

AIR FORCE DOCTRINE PUBLICATION 3-34

ENGINEER OPERATIONS



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“The Air Force organizes, trains, and equips forces to be an air component to a joint force commander (JFC). As part of the joint force’s air component, our forces must be prepared to accomplish JFC objectives. The air component commander’s administrative authorities are derived from Title 10, U.S. Code, and exercised as the commander, Air Force forces (COMAFFOR). The air component commander’s operational authorities are delegated from the JFC and exercised as both the COMAFFOR, over Air Force Forces, and as the functional joint force air component commander (JFACC), over joint air forces made available for tasking. Thus, the air component commander leads Air Force forces as the COMAFFOR and the JFC’s joint air operations as the JFACC. This duality of authorities is expressed in the axiom: Airmen work for Airmen and the senior Airman works for the JFC.”

--Air Force Doctrine Publication (AFDP) 1, *The Air Force*

Since the COMAFFOR and JFACC are nearly always the same individual, this AFDP will use the term “air component commander” when referring to duties or functions that could be carried out by either or both, unless explicit use of the term “COMAFFOR” or “JFACC” is necessary for clarity.

FOREWORD

Doctrine embodies the fundamental principles by which military forces guide their actions in support of national objectives. It is a body of carefully developed, authoritative ideas that have been officially approved or ratified corporately, establishing a common frame of reference for solving military problems. However, to be an effective guide, the challenge for doctrine is to be simultaneously focused on the past, applicable in the present, and facing toward the future; all in equal measure.

The US Air Force must anticipate a new reality; one in which decision advantage, freedom of maneuver, and freedom of action are increasingly challenged. To deter, compete, and win across the competition continuum, Airmen must advance solutions that enable operations in highly contested environments. Broadly, the joint force's approach to meet this challenge is encapsulated in joint all-domain operations ([JADO](#)). Together with joint all-domain command and control ([JADC2](#)), JADO provides joint force commanders (JFC) the means to integrate, synchronize, and deconflict the convergence of effects across all domains to achieve operational advantage.

AFDP-1, [The Air Force](#), supports this effort by establishing mission command as the Airman's philosophy for the command and control (C2) of airpower. Despite our advances, adversaries will likely retain an ability to deny or degrade our communications. Decision makers at all echelons must have the ability to develop understanding, make decisions, and converge effects when disconnected from higher echelons. Mission command embraces centralized command, distributed control, and decentralized execution as the foundation for the responsiveness, flexibility, and initiative necessary at the tactical edge, and ensures capabilities continue to function, even when information is degraded or denied.

AFDP 3-34, *Engineer Operations*, though firmly rooted in the past, also looks to the future, adapting where needed to ensure continued utility and efficacy for the challenges to come. Properly planned and executed, engineer operations are a crucial element of combat support to enable achievement of joint force commander objectives in cooperation, competition, and conflict. What worked in the past, WILL work in the future; but NOT in the same way. Airmen must be trained to plan operations in a distributed or decentralized manner, and execute the mission when isolated from higher echelons in distributed environments. Airmen at all levels must be comfortable making decisions and operating based on the commander's intent and the principles of mission command.

Though not fully adapted to the challenges identified above, this doctrine represents what we believe to be true based on the evidence to date. As we continue to press toward a more capable future force, it is critical that we continue to evolve our doctrine, ensuring a grounded foundation perpetually set to meet our nations' security challenges. Throughout our history, innovative Airmen have adapted technologies and developed methods of employment to meet the challenges our nation has faced. We will continue to do so.

Chapter 1: INTRODUCTION TO ENGINEER OPERATIONS



Air bases are a determining factor in the success of air operations. The two-legged stool of men and planes would topple over without this equally important third leg.

- General Henry H. "Hap" Arnold

Engineers provide a critical capability because the Air Force projects airpower from installations and engineers build, maintain, and recover those installations. From the beginning of military aviation in the United States (US) to today, engineers have been pivotal players by ensuring airfields, facilities, and infrastructure help set the conditions for operational dominance.

Just as a runway is foundational to air operations, the "Civil Engineer (CE) Truths" are the basic foundational beliefs of Air Force civil engineers. They set the basis for civil engineers to deliver Air Force and Space Force installations effectively and efficiently, using modern principles to maximize contributions to the installation and its diverse mission sets. Engineers focus outwardly to support other mission readiness issues, as well as develop and support a total force of engineers--civilian and military, regular and air reserve components--to support the warfighter at home and abroad, ensuring their power projection platforms are ready for employment.

Founded on these truths, engineer operations doctrine provides a guide to effectively organize and employ engineer forces through the complexities of the [competition](#)

THE CE TRUTHS

Installations are power projection platforms.

Asset management principles drive how we mitigate risk to installation health.

Airmen engineers measure readiness first and foremost by the readiness of the weapon system they support.

Total force development at home enables ready Airmen engineers to rapidly employ forces and adapt to full-spectrum threats.

Presenting agile CE capabilities supports combatant commanders' (CCDRs') and air component commanders' projection of airpower. Installations are **built** by, **maintained** by, and **recovered** by ready Airmen engineers.

[continuum](#). As the Air Force continuously improves its airpower capabilities, its ability to identify the latest best practices and incorporate new concepts and technologies will revolutionize engineer doctrine and shape future engineer operations.

The competition continuum is a central consideration when determining best practices for the Air Force. Consideration of peer competition and conflict is a continuing concern as the Air Force supports the joint fight. All Airman have the capability to innovate and are integral parts in improving and developing processes and practices—succeeding as they connect, share, and learn together. Engineer operations in a contested environment against a peer enemy require the air component to be adaptive, resilient, and agile in its deployment, employment, and leadership philosophies.

Installations are power projection platforms built, maintained, and recovered by ready engineers, trained and equipped to carry out combat support operations within their assigned unit type codes (UTCs). Engineers are trained at home station, regional training sites, exercise deployments, and Silver Flag sites on pre-identified engineering operations. This training permits the rapid employment of Prime Base Engineer Emergency Force (Prime BEEF), Emergency Services, and RED HORSE Squadron engineers to support global military operations. Additionally, by incorporating asset management and lifecycle practices to power projection platforms, risks to the installation mission are reduced or mitigated through modernization. Finally, Air Force engineers are the force multiplier to execute general engineer operations described in Joint Publication (JP) 3-34, [Joint Engineer Operations](#).

Air Force CE enhances the joint force commander's (JFC's) ability to accomplish the mission and enable joint operations. The primary tasking for Air Force engineers is to enable Air Force and Space Force missions. Air Force engineers are trained and equipped with organic capabilities to support all aspects of projecting airpower. Secondarily, they also provide general engineering support for other Service requirements. Air Force engineers also conduct combat engineering functions in contingency and warfighting environments, both on the installation and off.

Joint engineer operations facilitate the mobility and survivability of friendly forces; provide infrastructure to position, project, protect, and sustain the joint force; and provide support to civilian authorities and other nations.

- JP 3-34, *Joint Engineer Operations*

Engineers prepare for contingencies by training as units, employing lessons learned, and exercising their capabilities in preparation for deploying fully capable engineer forces to rapidly establish airbases as power projection platforms, repair battle-damaged facilities and infrastructure, and recover installations from man-made and

natural disasters. A ready Airman engineer is one who is prepared to execute mission essential tasks, UTC mission capabilities, and wartime and contingency skills in all types of military operations. They are able to complete their missions at bare bases, main operating bases, joint bases, forward operating bases, collocated operating bases, and combat outposts. The Air Force sees these locations or installations in the context of an airfield, described as an area prepared for the takeoff, landing, and accommodation of aircraft (including any buildings, installations, and equipment required).

Most Services provide the capability to establish and maintain bases. However, each of those Services maintains core engineering capabilities stemming from its traditional roles to meet specific operational needs. Engineers have the capability of opening airfields, once secured by ground or host nation forces. Engineers have expertise in providing support to the maneuver of conventional and unconventional Air Force warfighters.

Furthermore, engineers enable airpower and spacepower operations in and through any environment via integrated base response and recovery. Engineers assist air and ground maneuver operations via the construction of expeditionary landing surfaces and structures to counter the effects of direct and indirect weapons through hardening.

Engineers possess organic general engineering capabilities involving the planning, building, maintaining, protecting, responding, recovering, sustaining, and closing of facilities and infrastructure on military installations that support CCDRs during steady-state conditions. The experience gained from performing these functions at home stations and during deployments, when complemented with task qualification, combat skills, career field, and UTC-specific training in the employment of contingency equipment, prepares Air Force engineers for the demands of contingency base operations, Service and joint staff duty, or theater engineer duties as tasked in any environment. The Air Force embeds military engineers, civilians, and contractors within the home station workforce. Providing general engineering, geospatial engineering, installation support and service, emergency services, engineer logistics services, and partnership building capabilities in this manner is a force multiplier. Mixing military (regular and Air Reserve Component), civilian, and contractor personnel creates an environment to leverage technical expertise and experience of long-term civilians to train military engineer forces, while simultaneously accomplishing the home station mission, which includes projecting airpower into multiple theaters simultaneously as well as ensuring readiness of the installation's primary weapon systems.

Engineer capabilities enable operational and tactical maneuver by supporting actions necessary for the commander to meet mission objectives. CE core operational pillars, structured to meet JFC and other operational requirements, are:

- ★ Prime BEEF.
 - ★ RED HORSE.
 - ★ Explosive ordnance disposal (EOD).
 - ★ Fire and emergency services.
 - ★ Emergency management (EM) and chemical, biological, radiological, and nuclear (CBRN) specialist teams.
 - ★ Other specialized teams.
 - ★ Staff augmentation teams.
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Chapter 2: CIVIL ENGINEER ORGANIZATION

ORGANIZATIONAL CONCEPTS

The CE enterprise consists of a total force mix of regular Air Force, Air Force Reserve, Air National Guard, and civilians. Air Force engineers are assigned or attached to organizations performing installation operations support, construction projects, and emergency response. Normally, the operational forces are organized as CE flights or CE squadrons, with several instances of CE groups. The institutional forces are organized in functions not aligned with the numbered units they deploy with at the installation level. These include higher than wing-level staffs, the Air Force Installation and Mission Support Center, the Air Force Civil Engineer Center (AFCEC), and the Air Force Institute of Technology. Civil engineers participate in training activities that support base and homeland operations, major commands, and numbered air forces, along with their subordinate wings. The CE leadership structure provides standardized guidance, training, equipment, and procedures through a corporate process. While at home station, civil engineers posture main operating bases for resiliency against possible attack by peer adversaries. Preparation and training at main operating bases are designed to protect and recover the bases and power projection platforms.

DEPLOYED ORGANIZATIONAL CONCEPT

Air Force civil engineers deploy as combat support units to provide general and geospatial engineering capabilities, protection, response, recovery, and sustainment across the competition continuum.

