Building USAF 'Expeditionary Bases' for Operation ENDURING FREEDOM-AFGHANISTAN, 2001-2002*

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Shortly after the horrific 11 September 2001 attacks, the United States found itself fighting a war in Central Asia for which it lacked adequate forward basing. For the first three months of Operation ENDURING FREEDOM-AFGHANISTAN (OEF), the dearth of forward bases required the US to rely heavily on Navy assets and Air Force long-range bombers to deliver the vast majority of ordnance against enemy targets. By the spring of 2002, however, US Air Force (USAF) civil engineers and support personnel had made great strides toward remedying the situation, providing 'expeditionary bases' for US and coalition combat air forces to put 'bombs on target.'[1]

On 30 September 2001, the US Secretary of Defense Donald H. Rumsfeld's Quadrennial Defense Review [QDR] Report outlined the new American defense posture that actually pre-dated the attacks of 11 September. Acknowledging a "new strategic environment" encompassing "particularly anti-access and area-denial threats" whereby US forces may not be able (or permitted) to operate from certain forward areas, the report called for a global reorienting of US forces. Significantly, of the four initiatives, two of them concerned development of bases in regions beyond Western Europe and Northeast Asia, the theaters of primary interest during the Cold War. Accurately predicting the very thing the USAF has done in the three years since '9/11,' these two initiatives deserve to be stated in full:

> Develop a *basing system* that provides greater flexibility for U.S. forces in critical areas of the world, placing emphasis on *additional bases* and stations beyond Western Europe and Northeast Asia.
>
> Provide sufficient mobility, including airlift, sealift, prepositioning, *basing infrastructure*, alternative points of debarkation, and new logistical concepts of operations, to conduct expeditionary operations in distant theaters against adversaries armed with weapons of mass destruction and other means to deny access to U.S. forces.[2]

In the two and one-half years from October 2001 to early 2004, US combat operations in Afghanistan and Iraq depended heavily on what may be termed unofficially 'expeditionary bases' initially located *around*, and as operations progressed, *within*, those two countries.[3] The development of such a "basing system" and "basing infrastructure"—the very thing called for in the pre-9/11 QDR—represents the largest undertaking of its kind in such a short period by the US military since World War II. By no means an exhaustive treatment of that effort, this study offers an initial, unclassified, look at selected bases established by the USAF for operational use in OEF. At the same time, it points out several doctrinal issues related to expeditionary basing that the USAF should address. One significant ad hoc change that has not yet been incorporated into doctrine took place in February 2002. In recognition of the growing engineering effort

involved in building-up expeditionary air bases—as well as to mirror the organizational structure at US Central Command (CENTCOM)—US Central Command Air Forces (CENTAF) Commander, Lt Gen T. Michael Moseley, transferred the CENTAF Civil Engineer function from the 'A4 Logistics' directorate to 'A7 Installations.'[4]

Air Force Doctrine Document [AFDD] 2-4.4, Bases, Infrastructure, and Facilities (dated 13 Nov 1999) provided the doctrinal basis for the present study. AFDD 2-4.4 defined "Forward Operations Bases (FOB)" as follows:

> Forward operations bases range from bases that are *usually austere with little or no infrastructure to some that are well developed*. Usually, these bases are minimally maintained with limited support capabilities. Within this category are en route support bases, forward operating locations, bare bases, and forward arming and refueling locations. The worst case is a bare base, defined as a site with a usable runway, taxiway, parking areas, and a source of water that can be made potable. It must be *capable of supporting assigned aircraft*; providing landing/recovery surfaces; and providing sufficient space for other mission essential features such as a logistical support and services infrastructure composed of people, facilities, equipment, and supplies. A bare base requires mobile facilities, utilities, and support equipment that can be rapidly deployed and installed, and be available to transform—virtually overnight—underdeveloped real estates into a survivable, operational airbase.[5]

Despite adopting the term 'expeditionary,' this study reflects the above definition in that the bases discussed herein range from "austere" to "well developed." Noteworthy, too, is the fact that of four types of locations specifically identified within the FOB category (above), three of them implicitly do not require the capability to support "assigned aircraft." Only the fourth type—a "bare base"—must be "capable of supporting assigned aircraft." A bare base, therefore, constitutes a "worst case" FOB in terms of the engineering effort required. A fifth type of base included under the FOB category, the "well developed" base, is not identified by a specific term but clearly represents something better than a bare base.[6]

The USAF experience in Southwest Asia a decade earlier served as a useful reference point for this study. In April 2002, the Headquarters Air Combat Command (ACC) Civil Engineer and A7, Brig Gen Patrick A. Burns, compared the basing challenges of OEF with those of Operation Desert Shield/Desert Storm in 1990-91. In the earlier conflict, Burns noted, "we deployed . . . to big Saudi bases, with big airfields, brand new runways, brand new shelters, and lots of capacity. Billeting, feeding and the supply routes were the things that had to be worked."[7]

But in 2001, the general continued, "it was dramatically different":

We had two sets of conditions. We had bases that were undersized—adequate runway, but way undersized [in terms of] parking and fuel and virtually no billeting capacity—on the Arabian Peninsula, and then we had bases in the '-stans' that were old, deteriorating, decayed, or even bombed-out (in the case of Afghanistan itself), with virtually no industry, no construction

capability, little utilities, little expansion [potential]. So, we had two very different kinds of bases.[8]

Within about six months of 9/11, the US established 12 bases in and around Afghanistan and significantly upgraded a number of other installations, mostly on the Arabian Peninsula. The present study focuses on seven bases falling under one of the two categories Burns described and mentions a variety of issues, challenges, and accomplishments. In the '-stans,' the bases are Shahbaz (Jacobabad) in Pakistan, Khanabad (K2) in Uzbekistan, Manas (Ganci) in Kyrgyzstan, and Kandahar in Afghanistan. On the Arabian Peninsula, it addresses the build-up at Al Udeid in Qatar, Masirah in Oman, and Al Dhafra in the United Arab Emirates (UAE). Taken together, the varied experiences of USAF personnel, many of them civil engineers, in building expeditionary bases for OEF demonstrated great resourcefulness in grappling with unforeseen difficulties, tenacity, and ultimately, significant contribution to the mission of putting 'bombs on target.'[9]

Building Expeditionary Bases in the '-stans'

As noted, General Burns addressed the challenges of deteriorating bases and lack of infrastructure in building bases in the '-stans.' Burns observed that in late 2001 and early 2002, in addition to the desert climate "we had . . . the challenge of the harsh mountain area, cold temperatures, harsh winter months, snow removal—a whole new ball of wax." The general's comments described Manas (Ganci) in particular. Among the other major expeditionary bases, Shahbaz—a classic bare base—was the worst location for environmental and health issues; aircraft and operators deployed before Base Operating Support (BOS) at a couple of sites, including Khanabad (K2); and the challenges the Air Force faced in assisting the Army were evident at Kandahar. Following is an overview of these four '-stan' bases.[10]

Shahbaz (Jacobabad) Air Base (AB), Pakistan

Following the 9/11 attacks and the identification of Al Qaeda as the perpetrator, US military planners began preparations for a retaliatory strike. The Taliban regime in Afghanistan supported Al Qaeda in various ways and thus its downfall became the first objective in the US response. Unlike in Europe, Southwest Asia, or Northeast Asia, however, the US lacked bases within easy reach of the landlocked Central Asian country of Afghanistan. Planners faced the challenge not only of finding bases from which strike aircraft could operate but that also could support special operations fixed- and rotary-wing aircraft and combat rescue helicopters. Despite the presence of pro-Taliban, Islamist groups in his own country, President Pervez Musharraf of Pakistan offered the US basing rights at several locations. The largest and most important of these was the Pakistani air base at Jacobabad, Shahbaz AB. Designed as an F-16 base with hardened aircraft shelters, and located 300 miles southeast of Kandahar, Afghanistan, the base was within reach for USAF Special Operations Forces (SOF) and Combat Search and Rescue (CSAR) assets staging from within the CENTCOM Area of Responsibility (AOR).[11]

