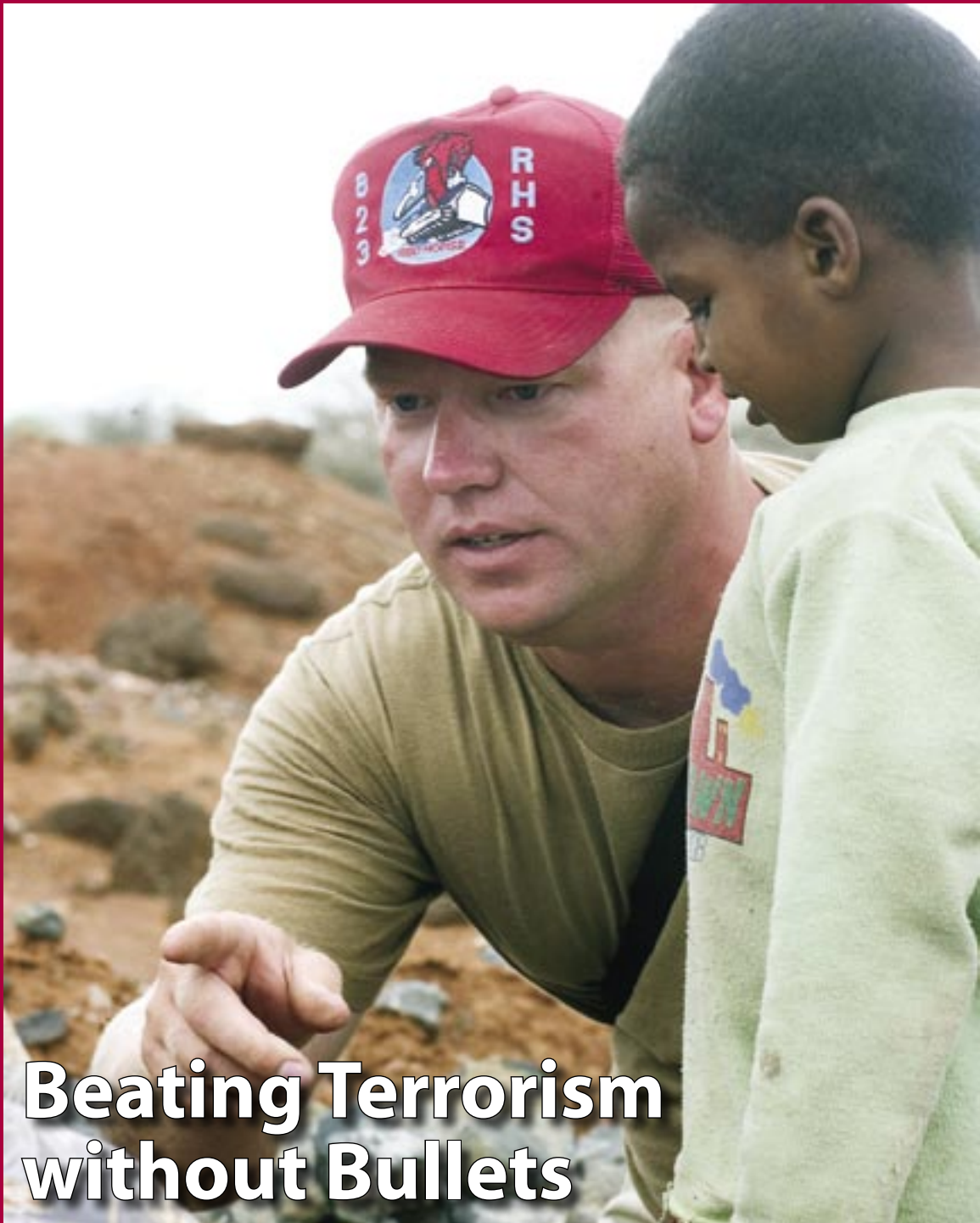


Air Force **CIVIL ENGINEER**

Volume 13 • No. 1 • 2005



**Beating Terrorism
without Bullets**

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Total Force—Supporting the Warfighter

I'm continually reminded how extraordinary our civil engineers are, day in and day out. As you repeatedly see in the media, our combat teammates are able to execute their missions, due in part to civil engineers directly supporting the war effort, maintaining bases, and providing other phenomenal support. Every day, that hard work and dedication to the mission is demonstrated, and I couldn't be more proud! As the struggle to combat terrorism continues, we must not forget this is a Total Force effort. Active, Guard and Reserve units are making a difference daily in the reconstruction of Iraq, and are also forging peace in other parts of the world.

This edition spotlights a vital component of our service, the Air Force Reserve Command (AFRC). It opens a window on some of AFRC's people and programs, key to executing important missions worldwide. One article focuses on AFRC's 'Deployment for Training' program that builds on a critical skill base in a nontraditional training environment, such as the annual joint exercise New Horizons 2005. Approximately 3,500 Army and Air Force reservists will work on projects in Central America and the Caribbean during the first half of the year. They've already rebuilt schools and clinics following devastating earthquakes in El Salvador. This "out-of-the box" method of fulfilling the annual two-week training requirement is a great way to put manpower and skills where they're needed most.

Another article in this edition highlights the superb work being done by members of the 823rd RED HORSE Squadron in support of Combined Joint Task Force—Horn of Africa (CJTF-HOA). These engineers executed over \$500K in humanitarian and contingency construction projects, including a new clinic, roads and repair work throughout the region. They also built a concrete bridge able to withstand the devastating floods in Djibouti. Winning hearts and minds in this poverty-stricken region is an effective instrument of power against the global threat of terrorism—and the 823rd was there, making it happen!

In addition to these articles, there are many others that illustrate various facets of the CE career field. We recently recognized the 2004 Civil Engineer Annual Award winners at a luncheon here in our nation's capital. A number of our CE "Founders" attended and remarked that this was a great event. I congratulate all the award winners for rising to the top among outstanding peers. The competition was fierce, but the selection committee took their time, and the best 'just stood out.' A complete list of winners is included in this edition, so if you know someone on it, give them a call or, better yet, give them a pat on the back.

I encourage you to share this magazine with your co-workers, friends and family, and spread the word about the great things our CE folks are doing around the globe. I also encourage you to submit an article for the magazine to advertise the great things you and your folks are doing at your bases.

As we move into spring, make time for family and friends, and keep safety in mind as you engage in outdoor activities. I hope to see you as I travel, and remember—keep up the great work!

L. Dean Fox
Major General, USAF
The Air Force Civil Engineer



From the Top



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**RED HORSE Rides
'Round the Horn p. 18**

Corrections to previous issue:

In the hurricane article on pg. 18-19, it was the 796th CES that worked 14-hour days, and Mr. Bobby Burns took the Eglin roof work photo.

In the Andersen AFB article on pg. 27, MSgt John Hancock took the photo.

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On the cover:
TSgt Marshall Brown,
823rd RHS, uses a lot
of hand gestures and
one-word sentences to
warn a local family to
be careful of the heavy
machinery working
the roads between the
towns of Hol Hol
and Djibouti City in
Djibouti, Africa.
(photo by MSgt
John E. Lasky)

Command Air Force Reserve

Focus Command

Ms. Teresa Hood
HQ AFCESA/CEBH



One weekend a month, two weeks a year. This standard time commitment for traditional Reserve airmen has a big impact on how civil engineers at Air Force Reserve Command (AFRC) do their jobs. “We have to be very efficient in our mission,” said Col Steven W. Zander, AFRC’s Civil Engineer.

Counting traditional reservists, AFRC ranks third among major commands (MAJCOMs) in number of civil engineer troops, behind the Air National Guard and Air Combat Command. Individual Mobilization Augmentees (IMAs) also fall under AFRC’s umbrella, and when they’re added into the mix, “We often fluctuate between second and third,” said Col Zander.

“The main difference between an IMA and a traditional reservist—aside from differing duty requirements—is in how they train,” explained Col Frank Myers, chief of AFRC’s Readiness Division. “Traditionals train with their reserve unit. IMAs back up active duty individuals, and their assigned host unit is responsible for their requirements and training.”

There’s one other difference between the two that’s becoming increasingly important in terms of force development: most traditional reservists have more base-level experience, while IMAs have more head-quarters experience. “We need to get a flow between the two for well-rounded development,” stated Col Zander. “Force development—officer, enlisted, and civilian—is one of our top priorities. We began with the smallest group, officers, but are actively working on all three.” In the past, reserve officers relied on word-of-mouth to find out what positions were available; now they can identify available positions by region or location from an online map. In the future, a development team will identify potential positions and facilitate assignments.

AFRC’s traditional reservists have been in high demand since Operations ENDURING

FREEDOM and IRAQI FREEDOM began, especially engineering assistants, officers with design capability, and those in the fire, explosive ordnance disposal, power pro, and readiness specialties. During the Air Expeditionary Force (AEF) 2 rotation, AFRC partnered with the Guard to take full responsibility for the CE mission at a forward operating location.

They’ll repeat the task in AEF 5, with one important difference: Reserve CEs will extend their “on-the-ground” deployment time to 120 days, filling a required position for the entire length of deployment rather than being rotated in for 15 days of a “time-share” position. “It’s better for everyone,” said Col Myers. “Better use of resources, better continuity, and better training.” With travel and preparation, the time away from home and civilian jobs is more likely to be 150 days for reservists. “Right now, everyone is a volunteer,” said Col Myers.

One weekend a month and two weeks a year—not surprisingly, this time commitment also affects how AFRC CEs manage and operate their facilities. AFRC has primary responsibility for 11 bases and is a tenant on 57 bases. On the primary bases, “We don’t need housing, dorms, or child development centers,” said Mr. Hilton Culpepper, AFRC’s Deputy Civil Engineer. But their troops do need lodging and AFRC CEs work hard to ensure they get it. About \$400M in construction requirements were identified after evaluating existing lodging facilities.

All of AFRC’s BCEs are civilians. Ten of AFRC’s 11 primary bases have gone through the A76 process and nine have had their base operating support turned over to civilian-only workforces. AFRC staffs only one or two full-time military positions at the 57 bases with reserve units. All of these factors mean that the bases often have to count on the command staff civil engineers to provide expertise and continuity. “We have to have a very close relationship with our bases,” said Mr. Culpepper.

"We also have a bigger input into the daily [operations and maintenance] workload than other commands," stated Mr. Edward Hilliard, the deputy director of AFRC's Engineering Division. "Our bases design their projects and then request O&M funding from us. This works better for the way we're organized and gives us a lot more mobility and flexibility." AFRC averages about \$53M in O&M annually.

Unlike the other MAJCOMs, a good deal of AFRC's O&M and military construction (MILCON) funds come directly from congressionally approved appropriations or from "inserts" into legislation. In FY2005, AFRC has close to \$124M in MILCON scheduled. Nearly \$39M of that came from inserts. Lt Col Rich Doran, chief of programming for AFRC, said, "Inserts often mean that a project slated for say, '08, has now been moved to '06 and has to be executed."

One weekend a month and two weeks a year means that AFRC must be extremely efficient to accomplish a primary part of its mission: ensuring that traditional Reserve CEs are trained and ready to go when and where they're needed.

"For our military units, the focus is training, training, training," said Col Zander. "They also have to handle any administrative or personnel duties while on station, so they have to be very, very organized." To maintain the focus on training, full-time Air Reserve Technicians have everything ready to go when a unit shows up. For their two-week duty, reserve units typically follow a four-year schedule: an operational readiness exercise, an operational readiness inspection, a deployment-for-training exercise, and a Silver Flag exercise.

This year, over 3,500 CEs are scheduled to participate in the Annual Tour/Deployment for Training program, commonly called the DFT program, during 206 deployments. "The DFT program gives our troops the opportunity to deploy off station for their 15-day annual training requirement," explained CMSgt George Hirner, AFRC's deployment manager. "They are able to get hands-on training in a real-world environment." Opportunities range from humanitarian work to military construction

projects, at bases or locations in other countries or cities, and working with the Air Force or jointly with other services (see "Keeping the 'Pieces' in Play," p. 6).

Before reporting to Silver Flag for a week-long training exercise, Reserve CEs spend the first half of their annual two-week duty at AFRC's Expeditionary Combat Support Training and Certification Center (ECS-TCC). Located at Dobbins ARB, Ga., the ECS-TCC provides training to the total force. "Classes are small—four to five people and one instructor," said Col Myers. "Our people get hands-on experience first, then reinforce what they learned in a team setting at Silver Flag."

Besides pre-Silver Flag instruction on status of resources and training system-reportable tasks, the ECS-TCC provides other schooling, including just-in-time training before deployments (task recertification/refreshers training) and individual 5-level upgrade or 7-level certifications. "One individual can go to the ECS-TCC and leave with many different certifications," explained Mr. John J. Glover, AFRC's Support Branch Chief. "Our reservists need hands-on time with equipment that we don't necessarily have on-station and, although there are many training sites, the class schedules don't always fit with our time constraints."

"It really all comes back to one weekend a month, two weeks a year," said Col Zander. "The longer I'm here, the more I realize the biggest difference between us and other major commands is time. We all have the same challenges. AFRC's time sequence management just has to be more aggressive."



Col Steven W. Zander became The Civil Engineer for Headquarters Air Force Reserve Command, Robins Air Force Base, Ga., in June 2004. He holds both bachelor's and master's degrees in architecture from the University of Wisconsin. Commissioned in 1979 through the Officer Training School, Col Zander has held a variety of positions at the base, major command and air staff levels. He oversees all aspects of civil engineering on 11 main bases and 57 tenant locations for 74,700 reservists. He also provides functional management for 39 Prime BEEF squadrons, three CE flights and two RED HORSE squadrons comprising more than 5,000 troops.

Keeping the 'Pieces' in Play

Ms. Teresa Hood
HQ AFCEA/CEBH

Every year, about 3,000 civil engineers from Air Force Reserve Command (AFRC) participate in the deployment for training (DFT) program during their 14- to 15-day required annual tour. The process of getting these traditional Air Force reservists through the DFT program is a lot like playing a board game. The objective is to successfully get the CEs from start (home station) to finish (training at another location), making required moves—checklists, approvals, matching availabilities—and dodging potential pitfalls along the way. It takes skill, strategy, a little luck, and a lot of vigilance.