Prime BEEF and RED HORSE force deployments are executed through the joint deployment system and conducted using guidance issued by Headquarters Air Force. During deployments, civil engineer forces are part of an air expeditionary task force (AETF) and follow command relationships affecting all Air Force forces. Most deployed Prime BEEF engineer units support an air expeditionary wing construct. Engineers may be placed under the tactical control of a joint force engineer command structure if established by the JFC. The air component commander, through the appropriate organizational structure, normally retains operational control of Air Force CE units.

The organization of Prime BEEF and RED HORSE forces under a single Air Force engineering commander is an alternate operational structure to support air component commander requirements. Under this construct, limited theater-wide engineering forces can be leveraged to prioritize and mass engineering capabilities at the right time and place to meet demands. Maintaining unit integrity should be considered during design and planning. Unit integrity enables engineers who train together also to deploy together, providing the air component commander an integrated mission-ready team.

Under air component commander tasking, engineers can be deployed as a Prime BEEF, RED HORSE, or specialized capabilities. They train as organic units and remain fully prepared to deploy rapidly as a full UTC or as tailored force packages. UTCs are designed to provide the right set of capabilities and skill sets to meet mission requirements.

Prime BEEF organizations rapidly respond worldwide to offer a wide range of engineer support required that establish, operate, sustain, protect, recover, and reconstitute installations.

RED HORSE is a self-sufficient, mobile heavy construction unit capable of rapid response and independent operations in a contested peer or terrorist threat environment. They provide heavy repair and construction capability that exceeds Prime BEEF capabilities.

Chapter 3: CIVIL ENGINEER FUNCTIONS

Air Force civil engineers have dual roles in maintaining military readiness and providing support to the home-station installation, which also serves as a force projection platform supporting multiple operations. These roles are intricately related. The total force team works together to hone contingency skills while maintaining the installation.

Engineer functions are categories of related activities grouped to enable installation and air component commander missions. CE provides engineering support to home stations and throughout all phases of military operations, including airbase opening, establishing operating locations, force beddown, sustainment, recovery, transitioning, and closure of operating locations. CE reconnaissance capability is also embedded in the contingency response wings and AFCEC to perform airfield site assessments. These functions contribute to achieving operational and tactical objectives. These capabilities allow the air component commander and JFC to integrate, synchronize, and direct engineer operations.

Engineer functions can be grouped into key areas: general engineering, geospatial engineering, and installation support and services. These functions working in combination result in deliberate consolidation of power projection platform (PPP) readiness and status information, enabling air component commander and JFC decisions regarding application of airpower capabilities across the competition continuum. In effect, this information is a critical engineer function that enables the Air Force to operate from the PPP capabilities engineers provide. With the emerging potential of peer-contested environments at main operating bases, engineers are prepared to employ in place to support joint all-domain operations at home, as well.



**Bagram Airfield, Afghanistan:
405th Expeditionary Support
Squadron Civil Engineers execute
rapid spall repairs exercise.**

Engineers plan, build, maintain, protect, respond, recover, sustain, and close facilities and infrastructure on military installations. Trained engineers apply these skills across the competition continuum. Ready Airmen engineers provide all engineer functions at identified operating locations to protect and recover these PPPs to ensure mission capabilities.

GENERAL ENGINEERING

General engineering consists of engineer capabilities and activities that provide infrastructure; modify, maintain, or protect the physical environment; and respond rapidly to establish, sustain, and recover airbases. Examples include:

- ★ Planning.
- ★ Construction.
- ★ Infrastructure repair.
- ★ Infrastructure maintenance.
- ★ Storage area requirements.
- ★ Lines of communications (supply chain).
- ★ Protection of natural and cultural resources.
- ★ Terrain modification and reconstruction.

The general engineering requirements for an operation could exceed the capabilities of available military engineers. Air component commanders may need to employ a combination of military engineers, civilians, contractors, and multinational and host nation capabilities to fulfill these requirements based on the operational environment.

GEOSPATIAL ENGINEERING

Geospatial engineering provides capabilities and activities that portray and refine data about the geographic location and characteristics of natural and constructed features and boundaries. Geospatial engineering requires highly technical and specialized capabilities, which may include:

- ★ Nonstandard tailored map products.
- ★ Precision survey.
- ★ Geospatial data management.
- ★ Baseline survey data.



Civil engineers from the 379th Expeditionary Civil Engineer Squadron collect and use geospatial data.

- ★ Identification of significant cultural sites and natural resources.
- ★ Facility and infrastructure support.
- ★ Force beddown analysis.
- ★ Digital data.
- ★ Existing topographic product and other collateral data.
- ★ Geospatial engineer reconnaissance related to terrain, airfield, and site surveys.

Geospatial engineering supports operational needs through reconnaissance including terrain, airfield, and site surveys to assist the air component commander's decision cycle on general engineering efforts. Engineers can assist in the predictive analysis of terrain and weather system effects during planning and construction. Geospatial engineering personnel evaluate potential construction sites and perform field tests on soils, asphalt, and concrete.

INSTALLATION SUPPORT AND SERVICES

Engineers provide installation support and services necessary to support military forces, to include activities essential for effective real property lifecycle management and installation services. This capability focuses on managing real property facilities and infrastructure in the US and bases in other CCDRs' areas of responsibility while providing protection, safety, security, and sustainability for personnel and mission-critical built and natural assets. Installation support activities may take place before, after, or concurrent with general engineering activities. These actions apply across military operations and include real property life cycle management, operations, emergency services, and related activities.

REAL PROPERTY LIFE CYCLE MANAGEMENT

Engineers provide for planning, acquisition, recapitalization, disposal, and economic adjustment activities of real property assets to meet operational requirements.

- ★ **Planning:** With the mission owners, engineers identify mission priorities and the most pressing needs for Air Force or joint installations and then translate plans into base infrastructure through a combination of real estate, basing, and facility options. Effective planners understand the requirements. They look to the future created by high technology weapons systems and new operational concepts, including cybersecurity concerns. Planning:
 - ★★ Focuses on base layout, environmental factors, infrastructure, and necessary subsystems, ensuring all requirements meet theater construction standards.

- ★★ Provides a logical progression of facilities and infrastructure development that fits together with provisions for long-range growth or mission realignment and issues such as flexibility, redundancy, resilience, and survivability.
- ★★ Maintains awareness of base support plans to identify resources and shortfalls required to support specific operation and concept plans.
- ★★ Includes research, development, and funding needed to provide mission-capable facilities.
- ★★ Takes into consideration force protection concerns wherever bases are to be developed.
- ★ **Acquisition:** Engineers translate base plans into infrastructure through a range of real estate, basing, and facility options. Engineers work with contracting and legal functions to purchase, lease, construct, or gain installation assets. An acquisition can include land, natural resources, buildings, structures, portable facilities, airfields and roads, installed equipment, and all interests in the property.
- ★ **Recapitalization:** Using asset management principles, engineers restore, modernize, and replace installation assets to meet mission requirements and comply with construction standards and statutory / regulatory requirements.
- ★ **Disposal of Installation Assets:**
Disposal actions may become necessary when facilities and infrastructure deteriorate beyond the point of economical repair, become a safety hazard, interfere with new construction, or are no longer capable of meeting mission requirements and disposal will not create a deficiency. Engineers do this by any authorized method (e.g., demolition, transfer) of permanently divesting the Department of Defense (DOD) of accountability for, and control of, a real property asset of the United States.
- ★ **Economic Adjustment:** The engineering enterprise also assists communities impacted by base beddown, realignment, expansion, closure, or other significant military operations, to include assessing hardships, evaluating alternatives for local recovery, identifying resource requirements, creating action plans, and implementing mitigation measures approved by the appropriate authority. Engineers in an expeditionary environment work with the Department of State (DOS) to assist



Demolition of 325th Fighter Wing Chapel

communities in mitigating adverse impacts of military operations, promote local cooperation, and further US-host nation relations. At enduring bases, measurable reduction or expansion of operations requires coordinating actions with the US Office of Economic Adjustment (for locations within US territory) or the DOS (for locations outside US territory).

OPERATIONS

Continuing the real property cycle, engineers bridge the gap between new facilities and those at the end of their life cycle by employing smart and secure asset management principles to operate and sustain facilities and infrastructure.

- ★ **Installation Operations:** Engineers operate and maintain the infrastructure necessary to support missions. The requirement is to balance mission effectiveness versus the efficient performance of infrastructure supporting base activities. They provide functional real property installation assets with utilities such as energy, water, and disposal of wastewater, and provide contract and real property management, pollution prevention, and other essential services.
- ★ **Sustainment:** Regular surveys of base layout, facilities, infrastructure, and equipment are conducted to enhance force protection and strengthen the combat capability of the base. Environmental and energy conservation and reduction plans are developed to protect the population's health, preserve the environment, and reduce waste. These include natural and cultural resources by practical assessment, maintenance, and repair of current assets and planning for future missions. Maintenance requirements are prioritized, taking into account resources, cost, timing, energy efficiency, operational need, reliability, maintainability, environmental impacts, safety, and quality of life.
- ★ **Utilities:** Engineers provide production, infrastructure, and distribution for electrical and water or wastewater systems. They plan and build backup and redundancy in utility systems to minimize impacts and ensure continued supply to key missions. These utilities and services include power production with high and low voltage systems; well drilling, water storage, and water treatment; collection and treatment or disposal of wastewater; and pest management.
- ★ **Cybersecurity:** Control systems with integrated hardware and software designed to monitor and control the operation of equipment, infrastructure, or associated devices are growing in capability within Air



**Renewable energy reduces
carbon footprint at the 436th
Airlift Wing**

Force facilities. These systems are a critical part of automation and are used extensively to optimize resources supporting nearly all aspects of Air Force core mission areas. However, modernization requirements expose control systems, data infrastructure, and underlying networks to cyberspace threats. Engineers integrate cybersecurity assessments and best practices throughout facilities planning, design, commissioning, and sustainment lifecycles to reduce or eliminate threats and vulnerabilities through control systems access. Tailored and verified cybersecurity solutions for specific control system environments ensure the ability to respond to threats, absorb cyberattacks, and recover to normal operations.

EMERGENCY SERVICES

Air Force emergency services include fire emergency services (FES), EOD, and EM activities. These activities protect the base from intentional or unintentional damage, minimize loss of life, and protect property and the environment.

★ **Fire and Emergency Services:**

Engineers provide facility protection through a robust fire prevention program. They provide asset protection through a series of facility systems and fire response capabilities. They provide personnel protection by responding to emergencies and provide immediate pre-hospital care. In many cases, they respond to calls for mutual aid with local communities and jurisdictions.



Team Offutt battles floodwaters

★ **Explosive Ordnance Disposal:** EOD mitigates hazards to personnel and property posed by weapons and explosive materials in all physical domains, at the home station and in the contingency environment. Their responsibilities range from small arms cartridges to nuclear weapons. EOD serves roles in defense support of civil authorities (DSCA) response as they execute military units' requirements to dispose of all military munitions discovered in the community, as well as the Joint EOD Very Important Person Protection Activity, providing counter-explosive search teams in support of the United States Secret Service, Department of Homeland Security, and Department of State.