As occurred at other locations, and not in accordance with doctrine, "iron flowed before BOS [base operating support]." That is, aircraft and operators deployed before the engineers and the support personnel that were required to establish a forward base. By 29 October when USAF civil engineer Maj Jeff Perham arrived at 'J-bad'—as Jacobabad was dubbed—there was already

a problem of "standing raw sewage" just outside the main hangar that housed some 400 deployed SOF members. Lacking support personnel to set up the latrines that comprised part of the USAF deployed housekeeping package known as "Harvest Falcon" (only a portion of those assets had arrived), the Americans were using toilets in a 'lean-to' attached to the hangar that flowed to a Pakistani-style septic tank. The tank soon reached its capacity, and sewage began coming through the stack vents. The situation made for a serious health hazard heightened by the presence of malaria mosquitoes feared to carry encephalitis. One of Perham's first actions was to spread lime on the affected area and cover it with dirt, thereby helping to decontaminate the area as well as diffusing some of the odor. Lt Col Allen B. Robinson, whose Ohio Air National Guard (ANG) civil engineer squadron arrived in November and performed the bulk of the beddown, added larvacide donuts to reduce the mosquito population.[12]

Unfortunately, raw sewage and mosquitoes were not the only health hazards at J-bad. By late October 2001, US personnel were suffering the effects of contaminated water. As Major Perham stated,

Our primary water source was an overhead fill stand outside the US compound, and before we got a water truck we were using the fire trucks to grab 1,000 gallons at a time and put it in various bladders. . . . but . . . weren't chlorinating them. When I got there, the entire population had a rash from bathing in water that was obviously contaminated. There was fecal coliform in the water, so everyone had a red rash around their elbows and joints.[13]

Perham credited TSgt Dave Keeley, an extremely knowledgeable 'RED HORSE' "water guy," with identifying the problem and starting to chlorinate [treat] the water. Keeley set up the Reverse Osmosis Water Purification Unit (ROWPU), tested the now-chlorinated [treated] water, and, according to Perham, "it was fine."[14]

Contamination issues notwithstanding, the greatest single challenge to the US 'beddown' was the need to raise the site's elevation by about two feet. At one time, the area surrounding J-bad had been rice fields. Although roadways in the area were elevated, surrounding fields had poor drainage and consisted of a deep, silty mud. Local Pakistani Air Force leaders were very accommodating and offered the Americans a site not requiring much 'fill' work (i.e., gravel), but it was located near the base perimeter, making it a security concern. Close to 200,000 Pakistanis lived outside J-bad, some of whom were pro-Taliban in sentiment. Prudently, the US leadership wanted to reduce the Americans' visibility on the base and thus selected a beddown site that, although more secure, required twice as much build-up in elevation as did the other.[15]

Little did the Americans realize the limited 'fill' capacity of local contractors. Major Perham estimated a need for 1,200 loads of fill based on 5-cubic yard trucks for the initial beddown—and that was only for one Harvest Falcon set designed for 1,100 personnel. The contract was awarded through the American Embassy in Islamabad and a few days later the fill material was ready "to start flowing." Perham explained:

We were expecting a dozen trucks or so on the first day. . . . about 6:00 pm, when it was dark, the runner came from the Pakistani liaison cell and said our trucks were there. . . . We went out to the gate and there was *one* truck, and it looked like a circus truck. . . . It was not a dump truck

in any way.[16] Two guys with shovels off-loaded that one truck. The next day we got another truckload during the day, so I took a photograph of the side of the truck with all the ornamentation. . . . I put it on a PowerPoint slide and sent it to [Lieutenant] Colonel [Dave] Nelson. I said, 'Sir, this shows you what our problem is. We need 1,200 loads of fill. Yesterday we got one; today we got one. This is the capability.'[17]

Differences related to economics, culture, or both, contributed to the frustrations of the Americans. When US officials rented additional vehicles and attempted to turn them over to the contractor for hauling the gravel, they were told that Pakistani law required tasks to be accomplished in a way that provided employment for the maximum number of people. They would not be permitted to take advantage of the trucks to increase efficiency. Despite all the challenges, ten days later the contractor had increased his gravel deliveries to 15 trucks a day. Lieutenant Colonel Robinson, who served as deputy base commander as well as the Base Civil Engineer (BCE), recalled that J-bad eventually was receiving "50 or 60 trucks a day." Little by little, the American beddown site at J-bad, took shape—and supported SOF and CSAR operations by USAF assets as Operation Enduring Freedom unfolded in Afghanistan.[18]

Khanabad (K2) Air Base, Uzbekistan

Even before 11 September 2001, CENTCOM Commander Gen Tommy Franks, USA, had expressed his interest in general terms in the air base at Karshi Khanabad to Uzbekistan's President Islam Karimov. Khanabad AB, or K2, was a former Soviet fighter base built in the 1950s; MiGs still sat idle in its bunkers. As the US planned its response to the 9/11 attacks, however, K2's strategic value rose; it was located only 300 miles northwest of Kabul, Afghanistan, relatively close in comparison to the distances USAF aircraft soon would be flying on combat sorties. In early October, US Secretary of Defense Donald Rumsfeld traveled to the capital, Tashkent, to meet with the Uzbek president. In a press conference two days prior to the start of OEF, Karimov and Rumsfeld announced that Uzbekistan would allow overflight by coalition humanitarian aircraft and the use of its bases by "cargo planes" and (combat) search-and-rescue helicopters.[19] Secretly, Karimov had also agreed to allow US special operators to stage out of Uzbek bases, the foremost of which was K2 located in the southern part of the country. The special operators were to work with the friendly Northern Alliance against the Taliban in Afghanistan.[20]

With the start of OEF coming only days after the decision to allow US forces to operate from K2, confusion regarding the build-up and opening of the base was not surprising. In fact, responsibility for 'Base Operating Support' (BOS), in concert with the problem of operators deploying before support personnel, became the foremost issue that frustrated US personnel. BOS responsibility entailed everything from tents, food, and sanitation to setting up work areas and providing electricity, base security, and fire protection. In the initial planning for OEF, the Army was to provide BOS, and some 600 soldiers of the Army's 10th Mountain Division did comprise the first large contingent of US personnel to arrive at K2. But just as OEF was beginning, CENTCOM shifted BOS responsibility from the Army to the Air Force. Suddenly, the USAF's 16th Special Operations Wing (16 SOW) was responsible for 'bedding down' the entire US force at the base, which was mostly Army. Adding to the shock was the fact that rather than setting up deployed bases, Air Force Special Operations Command (AFSOC) units were

accustomed to being the tenants at the exotic locales they frequented. The 55-member civil engineering 'lead' team from Hurlburt Field, Florida, was augmented with 25-member 'follow' teams from Minot and Eglin AFBs and an 18-member contingent from Holloman.[21]

Illustrative of the problems faced in early October, when Col Rick Parker, the Headquarters AFSOC Civil Engineer, arrived, was the single toilet shared by 600 soldiers and the total lack of support personnel to organize the small corner of the base the Uzbeks had granted for the Americans' use. Accordingly, in early 2002, General Burns ranked K2 as the second most challenging "classic bare base" that the Air Force established for OEF—mainly because 'Shooters' "flowed in before the support"—support for which the Air Force became responsible only at the 'last minute.' One problem with shooters arriving too soon was that civil engineers were unable to provide sufficient fire protection for early flying operations. Fortunately, there were no mishaps highlighting that issue.[22]

Another problem that may have been exacerbated by the confusion surrounding BOS was probably due to hazardous waste materials left by the Soviets a decade earlier. In October 2001, Uzbek contract workers preparing the tent city site came down with flu-like symptoms, including headaches and vomiting. In response, the US deployed environmental specialists to conduct sampling. Although they concluded that it was safe to build and live at the site as long as the underlying soil wasn't disturbed in the process of construction, the experience was unsettling.[23]

To its disadvantage, the 16 SOW had not been a participant in building the overall deployment package known as the 'TPFDD' and consistently lacked notification on the expected airflow into the base.[24] Lt Col Timothy Boone, the 16th Civil Engineer Squadron's Commander who deployed from Hurlburt in early October, described the airflow challenge at the outset: "We never knew day-to-day what was coming [on C-17 aircraft from Turkey]. It was just, 'Go open the plane and see who comes out, what comes out, and then we'll react. Make sure we've got enough tents to cover them all.'"[25]