“The process is a dynamic scenario from A to Z and requires constant oversight,” stated CMSgt George Hirner, AFRC/CE’s deployment manager, who’s been working at matching up Reserve units and DFT opportunities since 1999. MSgt Victor Sanicharra, AFRC’s contingency training manager, has been doing it since 1996. Both frequently put in 10- to 12-hour workdays because, in reality, making sure that Reserve CEs get the best training opportunities during their annual tours is not a game, but a serious job.

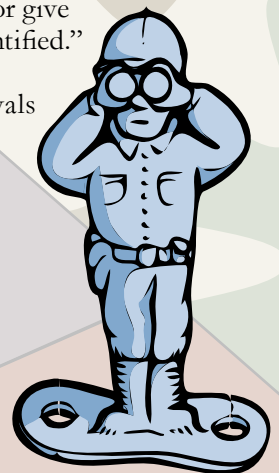
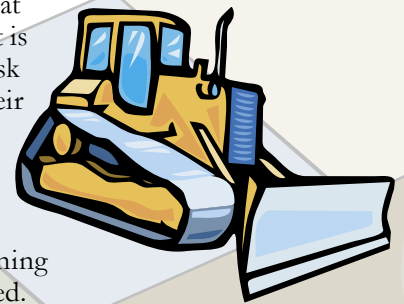
The DFT program was established to give the Air Reserve Component (ARC), which includes members of both the Reserves and the Guard, valuable, real-world training opportunities during their annual tour. “The units may opt to stay at home for ancillary training, but most of them will request a deployed opportunity,” said CMSgt Hirner. “It helps morale and the cohesiveness of the unit when they deploy as a group. The opportunities to get construction-related training for CEs at any one station are limited.”

The process begins annually by identifying and matching potential projects with CE units’ training needs. “The ARC is looking at the training value of the project. For example, what’s the skill set mix?” said MSgt Sanicharra. Projects can range from providing support for major projects at active duty major commands (MAJCOMs) to humanitarian efforts or joint exercises. Because reservists’ annual tours are already funded, host MAJCOMs and bases need only provide lodging and meals.

Every January, the Air Force Civil Engineer Support Agency (AFCEA) sends a letter to the MAJCOMS, asking them to identify any training opportunities that they might have available. At the same time, AFRC asks their units for information on their training needs. “The training manager and the commander both know what type of training and what locations their unit is looking for—we ask them to give us their top three priorities,” said CMSgt Hirner. When all the feedback is in, an initial training package gets created.

“In late May or early June, we have a meeting here at AFCEA, with representatives from the Reserve, the Guard, and all the MAJCOMs,” said MSgt Michael Beavers, Air Force Readiness Training Manager. “We’re able to resolve any conflicts, and it gives MAJCOMs the chance to bring up other projects or give details on ones already identified.”

Further checks and approvals follow. CE chief master sergeants from AFRC’s three numbered air forces



In the Deployment for Training program, moving Airmen & equipment takes a lot of planning & a little luck

will get their second look at the DFT proposals. Then the proposals are forwarded to AFRC's deployment review group, which looks at the proposals for not only civil engineering, but services, medical, and security forces, trying to marry up smaller groups to get the best use of airlift. Next, the proposals go up to a deployment review board, where they may be rejected or approved with airlift specifications: either "organic" (AFRC aircraft) only or organic with commercial back-up.

Matching airlift availability with deploying units is another challenge that requires vigilance. DFT packages approved by the review board go to AFRC's airlift allocations. "It's really like a big airlift auction," explained CMSgt Hirner, "with schedulers bartering for the missions." However, the missions aren't necessarily restricted to AFRC aircraft. Before going to the review board, missions with a high probability of approval can be programmed into the U.S. Transportation Command's single mobile system, where any MAJCOM can see and "pre-buy" the mission using their own aircraft.

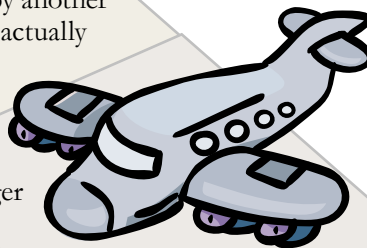
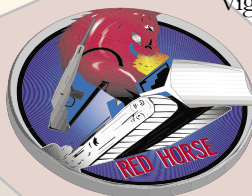
There are DFT opportunities outside of those available through MAJCOMs. "During their annual tours, our CEs may be part of joint exercises, such as New Horizons and Para Los Niños—these projects come to us from Twelfth Air Force," said MSgt Sanicharra (see "Reservists Support Joint Exercises" on p. 26). "A lot of these are initially bare-base, then school or clinic projects. Being in a different [area of responsibility] really helps get our guys prepared for readiness; it allows them to work with the other services, as well as different host nations."

AFRC's CEs may also work on an Innovative Readiness Training (IRT) project during their annual tour. All IRT projects take place in the States. "It's an 'Americans Helping America' program created by President Bill Clinton in 1996 and overseen by the secretary of Defense," said CMSgt Gilbert Taylor, AFRC's IRT program manager. In 2004, AFRC had 14 IRT projects, many of them for Native Americans.

From start to finish—from project identification to actual deployment—usually takes a year and a half; the overlap between DFT programs for one FY and the next requires vigilance and dexterity. "During execution for one year, we're in planning for the next," said MSgt Sanicharra. "There is no downtime."

There are myriad other checklists and approvals throughout the DFT process, involving such things as funding and equipment. But all the hard, careful work can be upset by another player—chance. "Until the team actually deploys, there's no guarantee it's going to happen," said CMSgt Hirner. "There could be a problem with the airlift or for some reason the unit can no longer go. Every day there's at least one if not several changes. It requires constant vigilance."

Ms. Hood is the editor of Air Force Civil Engineer magazine at Tyndall AFB, Fla.



Working Outside the Wire

Maj Marie Kokotajlo
52nd CES/CEO

Not even a pinpoint of light enters through the small opening high in the block wall of my cell. I look toward the window, boarded up tightly long ago, and I can faintly hear prayers being sung from the nearby mosque. The cold concrete floor collects sand and dust faster than I can keep it swept, but that no longer bothers me. My alarm sounds to tell me it's 0530, and soon I hear the sound of men coughing and metal doors banging open as others awake and come out of their cellblocks. So begins another day at Abu Ghraib Prison.

I command an Air Force Prime BEEF team deployed to Iraq in support of Multi-National Force-Iraq Detention Operations. Seven civil engineers (CEs) from Ramstein and Sembach ABs joined our Spangdahlem team to make a total of 60 people. After crew-served weapons* and convoy training in Kuwait, we deployed to Abu Ghraib Prison in November 2004 as 732nd Expeditionary Civil Engineer Squadron (ECES), Detachment (Det) 5. Nine of our troops forward-deployed to support the internment facility at Camp Bucca.

The prison sits about halfway between central Baghdad and Fallujah, just west of the town of Abu Ghurayb, in what's known as the Sunni Triangle.

Constructed by the British in the 1950s, Abu Ghraib Prison comprises a complex of concrete buildings spread over more than 280 acres, surrounded by a 20-foot tall concrete block wall. In early 2003, Saddam Hussein abandoned the facility, releasing all prisoners. The U.S. Army later used the prison to house Coalition detainees. Detainees are now housed in an outdoor, tented compound, and the main prison building is once again run by Iraqi Correctional Officers to house convicted criminals.

In March 2004, an Air Force CE team was configured as an Army Utilities Detachment and embedded with the Army at Abu Ghraib to operate and maintain the forward operating base (FOB) alongside a contractor team. My detachment occupies 20 cellblocks in one wing of the old prison. Roughly equivalent to a 3,000-person tent city, the detention camp requires considerable effort to operate and maintain. We enter the compounds daily to perform water operations or respond to emergency repairs. The HVAC crew learned detention operations from the inside out, and often works on heating units in close contact with known terrorists.

In his recent article (*AFCE*, Vol. 12, No. 3), Lt Col Jeff Vinger explained many of the challenges that the civil engineer, logistics readiness and security forces career fields face in this new mission for Combat Airmen. Because sustaining an FOB depends so heavily on ground transport and re-supply, our Airmen must be proficient at convoy and combat operations on the battlefield.

Abu Ghraib Prison is surrounded by communities that are still anti-Coalition. Whenever anyone leaves the prison, they are entering a war zone. My troops knew



*requires at least two people to use

from the start that they were expected to be Combat Airmen as well as engineers, conveying through unsecured areas and never hesitating to fire their weapons in defense of each other or the mission.

The Airmen carry their weapons at all times and wear protective gear whenever they aren't in a hardened facility. Only a few days after our arrival, a mortar round hit in the CE yard, scattering a dozen Airmen into the bunkers and nearby buildings; three of my Airmen received Purple Hearts.

The equipment operators and structures troops have taken work parties outside the walls to clear tons of explosion debris off the roads, repair fences, and place concrete barriers and signs that redirect traffic. Whenever they leave, my Airmen have Army or Marine gun trucks escorting them. They remain alert to threats, check for improvised explosive devices (IEDs) in their work areas, and complete their work quickly and efficiently so they can bring the convoy home. Picture this: one CE working on a forklift, while 16 soldiers with four gun trucks surround him, pointing loaded weapons outwards. When one of the prison's 1,500-pound steel tank gates was knocked off its hinges, CEs repaired it at 2 a.m., with tanks between them and the nearest houses and with a helicopter gunship circling overhead.

Re-supply and sustainment of the FOB depend on frequent convoys to a larger support base. At Abu Ghraib, convoys are combat operations, and the entire truck crew conducts pre-convoy checks: cleaning the weapons, performing ops checks, fueling the trucks, loading emergency supplies, and programming the radios. Det 5 Airmen know convoy tactics, techniques, and procedures like they know their own tool bags. During the first 60 days we were here, Det 5 sent out more than 35 work parties under heavy escort, and several times encountered small arms fire or an unexploded IED. We had a gun truck on the road 46 days, and twice our trucks narrowly missed an exploding IED.

At a minimum, Det 5 gun trucks include a driver, a crew-served weapon gunner, and a truck commander, all with weapons locked and loaded. The Airmen I've chosen to be gunners have demonstrated skill with the heavy weapon and responsible decision-making. Drivers need steady nerves and quick reactions to handle their vehicles in high-risk areas. Truck commanders choreograph the entire operation, knowing full well that they are responsible for completing the mission and bringing everyone back to the prison safely.

Det 5 sends a gun truck on convoy to Baghdad International Airport regularly, usually to pick up mail and construction materials or collect vehicle parts. My Airmen also run an escort gun truck alongside the Army and Marine trucks for the convoys that remove trash and sewage wastes from the prison. Insurgents place IEDs on this stretch of road every day, and the trick is to find them before they explode.

The Airmen of Det 5 will never be the same. They represent a whole new breed of Combat Airmen: engineering professionals with veteran combat and soldier skills. They've proven their adaptability, skill and courage in a violent combat environment, and they've learned to depend on each other, no matter the threat.

Maj Kokotajlo commands the Operations Flight, 52nd CES, Spangdablem AB, Germany, and is currently deployed to Abu Ghraib.



Above: All work outside the wire at Abu Ghraib Prison, such as moving these bunkers at the entry control point (ECP), is done under guard. Left: SrA Casey Feathers has gun duty as the vehicle enters the ECP.
(photos by TSgt José Ortizfigueroa)

What's the Score?

ACC scorecard tracks construction agents' performance

Ms. Susan Wells
HQ ACC/CEC

Air Combat Command's Construction Division (HQ ACC/CEC) manages congressionally approved military construction (MILCON) projects worth almost \$2.6 billion at any given time, so efficient execution is important. As part of ACC's Civil Engineering Directorate, the division's foremost goal is completing design and construction of top-quality major military facilities on time and within budget.

The need to control costs while dealing with increasing numbers of projects compelled the Air Force to overhaul its antiquated MILCON execution process to deliver facilities faster and more economically. In both 2000 and 2001, nearly 50% of ACC MILCON projects were not delivered to the customer on the promised move-in date. The challenge was to turn this statistic around, to deliver facilities to our users on time or ahead of schedule without large increases in costs.

To implement stricter controls of time and resources, ACC/CEC developed the ACC Agent Scorecard. This simple but very effective evaluation tool allows ACC to measure the performance of its design and construction agents, the U.S. Army Corps of Engineers and Naval Facilities Engineering Command.

Agents receive a quarterly scorecard package that includes the actual scorecard, a score summary spreadsheet and any management reports used to calculate the scores. Quarterly scores are added to agents' scorecards throughout the fiscal year, so they can see their progress and take note of improvements and concerns.

The scorecard tracks both President's Budget (PB) and Congressional Insert (CI) projects. It uses four specific categories (based on project stages), which are individually scored and compared between similar projects

within the agents' districts. Category totals appearing on the final scorecard are derived from weighted sums of individual project scores. The categories are listed below with available points for each category. Each category is weighted to reflect importance. Points are calculated by dividing number of projects that met the criteria by the number of total projects in the category. This total is multiplied by the weight.

1. Design Completion: date for PB projects is Sep. 30 FY-1; CI projects are usually designed during the year of appropriation and are not counted here. Projects designed by Sep. 30 (one year before FY-1) receive points. This category has a weight of 1.
2. Project Award: a measure of the ability to award projects. PB and CI projects are scored separately because of different goal dates: awards by Mar. 31 FY (PB) or Sep. 30 FY (CI) get points. The scores for PB and CI projects have a weight of 1. To see if projects are executable, the ratio of an agent's total current working estimate (CWE) to the sum of projects' authorized/appropriated/programmed amounts (PA) is calculated; points are given for ratios equal to or less than 97%. The CWE/PA category has a weight of 0.5.
3. Construction Placement and Cost/Schedule Growth.
 - a. Construction Placement: a measure of timeliness. For an individual project, it's the ratio of the number of days in a construction period (from notice to proceed date to beneficial occupancy date) to a set number of days determined by the current working estimate. $\leq \$5M$ (and all dorm projects) = 365 days, $> \$5M \leq \$20M$ = 540 days, $> \$20M$ = 730 days. A ratio $> 100\%$ = 0

points. This item has a weight of 1.5.

- b. Cost Growth: a measure of resource management. For a project, it's the ratio of the current working estimate (including all construction modifications) to the original contract cost at award. A ratio $\leq 105\%$ is awarded points, and a ratio $>105\%$ = 0 points. This category has a rating of 1.

- c. Schedule Growth; a measure of management ability. It's the ratio number of days in a construction period (from notice to proceed date to beneficial occupancy date) to the number of days contractually given the construction contractor, plus weather days. A ratio $\leq 110\%$ is awarded points, and ratios over 110% = 0 points. This category has a weight of 1.

