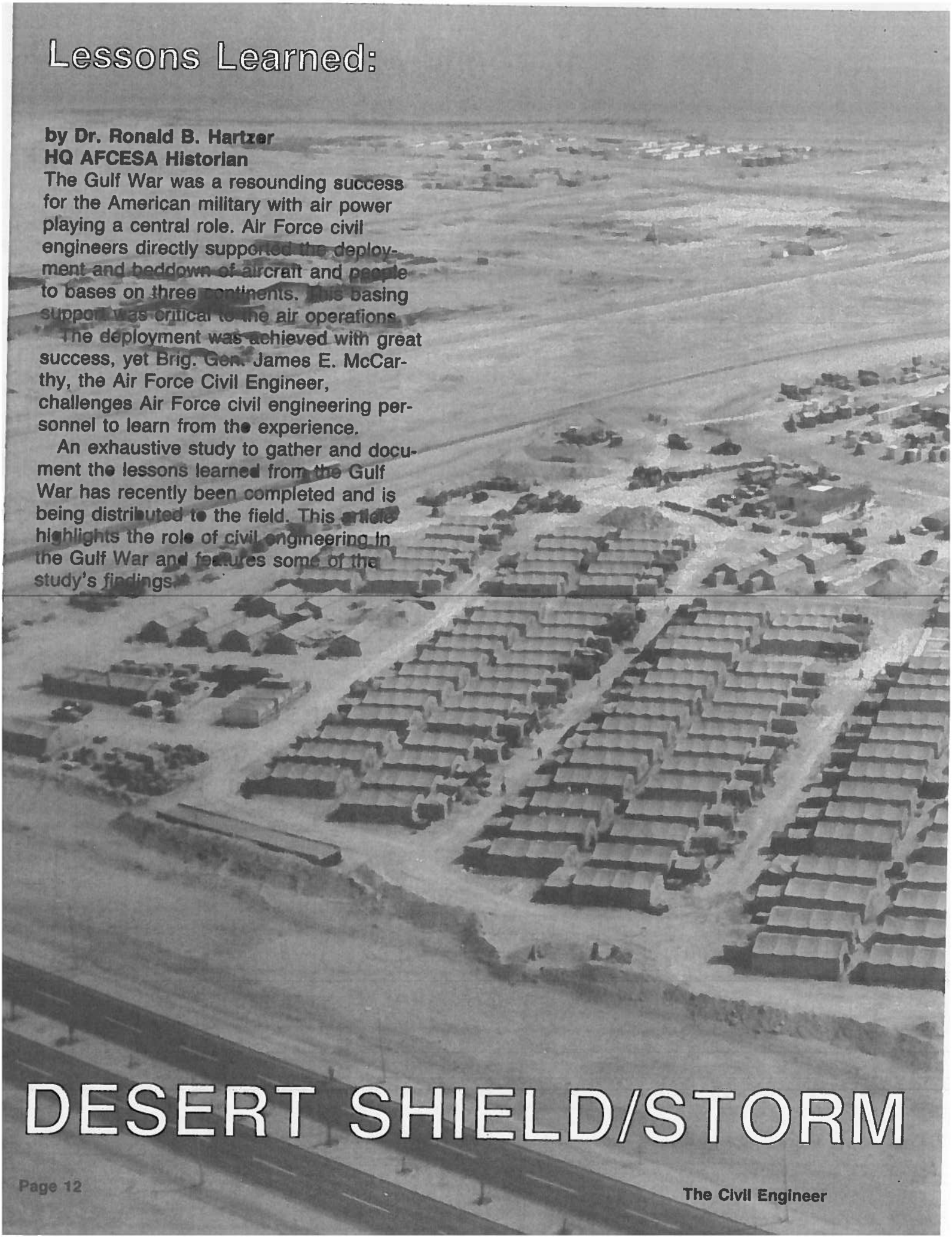
Lessons Learned:



