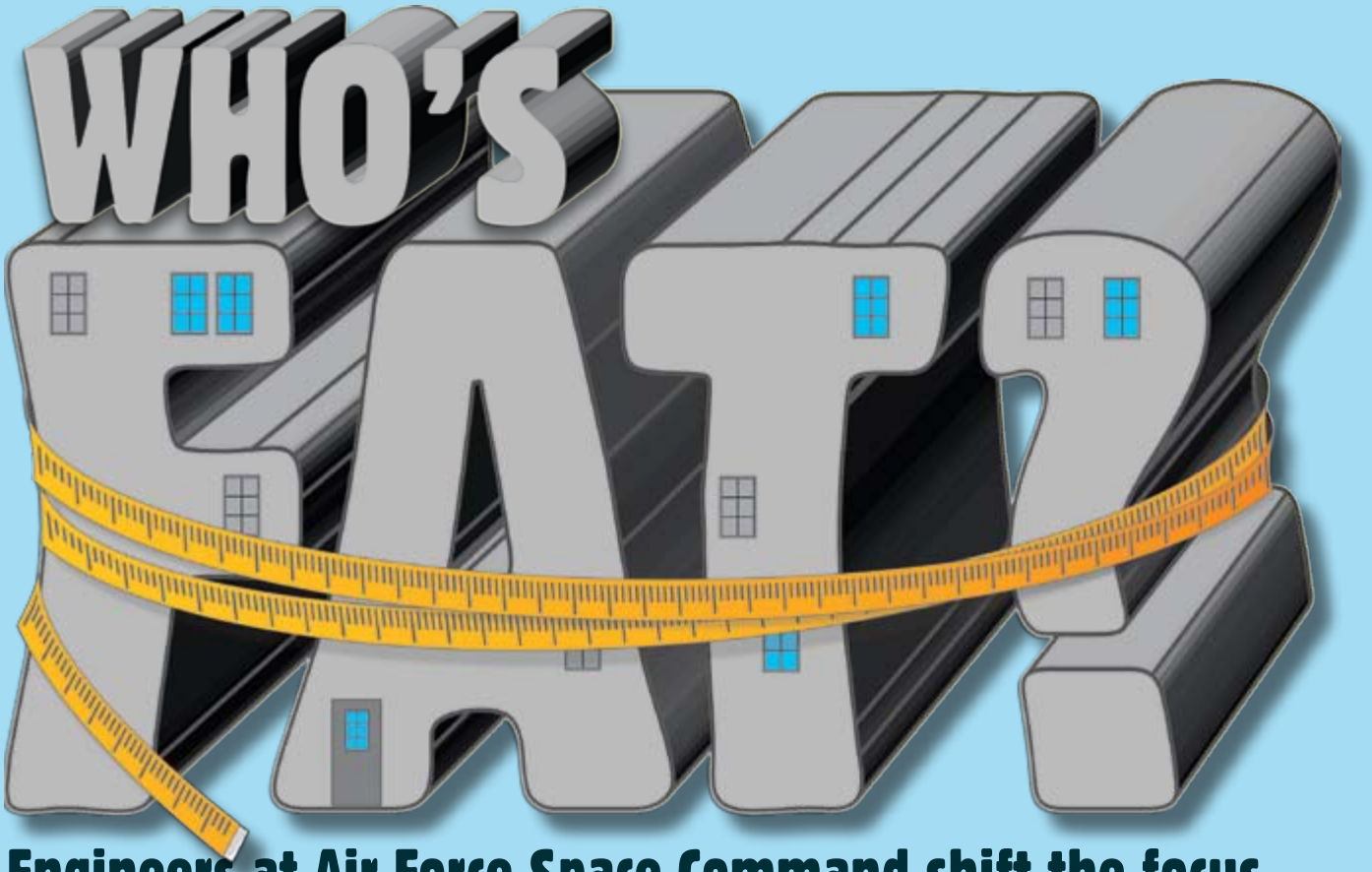
planes were able to land on the runway. However, Airmen from the 820th were able to gather and prioritize a horizontal construction wish-list from the 82nd Airborne Division and make significant improvements to the training site for future exercises.

The RED HORSE contingent used a variety of engineering tools and skill sets to conduct an expeditionary analysis of field landing strip through the use of the dynamic cone penetrometer and get a runway condition reading. A DCP was used to collect airfield data in order to determine the associated California Bearing Ratio to correlate soil shear strength. The data helped assess an older range survey that determined the controlling soil layer and estimate the number of theoretical passes in the airfield's current state. Without runway friction testing equipment, a rough runway condition reading was derived from characterizing the soil type and observing the moisture condition of the runway to advise the 20th Engineer Brigade on the plausibility of landing aircraft after persistent rains.

Using a field landing strip rather than an improved concrete airfield supplied different requirements in airfield maintenance and damage repair and overall, the JOAX was a unique chance for Air Force and Army engineers to cooperate and train together. Each service's demonstration of their tactical and technical prowess provided an opportunity to exchange knowledge and develop vital joint relationships.

Capt. Miller is the Airborne Flight Commander and Capt. Kim is a design engineer for the engineering flight, 820th RED HORSE Squadron, Nellis AFB, Nev.