4. Financial Closure: a measure of timeliness. This category looks at project closeout from beneficial occupancy date until all remaining monies are obligated and the facility has been officially accepted by the base engineer. Financial closure in 365 days or less gets points, with no points for projects that are closed after 365 days. This category has a weight of 2.

When agents score poorly, ACC/CEC is alerted and can investigate for causes. There isn't always a problem—a management decision may have been made to allow a project to miss a goal for the good of a base or the Air Force. All members of the “team” are

considered when developing an end score. The scorecards become a management tool to keep all of a project's players on the path to success.

As a result of implementing the quarterly scorecard, ACC/CEC is now building facilities with the lowest cost and schedule growth in the Air Force. More importantly, after two years of focused process improvement, we are now delivering high-quality facilities on time and within budget; 90% of them are delivered to users on or ahead of schedule, much better than our previous record of 50% being delivered behind schedule. Timely delivery of facilities to ACC's 15 bases prevents mission delays and costs associated with using temporary facilities and warehouses. Savings allow monies to be shifted to mission-critical needs on other MILCON projects in the command.

For additional information, call DSN 574-0799 (commercial 757-764-0799), or send e-mail to susan.wells@langley.af.mil.

Ms. Wells is a Construction Division program analyst for HQ ACC, Langley AFB, Va.

ACC SCORE CARD							
PROCESS	Pts	FY 2001		FY 2002		FY 2003	
		ACC PTS	ACC GRADE	ACC PTS	ACC GRADE	ACC Points	Grade
DESIGN	40	31	A	31.25	A	37.5	A
Use of P&D Funds	20	20		20		20	
Design Completion	20	11		11.25		17.5	
AWARD	50	32	A	43.33	A	42.92	A
President's Budget Projs	20	10		15		16.25	
Congressional Insert Projs	20	12		18.33		16.67	
CWE/PA Ratio	10	10		10		10	
CONSTRUCTION	70	21.43	C	28.23	C	46.23	B
Cost Growth	20	12.14		14.31		15.83	
Schedule Growth	20	9.29		8.7		14.8	
Construction Placement	30	0		5.22		15.6	
FINANCIAL CLOSURE	40	6.67	F	5.45	F	10	D
Timely Close Out	40	6.67		5.45		10	
Total	200	91.1		108.26		136.65	

This is an example of a scorecard over three fiscal years. (chart courtesy ACC)

Electrical IPT Results Published

Col York D. Thorpe
HQ AFCESA/CEO

During the six-month period from March to August 2004, there were six on-duty mishaps (Class “A” and “C”) involving civil engineer troops in the electrical career field, resulting in four injuries and two deaths.

In the last issue of *AFCE*, Maj Gen L. Dean Fox, The Air Force Civil Engineer, commented on our need for safety and emphasized that “[a] loss to one squadron is a loss to all of us.” Because of the high number of electrical mishaps in a short period of time, General Fox chartered an integrated process team (IPT) to study the electrical career field (3EOX1) with three specific objectives:

- 1) Review the current training and safety procedures to identify possible reasons for the increased mishap rates.
- 2) Analyze the shop structure and capabilities of the career field as related to the safe completion of in-garrison and deployed mission objectives.
- 3) Propose corrective actions to improve capability and to decrease mishaps.

The IPT met in early November 2004, and included subject matter experts from each major command and the 11th Wing. Representatives from several organizations, including the Air Force Safety Center, the Occupational Measurement Squadron and

the 366th Training Squadron, served as advisors in their areas of expertise.

The Air Force Safety Center provided data on Air Force-wide on-duty safety mishaps for FY 90–04. There was no definable trend for overall fatalities. During FY 00–04 the electrical career field represented 0.5% of the Air Force population, but had 9% of the fatalities (3 out of 33). Within the electrical career field mishaps, one recognizable trend was that six Class “A” mishaps (three during FY 88–93 and three during FY00–04) involved exterior electrical-related work. Comparison of the FY 00–04 safety mishaps for the 13 CE Air Force Specialty Codes showed that the electrical career field had the highest mishap rate.

After careful review and discussion of safety mishap reports for the electrical career field during FY 00–04, the IPT identified six root causes:

- Lack of shop leadership—not enforcing standards/checklists/procedures
- Lack of direct supervision
- Improper training of Airmen on the tasks that they are performing
- Limited proficiency in high-voltage procedures/equipment

High-voltage electrical work is extremely dangerous. Without safety procedures, proper training and adequate supervision, it's all too easy for electrical workers to be injured or killed. Electricians like SSgt Jason Wintersteen, 332nd ECES, Balad AB, Iraq, must be sure to de-energize and lock out equipment before performing any installation, maintenance or repair work. (photo by MSgt Jon Hanson)



- Failure of Airmen to follow basic electrical safety procedures
- Failure of Airmen to follow equipment procedures and safety standards

After reviewing training, the IPT concluded that it was difficult to keep all Airmen within an electrical shop proficient on high-voltage systems due to limited training opportunities and rotational challenges. Most Air Force electricians are generalists with very limited high-voltage experience. At home base, civilian specialists provide that knowledge, while Airmen typically learn it on the job during deployments. There was a tendency to stovepipe those Airmen with strong high-voltage skills.

The IPT noted that established safety standards, guidance, and programs do exist, but personnel may not always follow the guidance.

After analyzing shop structure, the IPT noted a disparity between home-base and deployed environments. Where a one-shop/one-supervisor setup is the standard on deployment, only 36% of home bases are set up the same way. With the limited exterior experience of Airmen going on deployment, there is a potential for an unbalanced mix of interior/exterior expertise. However, due to the length of deployments, the electricians' overall skills improve as they are exposed to a variety of tasks.

The IPT proposed several short-term recommendations to decrease electrical mishaps:

- Mandate the use of draft Uniform Facilities Criteria guidance (UFC 3-560-02, Electrical Safety)
- Validate skill levels of current military personnel (MAJCOMs should conduct staff assistance visits, focusing on supervision, training programs, quality of training, and personal protective equipment)

- Develop a CE incident reporting system that mirrors the existing fire-reporting system managed by the Air Force Civil Engineer Support Agency
- Conduct a Unit and Training Workshop (held in February 2005) to evaluate non-wartime tasks and recurring training requirements on critical tasks; to validate 5- and 7-skill level tasks and upgrade timeframes; and to develop both a training ladder for progression in the electrical career field and a community of practice
- Revise the 7-level course to include hands-on craftsmen training and electrical safety supervision

In December 2004, the IPT presented these short-term options to CE senior leaders for approval at their annual meeting, along with several possible long-term solution options. The first choice recommended realignment of the career field (interior, exterior, and controls AFSCs). The senior leaders stated that the data presented were insufficient to support realigning the career field. They directed the IPT to study further the long-term solutions and report back to the Program Review Committee. The senior leaders approved the implementation of the short-term corrective actions, directing that they be changed to "urgent fixes."

Continued injuries and deaths due to lack of training and supervision are unacceptable. We can't afford to lose any more of our CE family.

Col Thorpe is the director of Operations Support, HQ AFCESA, Tyndall AFB, Fla. He chaired the IPT examining the CE electrical career field.

Accident Categories

Class A—Fatality or permanent total disability, or property damage in excess of \$1M

Class B—In-patient hospitalization of three or more people or a permanent partial disability, or property damage of \$200K–\$1M

Class C—Absence from work or occupational injury or illness that requires permanent change of job, or property damage of \$20K–\$200K

Back to Basics for Safety

Maj Valerie Hasberry
HQ PACAF/CEOO

Have all personnel been trained on lock-out/tag-out and confined-space programs or proper equipment operation? Do they have necessary personal protective equipment (PPE) and know how to use it?

What's the status of the safety program in your squadron, flight or shop?

Do you take steps toward Operational Risk Management (ORM) just well enough to meet reporting requirements, or is it institutionalized into your organization's planning and operational processes?

When did you last review/update your AF Form 55, or those of your personnel?

If you don't know the answer to these questions, you may be contributing to the Air Force's rising number of mishaps and fatalities. In FY04 alone, the Air Force lost eight Airmen, the highest number since 1999, in on-duty fatalities. Any accidental fatality is unacceptable. The fact that they continue to happen during a period of increased focus on safety issues is truly alarming.

Do you have—and use—a current Job Safety Training Lesson Plan for your area?

In May 2000, Gen John P. Jumper, Air Force Chief of Staff, stated, "As our people's stress levels increase, so does the potential for mishaps. We've also heard so many safety buzzwords and seen so many new initiatives that, to some, safety has become cliché. Nothing could be more dangerous to our lives and our mission than such complacency."

Has a qualified instructor trained everyone on the equipment, processes & vehicles that they're required to use?

The Chief's Sight Picture of Feb. 18, 2004, also addressed safety and mishap reduction and prevention. It reminded leaders to balance risks "...against mission requirements and mitigate the risks or stop operations when those risks become too great."

Within civil engineering, our safety focus needs to stay on "high alert." Engineers may not fly aircraft, but we do operate systems and equipment that are just as unforgiving of mistakes. During the last six months of 2004, we lost two members of our family to preventable accidents, and five additional personnel suffered moderate-to-severe injuries at home stations and deployed locations. While all of the accidents were different, investigation boards identified several common areas of concern, including training, equipment, PPE, processes and organizational culture.

Improper use of equipment—often a training issue—was a factor in at least three mishaps. Multiple reports identified significant deficiencies in timing, quality and format of training. The units involved had no formal programs to address training of new personnel or training across multiple shops. Supervisors did not ensure that all personnel were trained prior to assuming duties. Where training programs did exist, they were often *ad hoc* and taught by improperly trained personnel, and were not always comprehensive enough to include training on all the equipment used by the shop. Personnel assumed they knew how to use equipment they had not been trained on. Equipment was used for purposes other than what was intended, or was operated outside of technical order tolerances.

PPE was also a major factor. In multiple mishaps, the personnel involved either failed to use PPE or used the PPE incorrectly; a lax attitude toward providing and using PPE was a common thread.

Organizational culture and the approach to core processes was perhaps the most significant factor in the majority of the incidents. We cannot accept the apparent willingness to take safety and procedural shortcuts to accomplish the mission. In both fatalities, personnel routinely took shortcuts with regards to training, procedures, equipment, and PPE.

To keep civil engineers safe, our leaders and supervisors must ensure that Airmen have the right training, tools and equipment. They must ensure that ORM is ingrained into our organizations down to the lowest functional level. Most importantly, they must nurture a culture where Airmen are trained and encouraged to constantly assess safety factors and, if necessary, halt operations to make things safe.

What kind of culture has been created and fostered in your organization?

Major Hasberry is chief of the Infrastructure Support Branch, HQ PACAF, Hickam AFB, Hawaii.

A Consolidated Approach

As with all commands, it is no small task for Air Force Reserve Command (AFRC) bases to interpret and then practically apply the almost limitless volume of current environmental, safety, and occupational health (ESOH) regulations. Add the related Department of Defense and Air Force guidance and instructions, and the challenge facing our installations is clearly formidable.

At AFRC, we want to help our installations create safe, healthy, and effective workplaces. In 2003, we instituted a consolidated approach to the assessment process. It was so successful that in 2004, we added ground safety and weapons safety program evaluations to the mix. Four separate program reviews have been combined into a single ESOH Compliance Assessment; four weeks of intense operational reviews are now one week of highly focused and coordinated activity. With a minimized inspection 'footprint,' installations are able to maintain their outstanding records of environmental compliance while still responding to real-world missions. The review teams enjoy increased efficiency thanks to better support from each base.

This consolidated assessment has increased the visibility of ESOH programs and highlighted common challenges faced command-wide. Partnering with our friends in the Safety and Surgeon General offices has transformed this into a true performance-based process. We now decisively place our command emphasis on correcting deficiencies identified during the assessments, not on tracking the number of findings.

To ensure that findings are practical (not theoretical or speculative), each is reviewed and approved by the originator, fellow team members and responsible base personnel on the day it is identified. At the end of the assessment, the team leader and the base environmental flight chief jointly review and approve each finding.

To that ensure the assessment is thorough, each base completes a pre-visit compliance questionnaire several weeks in advance.

After reviewing the responses to learn current program status, the assessment team contacts the base to set up a schedule to review and assess each shop.

Ensuring that each finding identified during the assessment is fair is the most important, and sometimes the most difficult, aspect of the entire ESOH process. Listening openly and attentively to base personnel during the shop and field assessments is key to ensuring that each finding is fair. To fully understand conditions in a shop, an office or in the field, every team member must thoughtfully look, listen and apply their experience to the conditions they observe. Careful documentation of discrepancies and concerns is also critical. At the end of the week, we leave no findings with the installation until the assessment team and the base agree that all discrepancies are accurate and fairly documented.

Ultimately, and most importantly, the success of our assessment program depends on each base and each of the various offices involved for their support and active participation, which has been outstanding.

Mr. Canfield is the ESOH Assessment Program Manager, HQ AFRC, Robins AFB, Ga.

Mr. Mark A. Canfield
AFRC/CEVQ

AFRC advocates a practical, thorough and fair approach to environmental, safety and occupational health assessments



Dumpster-diving is a common occurrence during an ESOH assessment. Surveillance of installation solid waste disposal practices is one of many key inspection activities. (photo by Mr. Chuck Jones)

What's That Ticking Noise?

Capt Joshua DeMotts
31st CES/CED

After 7 months chock full of 12-hour days, 6-day weeks, and 42 individual performance and written tests, I finally graduated from Explosive Ordnance Disposal (EOD) school. At last I understood the pride of wearing the EOD badge (affectionately known as “the crab”).

Founded in 1941 as the Naval Mine Disposal School, it was designated the Naval School for Explosive Ordnance Disposal (NAVSCOLEOD, also called EOD School) in 1955 and became the only school in the U.S. military for EOD training. All services send candidates—officer and enlisted—to this school. Since 1988, EOD School has been located at Eglin AFB, Fla., training men and women from over 70 countries in the most up-to-date methods of detecting, identifying, rendering safe, and disposing of both foreign and domestic explosive ordnance.

The EOD School is always changing with the times, but when I attended, it consisted of eight training divisions designed to send tested and proven technicians into the field to continue their learning. Day one began in the Core I division. During the three-plus weeks of Core I, we learned the science and physics of ordnance. We learned how to identify all types of foreign and domestic ordnance, from hand grenades to 2,000-pound bombs, and learned what makes each of them go bang.