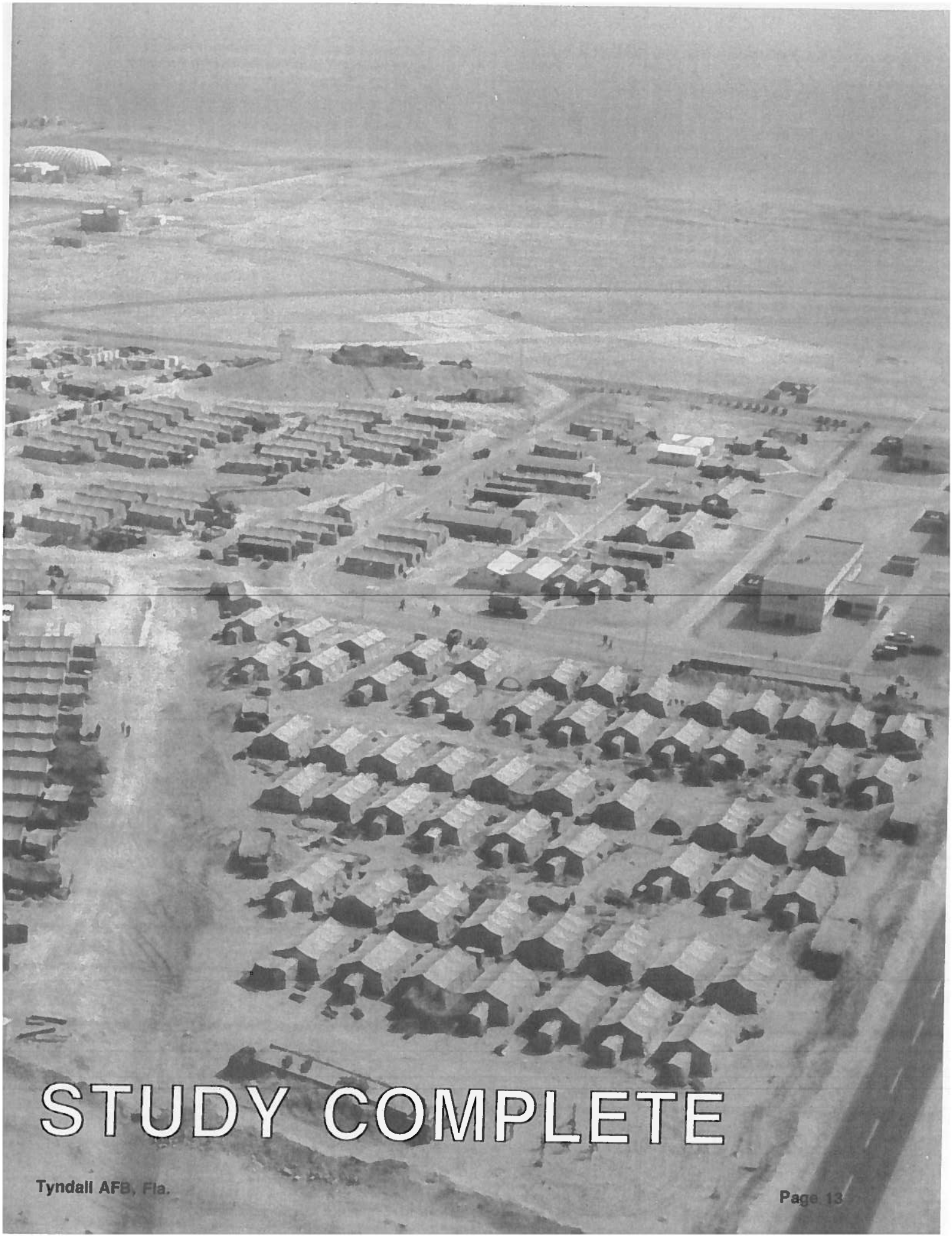
DESERT SHIELD/STORM

by Dr. Ronald B. Hartzer
HQ AFCESA Historian

The Gulf War was a resounding success for the American military with air power playing a central role. Air Force civil engineers directly supported the deployment and beddown of aircraft and people to bases on three continents. This basing support was critical to the air operations.

The deployment was achieved with great success, yet Brig. Gen. James E. McCarthy, the Air Force Civil Engineer, challenges Air Force civil engineering personnel to learn from the experience.

An exhaustive study to gather and document the lessons learned from the Gulf War has recently been completed and is being distributed to the field. This article highlights the role of civil engineering in the Gulf War and features some of the study's findings.