Engineers at Air Force Space Command shift the focus to tackle space management issues

Craig Highsmith
Maj. Chris Bulson
AFSC/A7IF

In 2011, the Air Force Vice Chief of Staff, Gen. Philip Breedlove, issued a memorandum, "Sustainable Installations and Air Force 20/20 by 2020," that reiterated guidance on the reduction of owned, leased and Air Force-led joint base real property and associated operating costs by 20 percent by the year 2020. The reiteration was a result of President Obama's 2010 memorandum charging all federal agencies to dispose of unneeded real estate, with a focus on utilizing installations more efficiently by optimizing facility space use, reducing energy and water operating costs and sustaining only needed facilities.

One defining goal of 20/20 by 2020 is to reduce expenditures by operating and maintaining only those facilities necessary for mission accomplishment. This frees up funding to keep good facilities in adequate condition, while demolishing maintenance intensive and energy in-efficient buildings. Using existing facilities more efficiently also provides space opportunities for new or expanding missions in lieu of new construction.

To meet this goal, civil engineers need a significant paradigm shift in the way they manage facility space on installations. Historically, space has been allocated on a request/availability basis. A new mission/space request was fulfilled simply by finding existing empty space or building new space. This practice often did not address space across an installation that was underutilized (i.e. not vacant but sparsely populated), nor did it address how much space a new entity truly needed or "earned."

The new paradigm is to allocate space based on what is actually authorized using AFMAN 32-1084, "Civil Engineering Facility Requirements." Authorized space is based on quantity of personnel, their positions and the required special purpose space by mission type. This process has the advantage of being defendable, repeatable and transparent.

Implementing authorization-based space management does require more effort and analysis up front in the planning and programming process. A detailed understanding of the manning and space needs of each organization on an installation must be determined by a thorough examination of unit manning documents and by interviewing knowledgeable personnel within units.

While the foundation of personnel counts is the UMD, a headquarters validation of the personnel count may be required if the UMD does not accurately reflect current

manning levels. For example, a space requirement for 10 additional contractors (not on the UMD) needs to be validated by the functional owner as well as Personnel (A1) and Financial Management at the MAJCOM. This is where a MAJCOM's Civil Engineering staff should take an active role. By coordinating with functionals at the MAJCOM level to resolve discrepancies and verify true requirements, they assist and provide top cover to base civil engineers.

The finalized manning information, combined with guidelines set forth in AFMAN 32-1084, will determine each unit's authorized square footage. Once a baseline authorized square-foot determination is made for all units on the installation, the difference between authorized and existing (occupied) space can be used to identify opportunities for consolidation, demolition or new mission. The Table shows examples of the level of detailed data a base space manager should have at his or her fingertips to aid leadership in making decisions.

Consolidation projects often yield the most attractive end-state by utilizing existing facilities to vacate others, resulting in a renovation project with a much more favorable return on investment when compared to traditional construction. However, since consolidation projects can involve multiple unit moves and facilities, political willingness is often the toughest obstacle to overcome. Focusing on ROI and life-cycle costs provides leadership the opportunity to see which option yields the biggest bang for the buck when investing in our facilities. Potentially reducing a unit's facility space to meet standards is not a popular nor well-received endeavor. This can become especially contentious when dealing with tenants and operational units, but is worthwhile and necessary during these times of significantly constrained resources.

Space Command's facility engineers have strived to socialize this new paradigm shift by conducting a command-wide space authorization review and creating a computer-based training program to aid installation space managers. As fiscal realities continue to emphasize the need to make smarter investments, an authorization-based space management program can be a valuable tool in effectively managing a base's existing assets before pursuing expensive new construction.

Creating sustainable installations is aided by the removal of outdated, inefficient facilities such as this building at Schriever AFB, Colo., that was demolished in late 2012. (U.S. Air Force Photo/Dennis Rogers)

The AFSPC Space Management training is available on the Air Force Civil Engineer Virtual Learning Center at https://afcesa.csd.disa.mil) by performing a keyword search for "Space Management." Training includes modules on space utilization data management, authorizations and optimization.

Mr. Highsmith is a facilities engineer and Maj. Bulson is the Deputy Chief, Facilities Branch, at Headquarters Air Force Space Command, Peterson AFB, Colo.

Table. Example of data that base space managers should compile for authorization-based management decisions.

Unit	UMD*	Max Shift*	Admin Space Authorized (GSF)**	Special Purpose (GSF)	Total Authorized (GSF)	Currently Occupied (GSF)
Org 1	311	311	43,264	98,363	141,627	177,851
Org 2	84	84	11,169	1,222	12,391	13,120
Org 3	50	50	6,391	2,464	8,855	12,122
Total	445	445	60,824	102,049	162,873	203,093

***Based on current personnel numbers collected and validated with users*

****Gross square footage based on AFMAN 32-1084 by position standard (middle of range)*

Current excess of 40,220 SF

(Currently occupied minus total authorized)

Engineering CONCRETE Solutions

Bob Hankins
Lt. Col. Amanda Birch
Capt. Rob Lydon
4 CES

Placing 3,000 cubic yards of concrete on the runway per day is easy compared to coordinating an $18 million concrete replacement project on one of Air Combat Command's busiest airfields. That's hard!

That was the task for civil engineers at Seymour Johnson Air Force Base, N.C., home to more than 100 aircraft, including the 4th Fighter Wing's F-15E Strike Eagles and the 916th Air Refueling Wing's KC-135R Stratotankers. Civil Engineering's skillful planning kept the flying missions on track during replacement of 51 percent (1,206 25x25-foot slabs) of the base's only runway in a project awarded on March 26, 2012, with a completion date of May 31, 2013.