For a time, the Army's 'Force Provider' deployed housekeeping kits dominated the C-17 airflow into K2. Partly for that reason, tent-building became the primary task for the civil engineers. For weeks, the base population continued to climb until reaching at least 3,500 in January 2002. Air Force personnel accounted for only one in seven. But not only did USAF engineers erect their own service's 'Harvest Eagle' tents, they also put up the Force Provider tents, a requirement that produced some grumbling among USAF personnel. Lieutenant Colonel Boone, the de facto BCE at K2, kept the tent crews focused: "It was pretty much asking them to step back, not looking at the fact that it was an Army tent or an Army mission, and really take a look at the bigger mission. Ultimately we're still helping the guys down range kill terrorists." Erecting the Army's tents brought additional challenges, however, such as how to procure enough fire-extinguishers, light sets, and heaters. Force Provider lacked such items, requiring the purchase of nearly "every fire extinguisher in the country's capital," according to Colonel Parker. In any case, the tent-building was daylight work only, because the base was blacked-out nightly in support of special operations missions in northern Afghanistan.[26]

Lieutenant Colonel Boone found that especially at a classic bare base like K2, leadership could make a significant difference in the troops' morale. In the early days of the deployment, during

the hectic build-up period, he held two formations daily. The first was held shortly after daybreak, in which Boone outlined the engineering tasks for the day. Although off-days were non-existent and alcohol and most other amusements unavailable, he adopted a simple policy that paid off in terms of morale. He recalled,

[W]hat I started doing right away was having the formation an hour later on Saturday and Sunday, kind of like a weekend of sorts. I thought it was no big deal, but it was huge. It gave them something to look forward to on Saturday and Sunday—hey, we get an extra hour of sleep or can have a relaxing breakfast. . . . Just something. Simple things like that become very big in an environment like that. It kind of brought some normalcy back into our lives, more like the routine they're used to back [home].[27]

Shortly after returning home in early 2002, Boone rightly expressed pride in the work his deployed civil engineers had done in about 100 days. "It was rough when we got there," he recalled, "a dust bowl with nothing, in the middle of nowhere. When we left, it was in good shape. . . . We improved the quality of life for folks there."[28]

Manas (Ganci) Air Base, Kyrgyzstan

During the first three months of OEF, the US lacked fighter bases within a reasonable distance of targets in Afghanistan. While beginning negotiations with neighboring countries for forward bases, the US had to rely on long-range bombers and carrier-based naval forces to deliver 90 percent of the munitions against the enemy. Two months into the war, the governments of Kyrgyzstan and the US reached an agreement whereby the Americans would be permitted to establish a coalition air base at Manas International Airport, located outside the capital of Bishkek. A former Soviet heavy bomber base, Manas had an excellent 13,800-foot runway and was the most modern commercial airport in Central Asia, with good taxiways, main parking area, and lighting. Under the agreement, the airport would remain open for its roughly ten daily scheduled flights, but coalition forces would be allowed to conduct fighter, cargo, refueling, CSAR, and humanitarian sorties as part of OEF. Sweetening the deal for the Kyrgyz Government was the fee of $5,000 to $10,000 the US agreed to pay for each transport aircraft landing and $1,000 for every truck entering the base.[29]

Located at the same latitude as Boston, and at 2,000 feet above sea level, Manas was the northernmost of the expeditionary bases the US established in late 2001 and early 2002. Weather conditions there presented a different challenge for the Americans than at other locales in the region. Lt Col Kevin Rumsey, who deployed from Seymour Johnson AFB, N.C., in late December and served as the BCE at Manas for three months, emphasized his engineers' accomplishments in the cold temperatures:

Our guys . . . [built a tent city for 2,200 personnel] in the dead of a Russian winter. It was freezing cold; it would reach temperatures below zero frequently the first four weeks we were there. We were able to work through the challenges of freezing pipes and freezing boilers and diesel fuel that gelled and wouldn't flow through the heaters. . . . To me, that's a major accomplishment. That's the most significant one. And we were able to do that, for the most part, within 30 days.[30]

The lowest recorded temperature during the deployment was minus 17 degrees Fahrenheit. Although one 9-inch snowfall caused concern, most snows melted quickly and were not much trouble.[31]

Fortunately, unlike the experience at Shahbaz and Khanabad, USAF civil engineers deployed to Manas prior to the arrival of operational aircraft and crews. Well aware of the 'iron before BOS' phenomenon that challenged the tent-city builders elsewhere, Lieutenant Colonel Rumsey observed that at Manas, "We were very fortunate. . . . We actually had civil engineers laying things out correctly"—a fact the deployed 376th Air Expeditionary Wing Commander, Brig Gen Christopher A. Kelly, recognized and appreciated. Lacking any base-assigned aircraft for weeks, it appeared that Manas had been "out-prioritized" by other stations in the AOR. Taking advantage of the opportunity to work other issues, USAF civil engineers and support personnel used the delay to set up not only living tents and a dining facility—a much-appreciated part of the Army's Force Provider deployed housekeeping package—but also a gymnasium, post office, chapel, and recreation center. Kelly was pleasantly surprised with the tents' concrete-flooring. The engineers devised "a system of little plastic tents" that could be placed over the freshly poured concrete and then cured by means of portable heaters. The general noted with approval, "15,000 square feet [of concrete] poured in the middle of January. I don't think the temperature ever got above freezing. That concrete is still holding up."[32]

Another major difference from other bases was the coalition nature of the deployment. On 16 December 2001, the first 'chalk' of 86th Contingency Response Group (CRG) personnel arrived on a C-17 from Ramstein AB, Germany, with the intent of preparing the base for some 60 aircraft consisting of USAF F-15Es, Marine Corps F/A-18s, French Mirage 2000s, and KC-135s and C-130s from several coalition countries. An initial survey prior to the main body's deployment concluded the airfield could support a large force, including the F-15s, but a later, more thorough assessment proved otherwise. For one thing, a disagreement between the Kyrgyz International Airline and the airport authority over who owned a main building, taxiway, and parking area prevented the Americans from leasing those areas. Eventually, based on the availability of aircraft parking areas—perhaps an unexpected limiting factor—there were 21 aircraft assigned to Manas: six Marine F/A-18s, six French Mirages, four KC-135s from France and Australia (two apiece), and five C-130s from NATO nations. Thus, ironically, General Kelly found himself in the unlikely position of running an Air Force base with an active runway that had no USAF aircraft assigned to it![33]

The presence of coalition aircraft and personnel created its own logistics challenges. Lieutenant Colonel Rumsey observed, "[W]hen you have fighters and cargo aircraft and refuelers, as well as French fighters . . . You've got to have different maintenance buildings, and . . . office buildings, and then we had Australian tankers and French tankers, and they didn't want to work together." In the end, the same functions did work together, but maintenance facilities remained at a premium.[34]

The base at Manas was unique in several respects, but the one that will be remembered years from now was the name the Americans gave it: Peter J. Ganci, Jr. Air Base. Ganci was the New York City Fire Department Chief who perished on 11 September attempting to save the lives of others at the World Trade Center. An 86th CRG member had read an article about Ganci's

heroics and suggested naming the base for him. When the 86th's Public Affairs Officer contacted Fort Hamilton, New York, she unknowingly telephoned down the hall from where Ganci's brother, Army Reserve Col Daniel Ganci, worked. The providential contact hastened the process of obtaining the family's approval for naming the base in honor of the fallen fire chief. In early 2002, General Kelly planned to visit the Ganci family in New York to present them with a flag that had flown over Ganci AB. As the BCE, Lieutenant Colonel Rumsey also served as the Fire Marshal. Rumsey recalled the flag-folding ceremony at Ganci prior to the trip: "It was very emotional, and it was quite a thrill to be the Fire Marshal at an Air Force base that was named after a firefighter."[35]

Kandahar Air Base, Afghanistan

In November and December 2001, US/Coalition and Northern Alliance forces gained control of almost all of Afghanistan, including Kabul, driving the remaining Taliban forces into isolated enclaves or across the border into Pakistan. As friendly forces gained ground, they began opening airfields to provide logistical support to the troops and support humanitarian airlift to needy Afghanis. Previously, CENTAF had identified Kandahar AB, located in southeastern Afghanistan, and Bagram AB, outside Kabul, as two key airfields to be opened. Preliminary airfield pavement evaluations indicated both fields were suitable for C-17 and C-130 airlift operations. Bagram became the Air Force 'hub' for Afghanistan operations, Kandahar the Army hub. Additionally, Kandahar was to be the site of the main Taliban detainee facility in the country.[36]