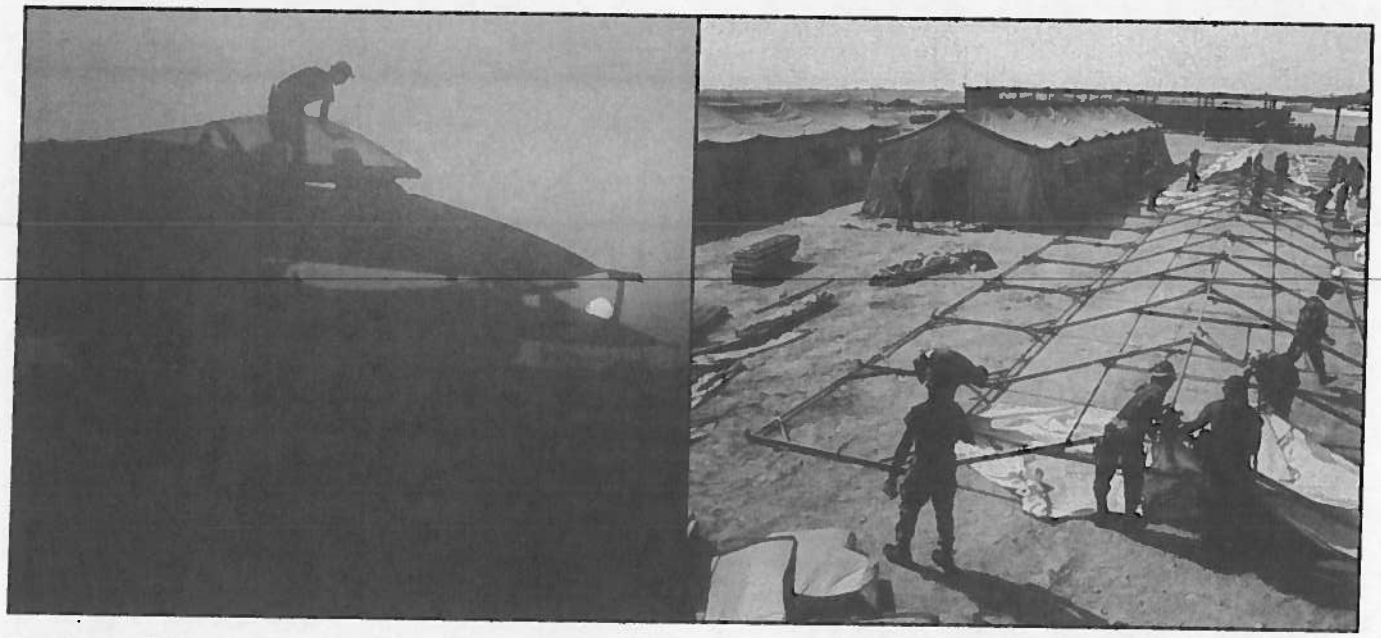


Tyndall AFB, Fla.

CIVIL ENGINEERING IN THE GULF WAR

Air Force civil engineers provided the beddown and basing support for deployed forces at sites ranging from modern military air bases, to busy civilian airports, to a location with nothing more than a runway, parking apron, and sand. In supporting the mission, they encountered blazing heat and high humidity in Southwest Asia (SWA), a hurricane on the island of Diego Garcia, and a blizzard in the United Kingdom.

Civil engineers used bare base equipment (primarily Harvest Falcon and Harvest Bare) to construct tent city cantonment areas, administrative facilities, and flightline operations structures. They provided water, sewage, and electrical utility support. Once built, they operated and maintained the bases in a harsh environment. They expanded aircraft parking areas and erected revetments to protect valuable aircraft. When the war began,



they were ready to recover the bases if attacked. Firefighters provided structural fire protection and crash/rescue support. Air base operability personnel deployed to assist commanders in preparing bases for combat. Disaster preparedness forces trained and equipped personnel for the threat posed by the Iraqi military. Explosive ordnance disposal (EOD) provided expertise in the handling of munitions under often difficult situations.