Using pavement condition index assessments provided by the Airfield Pavements Team from the Air Force Civil Engineer Center, Tyndall AFB, Fla., as well as visual inspections, CE focused on the most critical slabs to replace on the 52-year-old runway. The project engineer, Bob Bero, and project manager, Capt. Rob Lydon, assembled a runway project working group from Civil Engineering and the Operations Group, to identify and handle problems. As part of the RPWG, the 4th Operations Support Squadron led the selection of a course of action that allowed the wings' missions to continue while construction timelines were met. Everyone had to be on board with the COA to make this a success. Throughout the project, a daily briefing slide updated the commanders on the high visibility project.

The final COA included two displaced threshold periods (one for 30 days and one for 60 days) and five 9-day runway closures that stood down flying operations. Engineers scheduled two more 9-day closures as a contingency in case of bad weather during the winter months. Several additional weekend closures also allowed some work, such as set up and removal of the expeditionary aircraft arresting system (BAK-12) and runway signage. Other weekend tasks included 21 miles of joint sealing, asphalt milling and paving the concrete keel edge; grooving new concrete slabs to prevent hydroplaning; and grading and seeding along the disturbed edge of the runway.

The project required that a concrete batch plant be located on the base (just off the end of the runway) to ensure concrete quantity on a large scale as well as quality. Local concrete plants served as backups to provide smaller amounts of concrete. Responsibility for daily quantities and quality rested with the contractor, Southern Management. The project scope required displaced thresholds on both ends of the runway. Engineers removed and replaced the equivalent of two-and-a-half football fields' worth of concrete on one end and four on the other end – a total volume of 16,000 cubic yards.

The six flying squadrons, including two training squadrons, carefully planned for and adjusted their flying operations for a shorter runway for three months. Utilizing displaced thresholds became routine operations. However, removing and replacing more than 24,000 cubic yards of demolished concrete in the center keel section without bringing the flying missions to a halt was anything but routine.

The paving operation included delivery of ¾-inch slump concrete by dump truck. A conveyor belt then placed concrete into the 25-foot-wide lanes. A single machine distributed the concrete via a horizontal auger and then

completed a rough screed of the fresh concrete. A follow-on slip form paving machine vibrated the concrete and placed the final screed to create the 17-inch-thick slabs. Hand finishers added the final touches just before applying the burlap drag finish and curing compound.

The weather cooperated throughout most of the project, but rain and cold, wet sub-grades presented a serious challenge toward the end of the project. With 301 slabs removed, storms created a "bathtub" at one end of the runway and the saturated sub-grade became unstable, even while pumping away 200,000 gallons of water per day. To keep the project on schedule, the contractor and project engineer worked on a solution to cement stabilize the top 10 inches of the 188,000-square-foot sub-grade. Time was critical, but the contractor pulled if off before the next rain and started the concrete placements.

Throughout the project, daily on-site meetings started the intense work periods off right. An experienced inspector from 4 CES, Chuck Dunham, remained on call around the clock, working on the runway and handling unforeseen site conditions at all hours. Another experienced inspector for the base, Sherwood Core, oversaw the batch plant operations to ensure concrete met the design specifications.

Even though working conditions were less than ideal at the project completion, through the inspectors' diligence and the contractor's perseverance, the team met the final runway opening date. The majority of the runway work was completed in March 2013. Engineers also finished the center keel section in just four 9-day closures (rather than the agreed-upon five closures) and reopened the runway ahead of schedule. A few more weekend closures wrapped up the joint sealing, grooving, grading and seeding.

During the entire runway construction period, the 4 FW also had to prepare for an Operational Readiness Inspection. The ORI went off without a glitch with the 4 FW receiving an "Excellent" rating. No doubt, Seymour Johnson's runway project will receive its own excellent grade as an example of civil engineers pushing the threshold and providing concrete solutions that live up to the to the 4th FW's motto: Fourth but First.

Mr. Hankins is the chief of Construction Management, Lt. Col. Birch is the IMA to the commander and Capt. Lydon is the deputy chief of the Engineering Flight, 4 CES, Seymour Johnson AFB, N.C.

(facing page) During replacement of concrete on Seymour Johnson AFB's runway using the slip form paving process, the rough grade processed by the front spreader machine (left) is then vibrated and fresh, screeded 17-inch deep concrete appears behind the slip form paving machine, awaiting hand finishing and application of curing compound. *(U.S. Air Force photo/Airman 1st Class Mariah C. Tolbert)*
(above) During Seymour Johnson's runway project, a dump truck delivers concrete to the conveyor belt of a spreader machine where it is distributed by an auger on the underside of the machine. *(U.S. Air Force photo/Airman 1st Class John Nieves Camacho)*
(below) At Seymour Johnson AFB, a 25-foot wide concrete lane is placed on a displaced threshold of the runway, while an F-15E taxis off the runway beyond the work zone. *(U.S. Air Force photo/Airman 1st Class Mariah C. Tolbert)*

BACK TO THE FUTURE

THE CE RESEARCH, DEVELOPMENT, AND ACQUISITION MISSION CIRCLES BACK TO AFCEC

Dr. Ronald B. Hartzer
AFCEC/DSM

On October 1, 2013, history will repeat itself as the Air Force Civil Engineer Center will assume responsibility for portions of the research, development, and acquisition mission formerly accomplished by the Air Force Research Laboratory. AFCEC, headquartered at Joint Base San Antonio, will manage the R&D and acquisition mission through its Requirements and Acquisition Division at Tyndall Air Force Base, Fla. (see article on p. 12)

The first recognized CE R&D activity dates back to 1950 and the establishment of the Special Studies Office of the Design Branch, Installations Engineering Division, Headquarters Air Materiel Command at Wright-Patterson AFB, Ohio. Its mission was to support nuclear weapons effect testing, including structural design criteria development.