Next it was on to the Demolition division, or “Demo,” where we were taught how to safely handle and employ all types of explosives found in the U.S. inventory today. Arguably one of the most enjoyable divisions, Demo culminated in a final disposal exercise where we piled up over 500 pounds of “mixed bag” conventional munitions with the purpose of “making it go away.”

The next division, Tools and Methods, exposed us

to the tools and techniques used by EOD technicians in the field. Rigorously physical, this training stresses meticulous attention to detail—the same attention to detail expected in theater operations today.

The Core II division included instruction on using the Automated EOD Publication System to quickly research any of the thousands of ordnance items catalogued in the database and select hazard and render safe information devised over the years. This division closed out with field training in proper EOD reconnaissance techniques; we learned how to safely approach, identify, and locate technical data on specific items, to prepare for later training divisions.

The Ground Ordnance Division (GOD) was next. “GOD’s Country” was halfway through the course, but the second half would be all uphill. We put to the test a basic design of the school: learning in each division builds upon knowledge acquired in the previous one. Instructors taught us foreign and domestic grenades, landmines, rockets and projectiles in great detail. This division was our first chance to take a unique problem from start to finish: incident call, witness interview, reconnaissance, publication research, exact identification, render-safe procedure, and disposal.

The Air Ordnance Division followed a successful trip through GOD’s Country. Much



the same as Ground, Air consisted of full problems in several categories: aircraft explosive hazards, guided missiles, bombs and dispenser/dispenser payloads. Almost ten weeks later, both Ground and Air were in the rearview mirror.

The Biological/Chemical division was the next stop. This three-plus week division concentrates on surviving and operating in a chemical environment and identifying chemical ordnance.

Next came the fun part: improvised explosive devices (IEDs), where we were truly challenged to think “outside

the box.” Once finished with multiple classes on today’s threats—IED design, types of explosives, and methods of initiation—each student faced possible real-world problems. During this practical phase, students ran scenarios start to finish using actual tools and techniques to safe functional (but inert) training aids in a variety of settings from buildings to vehicles.

With just over three weeks to graduation, there was one more hurdle to leap: the Nuclear Ordnance division. This mentally challenging block of instruction described the functional design of nuclear ordnance and offered

hands-on training opportunities on weapon systems employed by the Department of Defense.

Graduation came, and those still left got to pin on “the crab.” EOD School is proclaimed by instructors to be the Navy’s second-toughest tech school (behind Nuclear Propulsion), and it’s clearly one of the most challenging for the Air Force, Army, and Marine Corps. Though attrition rates have improved over the years, failure is still a very real possibility. Of 10 students sitting in day one Core, three will never wear an EOD badge, three to six will suffer some type of setback and be removed from training for varied periods of time, and only one or two will finish with their original class. It sounds harsh, but in a career field with so little room for error, only the very best will do.

Capt DeMotts commands the EOD flight at Aviano AB, Italy.



As the photos on both pages show, hands-on training is an important part of the curriculum at EOD School. (photos by SSgt Charles E. Schneidewind)



RED HORSE Rides 'Round the Horn

Capt Matthew "Scott" Stanford
823rd RHS/DEE

More than three dozen members of the 823rd RED HORSE Squadron, based at Hurlburt Field, Fla., deployed to Camp Lemonier, Djibouti, for 180 days in support of Combined Joint Task Force–Horn of Africa (CJTF-HOA). They overcame lack of quality materials, fractured infrastructure, and geographically isolated project locations to execute over \$500,000 in humanitarian and contingency construction projects across Djibouti, Ethiopia and Kenya.

Most people don't realize that the CJTF-HOA mission is part of Operation ENDURING FREEDOM, but the "fighting" is done with military training and civil-military operations rather than bullets. To help eliminate safe havens for terrorists and improve regional stability, we traveled into communities to construct schools, clinics, roads and perform other humanitarian-related projects. The CJTF identified construction needs throughout the Combined Joint Operating Area (CJOA) and used military construction teams in locations where a positive uniformed presence is required. We also provided construction services to field operating camps in the CJOA, building and improving conditions for forward-deployed missions.

We arrived in July and found conditions similar to Southwest Asia: extremely hot, with direct sunlight temperatures exceeding 130 degrees. "It was so hot you could hardly breathe," said SSgt Tobbie May, a team leader on the project. Ten crewmembers endured the Djibouti heat while working on Hol Hol Road, which leads to a village of 3,000 people, mostly ethnic Somalis and refugees. The crew constructed a 45' concrete culvert bridge, nine low-water crossings (concrete fords), and repaired 35 km of gravel road damaged during floods in April 2004. The road improvements will keep the road functional during and after flash floods. Just as important, the people of Djibouti witnessed U.S. forces improving their country's infrastructure.

None of the team members had ever worked on bridge construction before, and it was an incredible learning experience. SSgt May commented, "It feels good to build something that you know will last."

The team gained first-hand experience with a flash flood. Floodwaters rushed out of the mountains one morning, right over the still-wet concrete, ruining a week's worth

Counterclockwise from leftmost photo: SSgt Garfield Turner ensures that his load is securely strapped down (photo by MSgt John Lasky). The Magal At villagers held a celebration for the new clinic's dedication and opening (photo by the author). Before the 823rd RHS arrived, the stretch between Hol Hol and Djibouti City was 35 km of bad road (photo by MSgt John Lasky). The 823rd RHS' temporary mascot—named Billy, naturally—is ready to move into the corral the team built in Gode, Ethiopia. (photo by MSgt John Lasky). The guys couldn't decide whether to consider him "heavy equipment" or a team member (photo by the author).



of work. An SUV carrying several United Nations workers was crossing the 400' riverbed at the time. Within seconds the water was three feet high, and the vehicle and its occupants were stranded. The team jumped in to rescue the U.N. workers and retrieve their vehicle with the help a Caterpillar 966G front-end loader, preventing any injury or major damage.

Hol Hol Road was our longest project, but the majority of RED HORSE labor was concentrated in Northern Ethiopia, where we completed three construction projects in 110 days. A team of more than two dozen deployed in September 2004 to operate in a place that many of team members had never worked before: outside the base perimeter.

This team first tackled the renovation of 12,500 square feet of Ethiopian military billets for use by Alpha Company of the 1/294th Infantry (Light) from the Guam National Guard. The project supported infantry training between the U.S. forces and the Ethiopian

Army. After renovations were complete, the camp was equipped with billeting space for 50, functioning latrines, hot-water showers, a 10,000-liter water storage capability, and backup generator power. The team also installed a perimeter fence, concertina wire, a guard tower and defensive fighting positions for camp security.

During the same time period, they built a 1,000-square-foot clinic in the tiny village



RED HORSE Rides..., cont'd.



A1C Ryan Taylor checks his handiwork on a corral for herders' livestock in Gode, Ethiopia. (photo courtesy 823rd RHS)

of Magal At, Ethiopia. They provided the first-ever medical facility for the village of 100, but it is also expected to serve 500 ethnic Somalis in the area, primarily to provide a safe, clean environment for delivering babies. The entire village turned out for the dedication ceremony and celebrated with traditional Somali singing and dancing, an eye-opening cultural experience for the RED HORSE team.

Three hours' travel away, the team completed its largest and most ambitious vertical project, a 3,000-square-foot schoolhouse facility in Jijiga, Ethiopia. Led by Capt Javier Velazquez, they completed the project in an amazing 32 days—three weeks ahead of schedule. They overcame a

lack of quality construction materials, supply runs that took eight hours round trip, and often-negative attitudes from the community. However, by the time the team finished construction, that attitude had changed. Capt Velazquez noted the difference, saying, "When we first arrived, the people acted like, 'What are you doing here?' By the time we finished, people would rush out of their homes to wave at our convoys, realizing that we were there to help."

Meanwhile, 250 miles away in Southern Ethiopia, another team of RED HORSE engineers executed what was perhaps the most visible RED HORSE project in the Horn, in the city of Gode (*pronounced "go-day"*). The team renovated a 12' x 400' bridge that serves an estimated population of more than 200,000 residents and nomadic herders. The old bridge decking was severely deteriorated and had caused many animals to fall and break their legs; in a livestock-driven economy, each animal's health is vital to the nomadic herders. In less than

two weeks, the team replaced the decking and also built a great reputation for U.S. forces in the region. The following week, team members constructed a wooden corral for local herders to treat their animals. The U.S. Army Civil Affairs team will use it to conduct a Veterinarian Civic Action Program (VETCAP). VETCAPs typically treat thousands of local animals over a 3–4 day period.

RED HORSE members also conducted airfield pavement assessments in Kenya, Ethiopia and Djibouti. On one occasion, we teamed up with a detachment of combat controllers to evaluate pavement surfaces for C-130 re-supply operations to forward-deployed units.

Joining an inter-service team of Soldiers, Sailors, and Marines was a new experience for most of the RED HORSE members. We learned how the different services function and about each other's strengths. We worked regularly with Army Infantry and Civil Affairs units, and interacted with Navy and Marine staff members who operated Camp Lemonier. As the detachment officer-in-charge, my chain of command in CJTF-HOA included a Navy commander, an Army colonel, and a Marine major general.

We also interfaced with military members of several coalition partners, including Djiboutians, Ethiopians and Kenyans, who often helped with security at project and beddown sites.

Our team experienced a lot of "firsts" over the past six months: first time in Djibouti, Ethiopia or Kenya; first bridge work; first time for many working outside the wire; and first experience in a Combined-Joint environment. We're proud of the work we did, improving the lives of people in the Horn of Africa and leaving behind a positive impression of the U.S. military.

Capt Stanford is a project engineer with the 823rd RED HORSE Squadron, Hurlburt Field, Fla. He was the detachment commander during this deployment to the Horn of Africa.

The Last Alarm

On February 13, Air Force civil engineers lost one of their own in Southwest Asia. SSgt Ray Rangel, a firefighter from the 7th CES at Dyess AFB, Texas, drowned while trying to rescue Soldiers from a Humvee overturned in a canal near Tikrit, Iraq. SSgt Rangel was deployed with the 732nd Expeditionary Civil Engineer Squadron at Balad AB. Volunteers from the Iraqi Army's 203rd Battalion recovered his body at great risk to themselves.

Memorial services were held at Balad and Dyess, but many of the firefighter brethren around the world sounded the last alarm for him at noon on Feb. 16. Officials estimate that more than 3,900 active-duty fire-

fighters, countless civilian firefighters and thousands of other service members at Air Force installations around the world participated in the ceremony. Many took photos, which were assembled into a montage that was displayed at the Dyess memorial service.

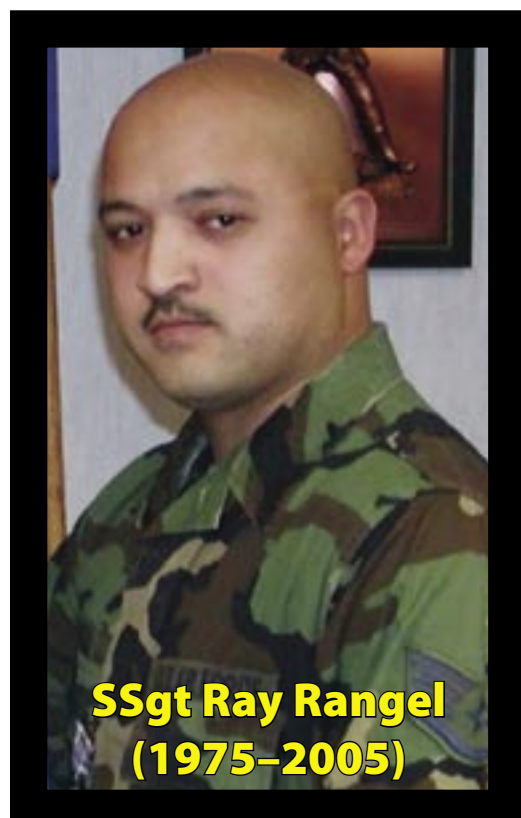
According to CMSgt Frank Levand, 332nd Engineering Operations Group, SSgt Rangel's friends and co-workers in Iraq told a few stories about him during the memorial service at Balad. Near the end of the ceremony, his fellow firefighters sounded their siren three times to signify the last alarm while a lieutenant colonel played "Amazing Grace" on the bagpipes. Then, one by one, all the

attendees, including generals, colonels, chiefs, and Army sergeants major, marched to SSgt Rangel's photo, saluted, and slowly marched out of Town Hall. At the exit, several Iraqi National Guardsmen stood at attention to honor SSgt Rangel.

"To give you an idea of what Ray meant to the friends he made, (a person can) just look at the phone log—just about every fire protection flight within the United States has called," said MSgt Tim Brown, 7th CES deputy fire chief at Dyess AFB.

SSgt Rangel leaves behind his wife, Serena, and four children.

Compiled from news stories and personal accounts.



**SSgt Ray Rangel
(1975–2005)**



A firefighter sounds the last alarm for SSgt Ray Rangel during a ceremony held at al Udeid AB, Qatar, on Feb. 16.

Doing More With Less

When CEMIRT talks about “remote control,” they don’t mean the TV

Mr. Dan Nash
AFCESA/CEMIRT

“Doing more with less” has become more than a popular catch phrase to motivate employees of corporate and government agencies. Increasingly, it’s a circumstance faced every day, especially for those who keep our military bases running. Many Air Force bases are optimizing manpower by using a tool called SCADA (Supervisory Control and Data Acquisition). SCADA is a hardware and software system that allows civil engineer personnel at a central “hub” to remotely monitor and control operational processes and equipment spread throughout a base, including sewage lift stations, standby generators, water wells, water treatment plants, and electrical substations.

For more than a decade, specialists from the Civil Engineer Maintenance, Inspection, and Repair Team (CEMIRT) at the Air Force Civil Engineer Support Agency, Tyndall AFB, Fla., have helped civil engineers install and maintain SCADA systems. In 1994, CEMIRT installed its first complete SCADA system at Howard AB, Panama, to monitor and control 12 remote standby generators, some more than five miles from the master station. An additional

system was later installed in the main base power plant, to monitor and control five 750-kilowatt generators.

