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Use of Civil Augmentation Progam (CAP) Contracts to Perform Base Opoerating Support-Integrator (BOS-I) in U.S. During Times of High Oconus Demand for Support/Military Forces

June 2023

James A. Anderson
Kristina A. Self
LCDR Calvin T. Chu, USN

Thesis Advisors: Lt Col Daniel Finkenstadt, USAF
Cory Yoder, Senior Lecturer

Department of Defense Management

Naval Postgraduate School

Prepared for the Naval Postgraduate School, Monterey, CA 93943.

ACQUISITION RESEARCH PROGRAM
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ABSTRACT

Today's strategic competition requires joint force capabilities and operational flexibility for the fights of the future. New operational concepts guaranteeing full deployment capability of military forces and resources from CONUS installations in response to adversary aggression anywhere in the world are necessary. This paper explores the use of Civil Augmentation Program (CAP) contracts to perform base operating support–integrator (BOS-I) in the U.S. during times of high OCONUS demand for military forces deployment. Data available online and through military databases was used to identify current BOS-I functions that can be performed by CAP. This research provides a framework for understanding the military capabilities gained and contract support required by CONUS installations during a major fight requiring a full deployment of available military forces. After 20 years of focus on the Global War on Terrorism, the Department of Defense (DOD) shifts focus to near-peer competition not faced since the end of the Cold War. With an increasingly assertive China and a destabilizing Russia, the DOD must be capable of providing sufficient military force to defend democracy and achieve national objectives.

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In conclusion, we are humbled and grateful for the support and guidance we have received throughout this journey, and we look forward to applying the skills and knowledge gained towards making a meaningful impact in our chosen fields.

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LIST OF ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
AFCAP	Air Force Contract Augmentation Program
AFIMSC	Air Force Installation and Mission Support Center
AFRICOM	Africa Command
AFSC	Air Force Specialty Code
AOR	Areas of Responsibility
BDOC	Base Defense Operations Center
BLS	Base Life Support
BOS-I	Base Operating Support Integrator
BST	Base Support Tail
CAP	Civil Augmentation Program
CCDR	Combatant Commanders
CENTCOM	Central Command
CL	Contingency Locations
CNIC	Commander Navy Installation Command
CNRNW	Commander Navy Region Northwest
CONUS	Continental United States
COOP	Continuity of Operations
COVID	coronavirus disease
DA	Department of the Army
DOD	Department of Defense
DoDI	Department of Defense Instruction
DRU	Direct Reporting Unit
EUCOM	Europe Command
GCC	Geographic Combatant Commander
IAA	Interagency Government Agreement
IAW	In Accordance With
ICBM	Intercontinental Ballistic Missile
IDIQ	Indefinite Delivery Indefinite Quantity
IDIQ MAC	Indefinite Delivery Indefinite Quantity Multi-Agency Contract

IHA	Installation Health Assessment
IMCOM	Installation Management Command
INDOPACOM	United States Indo-Pacific Command
ISR	Intelligence, Surveillance, and Reconnaissance
JCS	Joint Chiefs of Staff
JTF	Joint Task Force
LN	Local National
LOGCAP	Logistics Civil Augmentation Program
MAJCOM	Major Command
MATOC	Multiple Award Task Order Contract
MCICOM	Marine Corps Installation Command
MICC	Mission Installation Contracting Command
MILCON	Military Construction
MWR	Morale Welfare Recreation
NAVFAC	Naval Facilities Engineering Systems Command
NORTHCOM	North Command
OAR	Operation Allies Refuge
OAW	Operation Allies Welcome
OCONUS	Outside Continental United States
OCS	Operational Contract Support
OSD	Office of the Secretary of Defense
PACOM	Pacific Command
PAD	Program Action Directive
PIEE	Procurement Integrated Enterprise Environment
SAA	Senior Airfield Authority
SECAF	Secretary of the Air Force
SOUTHCOM	South Command
TCN	Third Country National
USAFA	United States Air Force Academy
VADM	Vice Admiral

I. INTRODUCTION

This paper provides a background of base operating support—integrator (BOS-I) responsibilities, functions, and recommendations for improvements. BOS-I comprises a diverse set of functions that include but are not limited to maintenance, logistics, communications, transportation, and security, in which the primary purpose is to ensure that the organization's facilities are fully operational and capable of supporting the organization's missions (Joint Chiefs of Staff, 2019a, pp. III-6, VI-4). The purpose of this research is to provide actionable recommendations for continuity of garrison operations if all military personnel deployed overseas. One major area of concern was identified that directly and negatively affects families and physical property on each garrison. This research will help to inform the development of strategies and policies to improve BOS-I performance, enhance mission readiness, and ensure that the organization's facilities can continue to support critical missions effectively.

A. PROBLEM BACKGROUND, PURPOSE, AND SIGNIFICANCE

According to the United States Government, the Department of Defense (DOD) maintains a trained and equipped military necessary to protect democracy around the world, ready to deploy anywhere to deter combat aggression. The DOD achieves this through the process of contingency planning and exercising numerous potential scenarios in different combatant commands around the globe.

> Combatant commanders (CCDRs) plans are supported by posturing forward-deployed military forces throughout their areas of responsibility (AORs) ... Fundamentally, contingency locations (CLs) support CCDRs' operational requirements through the provision of base operating support (BOS) services, physical and technological infrastructure, and logistical assets and capabilities. (Joint Chiefs of Staff [JCS], 2019a, p. vii)

Since the 1991 Gulf War BOS services at CLs have been provided through some combination of organic military forces and contracted support (Warfighter Support, 2010). Today, the military services are reliant on contractor BOS support to meet mission requirements during contingency operations due to a lack of organic personnel to support both CLs and home station missions.

> DOD officials have stated that without a significant increase in its civilian and military workforce, the department is likely to continue to rely on contractors both in the United States and overseas in support of future deployments. For example, the Deputy Under Secretary of Defense for Logistics and Materiel Readiness testified in 2008 that the structure of the U.S. military had been adapted to an environment in which contractors were an indispensable part of the force. (Warfighter Support, 2010, p. 1)

Contractor support is a critical enabler of how the U.S. military fights, however in a highly contested engagement with seesawing battle lines, contractor support may not be available or capable of supporting in the combat zone. In this instance active-duty base operating support personnel are relied upon to provide all required support, likely necessitating significant personnel deployment in the case of a near peer competitor fight. What is required for and how do continental United States (CONUS) installations continue to provide BOS support when active-duty fully deploy?