In 1955, the office transferred to the Aeronautical Research Laboratory at Air Research and Development Command and became the Blast Effects Research Group. The next year, the group, now renamed the Structures Group, moved to Kirtland AFB, N.M.

The Structures Group became part of the new Air Force Weapons Laboratory in 1963. That same year, the Air Force Director of Civil Engineering, Maj. Gen. Robert H. Curtin, tasked Air Force Systems Command to study how to best accomplish CE research. This resulted in the first formal, centralized management of CE R&D work. The Structures Group became a larger organization, the Civil Engineering Branch.

In 1966, the branch was named the lead laboratory for CE advanced development. Over time, areas identified for research began to grow, many reflecting requirements from the Vietnam War. Research included sonic boom effects, bomb damage repair of airfield pavements, aircraft landing mats and aircraft revetments. In 1968, the embryo of a broad-based facilities technology program developed that included air and water pollution control, fire protection technology and electrical power systems.

The Civil Engineering Center was established at Wright-Patterson in 1968. Along with its policy and field assistance role, it became involved in the procurement of prototype re-locatable facilities and developed a testing capability for airfield pavement evaluation, aircraft shelters, field testing skid resistance systems, and rapid runway repair techniques. Although not part of Systems Command, in many ways the center served as one of the command's test and evaluation centers. In 1969, the term "research" was included in CEC's mission statement.

In 1972, the Air Force announced that CEC would move to Tyndall AFB, Fla., to provide space for expanded operations. The center subsequently transferred to Air Force Systems Command and became the Air Force Civil Engineering Center, or AFCEC. These moves gave CEs a bona fide R&D and test and evaluation role as well as a means to test equipment and methods under actual field conditions.

The R&D role grew as environmental engineering work known as Environics moved to Tyndall. AFCEC was named the Laboratory Designated Area Manager for environmental quality research. In 1975, much of the advanced work — and about 26 manpower positions — transferred from the Weapons Laboratory to AFCEC. By 1977, AFCEC was the single manager for a wide range of CE research.

In 1977-78, a series of organizational changes brought about the creation of the Air Force Engineering and Services Center at Tyndall, which incorporated AFCEC and the R&D mission from Systems Command. Strongly supported by the AFESC commander, Brig. Gen. Clifton D. Wright, Jr., this change gave CE an even stronger voice in the R&D program. The Engineering and Service Laboratory had two divisions, Engineering and Environics.

Although Tyndall offered plenty of space for the lab functions, particularly at the eastern end of the base, many of

A group of researchers and support staff in the new Environics section at Kirtland AFB, NM. This function moved to Tyndall in 1975.

A sign marking Environics new home at one of the 1950s-era buildings at Tyndall.

the offices were spread out in small 1950s-era buildings. A new facility, Building 1117, was constructed in 1987 to consolidate many of the functions.

Under CE leadership in the late 70s and 80s, the laboratory grew to more than 100 military and civilians and was supported by a number of contractors, while its budget increased five-fold. It was the lead agency for R&D and testing and evaluation in the areas of civil and environmental engineering and designated by Systems Command as the focal point for environmental quality technology and facility energy research. As the focus on airbase survivability and operability grew in the 1980s, the research in rapid runway repair, aircraft shelters, and facility hardening also expanded. This research culminated in 1985's airbase operability demonstration Salty Demo.

The laboratory had approximately 150 separate research efforts and produced almost 100 technical reports annually. Its accomplishments included a new firefighter protection ensemble, expedient repair methods for airfield spalls, in situ treatment of contaminated soil and thermal soil decontamination techniques (e.g., incineration of dioxin-contaminated soil). The lab also began work on the use of robotics for airfield recovery and the development of environmentally acceptable (i.e., non-ozone depleting) fire suppressants.

Dr. Daniel Stone, a long-time researcher in the laboratory, operates testing equipment in the Environics Laboratory.

In the late 1980s, the laboratory teamed with AFESC's new program office to manage full-scale development and acquisition support in rapid runway repair, firefighting and facility engineering. The two offices combined in 1991 to create the Research, Development and Acquisition Directorate to provide quicker transition and transfer of technology to its customers.