★ **Emergency Management:** Emergency managers are multi-skilled engineers specialized in providing all-hazards emergency management and countering weapons of mass destruction consequence management. They are postured to operate across the competition continuum at home and abroad. They are critical in the prevent, protect, respond, and recover realms. Their responsibilities include integrated risk management, all-domain installation command and control (C2), force development, building partnership capacity, DSCA, and emergency response to nuclear weapon accidents and international CBRN response.

OTHER RELATED ACTIVITIES

Engineers provide additional services to the installation at contingency locations and to advance CCDR steady-state campaign objectives. These tasks are aligned with other joint functions.

- ★ **Contingency Base Services:** An engineer activity that supports logistical services. Examples include shelter beddown, water, waste management, hygiene services, and liquid fuel capabilities. When Air Force forces are deployed in support of major operations where beddown and sustainment support is unavailable, the supported command, Service, or agency provides logistical sustainment requirements.
- ★ **Building Partnership Capacity:** Engineers execute a wide array of programs and integrate those programs into solutions that contribute to accomplishing national security objectives. These programs are designed to advance partner nation (PN) capacity and capabilities through the provision of training and equipment. They include a series of humanitarian-based programs that provide DOD the ability to accomplish national security objectives through military-civilian engagement. Engineers can provide C2 structures while working alongside local engineers and US Government (USG) agencies and nongovernmental organizations (NGOs). Engineers support development of the air component commander's campaign support plan and operations plans designed to shape the steady-state environment in support of a CCDR's campaign plan. Engineers facilitate security cooperation through the exchange of knowledge, technology, and personnel. Providing engineering and construction expertise to PNs assists an air component commander's, JFC's, or CCDR's ability to influence and maintain access in critical regions and helps build PN capability and capacity in essential services. Civil engineers advise, assist, train, and enable PNs to promote themselves as well as support third nation requests. Building this combined warfighter capability ensures that other nations can contribute to an international engineer warfighting mission.
- ★ **Theater-level C2 and Specialized Technical Expertise:** Reserve component engineers provide specialized technical expertise gained as practicing engineers when not in uniform. Their industry contacts and specialized experience infuse the Air Force with critical competencies for planning and coordinating theater-level engineering activities, including C2, in a cost-effective manner.
- ★ **Power Projection Platform Readiness and Status Information:** Within the context of the joint function of information, engineers consolidate and provide critical PPP readiness and status information throughout C2 actions. Engineers posture this information in support of air component and combatant command future plans (readiness) and current operations (status). Furthermore, this Information directly supports the JFC's ability to integrate, synchronize, and direct joint operations primarily concerning fires, movement and maneuver, sustainment, and force protection. In simplest terms, if a disaster or enemy attack compromises and degrades PPP capability, engineers ensure tactical, operational, and strategic levels

are informed to support operational decision making (e.g., adjust the air tasking order, time-phased force deployment data flow, availability of alternate PPPs, etc.).

Chapter 4: CIVIL ENGINEER TEAMS

As part of an organized force, Air Force engineers are presented in teams with varying capabilities who contribute general engineering, geospatial engineering, and emergency services to several joint functions including sustainment and protection. Teams are generally presented as Prime BEEF (including emergency services) or RED HORSE.

PRIME BEEF

Prime BEEF teams consist of total force personnel with Air Force CE specialties and capabilities. These teams are capable of responding worldwide in support of agile combat employment to provide engineering expertise and emergency services needed to establish, sustain, protect, and recover bases for the employment of Air Force weapon systems supporting joint, interagency, and multinational operations.

Prime BEEF core competencies are expeditionary general engineering and emergency services. Expeditionary engineering consists of those capabilities Prime BEEF teams provide to establish, sustain, and recover bases, while emergency services include FES, EOD, and EM activities. Prime BEEF units can deploy as part of an AETF to establish and maintain all types of joint operating locations throughout the operational area.

Prime BEEF capability consists of activities to establish, sustain, protect, and recover airfields and conduct force beddown operations, infrastructure maintenance, base sustainment activities, and force protection, with the focus on the following capabilities:

- ★ Installation development planning, project programming, and design; construction project and contract management; and construction quality assurance.
- ★ Light horizontal and vertical construction.
- ★ Construction of temporary, semi-permanent, or permanent facilities.
- ★ Installation Geospatial Information and Services (GI&S).
- ★ Recover the installation after an attack, to include repairs to facilities and infrastructure systems.
- ★ Infrastructure support.
- ★ Power generation and distribution systems.
- ★ Utility system installation and maintenance.
- ★ Airfield surfaces maintenance.

- ✧ Operating and maintaining aircraft arresting systems.
- ✧ Airfield lighting and emergency airfield lighting systems.
- ✧ Remote area lighting.
- ✧ Heavy equipment operations.
- ✧ Road construction and repair.
- ✧ Concrete and asphalt paving.
- ✧ Pest management and environmental services.
- ✧ Cybersecurity of industrial control systems.
- ✧ Collective protection operations and support.
- ✧ Structural firefighting.
- ✧ Aircraft rescue and firefighting.
- ✧ Disposal of unexploded ordnance or improvised explosive devices (IEDs).
- ✧ Emergency operations center operations.
- ✧ CBRN defense.

PRIME BEEF SPECIALIZED TEAMS

- ✧ Airfield damage assessment teams (ADAT) check and report the condition of the installation's airfield after an attack or disaster to provide leaders with instant visibility.
- ✧ Rapid airfield damage recovery (RADR) teams span most engineer specialties to include some specific logistics readiness specialties. It encompasses all actions required to rapidly repair runways and runway support structures to recover operations on an airfield after an attack.
- ✧ Damage assessment and response teams (DART) provide damage assessments, reporting, and repair or demolition estimation for critical installation facilities, utilities, and infrastructure.
- ✧ CBRN reconnaissance teams deploy to detect, identify, quantify, and collect CBRN material to presumptively confirm the presence of a CBRN agent.

GEOSPATIAL ENGINEERING (GI&S)

Capabilities provide terrain, geographic, line-of-sight, base expeditionary airfield resources (BEAR) base beddown; aircraft parking analysis; terrain visualization; general, baseline, expeditionary, and precision surveys; general and special purpose map products; and data management of the built and natural infrastructure.

EMERGENCY SERVICES

Services include FES, EOD, and EM activities. These activities protect the base from intentional or unintentional damage, minimize loss of life, and protect property and the environment.

- ★ FES provides incident management, fire prevention, and protection to minimize loss to lives, property, and the environment occurring throughout all phases of military operations based on the following specializations:
 - ★★ Fire suppression.
 - ★★ Hazard mitigation.
 - ★★ Rescue.
 - ★★ Mitigation or containment of hazmat releases.
 - ★★ Emergency medical responses.
- ★ EOD can be employed alone or as part of an Air Force, joint, interagency, or coalition force to support JFC or air component commander objectives. EOD provides Air Force and joint commanders the capability to mitigate or defeat enemy or friendly explosive hazards, including CBRN, incendiary or homemade explosives, and IEDs. It provides expertise to protect the mission, resources, and the environment in airfield operations, ground combat, homeland operations, Defense Security Cooperation Agency, and worldwide contingencies to include traditional and irregular warfare operations. EOD flights provide very important persons protective support counter-explosive search teams in support of the US Secret Service and DOS.
 - ★★ Primary support to airbase operations, missions sortie generation, and force protection by eliminating explosive threats to airfield operations.
 - ★★ Support of base security zones and EOD missions outside the base security zone in support of air operations or land operations, enabling freedom of maneuver.

- ★★ Weapons technical intelligence investigating explosive events to capture bomb emplacements, identify bomb builders, and unravel extremist networks.
- ★ EM personnel can be employed alone or as part of an Air Force, joint, interagency, or coalition force to support JFC or air component commander objectives. Emergency managers provide the Air Force and joint commanders an all-hazards emergency management and countering weapons of mass destruction (CWMD) consequence management capability. They provide expertise to protect, prepare, respond, recover, and mitigate natural, man-made or technological hazards occurring across the competition continuum.
- ★★ Primary core all-hazards mission area tasks include education and training, C2, incident response and recovery, and integrated risk management.
- ★★ Primary core CWMD consequence management tasks include building joint and combined partner CBRN defense interoperability, providing CBRN warning and reporting, and domestic and international CBRN response.

RED HORSE

RED HORSE organizations are manned and equipped to provide highly mobile, rapidly deployable echelons to support force beddown and provide airfield and base heavy construction and repair capability, along with many specialized capabilities that allow the JFC to move and support missions as operations dictate at any level of global competition. RED HORSE teams achieve high mobility through air insertion, air delivery, or surface transportation. Some inherent specialized capabilities include water-well drilling, explosive demolition, quarry operations, rock crushing, concrete and asphalt batch plant operations, material testing, contingency airfield evaluations, and concrete and asphalt paving. RED HORSE provides CCDRs with a highly mobile heavy construction force capable of independent operations to meet theater construction requirements. These organizations contain self-sustaining logistical support for vehicle maintenance, secure communications, food service, supply, security, and medical support with additional Air Force specialties other than engineers. This support allows the unit to operate independently for 30 days with resupply to sustain continued operations.

RED HORSE maintains other vital capabilities, which include initial site survey assessment or assessment of a site for CBRN materials, removal or demolition of obstructions, expedient force protection construction, repair of airfield surfaces for limited airlift operations, testing for potable water sources, and performance of airfield pavement assessment evaluations. RED HORSE forces can be augmented by EOD to conduct limited clearance of unexploded explosive ordnance, IEDs, and other explosive hazards, and by FES to perform limited firefighting, rescue, and emergency medical services.

During peacetime, continental US-assigned regular Air Force RED HORSE units report to the 800th RED HORSE Group. Pacific Air Forces (PACAF)-assigned RED HORSE units report to the 36th Contingency Response Group. Air National Guard (ANG)-assigned RED HORSE units report to ANG/A4X and Air Force Reserve Command-assigned RED HORSE units report to the 622d Civil Engineer Group. During contingency operations, RED HORSE units are normally used as a theater asset reporting to the air component commander or an engineer commander with theater-wide responsibilities. RED HORSE provides the air component commander a dedicated, flexible airfield and base heavy construction and repair capability along with many unique capabilities that allow the JFC to move and support missions as the operation dictates.

AIR FORCE-LEVEL SPECIALIZED TEAMS

The CE enterprise has other specialized teams working across installations. While not precisely aligned with Prime BEEF or RED HORSE, they are organized to support both home station and contingency installations.