Currently installations utilize a mixture of military, civilian, and contractor workforces to perform BOS services. According to the Office of the Secretary of Defense:

> These resources sustain mission capability, ensure quality-of-life, and enhance work force productivity and fund personnel and infrastructure support. Personnel support includes food and housing services for unaccompanied and deployed forces; religious services and programs; payroll support; personnel management; and morale, welfare, and recreation services to military members and their families. Infrastructure support includes utility systems operations; installation equipment maintenance; engineering services including fire protection, crash rescue, custodial, refuse collection, snow removal, and lease of real property; security protection and law enforcement; and transportation motor pool operations. (Office of the Secretary of Defense [OSD], 2003, p. 117)

As discussed in the *OSD Operations and Maintenance Overview for the FY 2004 Budget Estimates*, DOD has outsourced some BOS services to private industry and commercial mission partners to shift DOD personnel out of BOS positions to support more critical positions (OSD, 2003). Outsourcing through privatization efforts and shifting military personnel out of BOS positions increases deployment demands on those remaining military BOS members to support the contingency missions and pulls them from the home station mission. Plans for continuation of installation missions and BOS

requirements during a full activation of forward deployed military forces in response to military conflicts outside the continental United States (OCONUS) requires an understanding of remaining installation missions and BOS services for mission sustainment. Therefore, this research identifies personnel limitations and civil augmentation program (CAP) capabilities to better support BOS services across the CONUS military installations during a full deployment requirement.

B. PURPOSE

The purpose of this applied project is to identify essential BOS services and provide recommendations to how BOS-I requirements can be analyzed for potential augmentation by CAP contractors during the full activation of forward deployed military forces.

C. RESEARCH QUESTIONS

In pursuing this project, the research will answer the following questions:

1. What essential services are required for sustaining CONUS military installations when all deployable assets are concurrently deployed?
2. What BOS-I functions (capability and capacity) can CAP contractors perform in CONUS to increase deployable military personnel?
3. What are the demand drivers for essential BOS services?
4. How can CAP contracts be used to sustain CONUS military bases during a full-scale forward deployed military force requirement?

D. OBJECTIVES

The research identifies a framework for CONUS installation commanders to assess necessary mission essential functions required to maintain installation mission absent military BOS service personnel. The research presents demand drivers that influence BOS service levels and identifies common essential functions, fixed assets, and variable assets required for continued installation mission. It identifies the military

workforce currently used for the performance of critical life support functions and those that could be performed by a CAP in the place of military service members.

II. LITERATURE REVIEW

In this chapter, we briefly discuss the literature pertinent to BOS. Firstly, it describes the existence of BOS-I services and CAP capabilities to include historical implementation. Next, it examines the similarities and variables of BOS requirements across the DOD services. Finally, this chapter analyzes the population mix between military workforce and civilian workforce within the military services.

A. DESCRIPTION OF BASE OPERATING SUPPORT–INTEGRATOR AND OPERATIONAL CONTRACT SUPPORT

As defined by *Contingency Basing* Joint Publication,

> The BOS-I is responsible for planning and synchronizing the efficient application of resources and contracting to facilitate unity of effort in the coordination of sustainment functions at designated CLs. When multiple Service components share a common base of operations, a [Geographic Combatant Commander] GCC may designate a service component or joint task force (JTF) as the BOS-I at each CL. (JCS, 2019a, p. III-5)

The designated BOS-I is responsible for providing resources for the overall base operations and coordinating contract support for all joint forces These responsibilities may also include prioritizing requirements, force protection, funding support, emergency management and services. Considerations for assigning specific BOS responsibilities from the JCS *Contingency Basing* publication include (JCS, 2019a):

> (1) Initial forces at a location.
>
> (2) Preponderance of forces at a location.
>
> (3) Greatest capability to perform the function.
>
> (4) Agreement between the affected Services or components.
>
> (5) Anticipated duration of employment at a location.
>
> (6) Phase of operations. (JCS, 2019a, p. III-6)
>
> When shortfalls or opportunities for efficiencies occur, the GCC may task component commanders to provide or coordinate specific capabilities (e.g., infrastructure, security, and communications). The BOS-I must closely coordinate with the Senior Airfield Authority (SAA), single port, or terminal manager assigned by the JFC for CL support activities and airfield

> operations. If no SAA, single port, or terminal manager is assigned, the BOS-I is responsible for their functions. (JCS, 2019a, p. III-6)

Engineers and Logisticians are required to make early plans if the BOS-I will use contractors and CAP for base services. The JCS outlines reasons to use CAP, "Factors that inform the decision to use CAP include the size of the supported force, the expected duration of employment at the CL, the facility construction levels, security, and access requirements related to their use" (JCS, 2019a, p. III-6).

BOS functions provide service to the base population including tenant organizations which *Contingency Basing* states are

> units that reside and operate on or from CLs but do not fall under the direct command of the base commander. Tenant commanders actively participate in the preparation of base security and defense plans. They will normally be required to provide security for their own forces and mission-essential assets, provide individuals to the BDOC, perform perimeter/gate security, and will often be assigned battle positions IAW base security plans. These forces, when provided, will normally fall under the tactical control of the base commander for the purpose of base defense. Most importantly, tenant commanders direct training of their personnel to support and participate in base security in the event of attack. (JCS, 2019a, p. III-8)

As a stakeholder in the CL, tenant unit requirements in Figure 1 must be considered in the planning process for ensuring overall operations success. Tenant commanders should provide input on levels of service and what they can provide to the CL. Specific needs of the tenant organization are coordinated and captured through support agreements.

Unless the CL has been allocated sufficient organic resources to perform the mission, operational contract support (OCS) is required as a key enabler to mission success. OCS is an integrated cross functional "process of planning for and obtaining supplies, services, and construction from commercial sources" (JCS, 2019b, p. ix). Additionally, "OCS must be carefully planned to ensure contracted capabilities are available at the proper time and in the proper amount to support the CL mission" (JCS, 2019a, p. V-7). OCS consists of three support roles and related tasks listed in Table 1.