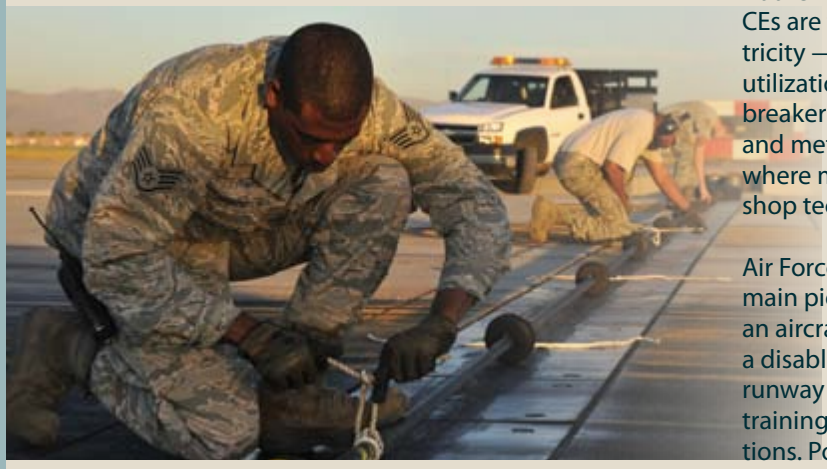
The laboratory was caught up in several cost-cutting and streamlining efforts in the early 1990s. The Department of Defense's "Project Reliance" proposed consolidating service laboratories, but while the proposal was being evaluated, all Air Force laboratories were placed under the newly established Air Force Materiel Command. (The Air Force inactivated Air Force Systems Command and Air Force Logistics Command.)

On Oct 1, 1992, the Research, Development and Acquisition Directorate was parceled out to several organizations. Execution of environmental quality programs and Environics moved to the Human Systems Center at Brooks AFB, Texas, the latter as part of the center's Armstrong Laboratory. The former Civil Engineering Research Division was aligned under Wright Laboratory at Wright-Patterson AFB and fielding of airbase operability equipment under an AFMC component at Eglin AFB, Fla. Concerned that CE work would be buried in the laboratory structure and eventually disappear, the Civil Engineer at the time, Maj. Gen. James E. McCarthy, worked out an arrangement for the people and functions to stay in place at Tyndall, near the new Air Force Civil Engineer Support Agency, one of its primary customers.

Now, 21 years later, the mission is once again returning to the Air Force Civil Engineer Center, an heir to the original AFCEC which first brought the lab to Tyndall in 1972.

Dr. Hartzer is the Air Force Civil Engineering historian, Air Force Civil Engineer Center, Tyndall AFB, Fla.

3E0X2
Power Production



As their career field name states, 3E0X2 CEs are responsible for electrical power generating and control equipment. They install, remove, operate, maintain and repair it. This includes both diesel- and gas-powered generators that either provide prime power or serve as emergency power sources. They work with generators that range in size from small commercial name brand ones that might provide power to heat and cool a tent to one large enough to handle an entire building.

At their schoolhouse at Sheppard AFB, Texas, Power Pro CEs are trained in the principles of electronics and electricity — its generation, conversion, transformation, and utilization — and the high and low voltage circuits, circuit breakers, switches, fuses, regulators, relays, instruments and meters associated with it. At contingency installations where most of power comes from generators, Power Pro shop technicians can be some of the busiest CEs on base.

Air Force pilots hope they never have to use one of the main pieces of equipment Power Pro CEs specialize in – an aircraft arresting system. The systems can safely stop a disabled aircraft after landing and are employed along runway and overruns of airfields supporting fighter and training aircraft at home-station and contingency locations. Power Pro CEs are the Air Force's experts in both permanent and mobile AASs, responsible for their installation, operation, maintenance, and most importantly, stopping an aircraft and protecting valuable Air Force resources. The Power Pro technicians also hope that an AAS never has to be used real-world, but they keep them at the ready, just in case.

A1C Diane Acarley

3-level Apprentice

Power Production Technician
49 CES, Holloman AFB, N.M.

When Airman Acarley joined the Air Force in September of 2011, Power Production wasn't her first choice.

"I was studying nursing, but there weren't any medical jobs available and my recruiter recommended either structures or power production."

According to Acarley, during tech school, she sometimes found the mechanical work hard to understand, especially on the generator side.

"I'm glad to be here at the flight because they're helping me a lot," she said. "The senior Airmen and NCO make sure we're learning. We maintain roughly 50 stand-by generators and 11 aircraft arresting systems. I really like the aircraft arresting system side. I am amazed how this system can save an aircraft and a pilot's life."

Acarley's long-term goals still involve the health field and since joining, a lengthy career in the Air Force.

"I decided to join at first for just six years and primarily for the benefits," she said. "But, I found I love the Air Force and want to be part of it for 20 years. Eventually, I would like to get back into nursing or maybe physical therapy."

Her first deployment, scheduled for April, was delayed so Acarley could complete another goal.

"I'm now an American citizen," she said. "May 17th was my oath ceremony. It meant a lot to me, and the shop really helped me. My commitment is to serve, to know my job, and be the best in what I do for the benefit of the Air Force."

SrA Matthew Norman

5-level Journeyman

Power Production
633 CES, JB Langley-Eustis, Va.

After joining the Air Force and finishing tech school, Norman joined the Power Pro shop at Langley-Eustis. He's deployed from there twice, first to Balad Air Base in Iraq and then to al Dhafra AB in the United Arab Emirates.

Norman says he enjoys the deployments more than being stateside because there's so much to do and learn.

"On my last deployment I was actually one of the older guys there, so I had to help some of the younger guys in a deployed location for the first time. There were a lot of generators, running prime power. Being the person to keep everything up and running and the mission going, was a lot of pressure."

According to Norman, although he has more experience with generators, he's trained on aircraft arresting systems and would welcome more time with them.

"They're very interesting, probably the most important thing in our career field," he said. "When I first got here, I worked a couple of months on them — the arresting system is usually the first thing new people from tech school go to. But, not all bases will have arresting systems, and then it also depends on the shop as well."

Power reliability is Norman's job, and reliability is also a quality he brings to it.