- ✧ Civil Engineer Maintenance, Inspection, and Repair Team (CEMIRT). CEMIRT provides intermediate and depot-level repair support for power generation, electrical distribution, and aircraft arresting systems. CEMIRT also offers technical support for heating, ventilation, and air conditioning systems and electronic industrial controls and monitoring systems for infrastructure elements.
- ✧ Airfield pavement evaluation (APE) teams provide technical inspection and evaluation of airfields across the globe, testing the strength and condition of airfield pavements.
- ✧ Base expeditionary airfield resources (BEAR) base teams provide technical expertise on war reserve material (WRM) assets. The 635th Materiel Maintenance Squadron (MMS) is the pilot unit for BEAR UTCs and advises on acquisition of BEAR assets in support of Air Force forces requirements. The 635 MMS provides expertise associated with planning, set-up, and employment of BEAR assets in a contingency environment where little or no infrastructure exists. The 635 MMS is the sole training location in the construction, inspection, maintenance, and repair of large area shelters to ensure life cycle management of these assets. As enablers, 635 MMS engineer teams deploy to support JFCs when needed and can employ rapid response teams for camp beddowns and recovery efforts after natural disasters where WRM assets may be required.
- ✧ AFCEC's Airbase Technologies Branch performs research and development, and fielding for civil engineering to close capability gaps with new equipment and materials to meet national defense objectives.

THEATER-LEVEL SPECIALIZED TEAMS

- ★ Staff augmentation teams (S-Teams) provide command staff augmentation for engineer management, technical design, construction management, and C2 during contingency planning and operations to synchronize the air component commander's global response commitments. S-Teams are aligned with the air component commander for theater- and operational-level capabilities at PACAF, US Air Forces in Europe, and Air Forces Central. They advise the air component commander on engineering-related issues affecting the JFC, provide input on global campaign plans, including theater posturing and infrastructure master plans to project airpower. They conduct operational area and environment assessments contributing to both planning and intelligence preparation of the operational environment.
-

Chapter 5: CONTINGENCY OPERATIONS

Engineer units are manned with both civilian and military members. Together, they are equally responsible for contingency operations at the home station. The civilians remaining at the home station are able to conduct the same activities to protect, respond, and recover from a full spectrum of threats, both man-made and natural. The military are ready to deploy to other contingency locations to perform missions. These missions away from the home station are considered expeditionary engineering missions.

EXPEDITIONARY ENGINEERING

Air Force expeditionary engineering capability consists of engineers' activities to open, establish, operate, sustain, protect, recover, and close bases. It can operate at any level of global competition, including agile combat employment scenarios. It focuses on operating and maintaining aircraft arresting systems; airfield lighting; heavy equipment; airfield surfaces; roads; and temporary, semi-permanent, or permanent facilities and includes the specialized capabilities of power generation and distribution

systems. Teams perform horizontal and vertical construction; provide pest management and environmental services; provide overall installation development planning, design, and contract support, to include specialized augmentation at echelons above wing level; and conduct base response and recovery, to include airfield damage repair and repairs to facilities and infrastructure systems. Engineers can deploy in large squadron-sized formations or as small as two-person teams. Engineers are able to move around the battlespace using air or ground transportation. Engineers are fully qualified and proficient in their weapons and are able to provide work party security and participate in integrated base defense.

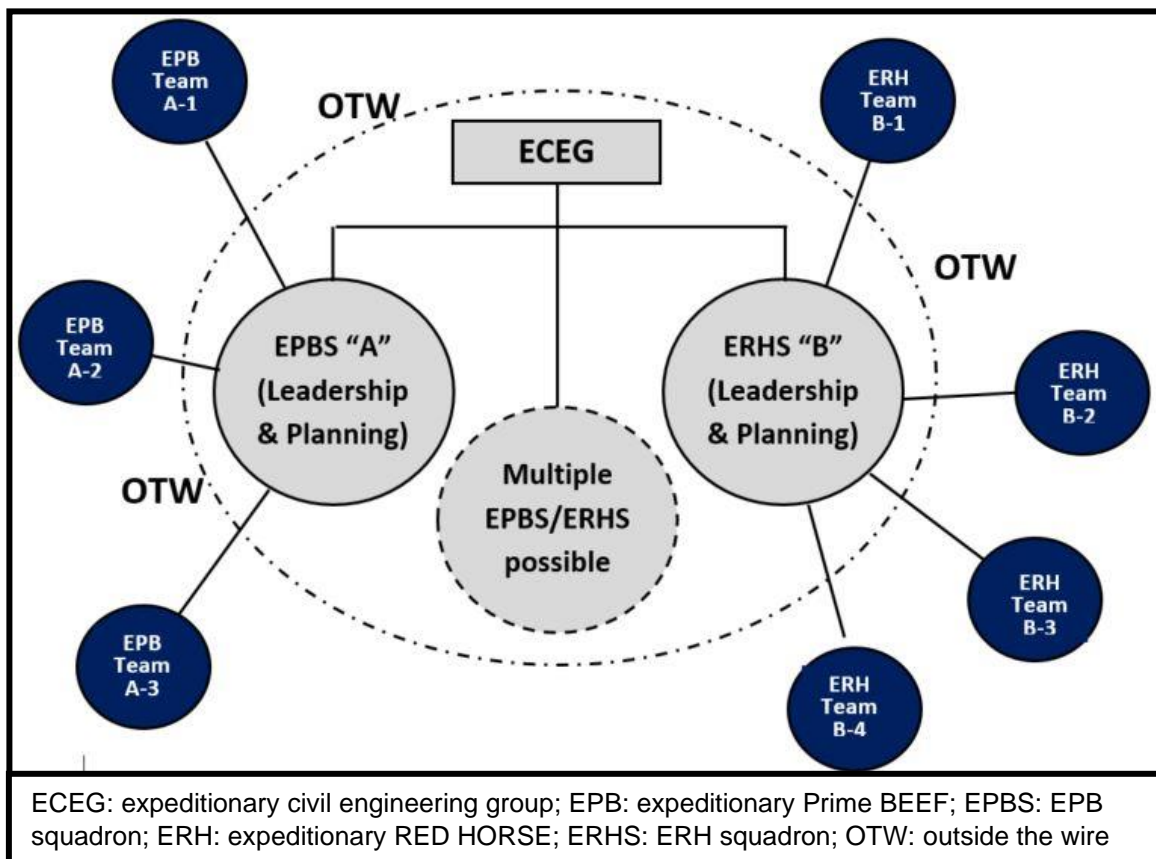
Expeditionary engineer units are normally organized as an expeditionary civil engineer squadron (ECES) or flight as part of an air expeditionary wing. The ECES is normally assigned as the general engineer and emergency services support to a specific installation. This expeditionary organization mirrors the home station squadron with the normal flights in the unit. Engineers can also be presented as an expeditionary civil engineer group (ECEG). An ECEG can be organized in a hub-and-spoke configuration with direct reporting to the air component commander.



Readiness Challenge 2019

HUB-AND-SPOKE CONFIGURATION

This configuration provides unity of command and effort while offering robust installation engineering, master planning, project management, and repair and construction, as illustrated in “Expeditionary Civil Engineering Group Hub and Spoke Configuration.” CE forces support theater plans, joint engineer constructions, or sustainment. They provide robust capabilities for contingencies and other operating locations, focusing on priorities and maximizing the efficiency of limited engineering resources. This allows Air Force engineer leadership increased responsiveness, flexibility, and theater-wide integration of engineer forces to ensure the most efficient and effective use of assets in meeting the air component commander's priorities.



Expeditionary Civil Engineering Group Hub and Spoke Configuration

An ECEG provides construction and repair capability throughout the combatant command area of responsibility when requirements or threat levels exceed assigned engineer unit capabilities. Additionally, ECEGs provide a model to meet theater engineer requirements through effective and efficient engineer capabilities. The ECEG can be used to surge engineer capability to existing or new locations and provides an immediate engineer response force.

An ECEG can be comprised of regular Air Force, Air Force Reserve, and Air National Guard members. The ECEG can range in size and can provide more than 600 engineers to meet a full range of mission requirements. The group consists of a group

staff, one or more Prime BEEF squadrons, and one or more RED HORSE squadrons. Within the hub-and-spoke structure, each expeditionary Prime BEEF squadron (EPBS) and expeditionary RED HORSE squadron (ERHS) has its leadership and planning function for the hub located with elements at spoke locations as required.

CONTRACT SUPPORT

Contingency operations beyond initial beddown and support could not be accomplished without contract support. AFCEC runs the Air Force Contract Augmentation Program (AFCAP) that provides a critical capability to augment civil engineering government capability involving natural disasters, humanitarian relief, and military operations. AFCAP can respond within hours under emergency situations. AFCAP contract support provides design/construction, commodities, and support services for all civil engineer missions (less mitigation of unexploded ordnance) and most other Air Force combat support missions (aircraft maintenance, food services, etc.).

Chapter 6: INTEGRATED BASE RESPONSE AND RECOVERY

Engineers receive specialized training to recover installations. This training includes basic medical training, casualty collection, closing gas valves, isolating electrical breakers, etc. Additionally, all units identify and train Airmen as teams to conduct post attack reconnaissance. These skilled teams are eyes and ears of C2 once an attack or event is over. They provide invaluable information in determining a response. Engineers lead the integrated base response and recovery (IBRR) efforts for the installation and direct other units, teams, and personnel to restore operations.

INTEGRATED BASE RESPONSE AND RECOVERY

Knowing how to prepare, respond, and recover an installation from any event is vital to the installation mission during any level of global competition. Engineers are proficient in executing their part of IBRR actions. IBRR's focus is restoring mission (operational and support) capabilities after a damaging event, which causes a degradation of the installation's missions. Damaging or mission-impacting events range from natural and man-made disasters to CBRN, kinetic, and cyber attacks. Engineers are trained and ready to perform life-saving measures, and prioritize and conduct expedient repairs.



Hurricane Michael makes a direct hit on Tyndall AFB, 10 October 2018

Engineers are typically assigned to specialized teams to perform several critical functions for IBRR. The DARTs conduct rapid evaluations and inspections for each facility. The team is responsible for determining if a building is safe enough to occupy, and if not, to decide what restrictions to place on its use or re-entry. An ADAT surveys airfields for damage, such as craters and unexploded ordnance. They coordinate with the minimum operating strip selection team and optimize repair time and efforts to launch mission aircraft as soon as feasible. CBRN reconnaissance teams deploy and maintain the base CBRN detection network and conduct post-attack reconnaissance of the installation. These teams coordinate with C2 nodes and enable rapid threat assessments and safe mission accomplishment, repair damage, and return the installation to an operational condition.

RAPID AIRFIELD DAMAGE REPAIR

Emerging threats drive engineers to improve airfield damage repair equipment and tactics, techniques, and procedures (TTP) for airfield recovery. Adversaries continuously seek to counter Air Force mission strengths using the anti-access and area denial (A2/AD) approach. Engineers are expected to respond to attacks that could leave hundreds of craters and thousands of unexploded explosive ordnance (UXO) on an airfield. Modernization of RADR addresses these threats and provides the capability to recover the airfield within a drastically reduced timeframe. Engineers continue to seek opportunities to improve RADR processes as adversaries continue to advance their A2/AD. Equipment, materials, and TTPs provide effective and robust crater repair capabilities that maximize available aircraft sortie generation, while minimizing mission downtime. The Air Force maintains the ability to rapidly recover damaged airfield surfaces to continue air operations after an A2/AD attack at locations with various manpower levels to receive and launch all airframe types. This capability becomes even more vital when agile combat employment is in play.