At Seymour Johnson AFB, N.C., CEMIRT installed a SCADA system to monitor 25 standby generator sets and 18 sewage lift stations, including the station for the on-base Burger King (see image). The generator SCADA system provides the operators with real-time indications of voltage, amperage, kilowatts, fluid levels and temperatures, and the status of both the generator and the automatic transfer switch.

SCADA owes its beginnings to the advent of programmable logic controllers (PLCs), which were invented to replace the electrical relays used to control automobile assembly line robots and other production line machines. PLCs use “ladder logic” software similar to the relay logic used in conventional electrical controlling circuits.

PLCs were quickly applied to other commercial applications: monitoring and controlling sewage lift stations, water treatment



TSgt Christopher Jordan, a SCADA technician, tests the operation of an Allen Bradley Micrologix 1200 PLC destined for installation at Hickam AFB, Hawaii. (photo by author)

plants, and standby generator sets, and in electrical power generation, transmission, and distribution. As the functions being monitored and controlled expanded, it soon became apparent that some sort of data collection would be necessary to provide trend analysis, alarms and report generation. From these requirements, SCADA was born.

SCADA systems are increasingly being used to provide a full range of monitoring, control, trend analysis, alarm monitoring, report generation and automation. Anticipated future uses of SCADA systems include monitoring and controlling cathodic protection systems, force protection sensor systems, and perhaps energy monitoring and control systems.

CEMIRT technicians have experience in the planning, programming, installation and maintenance of SCADA systems. Currently, CEMIRT has a group of seven technicians working projects of varying sizes for Hill, Hickam and McGuire AFBs.

At Hill AFB, Utah, CEMIRT is replacing a proprietary SCADA system with a commercial off-the-shelf (COTS) system. Early SCADA systems were usually custom-designed, locking the user into costly annual maintenance contracts from a single vendor. COTS systems are more generic in terms of hardware, can be purchased from and serviced by multiple vendors at lower cost, and require only programming to be customized. When completed, Hill AFB's COTS SCADA system will monitor and control five electrical substations with 18 pad-

mounted and 14 pole-mounted high-voltage switches; there is a possibility of adding a sixth substation in the future.

At Hickam AFB, Hawaii, the SCADA project installed in February 2005 will monitor voltage, current, load, engine water temperature, engine oil pressure, breaker position, and automatic transfer switch position for eight remote generator sites.

On-screen graphic design and device programming for the McGuire AFB, N.J., SCADA project is in progress. When installed later in 2005, this system will monitor three lift stations, four base water wells, and the main base water tower. The lift stations will be monitored for pump failure, high and low alarms, and elapsed running time of the main pump. The water wells will be monitored for proper flow, pump run-time using elapsed-time metering, and an alarm to notify operators when backwash of the filtration system is due.

Customers of the HQ AFCEA SCADA team reap the benefits of using in-house expertise to get their SCADA systems. Normally the only costs incurred are equipment and installation materials. The team performs the full range of services to design, purchase and install systems that comply with Air Force requirements and are non-proprietary and easily expandable. The team is also committed to providing timely follow-on maintenance and upgrade support as base requirements change.

For more information on PLC/SCADA services, contact CEMIRT's SCADA team chief, Mr. Dan Nash, at DSN 523-4291 (commercial 850-283-4291), Tyndall AFB, Fla.



This SCADA system screen shot shows the status of the Burger King lift station at Seymour Johnson AFB, N.C. (courtesy of the author)

Fuel Cell Heats Up Fire Station

Mr. Jon K. Scudder
3rd WG/PA

Firefighters at Elmendorf AFB's Station #3 in Alaska may not look like modern-day energy pioneers, but they are, due to an innovative fuel cell project that sounds a lot like a chemistry experiment.

"The fuel cell uses electrochemical energy conversion that combines hydrogen and oxygen from the air to produce five kilowatts of electricity and enough hot water to support the firehouse," said Ms. Paula Fowler, an environmental engineer with the 3rd Civil Engineer Squadron (CES) Environmental Flight.

"The fuel cell doesn't burn anything," said Mr. Jeff Sever, a mechanical engineer with the contracting firm that installed it. "That's really the most important point of its operation. Since it has no combustion process, emissions are low, mostly carbon dioxide and water vapor; nitrogen is a minor component."

"Our project is best described as a technology demonstration. Fuel cells are still experimental in an arctic environment, and they are relatively costly. We hope our experience will promote their use in northern regions by providing data on operations in this type of environment," said Ms. Fowler.

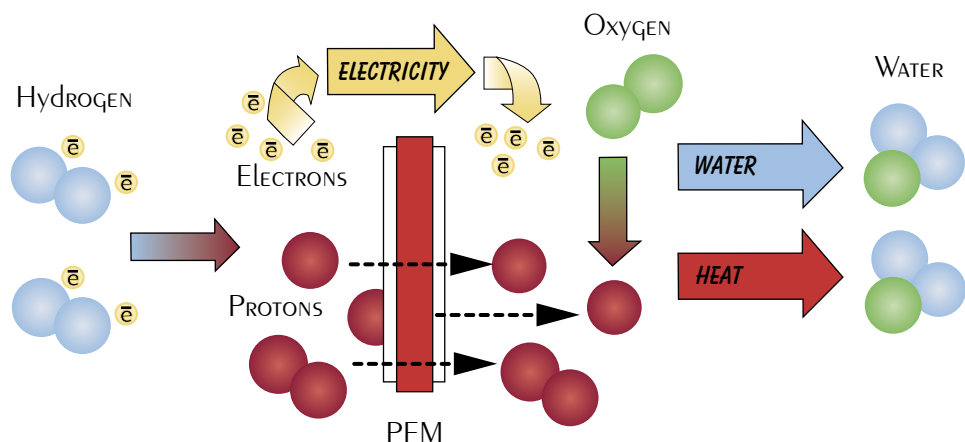
"Fire Station #3 was selected because it has a relatively continuous electrical demand, which is ideal for the fuel cell's output,"

added Ms. Fowler. "We started up the fuel cell at the end of June, and it has been running nearly flawlessly ever since." According to Ms. Fowler, periodic progress reports will fully document the experiences with operation and maintenance; energy produced; and feasibility for further implementation on base and elsewhere.

Financed by Pacific Air Forces as part of the 3rd CES's pollution-prevention program, the initiative develops new approaches for meeting Department of Defense and U.S. Environmental Protection Agency mandates for clean air. From a security perspective, fuel cells are much less prone to terrorist-related disruption because they are independent energy sources.

As for the future of fuel cell technology, Ms. Fowler said the outlook is hopeful. "When the unit costs decrease, this technology will be an economically viable option to be used for power generation. The manufacturer of our unit hopes to have its product for sale in do-it-yourself stores around the country within a few years."

The fire station's chief, SSgt Adam Martin, said the firefighters are also very pleased with the fuel cell's performance. "You would never know you are on a cutting-edge energy system. Everything runs exactly the same," he said.



This diagram shows how a fuel cell creates electricity. Electrons separated from hydrogen on the anode side of the fuel cell pass around a proton exchange membrane (PEM) through an electrical load to the cathode side, while the protons pass through the PEM. The DC power generated in the cell is converted into regulated power. The hydrogen protons combine with electrons and oxygen on the cathode side to form water. Heat is also a by-product of the process. (diagram courtesy Plug Power Inc.)

Airfield Assessment with GPR

Mr. Jon Haliscak provided a great article (*AFCE*, Vol. 12, No. 3) on the use of ground penetrating radar (GPR). Further development is underway to get this technology to our deployed civil engineers for airfield assessments.

On the Air Force CE modernization requirements list, improving pavement evaluation and expedient repair capabilities is second only to improving explosive ordnance disposal capabilities. Currently, it can take a week to do a good pavement evaluation. The vision for the future is to do an airfield assessment without putting a team on the ground, and have all the information in less than an hour.

Mr. Haliscak's article discussed many of the factors that govern the effectiveness of GPR, such as material density, electromagnetic properties, moisture content and temperature. Two other factors limit many military applications of this technology: the need for a skilled technician to operate the equipment and interpret the data, and the large size of the commercial off-the-shelf GPR equipment, which makes it difficult to deploy to remote locations.

The Air Force Research Laboratory (AFRL) is working on technology for rapid pavement assessment. Along with the University of

Florida, AFRL is focusing on these two limiting factors, trying to reduce the size of the GPR equipment as well as make it easy to use by any competent engineer or engineering assistant.

The team is placing heavy emphasis on the algorithms used to interpret the radar signatures. The figure shows two sample radar signatures; the left radar signature is what you get with today's technology. Depending on experience and whether they are working in a contingency environment, two technicians could interpret the data quite differently. Our goal is to put more of the interpretation process into the equipment, so that the end result looks like the simplified radar signature on the right and requires less interpretation by the technician.

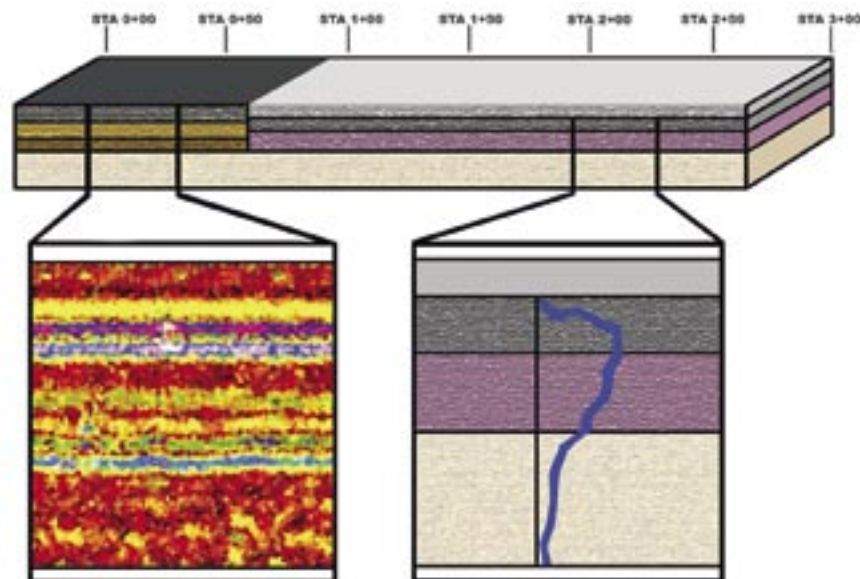
The second technology challenge is to "miniaturize" the hardware package. For now, our near-term goal is to make the assessment tools air-droppable to support the RED HORSE concept of operations.

Although GPR can be effective in showing voids and thickness of sub-grade layers, it currently doesn't provide strength data. AFRL is addressing this technology challenge for future development.

Lt Col Mellerski is a civil engineer on the staff of the Airbase Technologies Division of the Air Force Research Laboratory, Tyndall AFB, Fla.

Lt Col R. Craig Mellerski
AFRL/MLQ

Pavement surface with current radar display (left) and planned future radar display (right). (diagram courtesy of the author)



Reservists Support Joint Exercises

As part of the Deployment for Training program (see “Keeping the ‘Pieces’ in Play” on pg. 6), Air Force reservists often support joint exercises deployed for humanitarian efforts, such as the annual New Horizons exercise. The exercise is a long-term program, sponsored by U.S. Southern Command, that began in the 1980s. Originally designed for the Bahamas, Bolivia, Dominica, Guatemala, Honduras and St. Kitts-Nevis, it was later expanded to other nations.

New Horizons 2005 projects will be executed from January to June. Approximately 3,500 reservists, both Army and Air Force, will take on projects in several Central American

and Caribbean countries during their two-week annual tours. In February, Air Force reservists participated in several projects, including setting up base camp in La Mesa, Panama, and rebuilding schools and clinics following earthquakes in the San Vicente region of El Salvador.



Top: SSgt Angela Kimble, 507th CES, Tinker AFB, Okla., and Capt Heidi Gaddey, 99th Medical Squadron, Nellis AFB, Nev., level concrete for a new school's foundation in Tecoluca, El Salvador. Center, left: SrA Brandon Tenney, 349th CES, Travis AFB, Calif., works on the flooring for lodging tents in La Mesa, Panama. Center, right: SrA Joshua Reyes, 349th CES, Travis AFB, Calif., surveys the base camp area in La Mesa, Panama. Bottom: TSgt Darren Kennedy, 507th CES, Tinker AFB, Okla., uses a masonry saw to cut bricks that an El Salvadoran Army soldier (right) will use for the walls of a new school in Tecoluca, El Salvador. (top & bottom photos by SSgt Reynaldo Ramon; center photos by Mr. Miguel A. Negron)



Taking Home the Bronze

Quickness and accuracy are important when rendering safe explosive devices. MSgt Jeff Smith's ability to target needed improvements in an extremely hostile, wartime environment earned him one of the Air Force's highest honors, the Bronze Star.

"He was the one who made things happen," said SMSgt Martin Wright, 917th Explosive Ordnance Disposal Flight superintendent. "He was the guy who was putting together tactics. His leadership skills, intuitiveness, and ability to think outside the box were what kept us all working safely and effectively."

Part of a team of 12 EOD personnel—four reservists, six guardsmen and two active-duty—MSgt Smith left Barksdale AFB, La., for Iraq in November. The team's mission was to maintain safety for incoming and outgoing aircraft at the Baghdad International



Bronze Star recipient MSgt Jeff Smith prepares a safed 2,000-pound bomb for removal just outside Baghdad, Iraq. (U.S. Air Force photo)

Airport, a 35-square mile area. In addition to rendering safe improvised explosive devices (IEDs) along the roads, they also secured sites of rocket and mortar attacks, and cleaned up and disposed of unexploded ordnance.

An average day consisted of approximately 10 missions, with as many as three IEDs in one day. "We had to get

out of the peacetime mode and into the wartime mode," MSgt Smith said. "We took a couple of shots from the insurgents, and that really changed the way we did our business...fast!"

Under MSgt Smith's leadership, he and his team responded to airport runway attacks and rendered the runways safe in only 35 minutes, a task that had previously taken nearly two hours.

MSgt Smith also came up with ways to help his fellow EOD members load their vehicles with recovery robots and tools more quickly, safely and efficiently.

MSgt Smith remains humble, despite having received such a high honor. "All of our men over there did extraordinary work," he said. "If I should go back and I could pick my team, I would pick those guys. They kept me safe, out of trouble."