Interestingly, the airfield at Kandahar had been built by an American company around 1960 to support USAF U-2 reconnaissance flights over the Soviet Union. The runway was 10,000 feet long and 150 feet wide. During the 1980s, the Soviets had used the field and maintained it during their tenure. But since then there had been little, if any, upkeep of the airfield. The shells of burned-out Soviet helicopters remained beside the runway. Then, at the start of OEF, US aircraft bombed the field and rendered most of the runway unusable. Unlike other expeditionary bases the US established in the '-stans,' in Afghanistan CENTCOM assigned BOS to the Army Forces Central Command (ARCENT). And with BOS came responsibility for airfields.[37]

Despite the Army's 'owning' the Afghanistan bases, the Air Force assisted in areas in which their sister service lacked expertise. A prime example was Explosive Ordnance Disposal (EOD) at airfields. The acknowledged experts at clearing land mines, the Army's EOD teams also were knowledgeable of many types of ground ordnance. The Air Force, however, had the expertise at clearing airfields and on various types of air-dropped munitions. Furthermore, USAF EOD teams possessed specialized robots and vehicles for airfield clearing operations that the other services lacked.[38]

As the Americans began operations at Kandahar, SMSgt Robert C. Hodges, the Headquarters CENTAF EOD Program Manager, on several occasions offered his service's EOD assistance to ARCENT for clearing the airfield there. An Army combat engineer estimated that during the 1980s the Soviets had placed roughly eight million mines and unexploded ordnance (UXOs) around Afghanistan. At Kandahar, and elsewhere, the only safe practice was for personnel to walk on the pavement at all times unless following a path over the ground that had been cleared

and carefully marked. Hodges noted ruefully, “We were trying to get people into Kandahar after a couple of recommendations [to ARCENT] that we had equipment that could help, and we had people who could definitely help. The Army wasn’t interested.” Only after one individual there was injured by a mine did ARCENT request assistance. Headquarters CENTAF deployed six personnel with two of its All-Purpose Remote Transport System (ARTS) robots that featured a mini-flail system as well as a specially armored ‘Hummer’ mounted with a 50-caliber Barrett rifle platform. Both systems were designed specifically for airfield clearing operations; the Hummer was employed for Standoff Munitions Disruption (SMUD) operations that lessened the risk to EOD personnel.[39]

The USAF EOD team spent a week at Kandahar in clearing operations that proceeded without incident. One problem encountered was that the ground around the airfield was so hard that it actually broke the ARTS’ flail, but “the ARTS robots themselves operated flawlessly.” An interesting aspect was working with a Norwegian demining team that operated a heavy flail using logging chains. The Americans performed the UXO clearing work, detonating hundreds of pieces of ordnance. Then the Norwegians used the heavy flail for the demining part of the operation; it proved very effective “at tearing the ground to pieces.”[40]

Besides EOD support, the Air Force provided other types of assistance at Kandahar. Lt Col Lawrence C. Gray II, who arrived at Kandahar on 26 December 2001 and commanded the Air Force’s Tanker Airlift Control Element (TALCE) there, described the runway surface as “very fragile,” with only about six inches of dried-out concrete, “and the C-130s when they landed were crumpling it. So the airfield was getting destroyed even as we were using it.” With the Marines running the base initially, US Navy ‘Seabees’ civil engineers had deployed there and employed dirt compaction methods that allowed 10-12 C-130 landings per night. The Seabees’ work was a stopgap measure that required repairs to be accomplished daily. When the Seabees left, Army engineers came in. By that time, Lieutenant Colonel Gray had Air Force civil engineers on hand who worked closely with their Army counterparts in performing longer-lasting, concrete repairs on the heavily damaged runway.[41]

In addition to the USAF providing early fire protection and an Emergency Airfield Lighting System (EALS) at Kandahar, Gray assessed his Aerospace Ground Equipment (AGE) mechanics as his “most valuable guys” in that particular deployed environment. Power production was a major concern at the base and generators were the lone source of electricity. Lieutenant Colonel Gray recalled, “Those [AGE] guys are unbelievable [in] what they can do to keep the power running. . . . [They] not only worked on our generators, but they worked on Marine generators . . . [and] on Army generators,” providing heating, air conditioning, and meeting other mission essential requirements.[42]

In perhaps the most dramatic incident at Kandahar, AGE personnel responded under base blackout conditions to an Army CH-47 Chinook that experienced an in-flight emergency. Flying a low-level mission on night vision goggles, the helicopter crew had struck an unexpected “wall of sand” that damaged the landing gear and ramp. Worse still, a crewmember had been thrown from the aircraft and was hanging by a strap. Alerting the base of their predicament, the CH-47 limped back to Kandahar. Meanwhile, AGE personnel “built up four pallets like a cradle in a blacked-out environment” for the helicopter to set down upon—which it did—since it was feared

the landing gear might collapse upon a normal landing. Although the dangling crewmember fell to the ground near the runway, breaking a leg and being knocked unconscious, Air Force Security Forces personnel quickly found him, administered CPR, and transported him to the hospital.[43]

Upgrading Bases in Southwest Asia

For most of the 1980s, the US military presence in Southwest Asia consisted mainly of "small Navy offices in . . . Bahrain, an Air Force contingent training Saudi Arabian military forces," and supply warehouses in Oman and other Gulf States. After the Gulf War (1990-91), the US built or largely financed no less than 12 bases in the region. As described earlier by General Burns, the Headquarters ACC Civil Engineer, the result of the build-up in the 1990s was that by 9/11 the US enjoyed bases on the Arabian Peninsula that had adequate runways but were "way undersized" in terms of parking, fuel, and billeting—a very different set of conditions than in the '-stans.' In the three bases described below—Al Udeid in Qatar, Masirah in Oman, and Al Dhafra in the UAE—some of the very issues mentioned by General Burns precipitated major USAF civil engineering projects in support of OEF.[44]

Al Udeid Air Base, Qatar

Although the airfield at Al Udeid pre-dated 9/11, military analyst John Pike described its condition as of September 2001 as "nothing more than a runway and a field of sand covered by two-dozen tents and a few warehouses." Col Steven F. Maurmann, who deployed as the 366th Air Expeditionary Group Commander at the base, added: "There was no POL here, there was no billeting here, there was no anything." That bleak description soon changed, however, and dramatically so. The US and Qatar had planned for a long-term build-up of the base, but the attacks by Al Qaeda accelerated that process. Civil engineers from the 366th Civil Engineer Squadron (366 CES) at Mountain Home AFB, Idaho, commanded by Lt Col Richard B. Stonestreet, combined with a 36-member bare base team from Holloman AFB, New Mexico, to construct most of the 150 tents and "Ops Town" facilities.[45]

As the building started in early October, the 823rd RED HORSE Squadron (823 RHS) was diverted from a planned deployment to Masirah AB, Oman, to construct a huge, concrete parking ramp at Al Udeid. The actual construction period was from November 2001 to April 2002. Among the many impressive civil engineering projects accomplished after 11 September in support of operations in Afghanistan and, later, Iraq, the Al Udeid ramp ranked second only to a slightly larger ramp project at Al Dhafra AB (built later in 2002).[46] The $9.1-million military construction (MILCON) project consisted of a 17-football-field-sized ramp with taxiways, shoulders, and lighting. One of the largest pavement construction projects in RED HORSE history, the ramp provided flightline space for over 100 aircraft. At 15,000-feet, the runway at Al Udeid was the longest in the region. The ramp's addition confirmed the base as one of the best and most modern in Southwest Asia. At the same time, it demonstrated the American commitment to the Qatari Government, which in recent years had become a critical US ally.[47]