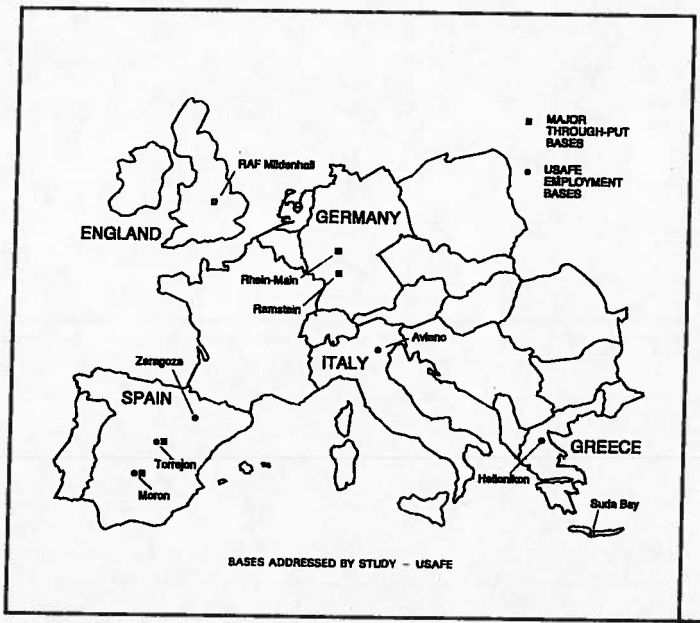
LESSONS LEARNED STUDY

Air Force engineering and services began collecting lessons learned in the early days of the deployment. Brig. Gen. Michael A. McAuliffe, who at this time was deputy chief of staff, Engineering and Services, HQ Tactical Air Command (HQ TAC/DE), challenged the deploying USCENTAF/DE staff to fully document and record the achievements and lessons learned from the operation. Maj. Gen. Joseph A. Ahearn, the former Air Force Civil Engineer (now retired), tasked all engineering and services personnel to write down their insights on a regular basis to ensure the lessons learned in August 1990 would be remembered upon completion of the operation.

Throughout the war, various elements of the engineering and services team recorded their lessons learned. Site engineers and chiefs of services submitted monthly reports to USCENTAF/DE in Riyadh. However, the willingness to sit down and write lessons learned was subordinated to the urgent demands of the deployment. It became clear that a separate, large-scale effort would be required to collect and document the lessons learned from all levels.

The Air Force contracted with the New Mexico Engineering Research Institute to conduct the overall Engineering and Services Lessons Learned Study. Originally, they were to gather the lessons learned from civil engineering (both Prime BEEF and RED HORSE), fire protection, and services personnel involved in the SWA deployment. USCENTAF/DE selected five target bases to represent a cross-section of the nearly 30 sites in the region. These bases included:

- A MAC intra-theater airlift base located on an airfield under construction
- A SAC base with a tanker and bomber mission located on a joint civilian/military airfield
- A multi-service (USAF and USMC) TAC base located on a host nation military installation
- A multi-command (TAC and AFSOC) and multi-service (USAF and USA) base located on a civilian airport under construction
- A classic bare base with nothing but a runway and parking ramp located on a military air base



BASES ADDRESSED BY STUDY – USAFE

under construction.

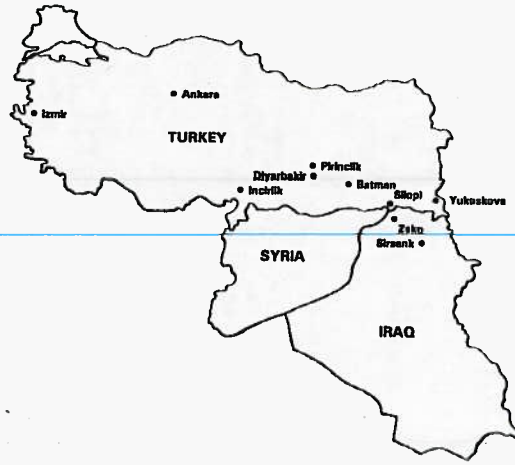
The scope of the project quickly expanded. The functional areas of air base operability (ABO), disaster preparedness, and explosive ordnance disposal became part of Air Force civil engineering and were added to the study. Also, it became evident that civil engineers in USAFE had played a major role in supporting the Gulf War. Operations in the USAFE Area of Responsibility (AOR) were included in the study. The humanitarian relief effort in Turkey and Northern Iraq following the war, Operation Provide Comfort, was the last element of the study.

