ENGINEERING: THE AIRMAN'S PERSPECTIVE

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Air Force civil engineers organize for war during peacetime, train as organic units, and deploy fully capable of rapidly establishing airbases to support the projection of airpower.

Airpower is more than aircraft, missiles, or weapons. It is the coordinated activities of elements within the warfare system: the weapon system, the weapon support system, and the basing system. The weapon system comprises the delivery vehicle, weapon, and operator. The weapon support system directly supports the weapon system. The basing system includes the infrastructure, people, materiel, and information needed to sustain operations for both the weapon and the weapon support system. Examples of expeditionary basing include bare bases, main operating bases, joint operating bases, forward operating locations, combat outposts, and cooperative security locations. There are differences in how the Services view expeditionary bases. The Air Force views an expeditionary base as an airfield, described as an area prepared to accommodate (including buildings, installations, and equipment), landing and takeoff of aircraft. The Army refers to these types of bases collectively as base camps: an evolving military facility that supports military operations of a deployed unit and provides the necessary support and services for sustained operations. Regardless of Service Component lead, expeditionary bases serve varying purposes, may be different sizes, and are built using different standards based on factors such as the mission, anticipated life span, and expected population. At the heart of the basing system is the installation itself.

All Services provide capability to establish and maintain bases. However, each Service maintains core engineering capabilities stemming from its traditional roles to meet specific operational needs. Air Force civil engineers have expertise in providing close support to conventional and unconventional forces while maneuvering; similar to Army and Marine engineer close support to ground forces. Furthermore, civil engineers eliminate obstacles to continuing airpower operations through rapid repair of damaged airfields, or construction of expeditionary landing surfaces; employ obstacles to deny enemy freedom of maneuver through denial of potential enemy airfields; and construct protective structures to counter effects of direct and indirect weapons through expeditionary hardening. Similarly, Army and Marine engineers train extensively on combat engineering functions to provide close support to ground forces. They focus on eliminating obstacles to maneuver, employing obstacles to deny enemy freedom of maneuver, and constructing protective structures to counter effects of direct and indirect weapons.

Air Force engineers possess organic general engineering capabilities involving the planning, establishing, sustaining, and closing of facilities and infrastructure on military installations that support the operation of airpower assets. Furthermore, the experience gained from performing these functions at home station locations, when complemented with specific training in the employment of contingency equipment, adequately prepares Air Force engineers for the demands of contingency base operations in the expeditionary environment.

Unlike the Army and Navy, who provide home station base support primarily through a mixture of contracts and civilian employees, with their wartime combat service support forces residing primarily in the Reserve Component, the Air Force embeds military engineer manpower within the home station work force. This leverages engineer capacity for peacetime use, rather than keeping engineers as a "force-in-waiting" for the next war. Providing engineer capability in this manner can be viewed as a force multiplier for many different reasons. Mixing military and civilian personnel creates an environment that can leverage technical expertise and experience of long-term civilians to train military engineer forces, while simultaneously accomplishing the home station mission. Furthermore, when military expeditionary mission requirements increase, the cadre of engineer civilians can, with some contract augmentation and at a reduced level of service, support the minimum essential workload remaining at home station installations. Lastly, the Air Force does not have to maintain a completely separate combat service support force structure to support expeditionary missions, while also resourcing a home station work force. By mixing the two force structures, the Air Force gains the "benefit" of peacetime base support from the combat service support forces-in-waiting.

For more information on Air Force Expeditionary Engineering see the AIR FORCE CIVIL ENGINEER CENTER website.

Contested Environment

The proliferation of affordable, advanced stand-off weaponry indicates a growing concern in contested environment (formerly known as Anti-Access/Area Denial [A2/AD]) strategies to deter US military involvement. Operating in contested environments challenges freedom of movement and strategic agility because larger threat radius of stand-off weapons will hold more bases at risk over greater distances. The Air Force should address which enduring locations and contingency bases outside the operational area (as defined by the Joint Task Force Commander) are potential high threat areas subject to enemy attacks. Emerging joint concepts such as rapid aggregation and mission command portend a doctrinal shift in the differences between Combat Engineering and General Engineering. If Combat Engineering is defined by close support of maneuver forces in operations, then it stands to reason that Air Force civil engineers supporting operational maneuver of air and space power from bases operating in contested environments will be providing Combat Engineering support. The traditional approach to defining joint engineering should adapt to meet the challenges faced in contested environments.