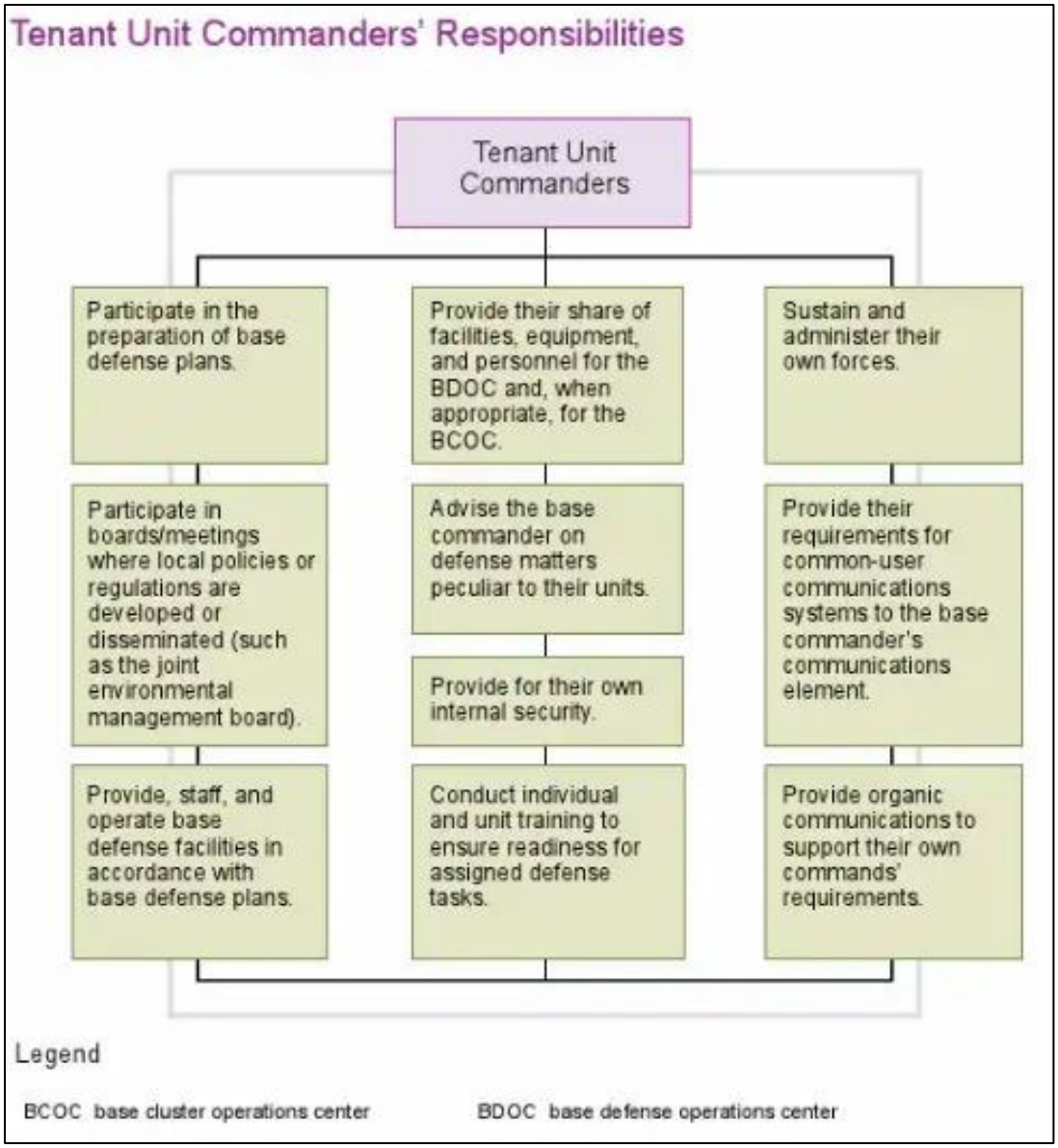

Figure 1. Tenant Unit Commanders' Responsibilities.
Source: JCS (2019a, p. III-9).

Table 1. Operational Contract Support Description and Subordinate Functions. Source: JCS (2019b, p. I-3).

Operational Contract Support Description and Subordinate Functions		
Operational Contract Support The process of planning for and obtaining supplies, services, and construction from commercial sources in support of combatant commander-directed operations.		
Contract Support Integration The planning, coordination, and synchronization of contracted support in military operations.	**Contracting Support** The planning, coordination, and execution of contracting authority to legally bind contractors in support of military operations.	**Contractor Management** The oversight and integration of contractor personnel and associated equipment in support of military operations.

• Plan and integrate contract support
  ○ collaborate in boards, centers, cells, and working groups
  ○ conduct assessments and provide recommendations
• Manage requirements
  ○ Develop requirements
  ○ approve requirements (includes consolidation, validation, and prioritization)
  ○ post-contract award oversight
• Information management and reporting
	• Plan and organize for contracting support
	• Coordinate/deconflict in theater contracting
	• Provide contracting support advice and assistance
	• Translate requirements into contract documents
	• Develop contracts
	• Award and administer contracts
	• Close out contracts
		• Plan contractor management
		• Prepare for contractor deployment
		• Deploy/redeploy contractors
		• Manage contracts
		• Sustain contractors

A thorough understanding of the three functions of OCS to achieve the right mix of organic and nonorganic personnel is required to ensure the use of contracted support has the maximum impact and effect on mission accomplishment. While OCS is primarily focused on Combatant Commander directed contingency operations planning the

principles are applicable to deliberate CONUS installation emergency response planning and execution. For CONUS installations a full deployment of active-duty personnel requires an understanding of installation continuity of operations plans IAW DoDI 3020.42 *Defense Continuity Plan Development*. Continuity of operations (COOP) is a planning process that guarantees that mission essential functions "MEF continue under all circumstances across the spectrum of threats" (Principal Deputy Under Secretary of Defense, 2006, p. 2). To further elaborate, the first step in the COOP planning process is to identify the MEFs of an organization. According to the Department of Homeland Security, MEFs are "the essential functions directly related to accomplishing the organization's mission as set forth in statutory or executive charter. Generally, MEFs are unique to each organization" (Department of Homeland Security, 2017, p. B-1). By identifying MEFs, an organization can prioritize its resources and ensure that essential services are still available to the public, even in the face of significant disruptions (Office of the Under Secretary of Defense for Policy [OUSDP], 2018). In addition to contract support functions provided in Figure 2, according to Office of the Under Secretary of Defense for Policy, some additional common MEFs found at most military bases include:

- Command and Control: This function involves the ability to direct and coordinate military operations. It includes the ability to communicate with subordinate units, assess the situation on the ground, and make decisions that are in line with the overall mission (OUSDP, 2018) .
- Force Protection: This function involves the protection of personnel and resources from physical harm or damage. It includes the ability to respond to security threats, such as terrorist attacks or natural disasters.
- Logistics: This function involves the movement and support of personnel and equipment. It includes the ability to transport troops and supplies to different locations, as well as the ability to maintain and repair equipment.
- Intelligence: This function involves the gathering and analysis of information about potential threats. It also includes the ability to monitor communications, track the movement of enemy forces, and provide commanders with up-to-date information about the situation on the ground.