DISASTER RESPONSE AND LIMITED CONTINGENCY OPERATIONS

Engineers can respond anywhere to crises or limited contingencies. Initial engineering assessments are critical to identifying available support and other resources needed to meet anticipated requirements based on the situation. Plans are tailored to the actual capability required for the response. Tasking only those capabilities needed reduces the burden on the deployment system and minimizes the engineering footprint. As operations continue, some efforts may transfer to contractors, local governments, other federal agencies, or host nations. AFCAP can provide an additional tool augmenting the initial response and short-term recovery efforts.

Chapter 7: OPERATIONS ACROSS THE COMPETITION CONTINUUM

Focusing on engineer planning, execution, and assessment functions may require special efforts based on the type of operation support. This focus also describes the skills Air Force civil engineers provide throughout the competition continuum. These military operations require engineers to understand the situation and apply the best engineering solutions. Engineers are active in all phases, from shaping the theater to returning control to civil authority. Engineers understand these differing military operations and apply critical thinking skills to enable the mission.

ENGAGEMENT, COOPERATION, AND DETERRENCE

Engineer planning, execution, and assessment for engagement, cooperation, and deterrence operations are similar to those activities required in support of other military operations. However, engineers should be familiar with different C2 structures, different cultures, and different languages while working alongside local engineers, USG agencies, and NGOs. Engineers support the development of the air component commander's support plan and country plans designed to shape the steady-state environment in support of a CDR's or other JFC's campaign plan.

SECURITY COOPERATION

Engineers facilitate security cooperation through the exchange of knowledge, technology, and personnel. Providing engineering and construction expertise to PN's assists a CDR's or other JFC's ability to maintain access in influential critical regions. It helps build PN capability and capacity in essential services. Engineers advise, assist, train, and enable PN's to promote themselves as support to third nation requests.

FORWARD PRESENCE AND FORCE PROJECTION

Engineers support both forward presence and force projection as deterrence options. Engineers establish and maintain basing platforms, including forward operating bases and combat outposts, to project airpower. These bases may be permanent, semi-permanent, or temporary, depending on US international agreements and the JFC's intent. Engineers support these operations with smaller, tailored teams. As agile combat employment becomes a more necessary aspect of Air Force operations, engineers will be called upon to perform their duties in direct support of such operations.

HOMELAND OPERATIONS

Engineer planning for homeland operations differs from major operations planning in coordinating planning efforts between installations and the community. All other aspects of engineer beddown planning remain the same for homeland humanitarian and disaster response or contingency operations.

Additionally, engineers support joint task forces with DSCA in the immediate aftermath of natural or man-made disasters. When military support to civilian operations are approved, engineers assist federal, state, local, and tribal emergency response agencies. Engineers support the Federal Emergency Management Agency by providing beddown support as an incident support base, or when the DOD establishes a base support installation, to help recover communities and missions as needed.



National Guard response to flooding

FOREIGN HUMANITARIAN ASSISTANCE

Engineer competencies developed for wartime also lend themselves exceptionally well to assisting NGOs during a humanitarian crisis. When a response is authorized, engineers respond with the following capabilities:

- ★ Plan and construct surface transportation systems.
- ★ Drill wells.
- ★ Clear debris.
- ★ Dispose of solid waste.
- ★ Provide sewage treatment.
- ★ Provide flood control.
- ★ Construct relief centers and camps for dislocated persons.
- ★ Provide environmental management to control hazardous waste and disposal.
- ★ Provide potable water production and distribution.
- ★ Provide emergency power and lighting.
- ★ Restore public facilities and transportation routes.
- ★ Provide incident command and emergency response.
- ★ Construct temporary facilities for governmental services and others as required.

In supporting NGOs, it is critical to establish effective communications with an engineering liaison to coordinate and execute engineering support. Based on the severity of a disaster, the level of support provided can be limited or involve specialized Prime BEEF or RED HORSE capabilities.

NUCLEAR OPERATIONAL INFRASTRUCTURE

Engineers maintain critical infrastructure and emergency services in support of the nuclear enterprise. Engineers provide nuclear incident response, render safe capabilities, decontamination expertise, and consequence management expertise. For additional information, see AFDP 3-72, [*Nuclear Operations*](#).

IRREGULAR WARFARE OPERATIONS

Engineers building partnerships outside a secure area should be familiar with culture and languages while working with local nationals or combined forces. Engineers maintain the ability to assist communities in restoring essential services and becoming self-sufficient, reducing their dependence on insurgents and reinforcing US support for the PNs. Commanders should consider employing the local populace to accomplish some tasks even while it may be more efficient for engineers to accomplish the tasks on their own over the long term.

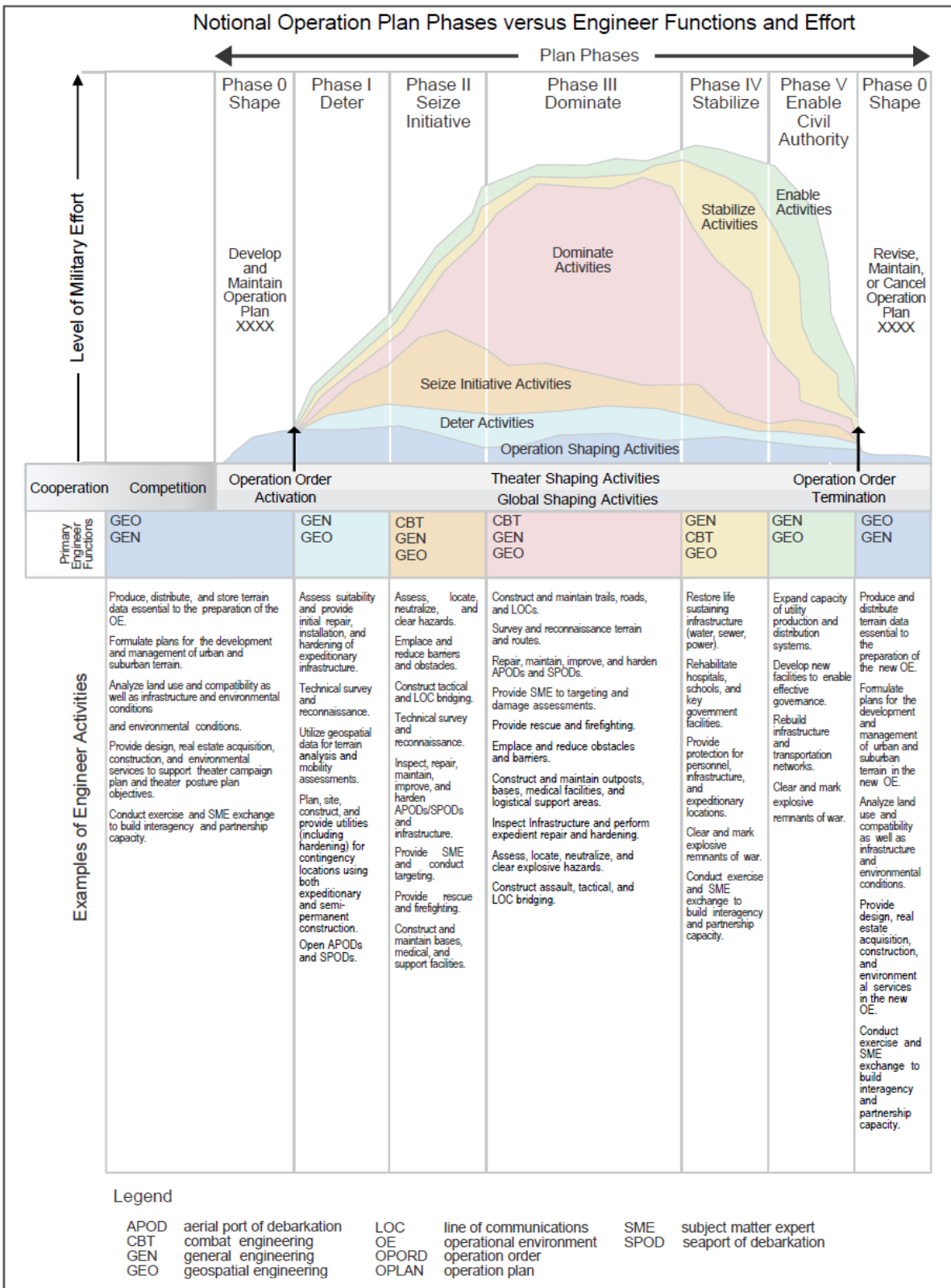
FOREIGN NATION STABILITY ACTIONS

This capability requires a different approach to planning. Stabilization tends to be of long duration, requiring sustained support of forces and significant resources. Engineers may be working within communities in high-threat areas, making force protection a critical aspect of planning. Engineers assist local communities by providing emergency services and restoring essential services such as:

- ★ Electrical power.
- ★ Potable water production.
- ★ Sewage treatment.
- ★ Expedient repair of critical infrastructures, like shelters, clinics, schools, and roads.

Engineers also focus on permanent infrastructure development (e.g., roads, railways, airports, electrical power sectors, and municipal services). These projects should employ local populations and contribute to stabilization. While executing stability actions, the engineers focus on training host-nation personnel and assist local communities in sustaining themselves. It is essential to involve the host population in all stages of the construction process, including planning, construction, maintenance, and operation of any facilities and infrastructure. Without host community support, the

infrastructure provided may lack long-term value and purpose and may ultimately be a waste of resources.



Engineer Support by (Notional) Joint Phase

TRADITIONAL WARFARE

Engineers provide a component of combat support to the air component commander during military operations. Engineers provide sustainable installations as PPP through general, geospatial engineering installation support, installation services, emergency services, and building partnerships support across the full mission spectrum. See the chart above, “Engineer Support by (Notional) Joint Phase.”

Chapter 8: CIVIL ENGINEER MODERNIZATION

Engineers are innovative in their approach to problem solving. They seek effective and efficient solutions to problems across the doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy lines of effort. Modernization of CE capabilities, infrastructure, equipment, and TTPs (to include the CBRN defense areas) is essential to keeping pace with peer competitors. Infrastructure that provides redundancy, resiliency, and flexibility is critical to maintaining power projection capabilities in a highly contested environment. Smarter, more efficient practices reduce waste and promote the economy of assets. Emerging advances in control systems provide efficiencies in energy savings and monitoring, but potentially open up avenues for cyberspace attacks. Modernization enables the Air Force to outpace its competitors through industry technological innovations and increased resiliency. Estimated funding, contracting, and execution timelines for Class IV material (construction and barrier materials, like lumber, nails, barbed wire, and sandbags) and construction contract support help develop clarity for engineering projects.

AFCEC's Civil Engineer Capability Requirements, Research and Development, and Acquisition Division within the Readiness Directorate takes input from multiple sources to drive innovation, research and development to field new capabilities to the civil engineer Airmen at home station and during contingency operations.

APPENDIX A: PRIME BEEF AND RED HORSE CAPABILITIES

This appendix describes the capabilities of Prime BEEF and RED HORSE teams when organized, trained, and equipped to support military operations. These are consistent with established precepts, typical operational plan phases, Air Force CE wartime task standards, and current joint engineer operations.