TSgt Sherri Savant
917th Wing/PA

Prestigious Pin-On



A promotion to lieutenant colonel is always a momentous occasion for an Air Force major. This particular pin-on, however, was a little more so than usual. When Maj Mark R. Flemming, 235th CEF, Maryland Air National Guard, deployed to Iraq to support the Army's Directorate of Public Works mission, he knew it wouldn't be possible for family members to pin on his new insignia at Tallil AB. Still, the "stand-ins" turned out to be more than adequate. After all, not many can say that they were pinned by Gen John P. Jumper, Air Force Chief of Staff, and Dr. James G. Roche, then secretary of the Air Force. (U.S. Air Force photo)

PACOM Commander's Cup

By Lt Col Roy Agustin
554th RHS/Det 1

Many in the watching crowd flinched when 20 feet of detonation cord exploded. For the 40 engineers of the 18th Civil Engineer Group (CEG), the noise was a signal to scramble from staging areas to nearby heavy equipment, ready to "Lead the Way" during the first-ever Airfield Damage Repair (ADR) Commander's Cup Competition held at Kadena AB, Japan, Oct. 25-28. Admiral Thomas B. Fargo, commander of U.S. Pacific Command

(USPACOM), initiated this annual joint engineer competition to demonstrate the Pacific Theater forces' ability to repair battle damaged runways, taxiways and aprons.



SSgt James Crosley, 18th CES, directs the dumptruck driver to pour dirt in a specific location for use during the PACOM ADR Commander's Cup Competition. (photo by SSgt Chenzira Mallory)

During the opening ceremony, presiding officer Brig Gen Jan-Marc Jouas, 18th Wing Commander, said he hoped this joint engineer competition would foster the exchange of tactics, techniques and procedures to better prepare engineers from each service for combat operations.

The 554th RED HORSE Squadron's Detachment 1 hosted this year's event at its Silver Flag Exercise Site, putting the 18th CEG engineers on their home turf. They competed against Seabees from Naval Mobile Construction Battalion 133, deployed to Camp Shields, Okinawa from Gulfport, Miss., and Marine engineers from Marine Wing Support Squadron 172, Camp Foster, Okinawa. Each team trained at the PACAF Silver Flag Exercise Site in the months prior to the competition. Twenty Japan Air Self Defense Force (JASDF) engineers, including all four JASDF Civil Engineer Group commanders, observed the four-day competition and expressed their desire to participate next year.

Engineering team readiness and ADR capability were evaluated under simulated combat conditions, with competitors wearing Kevlar helmets and flak vests. Despite secret hopes of some seasoned engineers that the 144-pound AM-2 panel mats had been replaced by lighter foreign object damage covers, operations in Southwest Asia continue to prove the utility of AM-2, thus keeping it part of this competition.

The first of three events was worth 25% of the total score and evaluated each team's command and control function to quickly and accurately assess and plot airfield damage, followed by selection of a bi-directional minimum operating strip to support fighter aircraft. The second scored event (25%) focused on crushed-stone crater repair operations. Teams had to repair two craters (30' and 50' diameters) using AM-2 and folded fiberglass mat. The final event (50%) combined the first event's tasks with repair of a 50' crater.

The competition was extremely tight, with the overall scores only six points apart. Each team took honors in individual events. The 18th CEG's engineering assistants won the first event. The Seabees took the second event, but the Airmen's solid performance there helped them maintain the overall lead going into the last day.

However, the young Marines from Camp Foster rallied in the heavily weighted third event, surging ahead to win the overall competition and the right to hold the Commanders' Cup trophy over the next year. "Considering many of the competitors only recently learned new equipment and procedures, everyone performed extremely well," said CMSgt Vincent Davis, Detachment 1's chief of operations.

Col Timothy Byers, Pacific Air Forces Civil Engineer and Executive Agent for the competition, said, "Events like this... go a long way to build closer joint and coalition teamwork among engineers."

Lt Col Agustin commands Detachment 1 of the 554th RED HORSE Squadron at Kadena AB, Japan.

Cool Idea Leads to Cold Hard Cash

Mr. Huey Moore and 2Lt Brian Desautels, 325th Civil Engineer Squadron, Tyndall AFB, Fla. shared a \$10,000 reward from the Air Force IDEA (Innovative Development through Employee Awareness) program, for saving Tyndall more than \$160,000.

Their idea involved relocating a malfunctioning liquid chiller, which chills water for the air conditioning system, from the basement of the 325th Medical Group's medical facility to a nearby unoc-

cupied building. The new location would provide easier access for maintenance on the chiller and eliminate extra time and labor required to remove two boilers surrounding the old chiller.

While this idea saved the wing a substantial amount of money and avoided mission interruption, it also benefited the innovators.

"It's just good to know that ideas to minimize our mission impact and avoid future problems are implemented," 2Lt Desautels said. "Saving

the Air Force money is great, since we need to maximize the use of taxpayers' dollars."

A1C Sarah McDowell
325 FW/PA



2Lt Desautels and Mr. Moore saved Tyndall AFB more than \$160,000 by relocating this chiller. (photo by Ms. Lisa Norman)

Senior Leaders Meet at Tyndall



The 2004 Civil Engineer Senior Leaders' Meeting was held December 13-17 at Tyndall AFB, Fla. Maj Gen L. Dean Fox, The Air Force Civil Engineer, presided over the annual meeting of major command and field operating agency Civil Engineers, with representatives from the Air Staff. The theme of this year's forum was "Transforming Our Installations" and included presentations on "Transforming Civil Engineers" and the "Lean Thinking" process. There were updates on military construction, family housing, readiness, environmental programs, and operations and maintenance, as well. *(photo by Ms. Lisa Norman)*

2004 Air Force

Along with the Air Force, the Society of American Military Engineers, the National Society of Professional Engineers and the Northeast Chapter of the American Association of Airport Executives recently announced their annual civil engineer award winners. The three organizations partner with the Air Force civil engineer community each year to sponsor the awards. The winners were honored at a ceremony in Washington, D.C., in February. Winners (highlighted in bold) and runners-up (where applicable) are listed.

Outstanding Civil Engineer Unit Award and The Society of American Military Engineers Major General Robert H. Curtin Award

Large Unit

18th CEG, Kadena AB, Japan
1st CES, Langley AFB, Va.

Small Unit

341st CES, Malmstrom AFB, Mont.

355th CES, Davis-Monthan AFB, Ariz.

Air Reserve Component

934th MSG/CE, Minneapolis-St. Paul IAP-ARS, Minn.

177th CES, Harbor Twp., N.J.

Brigadier General Michael A. McAuliffe Award (Housing Flight)

9th CES, Beale AFB, Calif.

11th CES, Bolling AFB, Washington, D.C.

Major General Robert C. Thompson Award (Resources Flight)

435th CEG, Ramstein AB, Germany

15th CES, Hickam AFB, Hawaii

Brigadier General Archie S. Mayes Award (Engineering Flight)

81st CES, Keesler AFB, Miss.

7th CES, Dyess AFB, Texas

Major General Clifton D. Wright Award (Operations Flight)

1st CES, Langley AFB, Va.

15th CES, Hickam AFB, Hawaii

Chief Master Sergeant Ralph E. Sanborn Award (Fire Protection Flight)

90th CES, F.E. Warren AFB, Wyo.

31st CES, Aviano AB, Italy

Senior Master Sergeant Gerald J. Stryzak Award (Explosive Ordnance Disposal Flight)

775th CES, Hill AFB, Utah

56th CES, Luke AFB, Ariz.

Col Frederick J. Riemer Award (Readiness Flight)

Active Duty

60th CES, Travis AFB, Calif.

1st CES, Langley AFB, Va.

Air Reserve Component

910th MSG, Vienna, Ohio

Environmental Flight Award

354th CES, Eielson AFB, Alaska

366th CES, Mountain Home AFB, Idaho

Major General Joseph A. Ahearn Enlisted Leadership Award

CMSgt Paul S. Kaplan, 60th CES/CEM, Travis AFB, Calif.

CMSgt Todd W. Barnes, 52nd CES/CEM, Spangdahlem AB, Germany

Major General William D. Gilbert Award

Officer

Maj Aaron K. Benson, HQ AMC/A7XP, Scott AFB, Ill.

Capt Steven W. McCollum, HQ PACAF/CE, Hickam AFB, Hawaii

Enlisted

SMSgt Mary B. Smith, AEF Center, Langley AFB, Va.

SMSgt David L. Cook, HQ AFCEA/CEXX, Tyndall AFB, Fla.

Civilian

Roger L. Johnston, HQ USAFE/A7CPH, Ramstein AB, Germany

John F. Krishack, HQ AFSOC/CEC, Hurlburt Field, Fla.

The Harry P. Rietman Award (Senior Civilian Manager)

Marc M. Aoyama, 15th CES/CE, Hickam AFB, Hawaii

Charles A. Rice, HQ AFCEE/IWA, Brooks City-Base, Texas

Outstanding Civil Engineer Senior Military Manager

Lt Col David H. Maharrey, Jr., 35th CES/CC, Misawa AB, Japan

Lt Col Claude V. Fuller, 62 CES/CC, McChord AFB, Wash.

Major General Eugene A. Lupia Award

Military Manager

Capt Christopher B. Meeker, 3rd CES/CEX, Elmendorf AFB, Alaska

1Lt Jay N. Haugen, 27th CES/CECNE, Cannon AFB, N.M.

Military Technician

TSgt Neil C. Jones, 375th CES/CED, Scott AFB, Ill.

MSgt Sherrie L. Lewis, 15th CES/CEOIF, Hickam AFB, Hawaii

Chief Master Sergeant Larry R. Daniels Award (Military Superintendent)

SMSgt Jacob P.E. Dunbar, 374th CES/CEOM, Yokota AB, Japan

MSgt Christopher R. May, 305th CES/CEOE, McGuire AFB, N.J.

Outstanding Civil Engineer Civilian Manager

Stanley J. Mrzygod, Jr., 92nd CES/CEO, Fairchild AFB, Wash.

Timothy Neu, 735th CES/CEUC, Ramstein AB, Germany

Outstanding Civil Engineer Civilian Supervisor

Volkmar Born, 52nd CES/CEOUH, Spangdahlem AB, Germany

Ronnie E. Creech, 88th ABW/CEMWF, Wright-Patterson AFB, Ohio

Outstanding Civil Engineer Civilian Technician

Christopher W. Roe, 375th CES/CEF, Scott AFB, Ill.

Tetsuaki Nihei, 374th CES/CEF, Yokota AB, Japan

Civil Engineer Awards

Outstanding Civil Engineer Individual Mobilization Augmentee Air Reserve Component

Officer Manager

Maj Robert D. Bowie, 113th
CES/CE, Andrews AFB, Md.

Lt Col David B. Muzzy, 75th
CEG/CC, Hill AFB, Utah

Senior NCO Manager

CMSgt Leonard Apo, HQ
PACAF/CE, Hickam AFB,
Hawaii

CMSgt Charles Warren II, HQ
AFCESA/CEOF, Tyndall AFB, Fla.

NCO Manager

TSgt Charles S. Newsome,
315th CES/CED, Charleston
AFB, S.C.

TSgt Charles D. Davis, 43rd
CES/CEOFS, Pope AFB, N.C.

Major General Augustus M. Minton Award (outstanding AF Civil Engineer magazine article)

Maj Marc R. Vandever, HQ
USAFE/A7CE, Ramstein AB,
Germany

Col Brian Cullis, OSD-
Acquisition, Technology and
Logistics, Pentagon

Outstanding Community Planner

Robert Brett James, 35th CES/
CECDC, Misawa AB, Japan

Amy R. Vandever, 435th CES/
CECP, Ramstein AB, Germany

Society of American Military Engineers (Major General James B. Newman Medal)

Col Timothy A. Byers, HQ
PACAF/CE, Hickam AFB,
Hawaii

Col Scott K. Borges, HQ ACC/
CEB, Langley AFB, Va.

Society of American Military Engineers (Major General Guy H. Goddard Medal)

Active Duty

MSgt Jerry D. Burns, 27th
CES/CEOP, Cannon AFB, N.M.

MSgt Tod E. Vanscoy, 15th CES/
CEOSE, Hickam AFB, Hawaii

Air Reserve Component

MSgt Judy L. Whidbee, HQ
AFRC/CEXO, Robins AFB, Ga.

2004 National Society of Professional Engineers Federal Engineer of the Year

Military

Capt Charles O. Kelm, HQ
USAFE/A7C, Ramstein
AB, Germany

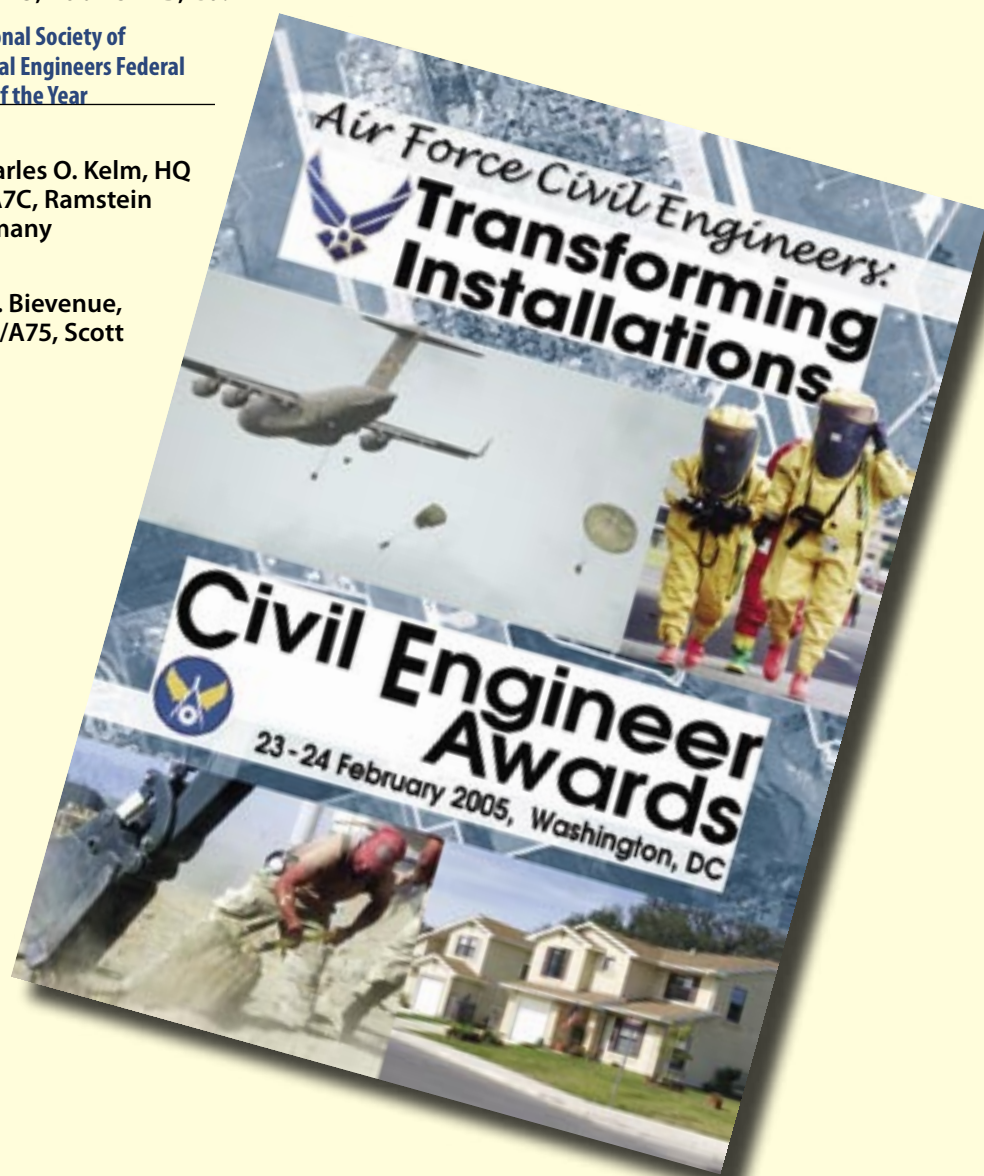
Civilian

Cheryl L. Bievenue,
HQ AMC/A75, Scott
AFB, Ill.