- Communication: This function involves the ability to maintain effective communication between units and with higher headquarters and subordinate commands. It includes the ability to transmit and receive messages using a variety of methods, including radios, telephones, and computer networks.
- Medical: This function involves the provision of medical care to military personnel and dependents. It also includes the ability to treat injuries and illnesses, as well as the ability to respond to mass casualty situations.
- Transportation: This function involves managing and coordinating the transportation of personnel and equipment to and from the organization's facilities. This function is essential for ensuring that personnel and equipment are in the right place at the right time, enabling the organization to carry out its missions effectively.

However, the establishment of MEFs varies depending on the branch of service, the location of the base, and the specific mission of each CONUS installation. MEFs within each service revolve around its warfighting priorities and sustainment capabilities supporting each service's core mission and capabilities below:

The Army's core mission is "to deploy, fight, and win our nation's wars by providing ready, prompt, and sustained land dominance as part of the joint force of all U.S. military" (United States Army, n.d.). Examples of mission essential functions on Army installations include the capability to train, equip, and forward deploy mission capable soldiers.

The Navy's core mission is to "defend freedom, preserve economic prosperity, and keep the seas open and free through its employment of carriers, surface combatants, submarines, and strategic forces around the globe" (United States Navy, n.d.c). However, specific to CONUS installation support, its MEFs focus on providing operational support and sustainment for Navy shore installations capabilities.

The Air Force's core mission is "global vigilance, reach and power through six capabilities of air and space superiority, global presence, rapid global mobility, precision

engagement, information superiority, and agile combat support" (United States Air Force, n.d.). Mission essential installation functions on Air Force installations include the capability to generate aircraft sorties; Intercontinental Ballistic Missile (ICBM) command and control launch capability; and train, equip, and forward deploy mission capable airmen.

B. DESCRIPTION OF CIVIL AUGMENTATION PROGRAM

Table 2 provides common external support contract capabilities of CAP contract logistics and non-logistics support. The current CAP contract support "includes the four main external support contract programs: the Army Logistics Civil Augmentation Program (LOGCAP), the Air Force Contract Augmentation Program (AFCAP), the Navy Global Contingency Construction Multiple Award Contract, and Global Contingency Service Multiple Award Contract." (JCS, 2019b) Below is discussed overarching CAP capabilities and then the specifics of each services program.

Table 2. Common External Support Contract Capabilities.
Source: JCS (2019b, p. I-9).

Common External Support Contract Capabilities	
Logistics Support • Base operating support (e.g., billeting, food service, laundry and bath) • Transportation • Port and terminal • Warehousing and other supply support operations • Construction • Facilities maintenance and management • Prime power • Materiel maintenance	**Non-Logistics Support** • Communications services • Linguist/translation services • Commercial computers and information management • Signal support • Physical security* • Staff augmentation (various functions) • Intelligence support services
*Limited in accordance with Department of Defense policy	

Fundamentally, the overall base operations support requirements are similar across military bases and the level of support depends on size of installations and the needs of their tenant commands. For example, Congressional Budget Office (CBO) assembled data on more than 200 bases across all four services in 2016 and found BOS characteristics are common between installations (Congressional Budget Office, 2019). While BOS services support troops in several ways, its main characteristics involve facility services, personnel support, mission support, administrative services, and other support (see Table 3).

Table 3. Typical Mission Essential Functions—Base Operations Support. Source: Congressional Budget Office (2019).

Facility Services	Services include those a city might provide to its citizens, such as operations and maintenance of utility and sanitation systems, equipment maintenance, fire protection, crash rescue, custodial services, refuse collection and disposal, snow removal, street sweeping, grounds maintenance, and insect control. BOS services in this category also include engineering services, leases of real property, security such as physical barriers and police services, environmental conservation, and pollution prevention programs.
Personnel Support	These services support the daily life of service members and their families. They include dining facilities, housing, religious services, education, counseling, child and youth development, and morale, welfare, and recreational services.
Mission Support.	To support the operations of military units they host, bases operate airfields, ports, and training ranges and provide other support to transient military aircraft and air crews.
Administrative Services	This category of services supports the staff and personnel management of the hosted military units and other organizations on the base. Such services include public affairs, financial management, legal, contracting, and other administrative services
Other Support	Other services support workforce productivity, the distribution of goods and personnel, and security. Such services include information technology, communications (such as telephone service), and logistics (supply operations and shuttle buses, for example).

1. Logistics Civil Augmentation Program

LOGCAP is a Department of the Army (DA) Regulated Program that provides a full spectrum of contracted logistics and base support services. All Army Staff Sections except for the Intelligence section (G2) have a responsibility in making LOGCAP decisions. The Logistics Section (G-4) is the approval authority for LOGCAP for global contingency operations. The G-4 serves as the DA Headquarters advocate for LOGCAP and the office of primary responsibility for LOGCAP policy, guidance, and direction. LOGCAP is a major subset of Operational Contract Support (OCS) as described in AR 715-9 (AR 715-9, p. 1). LOGCAPs purpose is to augment the military force for rapid support during contingency operations. Today, in CONUS, contractors and civilians manage base operations support.

The current LOGCAP contracts are collectively called LOGCAP V. The details provided in this research for the current contracts were found in the Procurement Integrated Enterprise Environment (PIEE) database. The contracts listed in Figure 5 were analyzed to find the following LOGCAP V data. LOGCAP V is an $82 billion indefinite-delivery-indefinite-quantity (IDIQ), Multiple Award Task Order Contract (MATOC) to provide logistics support to the Army in six different global regions. It consists of four contractors and covers six Army commands. Those four contractors, each covering a different part of the world, are Fluor, Kellogg Brown and Root (KBR), PAE-Parsons Global Logistics Services, LLC, and Vectrus. The Army Commands covered by LOGCAP are NORTHCOM, SOUTHCOM, EUCOM, AFRICOM, CENTCOM and PACOM.