Midway through the study, the Air Force separated services from civil engineering. However, it remained part of the study since they were combined during the Gulf War. (NOTE: Although services is included in the overall report, the remainder of this article will focus on elements of civil engineering only.)

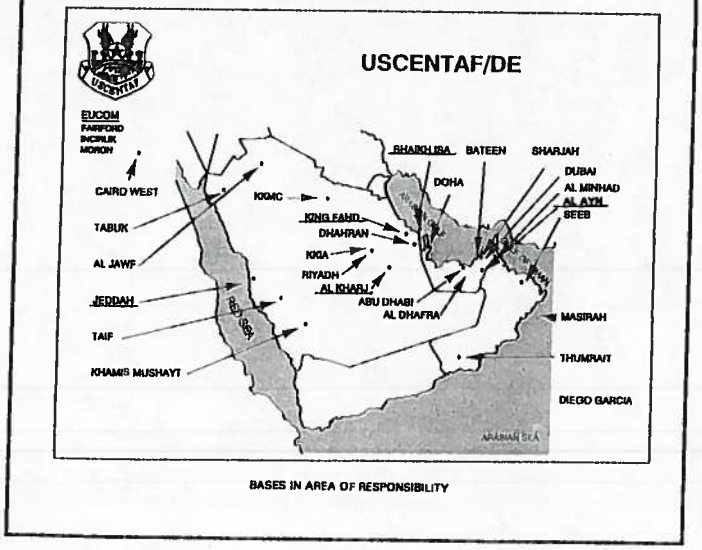
The Lessons Learned Team (three contractors, myself and MSgt. David Beal, HQ TAC/CEX) used three methods to collect the data. First, we reviewed the monthly history reports and other written materials. Second, the contractors sent a survey to approximately 900 personnel. Third, the team conducted personal interviews with nearly 400 personnel.

In a return to the grass roots of civil engineering, the team interviewed a cross-section of deployed forces ranging from airman to general officers and "wrench turners" to wing commanders. The team visited 24 CONUS and USAFE bases between July 1991 and February 1992.

A validation meeting held at Lowry AFB, Colo., reviewed the civil engineering findings in April 1992. At these meetings, the attendees validated



BASES ADDRESSED BY STUDY – USAFE



BASES IN AREA OF RESPONSIBILITY

120 of the 137 candidate lessons learned and combined them into 88 final items. They assigned OPR/OCRs to each lesson learned and determined a priority for each item.

The Civil Engineering Readiness Board was tasked to choose the top issues and begin tracking their implementation and resolution. The Readiness Board will report their progress to the Readiness Council on a regular basis.

FINDINGS

The overall conclusion of the report is that Air Force Civil Engineering provided outstanding support during all phases of the Gulf War. A brief recounting of a few achievements will illustrate their contributions to the entire operation. Civil Engineers in the USCENTAF AOR:

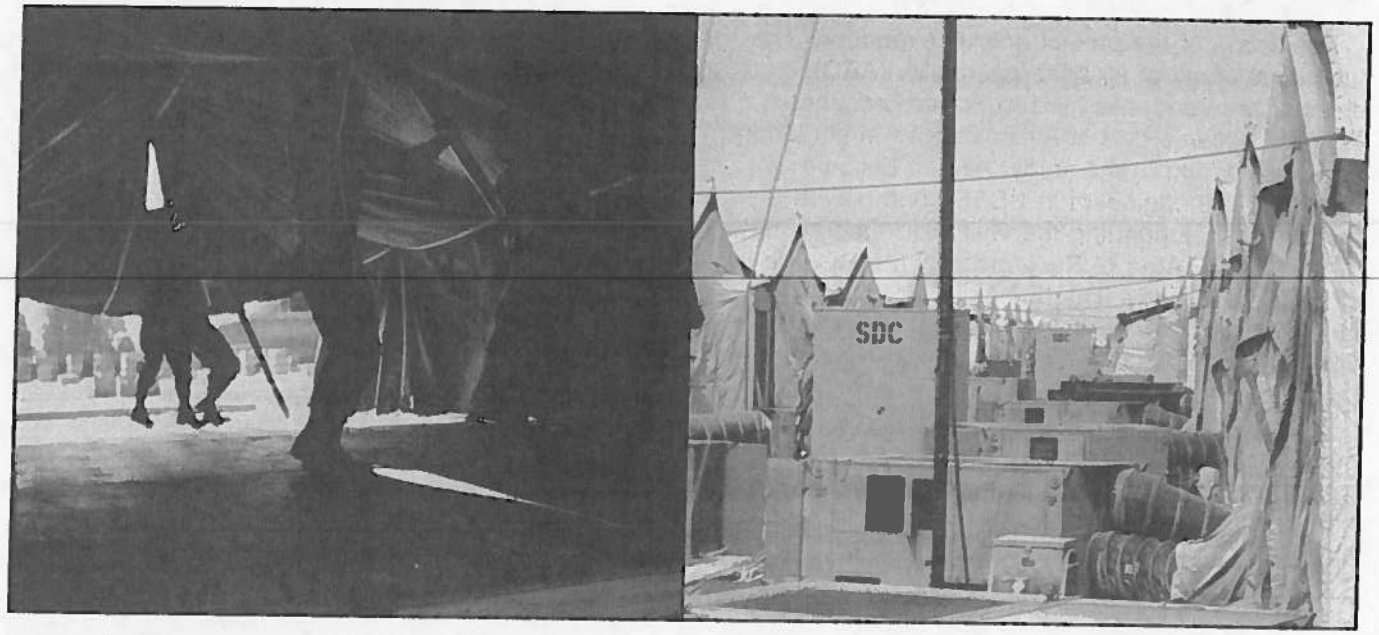
- Bedded down hundreds of aircraft and more than 55,000 personnel at 25 separate locations

using Harvest Bare/Harvest Falcon mobile basing equipment.

- Provided utility support using mobile electric generators, Reverse Osmosis Water Purification Units (ROWPUs), and by connecting to host nation sources.
- Used more than 5,000 new-generation TEMPER tents with environmental control units to provide air conditioning for the summer and limited heating for the winter. These were the envy of other services and allies.
- Air Force firefighters protected the vulnerable tent cities while also responding to hundreds of in-flight emergencies.
- Constructed munitions storage areas, aircraft parking ramps, taxiways, and protective revetments for aircraft.
- Established a plan for protecting air bases and personnel from chemical and conventional attacks. Trained base personnel in the use of chemical protection equipment and methods.
- Denied the use of two Iraqi airfields through the combined efforts of RED HORSE and EOD personnel.

In the USAFE AOR:

- Expanded base support at throughput bases for personnel and aircraft traveling to and from SWA.
- Bedded down Strategic Air Command aircraft and personnel at six locations.
- Established base support for contingency medical factilities at 12 locations.
- Planned and executed the buildup of three bases for Joint Task Force Proven Force.
- Provided basing support at five locations in Turkey and Iraq for Combined Task Force Provide Comfort.



GENERAL

The lessons learned in this category apply to more than one function or have overarching implications.

Despite major obstacles, the beddown of air power went quite smoothly. The U.S. had worked for years to help construct and arrange access to the basing network in SWA. Although the availability of infrastructure and utility systems varied widely from base to base, each included as a minimum, a runway.

Engineering and services support to the Unified Component Commander was essential to the successful development of a warfighting capability. The theater command engineering and services support staff needs to understand its role and be active in planning and resource allocation activities.