"I seem to get a lot of compliments on being there when they need something done, on never being late," he said. "I take pride in always being there for people to count on."

SSgt Ryan Robart

7-level Craftsman

Electrical Power Production Craftsman
628 CES, JB Charleston, S.C.

Charleston is Robart's third duty station since joining the Air Force in 2006. He's also deployed four times, to Iraq, Afghanistan and Africa. It was in Iraq that he realized that his career field's contributions can be critical.

"One of the generators that powered the base's main communication site went down, losing all communications — phones, email, everything — for 10,000 people. When everything is run on generators, we are pretty much the life line of a base when the power goes out. We stayed busy."

As one of about 15 Power Pro Airmen at Charleston, Robart also stays busy at home station.

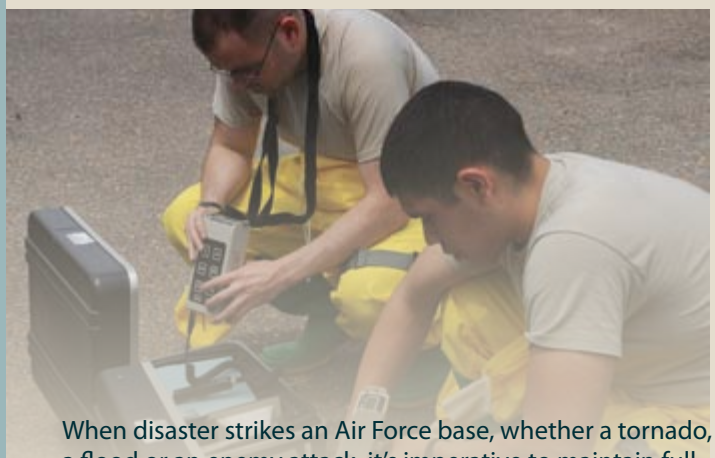
"Right now I am in charge of one of the generator crews," he said. "I will also be in charge of the BAK-12 arresting systems when they get reinstalled."

According to Robart, the Power Pro Shop is responsible for all back-up power for critical systems, including not only the generators but also the automatic transfer switches that sense a power outage and quickly turn them on. They also maintain several large mobile generators for use during long-term power outages, such as after a hurricane.

"I think, though, that one of the most important things I do is looking out for the Airmen under me, making sure they are trained and well taken care of, and being a mentor to them," said Robart. "I have quite a few mentors and I think that it is one of the most important things about being in the military.

"I just reenlisted for four more years and I'd like to stay in. 'What do I bring to the Air Force and CE?' Having the work ethic to find out what the right way is to do things and then wanting to do them the right way."

3E9X1 Emergency Management



When disaster strikes an Air Force base, whether a tornado, a flood or an enemy attack, it's imperative to maintain full operational capability. Emergency Management specialists develop plans and procedures to keep their base working no matter what happens.

Additional responsibilities include responding to major accidents involving hazardous materials. Airmen in the Emergency Management career field ensure that there is an integrated program in place to prepare for, respond to and recover from all hazards.

The Air Force EM program's mission is to provide commanders with specialized post-incident expertise necessary to save lives; minimize the loss or degradation of resources; and continue, sustain and restore combat and combat support operational capability in any threat environment.

Following graduation from their schoolhouse at Ft. Leonard Wood, Mo., EM specialists are trained at the Lt. Joseph Terry CBRN Training Facility to respond to chemical, biological, radiological and nuclear threats. Emergency managers are involved with recommending mission-oriented protective posture, or MOPP, levels. They are also responsible for managing emergency operations centers that provide direct support to incident commanders.

In accordance with DOD directives, Air Force emergency managers also work with civil support officials and host-nation authorities in incident response planning.

A1C Joshua Daggett

3-level Apprentice

Emergency Management
35 CES, Misawa AB, Japan

When Daggett joined the Air Force in 2011, he knew exactly what career field he wanted.

"The Air Force has always been something that I wanted to do, following in my family's footsteps," said Daggett. "My father is in the Air Force and in EM as well, so I kind of grew up with it and knew what it entailed", said Daggett. "I also have a particular interest in natural disaster planning and recovery."

According to Daggett, the Emergency Management field also gives him the background for similar civilian jobs, although he has no plans to leave the Air Force anytime soon.

"I'd like to stay in the Air Force as long as I can, at least 10-15 years. I do have plans for school, for getting a degree in EM. But, should I get out of the military, agencies in the civilian sector for EM look for military people like us because of the experience they know we have. We know how stuff goes down out in the field."

At Misawa, Daggett works in his flight's logistics section making sure the equipment is good to go, ready to be sent

out and used at a moment's notice. He's also working on moving up in his career field, becoming a 5-level journeyman.

"It generally takes a year," said Daggett. "It's great to be with the EM folks here. Some of them live and breathe it, and know everything about it. I have yet to experience what they've experienced. It's quite an honor to work with them."

A1C Carlos Gomez

5-level Journeyman

Emergency Management
460 CES, Buckley AFB, Colo.

When Gomez talks about his career field, he stresses the importance of training.

"Our training is pretty extensive. It's about three-and-a-half to four months total — the second longest there is at Ft. Leonard Wood," said Gomez. "And, we continue to do a lot and there is always something to learn in EM."

Since becoming a 5-level journeyman, Gomez moved from logistics to the training section. Some of his responsibilites include coordinating training within the shop and for CBRN, as well as keeping accurate records of it all.