Fluor Intercontinental, Inc. was awarded contracts for AFRICOM. They provide base life support (BLS) for bases in Kenya, Djibouti, Somalia, Nijer, and Cameroon. PAE was awarded contracts for SOUTHCOM (PIEE database). PAE provides facilities and facilities maintenance for a location in Honduras. Vectrus won the contracts for CENTCOM and PACOM which includes bases in the Philippines, Iraq, Qatar, UAE, Kuwait, and Kwajalein (PIEE database). Vectrus also won the contract for Talisman Sabre, a biannual military exercise with Australia (PIEE database). KBR supported

EUCOM by providing dining facilities in Romania, Poland, and Germany. KBR has supported NORTHCOM.

LOGCAP has also supported stateside missions in support of Operation Allied Refuge (OAR)/ Operation Allied Welcome (OAW) in Fort Bliss, Tx, Ft. McCoy, WI, Fort Pickett, VA, and Camp Atterbury, IN. LOGCAP provided full life support for OAW (tents, bedding, dining facilities, latrines, showers, medical, etc.). LOGCAP was used as a contract vehicle to support Operation Warp Speed in the fight against COVID. KBR provided food service for a quarantine area in Fort McCoy for every service member that temporarily had to quarantine for 14 days (about 2 weeks) after travel. KBR also provided temporary facilities to support efforts associated with COVID (trailers and equipment).

Table 4. Summary of LOGCAP V orders.

LOGCAP V CONTRACTS				
Contractor	**IDIQ Contract Number w/o Order numbers**	**Command**	**Locations**	**Service Provided**
Fluor	W52P1J19D0046	AFRICOM	Kenya, Djibouti, Somalia, Nijer, and Cameroon.	Base Life Support (BLS)
Kellog-Brown & Root (KBR)	W52P1J19D0044	EUCOM	Romania, Poland, and Germany	Dining Facilities
Kellog-Brown & Root (KBR)	W52P1J19D0044	Operation Allied Refuge	Kosovo, Germany, Fort Bliss, Tx, Ft. McCoy, WI, Fort Pickett, VA, and Camp Atterbury, IN	Dining Facilities
Kellog-Brown & Root (KBR)	W52P1J19D0044	Operation Warp Speed	Fort McCoy, WI	Dining Facilities- for quarantined troops
Parson's Global Logistics Services, LLC (PAE)	W52P1J19D0047	SOUTHCOM	Honduras	Facilities & Facilities Maintenance
Vectrus	W52P1J19D0045	CENTCOM & PACOM	Philippines, Iraq, Qatar, UAE, Kuwait, and Kwajalein.	LOGCAP Services
Vectrus	W52P1J19D0045	Australia	Operation Talisman Sabre	not specified at CLIN level

Civil Augmentation Programs (CAPs) exist to provide deployed troops with essential public facilities and services as base operations support. Before CAPs can safely set up shop in areas of conflict, uniformed personnel perform their own life support services. The Army still has uniformed specialists for food service and water treatment. Sewage disposal is also a heavily manual process performed using rudimentary methods until full BOS is established on site. Overseas, CAPs have replaced most uniformed personnel with contracted personnel. CAPs have done the same for some base operation services in the U.S. The Department of Defense Instruction 1100.22 instructs the DOD to augment the force with civilians and contractors so that uniformed personnel can train during peacetime to be prepared to go to war on short notice (Under Secretary of Defense for Personnel and Readiness, 2010). Contractors and civilians can do most things but there are limitations. They cannot be hired to do military- unique duties or to command-and-control military forces.

2. Air Force Contract Augmentation Program

The Air Force initiated AFCAP in 1997 as a method to fill the gaps in emergency operations capabilities created by reductions in active-duty forces. AFCAP I began primarily providing personnel to complement and augment civil engineer and services personnel but adapted over time to support a full range of required capabilities. As with other CAP contracts, AFCAP provides commanders with a tailored rapid increase in response or supplementation of military forces and capabilities. Thus, allowing the Air Force to maintain a smaller force structure but retain full mission capability by filling shortfalls through contractors. AFCAP contracts have the capability to provide augmentation support services mirroring any of the Air Force officer and enlisted career field groups 1 through 9, including Operations, Logistics, Support, and Medical.

AFCAP as a program is managed through the Air Force Civil Engineer Center with the contracts awarded by the Air Force Installation Contracting Center's 772 Enterprise Sourcing Squadron. Currently the Air Force is utilizing AFCAP V, an eight-year, $6.4 billion program with contracts awarded to eight firms. The eight firms are listed below. Historically, AFCAP contracts in CONUS focus on natural disaster

recovery efforts and standup of bare base operations supporting humanitarian efforts of declared contingencies. However, the intent of the AFCAP "contract is to draw on the resources and expertise from the private sector to provide a full range of Base Operating/ Life Support (BOS/BLS) and logistical support on an as required basis to support all programs" (Air Force Installation Contracting Agency 772 ESS/PKD, 2018, p. 2). This includes providing "backfill support at existing operational locations to augment mission requirements or bridging until other execution avenues become available" (Air Force Installation Contracting Agency 772 ESS/PKD, 2018, p. 2) AFCAP is available for use by DOD and other government agencies supporting National Command Authority objectives.

Recent examples include Tyndall Air Force Base (AFB) rebuild efforts and Holloman Operation Allies Welcome support. Within 48 hours of Hurricane Michael hitting Tyndall AFB, an AFCAP task order to Kellog Brown & Root Services provided: "establishing basic life support services by supplying food, water, and ice for the military personnel working the recovery, as well as those responsible for base security" (Breaking Defense, 2020). Additional work included "assessing damage, clearing debris, and stabilizing/repairing buildings [as well as] airfield management to keep the flight line open for supply and relief efforts" (Breaking Defense, 2020). Flour Intercontinental provided Holloman AFB support for Operation Allies Welcome starting on the same day as their notice to proceed with construction operation and maintenance of Aman Omid Village. Over 7,200 Afghan evacuees were provided essential support services in the form of shelter for living space, dining facility services, clothing procurement and distribution, and medical care through Flour's AFCAP task order (Flour, n.d.). Current AFCAP V contracts are shown in Table 5.