It is important to differentiate between primary and secondary capabilities listed in the table below. A primary capability (P) is one in which the ability to perform the function is organic to the unit and is a specified task within the unit mission; the unit is also equipped and trained to accomplish the task. A secondary capability (S) is one in which the unit has a limited ability (training, expertise, equipment) to achieve the task.

Note: Planners should refer to *Air Force War and Mobilization Plan-1, Basic Plan and Supporting Supplements*, CE Supplement, and the *CE Unit Type Code Guide* for planning purposes. These documents describe the capabilities listed in more detail—reference Appendix B for more detailed capability descriptions.

KEY	
P-	Primary capability
S-	Secondary capability
1-	Prime BEEF Construction Trades
2-	RED HORSE
3-	Prime BEEF Explosive Ordnance Disposal (EOD)
4-	Prime BEEF Fire Emergency Services (FES)
5-	Prime BEEF Emergency Management (EM)
6-	Prime BEEF Specialized Team
Task	Type
ENGINEERING	
General Engineering	
The ability to develop, rehabilitate, and maintain bases and installations by providing design, real estate, construction, and environmental services, which extend through final disposition. Base development is accomplished through a process of planning, programming, project development, design, and construction.	
Base Denial	P _{1,2,3,4,5}
Batch Plant Operations	P ₂
Contingency Contract Management	P _{1,6} S ₂
Engineer Recon/Site Survey	P _{1,2}
Explosive Demolition Operations	P _{2,3} S ₁
Provide Technical Engineer Advice	P _{1,2,3,4,5,6}
Quarry Operations	P ₂
Staff Augmentation (Air component commander staff)	P ₆
Targeting Assistance	P _{1,6} S ₂

Develop and Maintain Facilities The ability to develop, rehabilitate, and maintain bases and installations by providing design, real estate, construction, and environmental services, which extend through final disposition. (Joint Capability Areas [JCAs])	
Area Lighting	P ₁ S ₂
Asphalt Paving Operations	P _{1,2}
Installation Management	P ₁
Berm and Dike Construction	P _{1,2}
Concrete Paving Operations	P _{1,2}
Construct Temporary Facilities	P _{1,2}
Construction Materials Testing	P _{1,2}
Construction Surveying	P _{1,2}
Cybersecurity of CE industrial control systems	S ₁
Disease Vector Surveillance/Control	P _{1,5} , S ₂
Erect Expeditionary Facilities	P _{1,2}
Expedient Locksmith	P ₁
Fire Protection Systems	P ₁ S ₄
Horizontal Construction	P ₂ , S ₁
HVAC/Refrigeration Systems	P ₁
Lightning Arresting Protection	P ₁ S ₂
Installation Development Planning	P _{1,6}
Passive Defense Measures	P _{1,3,4,5} S ₂
Pest, Animal, and Vegetation Control	P ₁ S ₂
Power Generation/Distribution Systems	P _{1,2}
Project Management & Execution	P _{1,2,6}
Project Planning & Programming	P _{1,2,6}
Service Contract Management	P ₁
Vertical Construction	P _{1,2}
Waste Collection/Disposal Systems	P _{1,2}
Waste Water Collection/Disposal Systems	P ₁
Water Production/Distribution Systems	P ₁ S ₂
Well drilling (up to 1500 feet)	P ₂
Establish Lines of Communication (Airfield) The ability to assess, construct, repair, and improve routes, railroads, intermodal facilities, and supporting infrastructure allows the speedy flow of personnel, supplies, and equipment into the theater and forward to tactical units.	
Aircraft Arresting System	P _{1,2,6}
Airfield Damage Assessment/Repair	P _{1,2,3,5}
Airfield Lighting and Marking	P ₁
Airfield Pavement Evaluation	P _{1,6} S ₂
Asphalt/Concrete Milling Operations	P ₂
Asphalt/Concrete Paving Operations	P ₂ S ₁
Installation Management	P ₁
Improve Airfields	P _{1,2}

Limited CBRN Assessment/Support	P ₅
Limited Firefighting/EMS	P ₄
Limited Explosive Ordnance Disposal (EOD)/Unexploded Explosive Ordnance (UXO)/Improvised Explosive Device (IED) Clearance	P ₃
Revetments	P _{1,2}
Snow/Ice Control	P ₁
Repair and Restore Infrastructure Rehabilitate critical infrastructure. This capability includes repairing or demolishing damaged buildings, restoring utilities such as electrical power, and bringing essential facilities such as hospitals, water treatment plants, and waste management facilities online. (JCAs)	
Airfield Damage Assessment/Repair	P _{1,2}
Area Lighting	P ₁ S ₂
Installation Management	P ₁
Facilities/Infrastructure Damage Assessment/Repair	P _{1,2}
HVAC/Refrigeration Systems	P _{1,6}
Power Generation/Distribution Systems	P _{1,2,6}
Waste Collection/Disposal Systems	P ₁ S ₂
Waste Water Collection/Disposal Systems	P _{1,2}
Water Production/Distribution Systems	P _{1,2}
Well drilling (up to 1500 feet)	P ₂
Harden Key Infrastructure and Facilities The ability to apply site- and threat-adaptable plans and designs, advanced construction techniques, and materials to enhance the prevention or mitigation of hostile actions against materiel resources, facilities, and infrastructure. (JCAs)	
Fixed and Expeditionary Collective Protection	P _{1,2,5}
Develop Force Protection Plans	P _{1,3,4,5} S ₂
Provide Installation Force Protection Measures	P _{1,3,4,5} S ₂
Facility Design The ability to integrate land use, bills of material and forecasts, and construction requirements facilitates project execution and development of infrastructure and facilities. (JCAs)	
Installation Management	P _{1,6}
Installation Master Planning	P _{1,6}
Project Planning & Programming	P _{1,2,6}
Project Design	P _{1,2,6}
Geospatial Engineering Portray and refine data about the geographic location and characteristics of natural or constructed features and boundaries to provide engineer services. Examples include terrain analyses, terrain visualization, digitized terrain products, nonstandard tailored map products, facility support, and force beddown analysis.	
Use Geospatial Data The ability to provide the joint force commander with the foundation layer of the operational environment for collaborative decision-support and terrain analysis tools. (JCAs)	
Geospatial Information Systems	P _{1,2}

INSTALLATION SUPPORT	
Real Property Life-Cycle Management The ability to provide for the acquisition, operation, sustainment, recapitalization, realignment, and disposal of real property assets to meet the requirements of the force. (JCAs)	
Installation Management	P ₁
Installation Development Planning	P ₁
Staff Augmentation (Echelon Above Wing)	P _{1,3,4,5,6}
Provide Installation Assets The ability to purchase, lease, program for construction, or gain real property installation assets by any other means, including all land, natural resources, anything growing on the land, buildings, structures, housing, stationary, mobile facilities, linear structures, firmly attached and integrated equipment (such as light fixtures), plus all interests in the property such as easements, oil and mineral rights, or use water and airspace. (JCAs)	
Installation Management	P ₁
Identify Facility Requirements	P ₁ S ₂
Facilities Support The ability to provide functional real property installation assets with utilities; energy, water, and wastewater; contract and real property management; pollution prevention; and essential services throughout natural or man-made disasters. (JCAs)	
Installation Management	P ₁
Base Operating Support	P ₁
Design Management	P ₁
Utilities Security	P ₁
Operational Range Clearance (Testing & Training) Support	P ₃
Real Property Collective Protection Systems	P ₁
Real Property HVAC/Refrigeration Systems	P _{1,6}
Real Property Management	P ₁
Real Property Power Generation/Distribution Systems	P _{1,6,}
Real Property Waste Collection/Disposal Systems	P _{1,}
Real Property Waste Water Collection/Disposal Systems	P ₁
Real Property Water Production/Distribution Systems	P ₁
Sustainment of Installation Assets The ability to assess, preserve, maintain, and repair any built, natural, and cultural installation assets. Includes regular surveys and inspections and measures to comply with environmental and conservation requirements. (JCAs)	
Installation Management	P ₁
Environmental Program Management and Compliance	P ₁
Preventive Maintenance & Inspection of Installation Facilities, Utilities, and Infrastructure	P ₁

Recapitalization of Installation Assets Perform the restoration, modernization, and replacement of installation assets to meet tenant requirements and comply with safety and environmental laws to include cleanup of contamination from hazardous substances, pollutants, and contaminants.	
Installation Management	P _{1,6}
Installation Master Planning	P _{1,6}
Project Design	P _{1,2,6}
Project Management & Execution	P _{1,2,6}
Project Planning & Programming	P _{1,2,6}
Remediation/Restoration of Environmental Sites	P _{1,6}
Disposal of Installation Assets The ability to conduct demolition and disposal activities resulting in the removal of installation assets from the asset inventory by any means, considering the impact on local communities. (JCAs)	
Installation Management	P ₁
Redeploy AF Expeditionary Facilities, Utilities, Infrastructure and Vehicles/Equipment	P ₁
Installation Services Selected services not related to real property (or personnel services) to meet mission requirements.	
Emergency Services The ability to protect and rescue people, facilities, aircrews, aircraft, and other assets from loss due to accident or disaster. (JCAs)	
Aerospace Vehicle Mishap Response/Recovery	P _{1,3,4,5}
Aircraft Rescue Firefighting	P ₄
All-Hazards Response	P _{4,5} S _{1,3,6}
Antiterrorism (Counter-IED Operations)	P ₃
Detecting, Sampling, and Analyzing/Identification of CBRN and Toxic Industrial Material (TIM) Hazards.	P ₅ S ₃
Emergency Medical Service (Basic Life Support)	P ₄ S _{1,2,3}
EOC Operations	P ₅ S _{1,3,4}
EOD Initial Threat Assessment, Confirmation, Risk Mitigation, Site Stabilization	P ₃
Federal Agency & Civil Authority Support	P _{1,3,4,5,6} S ₂
Fire Prevention	P _{1,4}
Hazardous Material Incident Response	P _{4,5} S _{1,2}
Incident Command	P ₄
Integrated Early Warning	P ₅
Integrated Incident Management	P _{1,4,5}
Mortuary Services – Explosive Hazard Analysis/Removal	P ₃
Nuclear Weapons/ Accident Response	P _{3,4,5} S _{1,2}

Air Force Doctrine Publication 3-34, Engineer Operations

Federal Agency & Civil Authority Support	P _{1,3,4,5,6} S ₂
Fire Prevention	P _{1,4}
Hazardous Material Incident Response	P _{4,5} S _{1,2}
Incident Command	P ₄
Integrated Early Warning	P ₅
Integrated Incident Management	P _{1,4,5}
Mortuary Services – Explosive Hazard Analysis/Removal	P ₃
Nuclear Weapons/ Accident Response	P _{3,4,5} S _{1,2}
WMD (CBRN) Incident Response	P _{3,4,5} S _{1,2}
Operational Range Clearance	P ₃
Structural Firefighting	P ₄
Structural/Aircraft Rescue	P ₄
UXO Recovery Operations	P ₃
Urban Search and Rescue	P ₄
Weapons Technical Intelligence	P ₃
BUILDING PARTNERSHIPS (Shape)	
Build Capabilities and Capacities of Partners and Institutions	
Enhance Partner Capabilities and Capacities	
Engineer Skills Training for Building Partnerships	S _{1,2,3,4,5,6}