When Gomez joined the Air Force in April 2011, EM was not his first choice.

"The career field kind of picked me," he said. "Emergency Management was actually fifth on my list of eight, simply because the description was so brief. But, I'm glad I'm here. One of the things I think I do best is being able to step back and recognize certain situations and realize the entire picture."

A long-term goal would be eventually becoming a chief master sergeant, said Gomez.

"My first goal is to get my 7-level and just mentor the other Airmen coming in to make sure they learn stuff correctly. And, I want to continue with honor guard, which is great. It's a good way to give back to those who have served before us."

SSgt Jessica Clayton

7-level Craftsman

Emergency Management
Det. 1, 823rd RHS, Tyndall AFB, Fla.

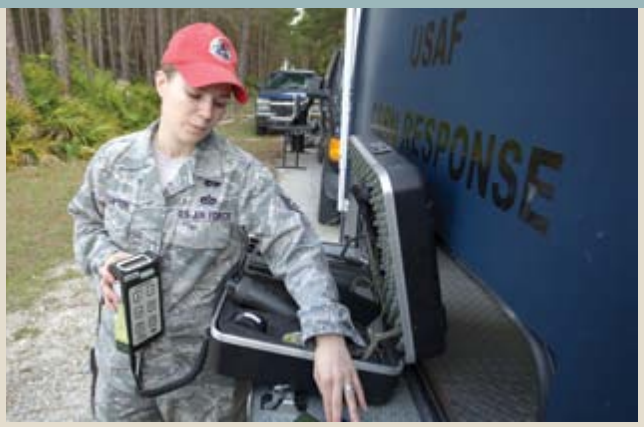
Clayton has been an emergency manager in the Air Force since 2004 and an instructor at Tyndall's Silver Flag Exercise Site for two years. During this time, she's seen the career field evolve.

"When I got into it, there was nothing about chemicals or biological agents, or nuclear incidents in the job description. It was all about peace time, natural disasters and major accidents. We've gone from an emergency management standpoint to an all hazards response capability."

According to Clayton, keeping up to date with the "all hazards" demands a lot of training.

"We do at least 16 hours of monthly in-house training within flights, then we have several different schools that we are required to attend. I'm also working on my Bachelors in emergency management at American Military University."

Clayton has deployed twice, once supporting the Army in a joint air operations center and another time working as a traditional emergency manager. She says the latter was a great learning opportunity.



"Getting the knowledge and experience was probably the best part. It was wonderful to learn more aspects of my job in an environment where we're of course more focused on our wartime capabilities."

What advice would she give an EM journeyman or apprentice?

"Study, read the AFIs and AFMANs and know the job inside and out," she said. "I like to do things to the best of my ability. I have always strived to know as much as I can and always do the right thing, to live up to our core values."

New System Lets New Horizons CEs Build Faster

Capt. Holly Hess
8 FW/PA

Air Force civil engineers on New Horizons' construction teams recently built classrooms in Belize using a fast, stay-in-place concrete wall forming system. Training is one of the primary objectives of the New Horizons exercise, and the teams are using this opportunity to learn how to construct buildings with a different method than what they have used previously.

Three of the four classroom structures built by CEs from the 823rd RED HORSE Squadron, Hurlburt Field, Fla., were constructed using the new forming systems. Forms are a means to hold concrete in place to provide strenghth to a structure or create a desired shape or appearance.

Before deploying to Belize, 823 RHS members used the system to build a small section of wall for the Army 10th Special Forces Group project as part of a troop training project. The project provided an opportunity to compare the concrete wall forming system to building with the traditional concrete masonry unit block.

During the April 2013 New Horizon's exercise, Senior Airman Donald Johnson (center) works with U.S. Army Pfc. Christopher Dobbins, left, and Spc. Jonas Kyle to build a window frame brace for the building shown in photo above. The military construction teams are using a concrete wall forming system to construct the facility at the Trial Farm Government School construction site in Orange Walk, Belize. *(U.S. Air Force photo/Master Sgt. James Law)*

"(The new system) is a lot quicker and requires less labor than a block wall," said 1st Lt. Joseph Miller, one of the 823rd project engineers. "The concrete wall forming system consists of panels that are slid into place and filled with concrete."

Staff Sgt. Benjamin Wiest, structural supervisor from the 823 RHS, believes this method is not only quicker, but also more visually appealing.

"It is a lot faster because everything comes preassembled," he said. "It looks a lot better in the end, because you have a smooth texture finish all the way across that is already filled with concrete."

Besides fast construction and aesthetics, the concrete wall forming system also has the benefit of being as strong as a traditional block concrete building.

"When you are done, essentially you have an 8-inch thick concrete wall," said Miller. "It is a very strong building. The (concrete wall forming system) panels act as forms on the inside and outside."

Buildings constructed using the concrete wall forming system are useful in locations that need buildings constructed quickly, such as deployed locations and contingency environments.

"Block buildings will take several weeks to set up and lay all the block and get them all mortared in," said Miller. "With this system, you can ... get the pieces set up, including all the rebar and bracing, in a week, and it takes a day or so to fill it with concrete.

"This is very valuable. This is something we can all take back and hopefully have it as a viable alternative in situations where we are looking at a block building, but we are under a time crunch," he said. "We can use the forming system to get it done quicker."