Table 5. Air Force Contract Augmentation Program V Contracts. Adapted from FPDS-NG

Contractor	Contract Number
DynCorp International	FA8051-20-D-0002
Environmental Chemical Corporation	FA8051-20-D-0003
Fluor Intercontinental	FA8051-20-D-0004
Kellogg Brown & Root Services	FA8051-20-D-0005
PAE-Perini	FA8051-20-D-0006
Readiness Management Support	FA8051-20-D-0007
URS Federal Services International	FA8051-20-D-0001
Vectrus Systems Corporation	FA8051-20-D-0008

3. Navy Global Contingency Construction Multiple Award Contract

This Contingency Construction Multiple Award Contract (MAC) is an Indefinite-Delivery/Indefinite-Quantity (IDIQ) MAC serving as a contracting vehicle managed by the Naval Facilities Engineering Systems Command (NAVFAC) to meet the Navy's construction requirements. NAVFAC reported that this contract vehicle is available "to provide rapid and emergency response to meet ever changing contingency requirements during natural disasters and military conflict." (Naval Facilities Engineering Systems Command, 2021) NAVFAC also reported, "this IDIQ MAC provides supervision, equipment, materials, labor, travel, and all means necessary" for civilian construction contractors responding to government requirements for construction and related engineering services during humanitarian efforts, conflict, or emergent mission critical requirements (Nava Facilities Engineering Systems Command, 2021). On 15 July 2021, Naval Facilities Engineering Systems Command (NAVFAC) Atlantic awarded six businesses, strategically spreading across CONUS (see Figure 6), IDIQ MAC for "contingency construction projects with a maximum amount of $5 billion in which future

task orders will be primarily funded by military construction (MILCON) and operations and maintenance" (Naval Facilities Engineering Systems Command, 2021).

Table 6. IDIQ MAC Contracts. Source: Naval Facilities Engineering Systems Command (2021).

Contractor	Contract Number
Aptim Federal Services, LLC–Baton Rouge, Louisiana	N62470-21-D-0018
CDM, a joint venture–Fairfax, Virginia	N62470-21-D-0019
ECC Contingency Constructors, LLC–Virginia Beach, Virginia	N62470-21-D-0020
Gilbane Federal–Concord, California	N62470-21-D-0021
Jacobs Project Management Co.–Dallas, TX	N62470-21-D-0022
Perini Management Services, Inc.–Framingham, MA	N62470-21-D-0023

4. Navy Supply System Command (NAVSUP) Global Husbanding Service Provider Multiple Award Contract

The Navy Supply System Command (NAVSUP) is responsible for the Husbanding Service Provider (HSP) Multiple Award Contract (MAC), which provides a wide range of services to support naval forces around the world. The HSP MAC is a vital part of the Navy's ability to operate effectively by providing a single contract for a variety of husbanding services, such as: water and fuel delivery, waste removal, security, transportation, communications, food service, line handling, pilotage, and customs clearance.

> The Navy Supply System Command (NAVSUP) serves as the Navy's lead for the Husbanding Service Provider (HSP) Multiple Award Contract

(MAC) supporting maritime forces, other government agencies, and military vessels. On October 1st, 2020, NAVSUP Fleet Logistics Center Sigonella, Italy, awarded a HSP contract with a total ceiling value of $2.1 billion for civilian husbanding service providers supporting critical elements such as force protection, water, tugs, waste removal, as well as provide electricity, phone lines, and transportation to a visiting ship and its crew. This HSP MAC contract is being utilized through eight Fleet Logistics Centers located in Norfolk, Virginia; Jacksonville, Florida; San Diego, California; Puget Sound, Washington; Pearl Harbor, Hawaii; Yokosuka, Japan; Manama, Bahrain; and Sigonella, Italy for providing critical support required when U.S. Navy vessels are visiting commercial and military ports across the globe. For example, over 30 companies supporting every Fleet across the globe for HSP contracts represented approximately 1,878 task orders valued at $169 million in fiscal year 2019. (Naval Supply Systems Command Office of Corporate Communications, 2020)

5. Governmentwide Acquisition Contracts

Outside of military service established CAP contracts other governmentwide acquisition contracts exist to provide rapid acquisition solutions that may align with specific categories of spend. The General Services Administration (GSA) maintains multiple award schedules within the security and protection; facilities; and information technology categories that provide competition as well as rapid execution. One specific example Is within the security and protection schedule GSA currently has 29 contractors in the Professional Law Enforcement Services category with established pricelists capable of providing alarm monitoring, guards, security officers, and security police personnel.

This chapter explained how CAP has most recently been used in CONUS and OCONUS by each military service. Each branch used a similar contract type and structure but with mission specific differences. The Air Force and the Army used some of the same contractors while the Navy and Marines used a completely different set of contractors. The next chapter will identify what BOS each branch supports and how those services are currently managed.

C. UNITED STATES ARMY BOS SERVICES

The U.S. (United States) Army Installation Management Command (IMCOM) exists for garrison operations. Their mission, according to their webpage is "IMCOM delivers quality base support from the Strategic Support Area, enabling readiness for a globally responsive Army." Their vision according to their webpage is "Every installation delivers superior base support, enabling readiness and the highest quality of life for our Soldiers, Families and Civilians." As with LOGCAP, IMCOM is managed by the Army's G-4 logistics section. Whether a base is CONUS or OCONUS, the G-4 oversees organic and nonorganic base support services.

IMCOM groups installation services into 11 major service areas. Those major service areas are listed in the exhibit titled USAG Services PowerPoint, IMCOM Installation Services (A. Douglas, email to author, October 27, 2022). Every CONUS Army base has the same 11 major service areas (Figure 2).

Figure 2. USAG Services PowerPoint–IMCOM Installation Services. Source: A. Douglas, email to author (October 27, 2022).

D. UNITED STATES NAVY BOS SERVICES

The "Navy Base Operations Support (BOS) is responsible for fleet operations, safety and security, facility support, quality of life, and mission support and management programs at 70 Navy installations" (Williamson, 2022, p. 8). Fleet operations involve the maintenance and support of Navy vessels, including ships and aircraft. Safety and security encompass the protection of Navy personnel, equipment, and installations, as well as emergency response and disaster preparedness. Facility support includes the management of infrastructure, utilities, and environmental compliance. Quality of life programs aim to improve the physical, social, and emotional well-being of Navy personnel and their families. Mission support and management programs provide administrative and logistical support to Navy operations.