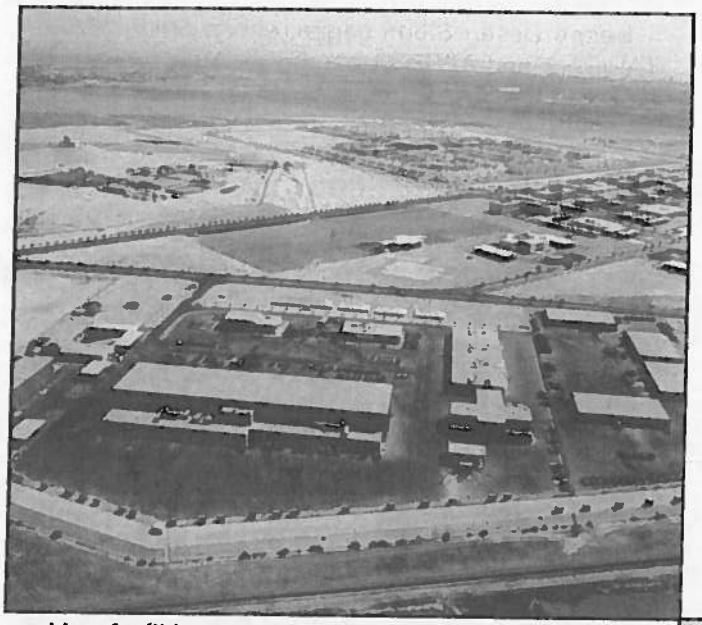
Communications packages were very good and yet did not provide the overall needed capability. Early in the deployment, lack of command, control, communications, and computer support was a major obstacle. By December 1990, an effective communications package has been purchased and distributed to the sites.

Base support personnel were generally well trained and hard working. However, more specific training on mobility basing sets was needed. Many engineers had little familiarity with Harvest Falcon assets. The engineers' innovation and willingness to work overcame any shortcomings.

Guard and Reserve forces in the CONUS backfilled at several bases, particularly in fire protection.

CIVIL ENGINEERING

The speed of the initial deployment precluded many engineering units from gathering information about the deployed sites and from sending an ADVON team. This challenged the engineers' ability to hit the ground running. Although civil engineers followed the weapon systems into most of the bases, they quickly provided the necessary living and



working facilities to conduct operations.

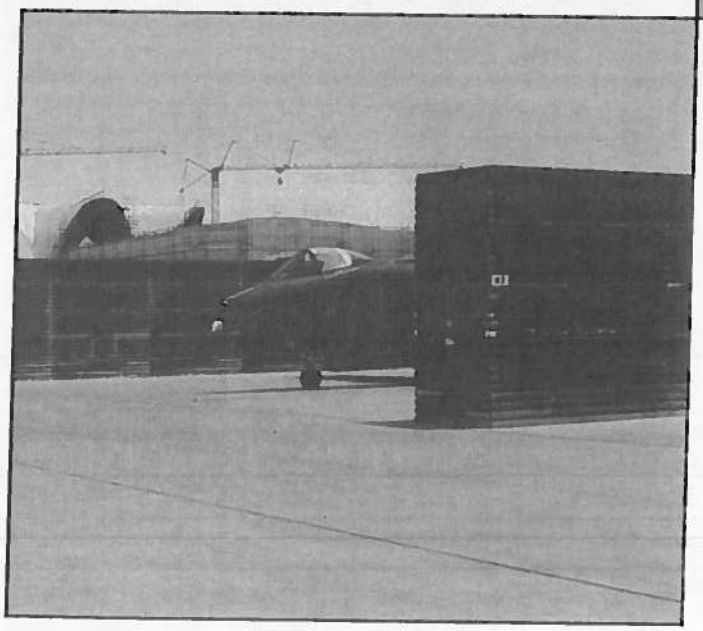
Civil engineers provided a good quality of life for the deployed troops. This was a critical issue in the long months of waiting during Desert Shield. Air conditioned TEMPER tents provided a good place to sleep and eat. Self-help shops, established by engineers, permitted troops to personalize their "home away from home."

RED HORSE and Prime BEEF personnel completed significant construction projects such as hot pit refueling pads, taxiways and parking aprons, roads, berms for ammunition storage, K-Span buildings, and an aircraft parking loop in minimum time. The two worked to transform a desolate, desert bare runway with taxiways into a fully operational air base with 6,000 personnel in a matter of weeks, just prior to Operation Desert Storm. These projects required round-the-clock operations and teamwork to meet mission requirements.

Because incomplete and unavailable War Readiness Spares Kits hampered operations, engineers turned to the local economy to purchase the needed items. They relied on a highly developed local economy with an established construction industry to obtain vehicles, construction equipment, and supplies. Helpful contracting officers often dedicated a single individual to support civil engineering. Many sites used Blanket Purchase Agreements as a viable logistics support concept.