APPENDIX B: PRIME BEEF, RED HORSE, AND OTHER SPECIALIZED TEAM CAPABILITIES DESCRIPTIONS¹

ENGINEERING

GENERAL ENGINEERING

- ★ **Base Denial**—Removal of resources from a threatened area, rendering resources unusable by fire or explosives, removal of parts, contamination (other than by nuclear, biological, or chemical means), immobilizing, partially or destroying military equipment, supplies, or infrastructure.
- ★ **Batch Plant Operations (Asphalt and Concrete)**—Performing batch plant operations, training, procuring, maintaining the batch plant, designing, and planning asphalt and concrete batch mix and operations.
- ★ **Contingency Contract Management**—Managing and inspecting construction and maintenance contracts and interpreting plans, specifications, and other contract documents and coordinating, evaluating, monitoring, and documenting contract activities and progress and preparing recommendations for contract modifications and reviewing material submittals for compliance with contract specifications and conducting pre-final, acceptance, and post-acceptance inspections.
- ★ **Engineer Reconnaissance and Site Survey**—Conducting reconnaissance, site location, construction, and mapping surveys.
- ★ **Explosive Demolition Operations**—Conducting explosive demolition for construction purposes, quarry operations, facility demolition, or base denial.
- ★ **Provide Technical Engineer Advice**—Providing technical advice on all matters about general engineering and installation support (e.g., force beddown and sustainment, capabilities and limitations, environmental concerns, installation geospatial data).
- ★ **Quarry Operations**—Using explosives, rock drilling, rock crushing, and conveyor operations to produce aggregate to support asphalt and concrete operations.
- ★ **Staff Augmentation (Echelon Above Wing)**—Providing command force staff augmentation for operational planning, engineer management, technical design, construction management, C2 expeditionary site planning, and reporting in support of

¹ Term descriptions in this appendix are provided to describe Air Force engineer capabilities to the air component commander and staff for planning purposes. They are derived from multiple sources, including civil engineer working groups, career field analyst descriptions, the civil engineer supplement to the *War and Mobilization Plan-1* (WMP-1), Joint Capability Area taxonomy definitions, JP 3-34, [Joint Engineer Operations](#), and US Central Command Regulation 415-1, *Construction and Base Camp Development in the US Central Command Area of Responsibility* (“The Sand Book”).

wartime or stability operations.

- ★ **Targeting Assistance**—Providing advice on the effects of targeting to avoid unnecessary destruction of infrastructure and estimate repair efforts for friendly forces.

Develop and Maintain Facilities

- ★ **Area Lighting**—Installing, operating, and maintaining remote area lighting systems.
- ★ **Asphalt Paving Operations**—Designing and constructing asphalt paved surfaces required for lines of communications and other purposes.
- ★ **Berm and Dike Construction**—Constructing and maintaining berms and dikes for force protection and control of other resources.
- ★ **Concrete Paving Operations**—Designing and constructing concrete surfaces required for lines of communications and other purposes.
- ★ **Construction Materials Testing**—Performing soil exploration, classifying soils in field conditions, and determining the strength of materials.
- ★ **Construction Surveying**—Determining distances, areas, and angles; establishing reference points for horizontal and vertical control; marking lines, grades, and principal points; preparing maps, layout structures, determining the vertical and horizontal placement of utilities, etc.
- ★ **Construct Temporary Facilities**—Erecting temporary facilities and equipment, to include wooden structures, storage structures, underground water, and power distribution systems.
- ★ **Disease Vector Surveillance and Control**—Performing integrated pest management functions, and conducting pest management surveys, determining pest management actions needed to control and prevent infestations by plant and animal pests. Interacting and coordinating with medical personnel to control health hazards.
- ★ **Erect Expeditionary Facilities**—Erecting expeditionary facilities and equipment to include deployable shelter systems, latrines, shower and shave units, environmental control units, generators, boilers, water production equipment, etc.
- ★ **Expedient Locksmith**—Troubleshooting, repairing, and installing commercially manufactured locking devices such as key, combination, cipher, panic hardware and exit devices, and padlocks; this does not include General Services Administration certification unless line items require it.
- ★ **Fire Protection Systems**—Inspecting, testing, repairing, and maintaining wet pipe,

dry pipe, deluge, foam, and specialized fire protection systems.

- ★ **Horizontal Construction**—Airfield repair and new construction, asphalt milling and paving, concrete repair, heavy earthwork including fuel and munitions berms, roads, and expedient airstrips and certain specialized capabilities quarry operations, asphalt batch plant operations, and concrete batch plant operations.
- ★ **Heating, Ventilation, Air Conditioning, and Refrigeration (HVAC/R) Systems**—Installing, operating, and maintaining HVAC/R systems, combustion equipment, and industrial air compressors.
- ★ **Lightning Arresting Protection**—Installing, maintaining, testing, and troubleshooting lightning protection systems.
- ★ **Installation Development Planning**—Performing comprehensive planning to address the full range of issues affecting or affected by the installation's development. Through this process, goals and objectives are defined, problems are identified, information is gathered, alternative solutions are developed, and a sound decision-making process is employed to select a preferred alternative for implementation.
- ★ **Passive Defense Measures**—Ensuring appropriate standoff; designing the effective facility and road layout; constructing berms, revetments, ditches, and fences; employing barriers; installing lighting; assisting in asset dispersal, facility hardening, etc.
- ★ **Pest, Animal, and Vegetation Control**—Performing integrated pest management functions and conducting pest management surveys, and determining pest management actions needed to control and prevent infestations by plant and animal pests.
- ★ **Power Generation and Distribution Systems**—Installing and operating electrical power production systems and equipment.
- ★ **Project Management and Execution**—Planning, organizing, and overseeing installation facility and infrastructure projects, ensuring the entire scope of work is accomplished by performance work statements and other predetermined criteria, on time and within budget.
- ★ **Project Planning and Programming**—Providing quality facilities needed to perform the mission. Ensuring project requests meet validated requirements, comply with all applicable standards, are programmed at the lowest lifecycle cost, achieve optimum resource efficiency and minimize damage to the natural and human environments, and are within authorities and available resources.
- ★ **Service Contract Management**—Validating contract requirements, preparing

performance work statements, preparing surveillance plans, and conducting quality assurance evaluations for facilities operation and maintenance activities.

- ★ **Vertical Construction**—Managing, constructing, repairing, and modifying temporary or permanent structural systems and wooden, masonry, metal, and concrete buildings. Fabricating and repairing components of structures, utility systems, and real property to include pre-engineered buildings and super spans.
- ★ **Waste Collection and Disposal Systems**—Establishing and maintaining field sanitary landfills or other similar systems for disposal of trash and refuse. Providing design and construction services for waste collection disposal.
- ★ **Waste Water Collection and Disposal Systems**—Installing, maintaining, and repairing wastewater collection systems. It does not include support to operate and maintain domestic wastewater treatment plants. Wastewater disposal limited to evaporation and facultative lagoons.
- ★ **Water Production and Distribution Systems**—Operating and maintaining water production in field conditions. Installing, maintaining, and repairing water production system components (e.g., pumps, valves, motors). It does not provide support to operate and maintain domestic water treatment plants. Installing, maintaining, and repairing water distribution piping systems (e.g., valves, fire hydrants, booster stations, well pumps, and chlorination).
- ★ **Well Drilling (up to 1,500 feet)**—Drilling and piping groundwater sources to produce potable and non-potable water. Capacity is 6-inch diameter wells at a maximum depth of 1,500 feet.

Establish Lines of Communication (Airfields)

- ★ **Aircraft Arresting System**—Installing equipment used to stop aircraft by absorbing its momentum via a mechanical, hydraulic, or pneumatic braking system for routine and emergency landings or aborted takeoffs.
- ★ **Airfield Assessment Repair, Initial (RED HORSE)**—Rapidly deploying to establish initial airfield operations with personnel from supporting units. Assessing airfield capabilities, preparing helicopter or aircraft landing areas, clearing obstacles, making expedient airfield damage repairs, and providing an initial assessment of required follow-on forces and material resources to establish airfield operations. It does not include the capture of airfields via forcible entry or operating on airfields controlled by other US or PN forces, or opening airfields not held by enemy forces.
- ★ **Airfield Damage Assessment and Repair**—All actions including damage assessment, explosive ordnance reconnaissance, minimum airfield operating surface selection, unexploded explosive ordnance hazard mitigation, pavement repair, airfield marking, airfield lighting, arresting system installation, and utility system repairs

required to establish, sustain, or recover flying operations capability at an airfield.

- ★ **Airfield Lighting and Marking**—Installing and maintaining airfield lighting to permit night flying and defining the boundaries on an aircraft landing strip or pad. Note: RED HORSE does not support this capability.
- ★ **Airfield Pavement Evaluation**—Performing tests and training personnel in airfield pavement standards, procuring and maintaining equipment, and generating reports.
- ★ **Asphalt and Concrete Milling Operations**—Conducting asphalt and concrete milling operations. Heavy transport is required for milling equipment.
- ★ **Asphalt and Concrete Paving Operations**—Conducting asphalt and concrete paving operations to include roads, taxiways, runways, ramps, ramp expansions, airfield damage repair, and other concrete operations. Heavy transport is required for paving equipment.
- ★ **Improve Airfields**—Conducting pavement evaluations, expanding width and length of runways, reducing obstacles to air operations, improving runway surfaces, marking, lighting, arresting systems, etc.
- ★ **Limited UXO, EOD, and IED Clearance**—Performing rapid narrow scoped clearance of UXO, EOD, and IEDs needed for initial beddown and site survey operations. During this phase, the initial EOD teams should conduct surveys to determine the need for follow-on forces, with additional resources (people, equipment, and explosives) to conduct large-scale, sustained operations.
- ★ **Limited Firefighting and EMS**—Containing or hindering the spread of fires and assisting trained firefighters in protecting RED HORSE resources.
- ★ **Limited CBRN Assessment and Support**—Conducting limited site assessments to determine the presence of toxic industrial materials or CBRN hazards; includes aircraft CBRN contamination assessments.
- ★ **Revetments**—Assembling and erecting revetments to protect aircraft, critical equipment, and facilities.
- ★ **Snow and Ice Control**—Maintaining continuous mission capability by removing snow and ice from airfields and base pavements.

Repair and Restore Infrastructure

- ★ **Airfield Damage Assessment and Repair**—Assembling and placing fiberglass foreign object damage covers on runways, assembling and placing aluminum matting for taxiways and ramps, based on aircraft use. Performing airfield marking operations.