These functions are primarily managed by the Commander, Navy Installation Command (CNIC), which is an Echelon II command responsible for

> worldwide U.S. Navy shore installation capabilities, in which the Commander, Navy Installation Command (CNIC) serves as the Navy's shore integrator, designing and developing integrated solutions for sustainment and development of Navy shore infrastructure for the operations, maintenance and quality of life programs across 10 regions, 70 installations, and 123 Naval Operations Support Centers. (Commander, Navy Installations Command, n.d.a).

The CNIC's role as the Navy's shore integrator is essential to ensuring the effective and efficient operation of Navy shore installations. Through its oversight of the various BOS functions, the CNIC plays a critical role in ensuring that Navy installations are prepared to meet their mission requirements, in which

> The Navy must deliver affordable, sustainable, environmentally compliant, and resilient shore platforms through improved processes ... to increase resilience of Navy installations ... Currently, the Navy's Logistics Enterprise is mission capable for day-to-day operations, but is not postured for a sustained increase in Fleet operational tempo, particularly given the tyranny of distance across the INDOPACOM AOR. The logistics enterprise must be prepared to enable and sustain readiness across the competition continuum—from Phase 0 peacetime mindset to Phase II crisis and conflict. (Williamson, 2022, p. 5)

Figure 3 provides the ten CNIC regions and different types of base operations support under the CNIC.

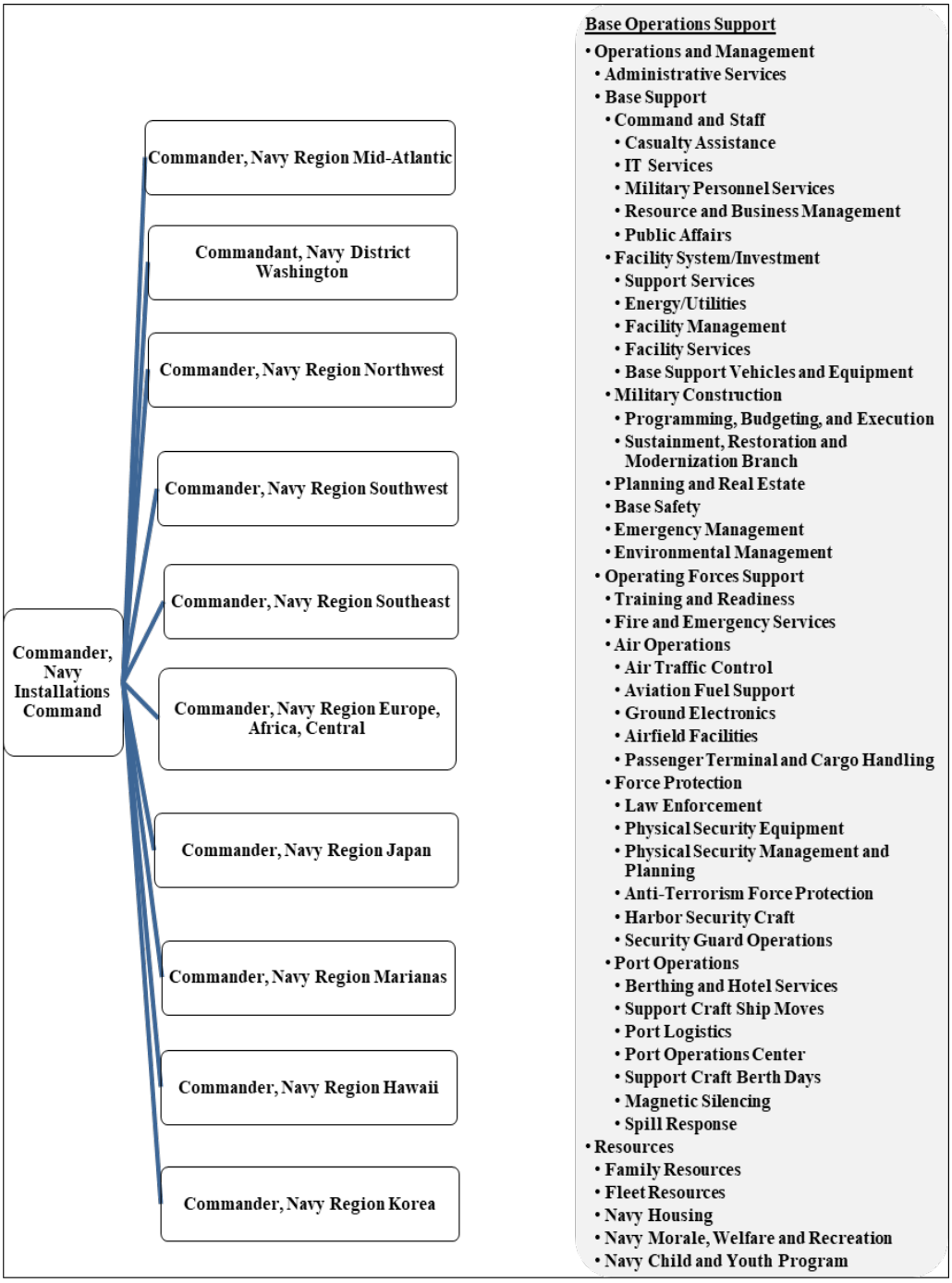

Figure 3. CNIC Command Structure.
Source: Commander, Navy Installations Command (n.d.b).

E. UNITED STATES MARINE CORPS BOS SERVICES

The Marine Corps Installations Command (MCICOM) is responsible for the policy, resources, and command and control over all Marine Corps installations. This includes four regional installations commands and ten main installations support sections. The four regional installations commands are MCI East Installation Command, MCI West Installation Command, MCI Pacific Installation Command, and MCI National Capital Region. The ten main installations support sections cover a range of functions, including personnel and administration (G-1), operations and plans (G-3/5), logistics and services (G-4), information technology (G-6), modernization and development (G-7), facilities (GF), asset management, capital investments, enterprise integration, environmental management, housing management, public works, MCICOM Command Inspector General (IG), safety division, MCICOM contracting, and energy management division (Marine Corps Installations Command, n.d.).

MCICOM was created on October 1, 2011, as the single authority for all Marine Corps installations matters. Its mission is to optimize support to the Operating Forces and tenant commands by providing policy, resource allocation, and command and control over all Marine Corps installations. MCICOM's structure is similar to that of the Army regarding base operations support, which is organized into similar functional areas (Marine Corps Installations Command, n.d.; United States Army, 2022).