Technical orders for such equipment as the MEP-12 750kW generators and M-80 Boilers generally did not accompany the equipment. Members of the HQ TAC/DE and USCENTAF/DE copied more than 1 million pages of technical orders and distributed them to the sites.

A shortage of critical electrical Primary Distribution Centers was overcome by Civil Engineering Maintenance, Inspection, Repair, and Training (CEMIRT) technicians, who designed, built, and shipped 34 units in as many days to provide electrical power to SWA sites. An eight-person CEMIRT team established a depot repair function in-theater to repair and maintain critical generators and electrical distribution equipment.



Based on their outstanding support to the Army in Turkey during Operation Proven Force, Air Force Civil Engineers were specifically tasked to provide base support the multiservice, multinational forces in Operation Provide Comfort. This arrangement may serve as a paradigm for future joint and combined operations.

The civil engineering and Air Force medical communities need to improve the planning for the opening of contingency hospitals and beddown of hospital personnel in Europe. The deployment of

thousands of medical personnel to sites in the United Kingdom created challenges for civil engineers, particularly in terms of utility support.

FIRE PROTECTION

Air Force firefighters deployed to varied situations, performing proficiently and many times heroically. Firefighters at one forward operating location responded to 157 in-flight emergencies and 785 integrated combat turn stand-bys during Operation Desert Storm.

Many Air Force firefighters augmented or merged with firefighters from host nations, other branches of the service, or with other Air Force firefighters. In several cases, many small Air Force teams were merged to make up one large firefighting operation. Differences in firefighting procedures remained until training could occur.

Fire Protection program managers were added to the USCENTAF/DE staff to provide oversight and direction to the theater.

The delay in sending firefighters and equipment to some sites jeopardized safety of equipment and personnel.

Fire protection vehicles from WRM storage were often in poor condition when they arrived. In addition to many mechanical problems, belts, hoses, and seals were dry rotted.

Firefighters locally purchased a fire suppressing agent for their vehicles and flightline fire extinguishers. They had to often fabricate connectors to match the threads of both vehicles and the British-made reservicing equipment.

AIR BASE OPERABILITY

The primary physical manifestations of ABO ideology occurred in the areas of Camouflage, Concealment, and Deception (CCD) and defensive construction. Commanders received ABO personnel with mixed reactions. For the most part, ABO became a headquarters function and was implemented in varying degrees at base level.

Policies and guidance on the minimum standards for survival and recovery of the combat air bases and on CCD are needed.

DISASTER PREPAREDNESS

Disaster preparedness ensured deployed personnel were ready to survive and operate in the chemical environment associated with the anticipated threat level. They provided massive amounts of Chemical Warfare Defense training and conducted exercises for Air Force, contractor, and host-nation personnel.

Disaster preparedness personnel provided invaluable assistance when the program OPR was unable to accomplish chemical warfare defense equipment inspection, storage, and issuance duties. This often degraded their primary taskings of planning, monitoring, and advising commanders.

Before Desert Storm began, efforts of USCENTAF/Rear and AFCESA personnel led to purchase and delivery of Giant Voice warning systems to sites.

EOD

EOD personnel needed equipment that was not always available. Among the items cited were: portable X-ray units, see-through shields for use in explosive mortuary cases, a robotic device, tactical radios, and selected power tools.

A number of issues centered on the need for training. EOD personnel were not given required training for conducting special operations with Army Special Forces or for conducting special operations by themselves in Iraq and Kuwait. Although the M14 SMUD rifle has been part of the EOD mobility package for three years, there was no authorized Air Force qualification course for this weapon. EOD "scrambled" to get deploying personnel trained to use armored vehicles, but couldn't gain the level of experience needed to most effectively use armored assets.

CONCLUSION

In the early weeks of Operation Desert Shield, Col. Karsten H. Rothenberg, USCENTAF/DE, voiced his frustration, "Too few of the lessons learned from past exercises were taken seriously and corrected—we continue to be plagued with the same old problems." Copies of the Lessons Learned report will be widely distributed to all levels in the coming weeks. To be truly useful, it must be read, discussed, and implemented. Continuous study, realistic training and exercises, and constant analysis is required to adjust to changes in the world and to support the Air Force of the 1990s.

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