In October, while civil engineers built the Ops Town and Tent City at Al Udeid, work had also begun on a new Combined Air Operations Center (CAOC). The second in the region,

the CAOC at Al Udeid was intended as the alternate facility in CENTCOM, in case the primary CAOC at Prince Sultan AB, Saudi Arabia, 'went down' for any reason. Daytime temperatures in October could exceed 110 degrees Fahrenheit, a condition that favored working at night as much as possible. Sadly, on the night of 10 October, Air Force civil engineer MSgt Evander E. "Andy" Andrews, died in a forklift accident while unloading equipment from the bed of a truck. In his honor, Al Udeid's Tent City was named "Camp Andy." Although USAF civil engineers did not engage the enemy directly, their jobs were hazardous nonetheless; and they had suffered the Americans' first loss of life in Operation ENDURING FREEDOM.[48]

Building facilities and raising tents at the base presented other challenges, too. First, the Advance Echelon (ADVON) team for Al Udeid was not allowed access to the base for several days following its arrival at Doha, Qatar. When the ADVON finally gained access, the US population had increased considerably, placing a burden on civil engineering and other support personnel. Second, as occurred elsewhere, the operators arrived at the deployed location at almost the same time as support personnel—especially personnel and contracting specialists—and that precluded setting up required facilities ahead of the operators' arrival. For a time, there was little else for operators and support personnel to do besides putting up tents. Third, Qatari officials denied to the Americans the use of preferred real estate on base, thereby requiring extensive grading in some areas. TSgt Clayton Peters, the 366 CES site development chief, noted, "We had to do a substantial amount of grade work just to make the ground level, flat, and drainable so we could start building on it." Finally, the scheduling of an Islamic Conference in Doha meant that for political reasons the KC-10 tankers there had to be relocated to Al Udeid well before the base was ready to receive them in terms of POL, communications, and life support. By early 2002, besides the KC-10s the base also supported KC-135, F-16, and JSTARS aircraft.[49]

But in terms of civil engineering, the ramp project was the biggest story at Al Udeid. It was the first time that RED HORSE had used a slip-form paver, "a piece of machinery that allows the team to put concrete down without having to use forms"—an advantage resulting from the paver's extruding a stiffer-than-conventional concrete with a low slump ratio. The paver also put in 69,000 tie bars that held the slabs together, thereby saving more than 30 mandays. RED HORSE engineers found the project rewarding. As SrA Tim Buckley stated after 150 days of deployed service, "The Air Force mission is flying. We've built something that will be a vital part of that mission for years and years to come."[50]

Masirah Air Base, Oman

Located on Masirah Island 15 miles off the coast of Oman, the air base had been used by the Americans since the 1970s. In April 1980, Masirah was the last staging base for the tragic hostage rescue attempt at 'Desert One' in Iran. A year later, the Omani Government—one of the strongest US allies among the Gulf States—signed an access agreement with the US providing for three pre-positioning sites and the use of three air bases. In 1991, American/coalition forces used Masirah as a staging base for operations against Iraq. Later in the decade, the American presence there was reduced to a US Navy P-3 maritime patrol detachment. Early in 2001, the US Congress approved Military Construction authorization for a huge runway and taxiway repair project at Masirah. For that reason, the 823rd RED HORSE Squadron (823 RHS) was scheduled to deploy there in October.[51]

The 11 September attacks changed the plan, however. Instead of deploying to Masirah, most of the 823 RHS moved to Al Udeid AB, Qatar, to apply the unit's experience with airfield construction and design to the ramp project needed there. Although the 823 RHS still provided a team to do taxiway lighting and contingency ramp projects at Masirah, the $18-million runway project was delayed until the fall of 2002 when the 819th/219th Expeditionary RED HORSE Squadron (ERHS) deployed from Malmstrom AFB, Montana. In the fall of 2001, however, civil engineers from a number of other units deployed to the island base. The 2nd Civil Engineer Squadron at Barksdale AFB, Louisiana, sent the first group, including Maj Edwin H. Oshiba who served as deployed Base Civil Engineer (BCE). Oshiba led a 55-member 'Prime BEEF' 'lead' team, arriving very early, on 24 September. Within about ten days, 25-member 'follow' teams from Dyess AFB, Texas, and Whiteman AFB, Missouri, had arrived. Other personnel flowed in after that, from various active duty bases such as Luke and Moody and ANG stations in Pennsylvania and Indiana. In all, according to Major Oshiba, at least 22 different bases were represented at Masirah.[52]

In the hectic fall of 2001, Masirah's geographically diverse engineer force set up three tent cities. Oshiba recalled his initial tasking was for a single 1,800-person tent city. Tent City #1 took seven to ten days. Then came word that 2,200 more personnel were to deploy there. In just 60 hours, engineers set up 150 tents comprising Tent City #2. In mid-October, the base was told to expect another 2,000 members, but with some personnel re-deploying from Masirah by that time, engineers 'only' had to put up tents for another 1,400 personnel in the third tent city. But while the number of deployed Americans increased steadily—Masirah became the most populated bare base in the theater—the actual mission at the base remained "very fluid." As the mission evolved, Masirah became a refueling support base for fighters and bombers flying sorties over Afghanistan. It also supported 16th Special Operations Wing classified missions, including AC-130 Spectre gunships and a SOF support team. To provide for the electrical and water needs of nearly 6,000 base personnel, engineers set up an extensive power plant and a large ROWPU that pulled up to 150,000 gallons of water from the ocean daily.[53]

Major Oshiba noted significant problems with War Reserve Materiel (WRM) equipment, one of many issues highlighted at a November 2002 Prime BEEF/RED HORSE Lessons Learned panel. Oshiba stated, "It was absolutely horrible. No piece of equipment lasted more than 2-3 hours without breaking. Our dozer caught fire. Every piece of heavy equipment that we got out of WRM storage broke." Creative solutions on the part of civil engineers, including "tape and bubblegum" fixes, enabled them to meet mission requirements, however. Oshiba acknowledged the perennial challenge of WRM: "If you put a piece of equipment that has a whole bunch of rubber fittings and gaskets into deep storage, you're going to have problems." Those very problems led to a situation in which for several weeks the base had only one operational fire truck.[54]

In September 2002, the 819/219 ERHS deployed to Masirah for the runway project that represented one of the largest and most complicated military construction jobs in RED HORSE's 37-year history. The main requirement was to repair a 2,000-foot section of failed asphalt on the runway and a parallel taxiway, a project more complicated than either of the large ramps at Al Udeid or Al Dhafra. The damage to the airfield caused by water drainage was such that "pilots had to weave through . . . 1.5-foot vertical depressions while taxiing." Over the next 170 days—

with crews working 24/7—160 team members became "the first military construction unit in [DoD] history to complete a horizontal bore" that involved tunneling beneath the airfield pavement and installing a steel casing for a special drainage line. Engineers used Global Positioning System (GPS) technology to accomplish other 'firsts.' Masirah was the first place that a military construction unit relied entirely on GPS for all surveying and construction—there were no stakes in the ground at the 12-million square foot airfield. Moreover, the RED HORSE team was the first USAF unit to use GPS with earth-moving equipment. Other aspects of the project included paving that had could not exceed one-eighth inch of vertical change in 12 feet and the meticulous replacement of 700 runway and taxiway lights that required precise elevation and alignment. The project NCOIC, CMSgt Steven Kembel, summed up his team's work at Masirah: "Our young craftsmen were challenged with the impossible, and they overcame with outstanding results!"[55]

Al Dhafra Air Base, UAE

In the 1990-91 Gulf War, the USAF operated a fighter squadron at Al Dhafra. A year later, it stationed tankers at the base in support of the enforcement of the Iraqi no-fly zone known as Operation Southern Watch (OSW). Although the UAE was less supportive of the US stance against Iraq than the other Gulf States, in 1994 it concluded a Defense Cooperation Agreement with the US. Three years later, the US decision to lengthen OSW deployments facilitated the upgrading of morale and recreational facilities at the base, including TV and VCR players in individual living quarters, two swimming pools, and a fitness center. In addition to hosting US tankers, the UAE operated Mirage fighters and Apache helicopters at the large air base. Following 9/11, in addition to KC-135 and KC-10 tankers the US deployed U-2 reconnaissance aircraft and Global Hawk Unmanned Aerial Vehicles to Al Dhafra.[56]

For four months in 1997, Lt Col George Runkle had served at Al Dhafra as the BCE. At that time—in fact, until the fall of 2001— there were only some 300 Americans on the base at a time. Relations between the Americans and the Emirati were in many cases both warm and informal. But, inevitably, some things changed after 9/11. For Runkle personally, the change was dramatic as he elected to 'pull' his retirement papers in order to participate in the war. By November 2001 Runkle again found himself serving as the deployed BCE at Al Dhafra, working with well over one dozen Air Force Reserve Command and ANG civil engineering units. He oversaw a difficult hangar conversion project as part of Al Dhafra's build-up as a semi-permanent base for up to 1,000 US personnel. The BCE recalled that four years earlier,

If I needed something from the Arabs . . . they just gave it to me. If they needed something from me . . . I gave it to them. I would send my people to help them out, and they would do the same for me. We swapped pretty well. When I got there [in late 2001], we needed some dirt for something, and I went over to ask my buddy Muhammad [his real name] if I could get some fill dirt from the other side of the base. He said, "Things are changed, George, I can't just give it to you anymore." . . . They would shut our water off because they would get angry at us for using water from the base to spread on the roads. We were using water from the fire hydrants for dust control. That infuriated them that we were using precious water to sprinkle on the ground. When we told them we needed it for compaction, they said, "Not to use the base water. Go buy water." So we had to figure out a place where we could buy water.[57]

Despite such changes, relations between the two allies' personnel remained very good—but they were more formal than in the pre-9/11 era.