Balchen/Post Award (awarded by the Northeast Chapter of the American Association of Airport Executives for snow and ice removal)

3rd CES, Elmendorf AFB,
Alaska

75th CES, Hill AFB, Utah



CE Senior Officers and Civilians

Active

HQ USAF	Maj Gen Fox, L. Dean	Pentagon	The Air Force Civil Engineer
HQ ACC	Brig Gen Burns, Patrick A.	Langley AFB	Command Civil Engineer
HQ AMC	Brig Gen Eulberg, Del	Scott AFB	Director, Installations and Mission Support
AETC	Col Amend, Joseph H. III	Wright-Patterson AFB	Head, Systems & Engineering Mgmt Dept, AFIT
AETC	Col Anderson, Benjamin	Tulane University	Commander and Professor of Aerospace Studies
AETC	Col Astin, Jared A.	Wright-Patterson AFB	Dean, CE and Services School, AFIT
HQ AFCEE	Col Bartholomew, Richard	Brooks City-Base	Director, MAJCOM & Installation Support
HQ AFMC	Col Benefield, Allen J.	Wright-Patterson AFB	Chief, Programs Division
HQ AETC	Col Bird, David F. Jr.	Randolph AFB	Director of Staff, HQ AETC
AFMC	Col Blackshear, Lemoyne F.	Robins AFB	Commander, 78 CEG
HQ ACC	Col Borges, Scott K.	Langley AFB	Chief, Base Support Division
AMC	Col Brackett, James S.	Andrews AFB	Commander, 89 MSG
HQ PACAF	Col Brewer, David C.	Hickam AFB	Chief, Programs and Force Development
HQ PACAF	Col Bridges, Timothy K.	Hickam AFB	Chief, Programs Division
HQ AMC	Col Brittenham, Larry W.	Scott AFB	Chief, Plans and Programs Division
HQ PACAF	Col Byers, Timothy A.	Hickam AFB	Command Civil Engineer
AETC	Col Carter, Theresa C.	Maxwell AFB	Commander, 42 MSG
PACAF	Col Cassidy, Wilfred T.	Osan AB	Seventh Air Force Civil Engineer
HQ USAF	Col Cawthorne, John	Pentagon	Chief, Environmental Division
HQ ACC	Col Chisholm, Maryann H.	Langley AFB	Chief, Programs Division
AFMC	Col Correll, Mark A.	Tinker AFB	Vice Commander, 72nd ABW
HQ USAF	Col Corson, William M.	Pentagon	Chief, Programs Division
OSD-DO	Col Coughlan, Michael	Pentagon	Asst Deputy, Force Management and Personnel
PACAF	Col Crummett, Thurlow E. Jr. "Terry"	Andersen AFB	Commander, 36 MSG
USAFE	Col Cruz-Gonzalez, Carlos R.	Ramstein AB	Commander, 435 CEG
AETC	Col Dinsmore, Raymond E.	West Virginia Univ.	Commander and Professor of Aerospace Studies
PACAF	Col Dowling, Maria	Osan AB	Commander, 51 MSG
HQ AFCESA	Col Elliott, Gus G. Jr.	Tyndall AFB	Commander, AF Civil Engineer Support Agency
AFMC	Col Falino, Michael	Hill AFB	Commander, 75 CEG
HQ AFSPC	Col Fisher, Marvin N.	Peterson AFB	Command Civil Engineer
HQ USAFE	Col Floyd, William R. "Randy"	Ramstein AB	Vice Commander, 38 CWS
11th Wing	Col Formwalt, William A.	Bolling AFB	Director of Staff
HQ AFCEE	Col Fryer, Richard A. Jr.	Brooks City-Base	Executive Director
AFMC	Col Gaffney, Timothy P.	Eglin AFB	Commander, 96 CEG
HQ USAFE	Col Gleason, Donald L.	Ramstein AB	Chief, Environmental Division
NDU	Col Green, Timothy S.	Ft. McNair	Student
USAFE	Col Greenough, William T.	Spangdahlem AB	Commander, 52 MSG
HQ USAF	Col Griffin, Bobbie L. Jr.	Pentagon	Chief, Housing Division
HQ USAFE	Col Hartford, Stuart D.	Ramstein AB	Chief, Programs Division
HQ ACC	Col Hicks, Otis L. Jr.	Langley AFB	Chief, Operations and Infrastructure Division
HQ PACAF	Col Hoarn, Steven E.	Hickam AFB	Chief, Operations Division
HQ PACAF	Col Holland, James P.	Hickam AFB	Deputy Civil Engineer
HQ USAFE	Col Howe, David C.	Ramstein AB	Command Civil Engineer
HQ ACC	Col Howell, Richard C.	Langley AFB	Deputy Civil Engineer
HQ AMC	Col Hutchison, Michael	Scott AFB	Chief, CE Operations Division
PACAF	Col Ibanez, Juan Jr.	Kadena AB	Commander, 18 CEG
AFMC	Col Jeter, Drew D.	Edwards AFB	Commander, 95 ABW
HQ USAF	Col Kanno, Neil K.	Pentagon	Chief, Readiness & Installation Support Div.
AFMC	Col Keith, Edmond B.	Eglin AFB	Commander, 96 ABW
PACOM	Col Kirschbaum, Max E.	Yongsan Garrison	Deputy Assistant Chief of Staff, Engineer, CFC
PACAF	Col Knapp, Andrew Q.	Hickam AFB	Commander, 15 CES
HQ AFMC	Col Kopp, Robert D.	Wright-Patterson AFB	Chief, Operations Division
HQ AETC	Col Kuhlmann, Bryan L.	Randolph AFB	Chief, Programs Division
AMC	Col Lee, Irvin B.	MacDill AFB	6 MSG Commander
HQ AETC	Col Lillemon, Steven K.	Randolph AFB	Chief, Engineering Division
ACC	Col Lyon, James D.	Hurlburt Field	Commander, 823 RHS
AETC	Col Macon, Sally D.	Randolph AFB	Chief, Environmental Division
HQ AFCEE	Col Macon, William P.	Brooks City-Base	Director, Housing
AFMC	Col Martin, William H. Jr.	Kirtland AFB	Commander, 377 MSG
AFELM DIA	Col McClellan, Richard G.	Bucharest, Romania	Air Attaché Romania
USAFE	Col McElhannon, Neal B.	RAF Lakenheath	Commander, 48 MSG
HQ AFSPC	Col Medeiros, John S.	Peterson AFB	Commander, Civil Engineer Flight
HQ AMC	Col Miller, Brian L.	Scott AFB	Deputy Director, Installations & Mission Support
PACAF	Col Moes, Steven J.	Elmendorf AFB	Eleventh Air Force Civil Engineer
AETC	Col Patrick, Leonard A.	Randolph AFB	Command Civil Engineer
HQ ACC	Col Piekarczyk, Edward	Langley AFB	Chief, Readiness Division
OSD-ATL	Col Pokora, Edward J.	Pentagon	Air Force Military Liaison to Director
ACC	Col Quasney, Thomas	Nellis AFB	Commander, 820 RHS
AETC	Col Rojko, Paul M.	Cambridge, Mass.	Commander, AFROTC Det 365, MIT
ACC	Col Rumsey, Kevin E.	Langley AFB	Commander, 1 MSG
HQ AFMC	Col Saunders, William R.	Wright-Patterson AFB	Chief, E-Business Project Management

CE Senior Officers and Civilians

ACC	Col Schluckebier, Thomas J.	Offutt AFB	Commander, 55 MSG
HQ USAF	Col Scrafford, Andrew R.	Pentagon	Chief, Engineering Division
USAF	Col Seely, Gregory E.	USAF Academy	Dept. Head, Civil Engineering
PACAF	Col Shelton, Kenneth P.	Yokota AB	Fifth Air Force Civil Engineer
HQ PACAF	Col Smiley, Charles P.	Hickam AFB	Chief, Readiness Division
AETC	Col Smith, Keith E.	Luke AFB	Commander, 56 MSG
HQ PACAF	Col Sohotra, Joyce F.	Hickam AFB	Chief, Environmental Division
HQ AFMC	Col Somers, Paul W. "Wes"	Wright-Patterson AFB	Deputy Civil Engineer
HQ USAF	Col Speake, Nancy L.	Ramstein AB	Deputy Civil Engineer
ACC	Col Staib, Robert J.	Malmstrom AFB	Commander, 819 RHS
PACAF	Col Thelen, Christopher	Elmendorf AFB	Commander, 3 CES
HQ AFCEA	Col Thorpe, York D.	Tyndall AFB	Director, Operations Support
HQ USAF	Col Tinsley, Hal M.	Pentagon	Chief, Information Resources Management
USAF	Col Tucker, Douglas K.	USAF Academy	Commander, 10 MSG
HQ PACAF	Col Wallington, Cary R.	Hickam AFB	Chief, Overseas Basing Division
ACC	Col White, Arvil E. III "Bobby"	Shaw AFB	CENTAF A7 Civil Engineer
AMC	Col Wilbur, Eric J.	Pope AFB	Commander, 43 MSG
HQ AFCEA	Col Worrell, Josuelito	Tyndall AFB	Director, Engineering Support
HQ AFSOC	Col Wright, Mark D.	Hurlburt Field	Command Civil Engineer
HQ AFRC	Col Zander, Steven W.	Robins AFB	Command Civil Engineer
HQ USAF	SES Aimone, Michael A.	Pentagon	Asst DCS, Installations and Logistics
HQ USAF	SES Ferguson, Kathleen I.	Pentagon	The Deputy Air Force Civil Engineer
AFRPA	SES Halvorson, Kathryn M.	Arlington, Va.	Director, Air Force Real Property Agency
HQ AFCEE	SES Parker, Paul A.	Brooks City-Base	Director, Air Force Center for Envir Excellence
HQ AFMC	SES Pennino, James R.	Wright-Patterson AFB	Command Civil Engineer
AFMC	SES Stephens, Eric L.	Brooks City-Base	Dir, AF Inst. for Env., Safety & Occup Hlth Risk Analysis
HQ AFCEA	GS-15 Anderson, Myron C.	Tyndall AFB	Director, Installation Support
AFRPA	GS-15 Antwine, Adam G.	Kelly AFB	Acting Senior Representative
HQ AFCEE	GM-15 Bakunas, Edward J.	Brooks City-Base	Chief Program Division of Installation & Planning
HQ ACC	GS-15 Barrett, Robert C. III	Langley AFB	Chief, Environmental Division
AFMC	NH-04 Beckett, Randy L.	Edwards AFB	Chief Civil Engineer/Transportation Director
AFRPA	GS-15 Beda, Carol Ann Y.	Pentagon	Participant, Civilian Career Development Program
HQ AFSPC	GS-15 Bednar, Bryon J.	Peterson AFB	Chief, Programs Division
HQ AFMC	GS-15 Bek, David J.	Wright-Patterson AFB	Chief, Engineering Division
USSOCOM	GS-15 Bosse, Harold D.	MacDill AFB	Command Civil Engineer
HQ AETC	GS-15 Bratlien, Michael D.	Randolph AFB	Deputy Civil Engineer
AFRPA	GM-15 Brunner, Paul G.	McClellan AFB	Deputy Senior Representative
HQ AMC	GS-15 Carron, Norman R.	Scott AFB	Chief, Construction Division
AFMC	GM-15 Clark, Michael J.	Eglin AFB	Deputy Director of Civil Engineering
HQ ANG	GM-15 Conte, Ralph	Andrews AFB	Chief, Programming Division
AFRPA	GS-15 Corradetti, John J. Jr.	Pentagon	Chief, Integration Division
AFMC	GS-15 Coyle, Steven W.	Robins AFB	Director, Environmental Management, 78 CEG
HQ AFRC	GS-15 Culpepper, Hilton F.	Robins AFB	Deputy Civil Engineer
HQ USAF	GS-15 Culver, Michael A.	Pentagon	Chief, Policy & Analysis Branch, Resources Div
HQ USAF	GM-15 Daugherty, Patrick C.	Pentagon	Chief, Program Mgmt Branch, Engineering Div.
HQ AFCEA	GS-15 Day, Alvin L.	Tyndall AFB	Chief, Mechanical/Electrical Engineering Division
SAF	GS-15 Dittamo, Hector T.	Pentagon	Director, Facility Support
NDU	GS-15 Domm, Jeffrey P.	Bolling AFB	Student, Industrial College of the Armed Forces
HQ USAF	GS-15 Eng, William F.	Pentagon	Chief, Plans and Policy Branch, Programs Division
HQ ACC	GS-15 Firman, Dennis M.	Langley AFB	Chief, Construction Division
AFCEE	GS-15 Gill, Robert M.	Dallas, TX	Director, Central Region Environmental Office
AFMC	GS-15 Gray, William G.	Arnold AFB	Technical Director
AFMC	GM-15 Harstad, Richard D.	Wright-Patterson AFB	Director, Acquisition Environmental Mgt (EM)
AFMC	GS-15 James, W Robert.	Hill AFB	Director, Environmental Management
AFRPA	GS-15 Jenkins, Richard D.	Pentagon	Chief, Real Estate Division
AFMC	GS-15 Johnson, Gary K.	Wright-Patterson AFB	Director, Civil Engineer Directorate, 88 ABW
AFRPA	GS-15 Johnson, Gerald R.	Pentagon	Chief, Environmental Div/Acting Chief Program Div
AFMC	NH-04 Judkins, James E.	Edwards AFB	Base Civil Engineer
AFRPA	GM-15 Kempster, Thomas B.	McClellan AFB	Real Property Disposal Manager
HQ AFCEA	GS-15 Lally, Brian J.	Tyndall AFB	Executive Director
HQ AFCEE	GS-15 Leighton, Bruce R.	Brooks City-Base	Director, MAJCOM & Installation Support Cmds
AFMC	GS-15 Lester, Ronald J.	Wright-Patterson AFB	Director, Environmental Management, 88 ABW
HQ USAF	GS-15 Lotfi, Connie M.	Pentagon	Chief, Housing Operations Branch, Housing Div
HQ AFSPC	GS-15 Maher, Gary T.	Peterson AFB	Chief, Environmental Division
HQ USAF	GS-15 Maldonado, Rita J.	Pentagon	Chief, Resources Division
SAF	GS-15 McCann, Robert W.	Pentagon	Director of Environmental
NDU	GS-15 Mcghee, Michael F.	Bolling AFB	Student, Industrial College of the Armed Forces
AFCEE	GS-15 Mendelsohn, Clare R.	San Francisco, CA	Director, Western Region Environmental Office
HQ USAF	GS-15 Moore, Robert M.	Pentagon	Chief, Program Management Branch, Housing Div
HQ AFMC	GS-15 Munday, Karl J.	Wright-Patterson AFB	Chief, Environmental Division
HQ AFCEE	GS-15 Noack, Edward G.	Brooks City-Base	Director, Financial Mgmt and Mission Support