For Guard and Reserve CEs:

Practice Makes Permanent

(background and left) Airmen with the Missouri Air National Guard, 139th Civil Engineering Squadron, lay concrete footings for a building at a YMCA camp in Colorado during an Innovative Readiness Program project. More than 30 Airmen from the 139th provided assistance with the construction and maintenance of various structures throughout the camp during an IRT mission, allowing them to complete Mission Essential Task Training Lists. *(U.S. Air Force photos/Senior Airman Patrick P. Evenson)*

(right) Senior Airman Dustin Fullerton completes work on a new observation tower at Grissom Air Reserve Base, Ind., as Senior Airmen Phillip Steffen and Eric Griffin assist. The Airmen are structural journeymen with the 434th Civil Engineer Squadron. Besides fulfilling a requirement for the base for the tower, the project gave the CEs hands-on practice for the knowledge and skills they need. *(U.S. Air Force photo/Staff Sgt. Andrew McLaughlin)*

In Memoriam

"I'm Having More Fun than I'm Allowed"

Rachel Zaney
AFCEC/PA

Mr. Robert M. Moore, a member of the Senior Executive Service and director of the Installations Directorate at the Air Force Civil Engineer Center at Joint Base San Antonio, Texas, passed away at his home June 2.

A self-proclaimed "dirt engineer," Moore began his Air Force career in 1983 as an environmental coordinator and project manager at MacDill Air Force Base, Fla. Moore furthered his civil engineering career at Langley AFB, Va., and the Office of the Civil Engineer at the Pentagon before his selection in 2008 as director of the Air Force Real Property Agency in San Antonio.

He is remembered as a leader, colleague and friend who constantly challenged his team to do more for the warfighter.

"Everyone knew Mr. Moore," said Tonda Sallee, the Installations Directorate executive officer. "He had the kind of dynamic personality that you couldn't ignore, even if you tried. Walking through the halls of our building, motorcycle jacket on and coffee cup in hand, he had a tendency to shout, 'How's the best agency in the United States Air Force?' just to see how enthusiastically his team would respond."

Under Moore's leadership, AFRPA evolved from an agency focused solely on base realignment and closure to the Air Force real property center of excellence.

"Above all else, Mr. Moore was passionate. He cared about the Air Force mission and all of those who supported it," said Dr. Stephen TerMaath, AFCEC's BRAC division chief. "Whether proclaiming his pride in the agency, program or individual, or challenging his team to do better today than they did yesterday, Mr. Moore always stood behind his team. It was the people, he said, that made the difference."

"You could be open with him, and he would always listen, even if he didn't agree with you in the end," said Brian Brown, the Strategic Asset Utilization division chief at AFCEC. "Mr. Moore was never too busy to pay you the attention you deserved. For a leader, that's a powerful thing."

(above) Bob Moore speaks at the Kelly AFB Whole Base Transfer ceremony December 2010 in San Antonio.
(below) Mr. Moore gathers "the troops" for a ride.
(U.S. Air Force photos)

Key Personnel Updates:

Brig. Gen. Theresa C. Carter, the Civil Engineer, was promoted to the rank of Major General on August 14, 2013.

Major Commands

Brig. Gen. Timothy Green is the Director of Installations and Mission Support for Air Combat Command, Joint Base Langley-Eustis, Va. He replaces Brig. Gen. David Howe, who retired. Brig. Gen. Green was formerly the Director of Installations and Mission Support for Air Mobility Command, Scott AFB, Ill.

Col. David Piech is the Director of Installations and Mission Support for Air Force Special Operations Command, Hurlburt Field, Fla. He was formerly the Commander, 27th Mission Support Group, Cannon AFB, N.M. Col Piech replaces Col. Van Fuller, who retired.

Mr. John H. Bonapart, Jr., is the Director, Installations and Mission Support, Air Mobility Command, Scott AFB, Ill. He was previously AMC's Deputy Director of Installations and Mission Support.

AFCEC

Dr. Marilyn C. Croach is the Deputy Director, Air Force Civil Engineer Center, Joint Base San Antonio-Lackland, Texas. She was previously the domestic policy adviser, North American Aerospace Defense Command and U.S. Northern Command, Peterson AFB, Colo. She replaces Brig. Gen. Vincent Saroni, who returned to his position as Mobilization Assistant to the Air Force Civil Engineer, the Pentagon, Washington, D.C.

Col. Anthony Higdon is the Deputy Director, Air Force Civil Engineer Center, Tyndall AFB, Fla. He was formerly the Commander, 96th Civil Engineer Group, Eglin AFB, Fla. He replaces Col. David Reynolds, who retired.

AFCEC director earns 2012 Presidential Rank Award

Air Force Civil Engineer Center Director Joe Sciabica receives the 2012 Presidential Distinguished Rank Award from Patricia Young, Air Force assistant deputy chief of staff for logistics, installations, and mission support during a ceremony at Joint Base San Antonio-Lackland, Texas, June 5. The award is the ultimate achievement in the career of a senior leader and only one percent of all senior executive service members will earn it. Sciabica was awarded for his work as the executive director of the Air Force Research Laboratory at Wright-Patterson Air Force Base, Ohio. *(U.S. Air Force photo/Jason Goode)*

24/7

Members of the 557th Expeditionary RED HORSE Squadron lay concrete for a contingency aero medical staging facility at an undisclosed location, Southwest Asia.

The photo was taken by Capt. Steve Toebben, the Future Operations Engineer for the 1 ECEG and a photographer by avocation.

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