As noted above, in the fall of 2001 deployed American personnel faced serious health and environmental concerns at Shahbaz (Jacobabad) AB, Pakistan. Given that it was a new operating location for US forces in South Asia, such issues were perhaps no surprise. In contrast, Americans had been operating at Al Dhafra AB for a decade. Moreover, since Operation Desert Shield/Storm, the US and its allies on the Arabian Peninsula had spent millions of dollars to upgrade numerous military facilities to guard against a resurgent Iraq, in addition to morale/recreational improvements (including Al Dhafra). Perhaps surprisingly, despite those improvements the post-9/11 build-up in Southwest Asia produced health issues there as well. In 2002, Lieutenant Colonel Runkle observed,

The biggest problem with trash collection there was that it would attract rats and bugs. . . . Flies were real bad. What I would do was send the fire department out to hose the place down a couple times a week. . . . that was the one way to keep the flies down, because there's no rain. The garbage stayed right on the . . . ground and attracted rats. There were also bad flies in the dumpsters. . . . The [doctor] wanted us to spray the dumpsters with a chlorine solution to help kill the fly larvae. That was something we never really got around to doing successfully. Controlling the pests was a real problem.[58]

Thus, ironically, even at an established base like Al Dhafra where US personnel had lived and worked for a decade—and where they enjoyed VCRs and swimming pools—the rapid build-up of deployed forces after 9/11 contributed to potentially serious health hazards. Those circumstances were a stark reminder that 'force protection' was not just an issue in places like Afghanistan where enemy bullets threatened US/coalition members.

But the biggest success story at Al Dhafra was the ramp project. At $17.6-million, it was nearly twice as costly as the ramp at Al Udeid. Following a delay in obtaining host nation approval, the construction at Al Dhafra began in January 2002, lasting six months. Indicative of their importance to national security, both MILCON ramp projects required presidential approval of emergency construction authority. The Al Dhafra ramp covered a slightly larger surface area than did Al Udeid's, but it was deeper and included a taxiway, lighting, and water hydrant system. In fact, Al Dhafra's ramp was the largest single project ever accomplished by a RED HORSE squadron, exceeding the tonnage of fill material and asphalt and covering a larger area than the ramp at Phan Rang AB, South Vietnam, in 1967. Lois Walker, a historian at the Air Force Civil Engineer Support Agency, summarized the success of both the Al Udeid and Al Dhafra ramps in 2002: "Both projects went so well because of the successful marriage of RED HORSE labor and Air Force Contract Augmentation Program (AFCAP)-provided rented equipment, construction materials, and supplies." The Headquarters ACC Civil Engineer, General Burns, was pleased as well, observing, "We used enough concrete and asphalt building that ramp to lay a sidewalk all the way from Langley Air Force Base to the Pentagon!"[59]

Summary/Conclusion

Even prior to 9/11, the Pentagon's 2001 QDR identified initiatives to develop a "basing system" and "basing infrastructure" in regions beyond the Cold War's traditional AORs of Western Europe and Northeast Asia. The USAF's experience after 9/11 verified the validity of those initiatives as CENTCOM established or significantly upgraded at least a dozen bases each in Central Asia and Southwest Asia in connection with operations in Afghanistan. Additionally, US forces established, improved, or evaluated many more sites ranging from dirt landing strips to civil airfields. By looking briefly at seven selected installations, each one in a different country—four in the '-stans' and three on the Arabian Peninsula—this study has highlighted several doctrinal issues relative to forward or expeditionary basing that may prove particularly relevant in the on-going global war. At Shahbaz (Jacobabad), Khanabad (K2), and Al Udeid, the deployment of operators before, or simultaneously with, support personnel meant that the latter worked under special disadvantages that required some period of time, usually a matter of weeks, to overcome. Although OEF was far from the first occurrence of the "iron before BOS" phenomenon, and most likely will not be the last, it is noteworthy that such was not in accordance with joint doctrine and, therefore, it should be addressed. Arguably, field grade or higher-ranking civil engineers should at least be included as part of ADVON teams that deploy to unfamiliar bases, especially where joint operations are anticipated.[60]

The experiences outlined herein suggested other issues, including the need to clarify USAF responsibilities relative to airfields when and where the Army 'owns' the base (Kandahar); the need for early environmental assessments (Shahbaz-Jacobabad); ensuring cold weather basing capabilities (Manas-Ganci); proper storage and maintenance of WRM assets (Masirah); providing adequate host nation contractor support and ensuring cross-cultural understanding relative to basing/support issues (Shahbaz-Jacobabad, Al Udeid, Al Dhafra). Many other important concerns could be mentioned; these are but a few. Nevertheless, in spite of the myriad challenges brought on by the 11 September attacks, as US forces prepared to conduct operations in harsh, distant, and sometimes, unfamiliar areas of Asia, USAF civil engineering and support personnel met each challenge head-on. From the miserably hot, contaminated conditions at Shahbaz (Jacobabad), Pakistan, to the freezing temperatures of a Russian winter at Manas (Ganci), Kyrgyzstan, or the largest and most complex runway construction project in RED HORSE history, at Masirah, Oman—and in various other settings—deployed USAF engineers and support personnel built or upgraded more expeditionary bases in one year than at any time since World War II—a truly historic accomplishment. Ultimately, these unheralded, dedicated Americans were key 'enablers' for putting bombs on target against Al Qaeda and for the success of Operation ENDURING FREEDOM-AFGHANISTAN.[61]

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Notes

1. Christopher J. Bowie, *The Anit-Access Threat and Theater Air Base* (Center for Strategic and Budgetary Assessment: Washington, 2002), pg. 54. For an excellent overview of the building of

forward airfields in conflict since 1973, see Daniel L. Haulman, "USAF Forward Airfields Since Vietnam," (forthcoming in *Air Force Magazine*).

2. Donald H. Rumsfeld, *Quadrennial Defense Review Report* (Washington, 30 Sep. 2001), pp. 25-26 [emphasis added], at http://www.defenselink.mil/pubs/qdr2001.pdf.

3. For the official Department of Defense (DOD) definition of "forward operating base," see http://www.dtic.mil/doctrine/jel/doddict/data/f/02200.html. Because the definition does not fit some of the bases included in this study, I elected to use the unofficial term, 'expeditionary base.' The term expeditionary base is not found in the *DOD Dictionary*; http://www.dtic.mil/doctrine/jel/doddict/data/e/index.html.

4. Oral History Interview (OHI), Brig Gen Patrick A. Burns, USAF, with Ms Lois Walker, AFCESA, Langley AFB, Va., 3 Apr. 2002, pg. 9; briefing, "OEF Lessons Learned," Lt Col Dave Nelson, USCENTAF A7, 12 Nov. 2002.