CE Senior Officers and Civilians

HQ USAF
HQ AMC
AFMC
AFRPA
HQ PACAF
HQ AFCEE
AFMC
HQ USAFE
AFCEE
HQ AFCEE
SAF
HQ USAFE
AFMC
HQ ANG
AFMC
AFMC

GS-15 Plockmeyer, Jamee S.
GS-15 Potter, Perry D.
GS-15 Preacher, Vicki L.
GS-15 Reynolds, Jean A.
GM-15 Ritenour, Donald L.
GS-15 Russell, Thomas C.
GS-15 Scheirman, Cathy R.
GS-15 Shebaro, Bassim D.
GM-15 Sims, Thomas D.
GS-15 Smith, Ian C.
GS-15 Smith, John Edward B.
GS-15 Thompson, John D.
GS-15 Tuss, Margarita Q.
GM-15 Vangasbeck, David C.
GS-15 Wilson, Denzil B.
NH-04 Wood, Robert W.

Pentagon
Scott AFB
Eglin AFB
Pentagon
Hickam AFB
Brooks City-Base
Tinker AFB
Ramstein AB
Atlanta, GA
Brooks City-Base
Pentagon
Ramstein AB
Wright-Patterson AFB
Andrews AFB
Kirtland AFB
Edwards AFB

Chief, Enviro Quality Br/Deputy Director Enviro Div
Chief, Housing Division
Director, Environmental Management
Program Manager, Division C
Chief, Engineering & Construction Division
Dir, MAJCOM & Installation Support—Worldwide
Director, Environmental Management
Chief, Engineering Division
Director, Eastern Region Environmental Office
Chief, Housing Privatization
Deputy to the Deputy Assistant Secretary
Program Manager, Rhein-Main Transition PMO
Chief, Engineering Division, 88 ABW
Chief, Environmental Division
Base Civil Engineer
Director, Environmental Management

Guard

MD ANG
MO ANG
CO ANG
CO ANG
HQ ANG
HQ AFCEA
FL ANG
OH ANG
MT ANG
MO ANG
HQ ANG
HQ ANG
OASD

Col Albro, William P.
Col Cole, Larry
Col Flood, Michael E.
Col Gann, Sharon M.
Col Maida, Anthony T. II
Col Norton, William E.
Col Paschal, Wallace J. "Jack"
Col Perkins, Dewey
Col Shick, Gary
Col Smith, Larry
Col Strandell, William J.
Col Stritzinger, Janice M.
Col Willert, Carl R.

Martin State Airport
Lambert IAP
Buckley AFB
Buckley AFB
Andrews AFB
Tyndall AFB
Camp Blanding
Camp Perry ANG
Ft. Harrison USA Post
Lambert IAP
Andrews AFB
Andrews AFB
Pentagon

Civil Engineering Staff Officer, 235 CEF
Operations Branch, 231 CEF
Commander, 240 CEF
Deputy Commander, Readiness, 240 CEF
Chief, Readiness Division
Reserve/ANG Advisor
Commander, 202 RHS
Commander, 200 RHS
U.S. Property and Fiscal Officer
Commander, 231 CEF
Deputy Civil Engineer
Command Civil Engineer
Deputy Director, Construction

Reserve

HQ ACC
HQ USAF
USNORTHCOM
AMC
HQ AMC
HQ USAF
HQ USAF
HQ USAF
AFRC
HQ USAF
HQ AFCEE
AFRC
HQ AFCEA
HQ AMC
HQ AFMC
AFMC
HQ AFMC
AFRC
HQ ACC
SAF
HQ USAF
AFMC
HQ AFRC
AFSPC
HQ USAF
HQ AFSOC
HQ USAF
AMC
AFRC
ACC
HQ PACAF
AFRC
AFMC
HQ AFSPC
HQ AETC
HQ AFSPC

Col Angel, Edward
Col Barnum, Wayne
Col Bednar, Bryon
Col Bonanno, Anthony
Col Bousquet, Roy V.
Col Earle, Alec
Col Fadok, Faith H.
Col Gironda, John
Col Groskreutz, Paul
Col Heigh, Martin
Col Hendrix, Lonnie
Col Hill, Brent
Col Kuhns, James E.
Col Lally, Brian J.
Col Lifschitz, Gabriel
Col Lindo, Emmanuel
Col Loomis, Paula J.
Col Mack, Francis
Col Macri, Charles L.
Col Morganti, Joseph
Col Murray, Jeffrey
Col Muzzy, David
Col Myers, Franklin
Col Ondrei, Andrew
Col Saroni, Vincent M.
Col Seitchek, Glenn D.
Col Snyder, Neil K.
Col Spahr, John
Col Stancil, Theron
Col Stringham, Steven
Col West, James
Col West, Robert G.
Col West, Stephen B.
Col Whalen, Daniel P.
Col Wilson, Robert C.
Col Zelenok, David S.

Langley AFB
Pentagon
Peterson AFB
Dover AFB
Scott AFB
Pentagon
Pentagon
Pentagon
Dobbins ARB
Pentagon
Brooks City-Base
Dobbins ARB
Tyndall AFB
Scott AFB
Wright-Patterson AFB
Hanscom AFB
Wright-Patterson AFB
Scott AFB
Langley AFB
Pentagon
Pentagon
Hill AFB
Robins AFB
Vandenberg AFB
Pentagon
Hurlburt Field
Pentagon
Travis AFB
Dobbins ARB
Nellis AFB
Hickam AFB
Carswell ARB
Robins AFB
Peterson AFB
Randolph AFB
Schriever AFB

IMA to Command Civil Engineer
IMA to Chief, Environmental Division
IMA to Base Civil Engineer
IMA to Commander, 436 CES
Chief, Reserve Affairs Division
IMA to Chief, Programs Division
MA to The Air Force Civil Engineer
IMA to Chief, Readiness Branch
Commander, 622 RSG
IMA to Chief, Contingency Plans Branch
IMA to the Director
22 AF Civil Engineer
IMA to the Commander
IMA to the Director, Installations & Mission Supt
IMA to Command Civil Engineer
IMA to Electronic Sys Command Civil Engineer
IMA to the Director of Mission Support
Commander, 932 MSG
IMA to Chief, Readiness Division
Director, Reserve Affairs
IMA to Chief, Housing Division
IMA to Commander, 75 CEG
Chief, Readiness Division
IMA to Commander, 30 CES
IMA to Readiness and Installation Support Div Chief
IMA to Command Civil Engineer
IMA to Chief, Engineering Division
IMA to Commander, 60 CES
Commander, 628 CEF
IMA to Commander, 99 CES
IMA to Chief, Readiness Division
Commander, 810 CEF
IMA to Commander, 78 CEG
IMA to Command Civil Engineer
IMA to Command Civil Engineer
IMA to Commander, 50 Space Wing

AFIT

Continuing Education

Wright-Patterson AFB OH

Course No.	Title	Off.	Start Dates	Grad Dates
MGT 570	CE Superintendent	05B/05C	16-May	27-May
ENV 418	Environ. Contracting	05B	02-May	13-May
MGT 102	Intro to BCE Organ. for Reserves	05A	02-May	13-May
ENV 531	Air Quality Mgmt.	05B	16-May	20-May
MGT 406	Housing Flight CC	05A	23-May	27-May
ENV 419	Envir. Planning, Programming & Budgeting	05C	24-May	26-May
ENG 550	Airfield Pavement Rehab. Design & Main.	05A	06-Jun	17-Jun
ENV 441	Environ. Data Quality Assurance	05B	06-Jun	10-Jun
MGT 585	Contingency Eng. Command	05A	06-Jun	10-Jun
MGT 580	CE Advanced	05B	13-Jun	17-Jun
MGT 412	Financial Mgmt.	05B	20-Jun	01-Jul
MGT 430	Ops Flight CC	05A	20-Jun	24-Jun
MGT 484	Reserves AB Combat Eng.	05A	20-Jun	01-Jul
ENG 520	Comprehensive Planning Dev.	05A	27-Jun	01-Jul

Resident courses are offered at Wright-Patterson AFB, Ohio. Registration begins approximately 90 days in advance. Students should register for CESS courses through the online registration process. Visit the CESS Web site at <http://www.afit.edu> (under Continuing Education) for satellite and Web classes.

366th Training Squadron

Eglin AFB FL

Course No.	Title	Start Dates	End Dates
J3ACP3E871 - 000	EOD Craftsman	16-May	27-May

Sheppard AFB TX

J3ARR3E453 - 002	Pest Mgmt. Recertification	16-May/13-Jun	20-May/17-Jun
J3AZR3E472 - 000	Liquid Fuels Storage Tank Supvr.	10-May	20-May
J3AZR3E051 - 003	Cathodic Protection Maint.	02-May/17-May	13-May/31-May
J3AZR3E051 - 008	Electronic Distribution Sys. Maint.	02-May/31-May	27-May/27-Jun
J3AZR3E051 - 010	BARE Base Electrical Systems	09-May/06-Jun/27-Jun	20-May/17-Jun/11-Jul
J3AZR3E051 - 012	Fire Alarm Systems Maint.	16-May/10-Jun	09-Jun/06-Jul
J3AZR3E051 - 013	Intrusion Detection Sys. I&M	16-May/13-Jun	03-Jun/30-Jun
J3AZR3E052 - 013	CE Adv. Electronics	25-May/23-Jun	22-Jun/21-Jul
J3AZR3E071 - 001	CE Adv. Electrical Troubleshooting	02-May/31-May/28-Jun	27-May/27-Jun/26-Jul
J3AZR3E072 - 002	Troubleshooting Elec. Power Equip.	19-May/27-Jun	10-Jun/19-Jul
J3AZR3E072 - 113	BARE Base Power (Diesel)	23-May/20-Jun	16-Jun/14-Jul
J3AZR3E151 - 013	HVAC/R Control Systems	23-May	27-Jun
J3AZR3E151 - 014	HVAC/R Direct Expansion Systems	28-Jun	29-Jul
J3AZR3E451 - 004	Fire Suppression Sys. Maint.	04-May/26-May/21-Jun	24-May/16-Jun/12-Jul
J3AZR3E471 - 101	BARE Base H ₂ O P&D Sys.	10-May/24-May	19-May/03-Jun
J3AZR3E472 - 001	Liquid Fuels Sys. Maint. Techs	16-May	27-May
J3AZR3E051 - 007	Airfield Appr. Lighting Cond. Discharge	02-May/06-Jun	11-May/15-Jun
J3AZR3E050 - 001	Civil Engineering Work Estimates	02-May/06-Jun	20-May/24-Jun

Gulfport MS

J3AZP3E351 - 001	Low Slope Roofing M&R	02-May/06-Jun	12-May/16-Jun
J3AZP3E351 - 002	Fabricating Welded Pipe Joints	16-May	27-May
J3AZP3E351 - 003	Metals Layout, Fabrication and Welding	01-Jun/21-Jun	20-Jun/11-Jul

Ft. Leonard Wood MO

J3AZP3E571 - 003	Engineering Design	02-May	13-May
J3AZP3E971 - 003	Adv. Readings	23-May/20-Jun	27-May/24-Jun
J3AZP3E971 - 005	NBC Cell Operation	23-May/20-Jun	27-May/24-Jun
J3AZP3E571 - 004	Construction Surveying	16-May/06-Jun/20-Jun	27-May/17-Jun/01-Jul
J4OST32E3D - 000	FSTR Mobile Training Team (MTT)	09-May/20-Jun	13-May/24-Jun

Indian Head MD

J5AZN3E871 - 001	Adv. Access and Disablement	09-May/31-May/20-Jun	20-May/10-Jun/01-Jul
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Additional course information is available at <https://webm.sheppard.af.mil/366trs/default.htm> or <https://etca.randolph.af.mil>. Students may enroll on a space-available basis up until a class start date by contacting their unit training manager.



SrA Matthew Nerat uses an acetylene torch on one of his many projects. He and other 374th Civil Engineer Squadron Airmen at Yokota AB, Japan, build, maintain and repair facilities for the Air Force's Western Pacific airlift hub. They also provide engineering, fire protection, environmental planning, housing and utilities for a 1,750-acre base and 12 satellite installations totaling 2,251 acres. *(photo by MSgt Val Gempis)*