- ★ **Area Lighting**—Installing, operating, and maintaining remote area lighting systems.
- ★ **Facilities and Infrastructure Damage Assessment and Repair**—Inspecting damaged facilities, determining the priority of repairs based on information provided from the emergency response plan, and performing expedient repairs and permanent repairs at a later time.
- ★ **HVAC/R Systems**—Repairing, HVAC/R systems, combustion equipment, and industrial air compressors.
- ★ **Power Generation and Distribution Systems**—Maintaining, modifying, and repairing electric power generating and control systems.
- ★ **Waste Collection and Disposal Systems**—Providing design and construction services for waste collection disposal.
- ★ **Waste Water Collection and Disposal Systems**—Providing design and construction services for wastewater collection disposal.
- ★ **Water Production and Distribution Systems**—Repairing water production system components and water distribution piping systems and providing design and construction support for water distribution.
- ★ **Well Drilling (up to 1,500 feet)**—Drilling and piping groundwater sources to produce potable and non-potable water. Capability is 6-inch diameter wells at a maximum depth of 1,500 feet.

Harden Key Infrastructure and Facilities

- ★ **Collective Protection**—Instructing assembly of systems to owner users to protect personnel inside a building.
- ★ **Develop Force Protection (FP) Plan**—Assisting in developing an FP plan consisting of specific measures to protect facilities and critical assets. Engineer aspects of the FP plan should include elements that contribute to protecting personnel and essential aspects of FP, such as site layout, barrier placement, berm construction, security lighting, backup power, water source protection, expedient hardening, terrain modification, etc.
- ★ **Provide Installation FP Measures**—Protecting personnel using site layout methods, barrier placement, berm construction, security lighting, backup power, water source protection, expedient hardening, terrain modification, etc.

Master Facility Design

- ★ **Project Planning and Programming**—Identifying and validating requirements for

facilities and infrastructure needed to satisfy current and future requirements, determining the most economical methods based on construction standards, developing estimates, obtaining funding, developing a project timeline and schedule.

- ★ **Project Design**—Designing facilities and utilities necessary to support the estimated population, mission, and anticipated life span.

GEOSPATIAL ENGINEERING: Use Geospatial Data

- ★ **Geospatial Information Systems (GIS)**—Collecting and using GIS data for installation planning.

INSTALLATIONS SUPPORT

Real Property Life-Cycle Management

- ★ **Installation Master Planning**—Identifying requirements, planning alternatives, and proposing facilities and infrastructure to support assigned missions and operation plan requirements. Installation master planning is focused on the base layout, taking into account the environment, base infrastructure, and necessary subsystems, ensuring requirements meet theater construction standards and comply with unified criteria.
- ★ **Staff Augmentation**—Providing command force staff augmentation for operational planning, engineer management, technical design, construction management, C2 expeditionary site planning, and reporting in support of wartime or stability operations.

Provide Installation Assets

- ★ **Identify Facility Requirements**—Coordinating with contracting and legal functions to purchase, lease, and program for construction, or gain installation assets, including all land, natural resources, buildings, structures, portable facilities, airfields, and roads, installed equipment, etc.

Facilities Support

- ★ **Base Operating Support**—Directly assisting, maintaining, supplying, and distributing support of forces at the operating location to achieve the mission and maintain the operation of its infrastructure.
- ★ **Cybersecurity**—Preventing damage to, protection of, and restoration of control systems, including information contained therein; ensures its availability, integrity, authentication, confidentiality, and non-repudiation.
- ★ **Design Management**—Providing technical support and contract management for

planning and designing base infrastructure.

- ★ **Installations and Facilities**—Providing, operating, maintaining, restoring, and protecting the built and natural infrastructure necessary to support the Air Force mission.
- ★ **Operational Range Clearance (Testing and Training) Support**—Clearing operational ranges and test and evaluation ranges of UXO. Normally, a surface clearance, operational test, and evaluation of ranges sometimes require sub-surface recovery of deeply buried experimental ordnance.
- ★ **Real Property Management**—Maintaining an accurate inventory of all Air Force-controlled real property and real property installed equipment with descriptions of current physical condition, capacity, sizes, and uses.
- ★ **Real Property Power Generation and Distribution Systems**—Installing, operating, maintaining, and repairing electrical power production systems and associated equipment.
- ★ **Real Property HVAC/R Systems**—Installing, operating, maintaining, and repairing heating, ventilation, air conditioning, refrigeration systems, combustion equipment, and industrial air compressors.
- ★ **Real Property Waste Collection and Disposal Systems**—Developing performance work statements to procure waste collection and disposal equipment and services; developing waste management plans; providing administrative oversight for waste collection and disposal activities.
- ★ **Real Property Waste Water Collection and Disposal Systems**—Installing, inspecting, maintaining, troubleshooting, modifying, and managing wastewater treatment systems.
- ★ **Real Property Water Production and Distribution Systems**—Installing, inspecting, maintaining, troubleshooting, modifying, and managing plumbing and water distribution systems.
- ★ **Utilities Security**—Establishing and executing a facility infrastructure utility program.

Sustainment of Installation Assets

- ★ **Environmental Program Management and Compliance**—Developing environmental plans to protect the health of the population, preserve the environment, reduce waste, and comply with international treaties, overseas environmental baseline guidance documents, the final governing standards, etc.
- ★ **Preventive Maintenance and Inspection of Installation Facilities, Utilities, and**

Infrastructure—Providing practical assessment, maintenance, and repair of current assets and planning for future missions. Regularly surveying the installation layout, facilities, and equipment, and performing preventive maintenance as needed.

Recapitalization of Installation Assets

- ★ **Installation Management**—The process of better quantifying, articulating, and managing risk, while supporting the mission with assets of the right size, condition, and cost to maximize value and utility of built and natural infrastructure. Installation management applies standard levels of service across the Air Force and integrates existing processes across all CE divisions and flights. Installation management provides resource visibility, supports advocacy and resource allocation, and enables analysis to balance costs, risks, and benefits.
- ★ **Installation Master Planning**—Planning focused on the base layout, taking into account the environment, base infrastructure, and necessary subsystems, ensuring all requirements meet theater construction standards and comply with unified facilities criteria.
- ★ **Project Planning and Programming**—See the previous description.
- ★ **Project Design**—See the previous description.
- ★ **Project Management and Execution**—See the previous description.
- ★ **Environmental Cleanup**—Conducting cleanup of spills and environmental contamination that poses known imminent and substantial endangerment to the health and safety of US and PN forces and host nation noncombatants.

INSTALLATION SERVICES: Emergency Services

- ★ **Aircraft Rescue and Firefighting**—Firefighting actions taken to rescue persons and to control or extinguish a fire involving or adjacent to aircraft on the ground.
- ★ **All-Hazards Response**—Describing an incident, natural or man-made, that warrants action to protect life, property, environment, and public health or safety, and to minimize disruptions of government, social, or economic activities.
- ★ **Aerospace Vehicle Mishap Response and Recovery**—Supporting sortie generation and space operations by responding to airfield emergencies to render safe ordnance and aerospace launch platforms during inflight and ground emergencies. Planning, organizing, directing, and assisting in safing, removing, and disposing of explosive ordnance, explosive hazards, and classified components on or in operational aerospace platforms during crash situations.
- ★ **Antiterrorism**—Locating, identifying, and neutralizing explosive hazards and

triggering devices, defeating criminal and terrorist explosive devices, and training others on improvised explosive device recognition, hazards, and precautions, and providing terrorist response and terrorist consequence management planning and operations.

- ★ **Detect, Sample, and Identify CBRN and Toxic Industrial Material (TIM)**
Hazards—Locating CBRN and TIM hazards using CBRN detectors or monitoring or survey teams. Collecting representative amounts of gas, liquid, solid, or characteristics of one of these, such as gamma or pH, to analyze. Determining which CBRN or TIM material or pathogen is present.
- ★ **Emergency Operations Center**—The C2 support element that directs, monitors, and supports the installation's actions before, during, and after an incident. The physical location at which the coordination of information and resources to support incident management activities usually occurs.
- ★ **EOD Initial Threat Assessment, Confirmation, Risk Mitigation, and Site Stabilization**—Obtaining as much information as possible to develop a plan of attack to include gathering information on perpetrator or target, threat analysis, employing detection assets, providing safe approach, and conducting diagnostics.
- ★ **Emergency Medical Service (Basic Life Support)**—Services provided to patients facing immediate medical emergencies that occur outside of military treatment facilities.
- ★ **Federal Agency and Civil Authority Support**—Assisting federal and civil authorities by preparing for, deterring, or responding to terrorist or criminal acts, accidents, found explosive items, and other requests for support. (Note: Support includes US Secret Service, DOS, and Joint EOD very important persons protection support activity taskings.)
- ★ **Fire Prevention**—Measures such as training, public education, plans reviews, surveys/inspections, engineering reviews, and life safety code enforcement directed toward avoiding the inception of fire and minimizing consequences if a fire occurs.
- ★ **Hazardous Material Incident Response**—Responding to an incident where hazardous material is present. A hazardous material is a substance (solid, liquid, or gas) that, when released, is capable of creating harm to people, the environment, and property.
- ★ **Incident Command**—Providing incident command system organizational element responsible for the overall management of the incident and consisting of the incident commander (either single or unified command structure) and any supporting staff.
- ★ **Integrated Incident Management**—Assisting with the broad spectrum of activities and organizations, providing effective and efficient operations, coordination, and

support applied at all levels of government, using both governmental and nongovernmental resources to plan for, respond to, and recover from an incident.

- ★ **Mortuary Services—Explosive Hazard Analysis and Removal**—Detecting, identifying, and removing explosive hazards left on or embedded in human remains during port mortuary operations, theater remains processing, POW and MIA recoveries, mass fatality support operations, and other operations involving human remains.
- ★ **Nuclear Weapons, Weapons of Mass Destruction (WMD), and CBRN Accident and Incident Response**—Locating CBRN contamination, assessing the damage, and aiding in the recovery and cleanup following a WMD attack. For nuclear weapons, efforts may include locating, securing, assessing, recovering a nuclear weapon involved in an accident, and preparing the recovered weapon for transfer to the Department of Energy.
- ★ **Operational Range Clearance**—Clearing active bombing and gunnery ranges in coordination with range management officials and environmental agencies.
- ★ **Structural Firefighting**—Performing rescue, fire suppression, and property conservation activities in buildings, enclosed structures, aircraft interiors, vehicles, vessels, aircraft, or like properties that are involved in a fire or emergency.
- ★ **Unexploded Explosive Ordnance Recovery Operations**—Clearing UXO during runway and airbase recovery operations and neutralizing hazards from explosive-related incidents, which, because of unusual circumstances, present a threat to operations, installations, personnel, or materiel.
- ★ **Weapons Technical Intelligence**—Conducting post-blast analysis and explosive device exploitation to gather information to build a common picture of enemy capabilities, inform commanders of new enemy tactics, techniques, and procedures, and support material developers in developing necessary countermeasures.

BUILDING PARTNERSHIPS: Enhance Partner Capabilities and Capacities

- ★ **Engineer Skills Training for Building Partnerships**—Air Force CEs are a valuable asset to building partnerships providing skills, knowledge, and experience to assist local governments recovering from disasters or become self-sufficient.
-