5. In 2005, the Air Force Doctrine Center issued the draft of a much revised AFDD 2-4.4, *Base Establishment and Mission Generation (13 July 2005 Draft)*, intended to supersede the older version. The above paragraph's definition of "forward operations bases" found in the 1999 version of AFDD 2-4.4 is appropriate as the basis for this study because it describes the types of bases included herein. However, the AFDD 2-4.4 definition differs from the *DOD Dictionary* definition of the same term, which has reference to special operations; http://www.dtic.mil/doctrine/jel/doddict/data/f/02202.html. In order to avoid confusion, I elected to borrow the AFDD 2-4.4 definition and apply it to the unofficial term 'expeditionary bases.' Air Force Doctrine Document 2-4.4, *Bases, Infrastructure, and Facilities* (dated 13 Nov. 1999), numbered in the document itself as pg. 6 [emphasis added], at https://www.doctrine.af.mil/Library/Doctrine/afdd2-4-4.pdf.

6. The phrase, "The worst case is a bare base" is unnecessarily confusing in that it may be read as meaning that a bare base is inferior to the other types of installations included under the category of an FOB. A bare base is the worst case *from the engineer's perspective* but not from the operator's viewpoint. AFDD 2-4.4 acknowledges that a "Soviet airfield in Eastern Europe" could constitute a well-developed FOB (pg. 32).

7. Burns OHI with Walker, pg. 4; interview with Brig Gen Patrick A. Burns, USAF, with *Air Force Civil Engineer* magazine, *Air Force Civil Engineer* Vol. 10, No. 1 (Spring 2002), pp. 4-5.

8. Burns OHI with Walker, pg. 4. In this study, the '-stans' included Afghanistan, Krygyzstan, Pakistan, Tajikistan, Turkmenistan, and Uzbekistan. By reason of its geographical distance from the area of operations, Kazakhstan was not included.

9. A number of sources mention '13' bases the US established for OEF. Somewhat inexplicably, they include Diego Garcia, a well-developed British base in the Indian Ocean.

10. Burns OHI with Walker, pg. 4. Besides Kandahar AB, Bagram was the other 'hub' base in Afghanistan where the Army owned the installation but the Air Force assisted with airfield operations.

11. OHI, Maj Jeff Perham, USAF, with Ms Lois Walker, AFCESA, Moody AFB, Ga., 16 Apr. 2002, pg. 10; OHI, Lt Col Allen B. Robinson, Ohio ANG, with Ms Lois Walker, AFCESA, Westerville, Ohio, 14 Apr. 2002, pg. 6; http://www.globalsecurity.org/military/facility/jacobabad.htm.

12. Perham OHI, pp. 6, 8, 18; Robinson OHI, pp. 6, 25-26. Robinson arrived on 9 November (pg. 5); Perham redeployed on 11 November (pg. 27).

13. Perham OHI, pg. 23; Robinson OHI, pg. 10.

14. Perham OHI, pg. 23. RED HORSE stands for Rapid Engineer Deployable Heavy Operational Repair Squadron-Engineer. Those squadrons are Air Force civil engineer units specially equipped for heavy construction and repair work. Generally, the water from the ROWPU was used only for washing and bathing. Except briefly, US personnel drank bottled water, but at one point deployed members were down to a two day supply; Robinson OHI, pg. 10. Although Perham mentioned "chlorination" only, the ROWPU actually provided more treatment than chlorination, including the removal of contamination that is larger than the water molecules and the addition of other chemicals to ensure safety for drinking.

15. Perham OHI, pp. 7, 10, 14, 20, 22, 25; Robinson OHI, pg. 8.

16. For an interesting piece on the cultural significance of truck-decorating in Pakistan, see http://www.saudiaramcoworld.com/issue/200502/masterpieces.to.go.the.trucks.of.pakistan.htm.

17. Perham OHI, pp. 14-15. The deployed civil engineers set up two Harvest Falcon kits, enough to house a population of 2,200; the actual population peaked at 2,145; Robinson OHI, pp. 8, 29.

18. Perham OHI, pp. 12-13, 15, 21; Robinson OHI, pp. 7, 33.

19. Presumably because of the political sensitivities involved, the word 'combat' seems not to have been used in the announcement.

20. Tommy Franks, *American Soldier* (Regan Books: New York, 2004), pp. 255-56, 286-87; http://www.globalsecurity.org/military/facility/khanabad.htm. For an insightful piece on the origins of US-Uzbek cooperation and the dangers associated with the approach, see Tamara Makarenko, "The Changing Dynamics of Central Asian Terrorism," *Jane's Intelligence Review*, Vol. 14, No. 2 (Feb. 2002), pp. 36-39. In 2004, Col Timothy W. Vining, Commander, 416th Air Expeditionary Group, located at K2, described the base's strategic advantages: "K2 is a perfect location as a stepping stone getting into the AOR. It's about a seven-hour flight from Germany, a little bit shorter from Turkey. You've got a friendly countryside and fairly good security. . . . a fairly good runway and plenty of ramp space"; see OHI, Col Timothy W. Vining, USAF, with Lt

Col Ben Hackworth, USAFR, and MSgt Mark Stanley, USAF, Khanabad AB, Uzbekistan, 7 May 2004, pg. 3.

21. Notes, Discussion between Col Rick Parker and other AFSOC civil engineers with Ms Lois Walker, AFCESA, Hurlburt Field, Fla., 7 Feb. 2002; email, Ms Lois Walker to author, 21 Jun. 2005. In mid-November, BOS reverted back to the Army; AFSOC Notes.

22. AFSOC Notes; "No One Comes Close!," *Air Force Civil Engineer*, Vol. 10, No. 2 (Summer 2002), pg. 4. According to General Burns, Shahbaz (Jacobabad) was the most challenging bare base in OEF.

23. Email, Walker to author, 21 Jun. 2005.

24. TPFDD stands for Time-Phased Force and Deployment Data; http://www.dtic.mil/doctrine/jel/doddict/data/t/05423.html.

25. OHI, Lt Col Timothy Boone, USAF, with Ms Lois Walker, AFCESA, Hurlburt Field, Fla., 14 Feb. 2002, pp. 8, 21.

26. AFSOC Notes; Boone OHI, pp. 6, 10, 12, 25, 26, 28; "No One Comes Close!," pg. 4. The specialized engineering contingent from the 49th Materiel Maintenance Group at Holloman AFB arrived at K2 ahead of the larger group from Hurlburt (Boone OHI, pg. 29). Force Provider was the Army counterpart to the Air Force Harvest Eagle kit.

27. Boone OHI, pg. 38.

28. Ibid., pg. 30.

29. Bowie, *The Anti-Access Threat*, pg. 54; http://www.globalsecurity.org/military/facility/manas.htm; OHI, Maj Gen Christopher A. Kelly, USAF, with Gary J. Phipps, Task Force Enduring Look (TFEL), Ft. Dix, N.J., 17 Dec. 2002, pp. 3, 5-6; John Hendren, "Beddown in Bishkek," *Air Force Magazine*, Vol. 85, No. 7 (Jul. 2002), pp. 58-59. Actual dollar amounts cited vary by source. Most of the five million Kyrgyz lived in poverty. Whether or not the influx of an estimated $40 million annually to the local economy would benefit the Kyrgz, or only the government and a few select contractors, remained to be seen; Hendren, "Beddown in Bishkek," pp. 58-59; Makarenko, "Changing Dynamics of Central Asian Terrorism," pg. 37.

30. Telephone interview, Lt Col Kevin Rumsey, USAF, with Ms Lois Walker, AFCESA, 21 May 2002, pp. 2, 8; Kelly OHI, pp. 13-14; Hendren, "Beddown in Bishkek," pg. 60.

31. Kelly OHI, pp. 3-4, 13.

32. Rumsey OHI, pp. 16, 24; Kelly OHI, pp. 10-14; History (Secret), MSgt Randy Bergeron, USAF, "Deployment of the 86th Contingency Response Group to Kyrgyzstan, 16 December 2001 to 28 February 2002," AFHRA call no. K-GP-CR-86-SU-RE (CD), 16 Dec. 2001-28 Feb.

2002, pg. 39 (unclassified excerpt). The 400-member French Air Force contingent had their own compound and dining facility; Rumsey OHI, pp. 5-6.

33. "Deployment of 86th Contingency Response Group," pp. 15, 35 (unclassified excerpt); Kelly OHI, pp. 2, 8-10; Rumsey OHI, pp. 3-4, 21; Eric Schmitt with Thom Shanker, "U.S. Might Establish More Afghan Bases to Intensify Pressure on the Taliban," *New York Times,* 29 Nov. 2001, pg. 1.

34. Rumsey OHI, pp. 7-8.

35. "Deployment of 86th Contingency Response Group," pp. 28-29 (unclassified excerpt); Rumsey OHI, pp. 18-19.

36. Chronology, Ms Lois Walker, AFCESA, "Air Force Civil Engineer Support to Operations Enduring Freedom and Iraqi Freedom," copy obtained from author in email, 11 Feb. 2005; Erik Eckholm with Steven Lee Myers, "Three Marines Wounded by Land Mine at Kandahar Airport," *New York Times*, 17 Dec. 2001; Tony Perry, "Marines' Mission Winding Down," *Los Angeles Times,* 16 Dec. 2001, pg. 17. AFCESA civil engineers evaluated Bagram on 22 Nov. 2001 and Kandahar on 15 Dec. 2001; AFCESA Chronology.

37. OHI, Lt Col Lawrence C. Gray II, USAF, with SMSgt Michael Alexander, USAFR, Maxwell AFB, Ala., 27 Jan. 2005, pp. 3, 5; OHI, SMSgt Robert C. Hodges, USAF, with Ms Lois Walker, AFCESA, Shaw AFB, S.C., 12 Apr. 2002, pg. 3; Perry, "Marines' Mission Winding Down." Marine Corps units began operations in southern Afghanistan on 25 November and took control of Kandahar Airport on or about 14 December, relinquishing control to the Army shortly thereafter; Eckholm, "Three Marines Wounded."

38. Hodges OHI, pp. 4-5. A briefing presented at Headquarters USAF/ILEXX observed that there had been "Confusion among Services on who provides all capabilities required on an airfield when Army is the BOS lead"; briefing, "ONE/OEF Lessons Learned," by Lt Col Cummings, HQ USAF/ILEXX, 27 Mar. 2002, slide 25.

39. Paper, Maj Dennis J. McNulty, USA, "Engineer Operations in Afghanistan," copy attached to email from Ms Lois Walker, AFCESA, to author, 11 Feb. 2005, pg. 10; Hodges OHI, pp. 7-9. The AFCESA historical staff verified the (above) mine-injury incident in an email to the author, 25 Apr. 2005. It is included here not for vindication but rather for instruction, in the sincere hope that its inclusion may help prevent a recurrence. Another mine-injury incident at about the same time, at Bagram AB, Afghanistan, is mentioned in Eric Slater, "Master Blasters Detonate Dangers," *Los Angeles Times,* 5 Jan. 2002.

40. Hodges OHI, pp. 7-9. McNulty wrote, "The general consensus from people on the ground observing the mini-flail was that they would not feel comfortable walking into an area where this was the sole clearance method. However, the size of the mini-flail made it ideal for clearing in tight areas around buildings or along trails. Because it can be transported in a CH-47 or sling-loaded under a Blackhawk, the mini-flail concept is ideal for extracting soldiers from minefields (pg. 13).

41. Gray OHI, pp. 2, 5; OHI, 1st SGT Steven Haag, USA, with Mr James S. Howard, AFHRA, Ft Rucker, Ala., 25 Apr. 2005; Perry, "Marines' Mission Winding Down." Initially, the only flying at Kandahar was at night under Visual Flight Rules (VFR). By mid-January, C-130s began daylight operations; Gray OHI, pp. 5, 10.

42. Gray OHI, pp. 7-8; email, Ms Lois Walker, AFCESA, to author, 13 Apr. 2005.

43. Gray OHI, pp. 10-11.

44. George Cahlink, "Building a Presence," *Government Executive*, Vol. 34, No. 16 (Dec. 2002), pp. 48, 54; Burns OHI with Walker, pg. 4.

45. http://www.globalsecurity.org/military/facility/udeid.htm; OHI, Col Steven F. Maurmann, USAF, with SMSgt Michael D. Dugre, USAF, Al Udeid AB, Qatar, 27 Oct. 2001, pp. 1-3; OHI, TSgt Clayton Peters, USAF, with SMSgt Michael D. Dugre, USAF, Al Udeid AB, Qatar, 7 Oct. 2001, pg. 1; email, CMSgt Dugre to author, 17 Jun. 2005.

46. For details, see the section on Al Dhafra.

47. http://www.globalsecurity.org/military/facility/udeid.htm; Burns OHI with Walker, pp. 14-15; Matt Donegan, "'Ramping Up' an Air Base: RED HORSE Builds MILCON project in Qatar," *Air Force Civil Engineer*, Vol. 10, No. 1 (Spring 2002), pp. 10-11; Otto Pohl, "Attack Highlights Qatar's Importance in Gulf," *International Herald Tribune*, 21 Mar. 2005.

48. http://www.globalsecurity.org/military/facility/udeid.htm; http://www.globalsecurity.org/org/news/2002/020819-iraq7.htm. Donegan, "'Ramping Up' an Air Base," pg. 10; notes, discussion between Col Ed Mayfield, USAF, with Ms Lois Walker, AFCESA, Hurlburt Field, Fla., 7 Feb. 2002, pp. 1-2.

49. Maurmann OHI, pp. 2-5; Peters OHI, pp. 1, 4-5; http://www.globalsecurity.org/military/facility/udeid.htm.

50. Donegan, "'Ramping Up' an Air Base," pp. 10-11.

51. http://www.globalsecurity.org/military/facility/masirah.htm; Burns OHI with Walker, pp. 14-15.

52. http://www.globalsecurity.org/military/facility/masirah.htm; Capt Ryan J. Novotny, 819 RHS, "RED HORSE Triumphs with Technology," *Air Force Civil Engineer*, Vol. 11, No. 1 (Spring 2003), pg. 5; telephone interview, Maj Edwin H. Oshiba, USAF, with Ms Lois Walker, AFCESA, 22 May 2002, pp. 1-2; AFCESA Chronology. For details on the ramp project at Al Udeid, see previous section. In the term, Prime BEEF, 'BEEF' stands for Base Engineer Emergency Force.

53. Oshiba OHI, pp. 3-4, 7; Mayfield notes, pg. 3; Franks, *American Soldier*, pg. 273. ROWPU stands for Reverse Osmosis Water Purification Unit.

54. Oshiba OHI, pp. 5-6; report, Headquarters AFCESA, "Operation Enduring Freedom, Prime BEEF and RED HORSE Lessons Learned," pp. 2, 21. The report acknowledged, "Many WRM assets quickly failed due to a lack of maintenance (or improper maintenance) while in storage."

55. OHI, Maj Anthony Davit, USAF, with Ms Lois Walker, AFCESA, Tyndall AFB, Fla., 24 Apr. 2003, pp. 5-6; Novotny, "RED HORSE Triumphs," pp. 5-7.

56. http://www.globalsecurity.org/military/facility/dhafra.htm; OHI, Lt Col George Runkle, USAFR, with Ms Lois Walker, AFCESA, Wright-Patterson AFB, Ohio, 15 Nov. 2002, pg. 3; Lt Col George Runkle, USAFR, "One Team, One Fight," *Air Force Civil Engineer*, Vol. 10, No. 2 (Summer 2002), pp. 10-11.

57. Runkle OHI, pp. 2, 5, 9, 12, 18-19.

58. Ibid., pg. 22.

59. Ibid., pg. 13; http://www.afcesa.af.mil/cex/cexx/cex_afcap.asp; quote from email, Walker to author, 21 Jun. 2005; quote from Burns interview with *Air Force Civil Engineer*, pg. 6; unpublished manuscript, CMSgt Vincent E. Davis, 820 RHS, "A Comparison Of Projects: Phan Rang versus Al Dhafra," 14 Feb. 2002, copy provided to author by Walker. President Bush approved both projects in accordance with Title 10 USC 2808.

60. Cummings briefing, "ONE/OEF Lessons"; briefing, "OEF Lessons Learned and the Way Ahead," Lt Col Rick Wheeler, ACC/CEXO, n.d.; Nelson briefing, "OEF Lessons." Although somewhat repetitive, these briefings address numerous issues relevant to expeditionary basing during 2001 and 2002.

61. Cummings briefing, "ONE/OEF Lessons"; AFCESA report, "[OEF] Prime BEEF and RED HORSE Lessons"; see notes 39 and 55 (above).

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