The Marine Corps Installations Command serves a critical role in ensuring the readiness and effectiveness of the Marine Corps. It provides essential support services to operating forces and tenant commands, including facilities management, logistics, personnel support, and information technology. By prioritizing resources and establishing policies, MCICOM helps to ensure that Marine Corps installations operate effectively and efficiently, enabling Marines to perform their duties to the best of their abilities (Marine Corps Installations Command, n.d.).

F. UNITED STATES AIR FORCE BOS SERVICES

The Secretary of the Air Force (SECAF) outlined the following, Base Operations Support functions within the Air Force are managed through the Air Force Wing structure as described in Air Force Instruction (AFI) 38–101 paragraph 26.3 (Secretary of the Air Force [SECAF], 2019a) (see Figure 4). The SECAF also outlined the following, "the standard operational wing structure is a wing with four groups (Operations, Maintenance, Mission Support, and Medical), related functions and disciplines are aligned under the appropriate group, [squadron, and ultimately flight]" (SECAF, 2019a, p. 85). BOS functions align primarily within the Mission Support Group portfolio, with some directly under Wing Commanders, and are performed by a combination of active-duty, AF civilian, and contractor personnel. Within this structure the Mission Support Group Commander serves as the BOS-I coordinating the support provided to the other mission areas.

Above wing-level installation and mission support capabilities and resources are managed through the Air Force Installation and Mission Support Center (AFIMSC). This structure flows command authority through Major Commands (MAJCOM) down through the wing structure and BOS functional authorities flow through AFIMSC. The reason the AF established AFIMSC is "centralizing key combat support-enabling capabilities provides an opportunity for greater synchronization of effects, innovation, potential increases in operational efficiencies, and the ability to allocate funding against the Air Force's highest priorities from an enterprise-wide (E-W) perspective" (Headquarters United States Air Force, 2014, p. 1). Common Operating Levels of Service standardize BOS support services across installations accounting for location and mission. Within CONUS AFIMSC provides functional oversight of BOS for 62 active-duty Air Force Bases assigned to one of six Major Commands (MAJCOM) or two Direct Reporting Units (DRU).

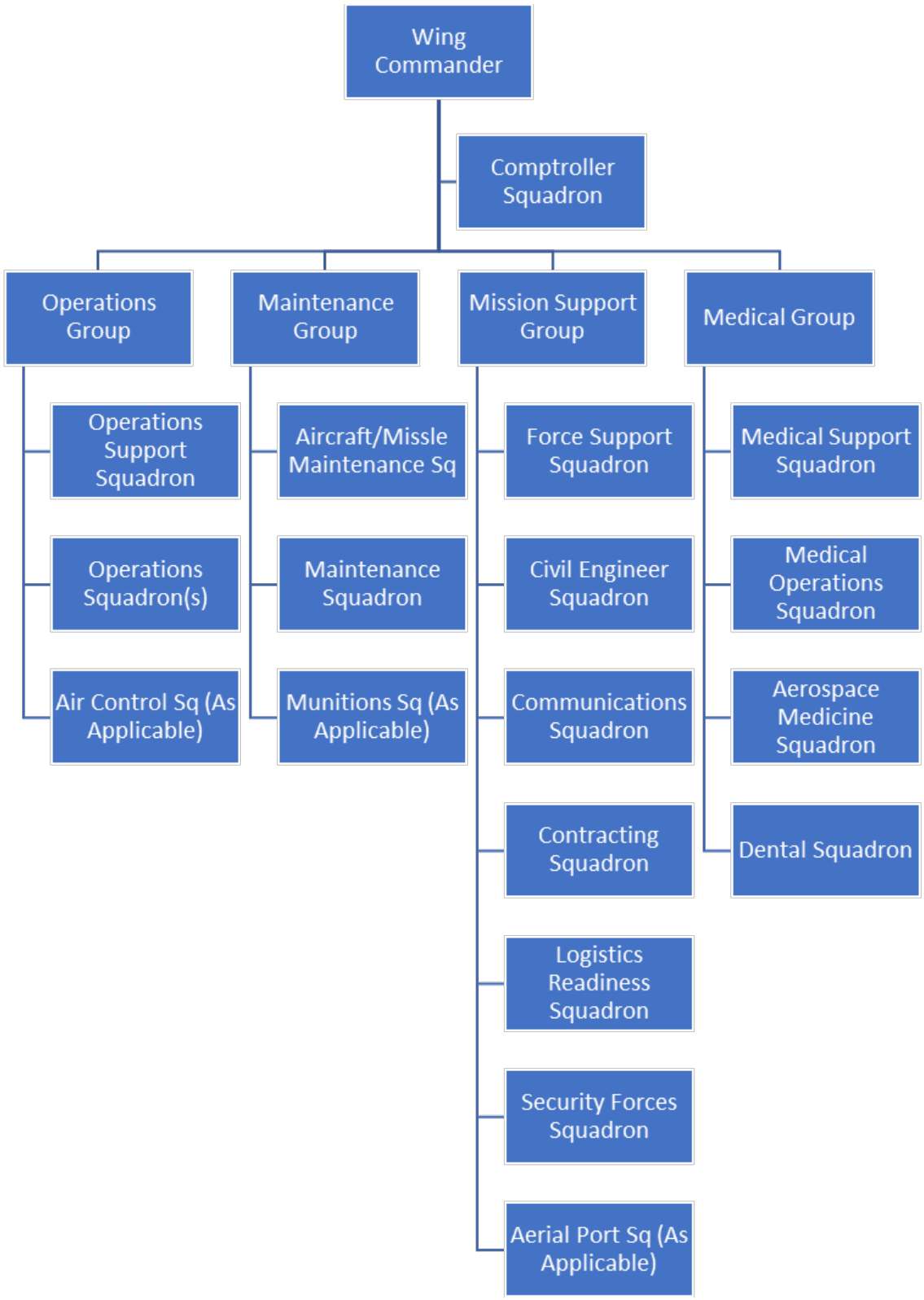

Figure 4. Wing Structure. Source: SECAF (2019a, p. 85).

Each MAJCOM/DRU focuses on specific mission areas requiring differing combinations of BOS on the AFB dependent on supported missions and tenet organizations. However, in general every AFB requires some level of civil engineer facilities support; security forces installation protection; communications information technology services; logistics readiness and transportation support; and force support and personnel support. AFIMSC tracks personnel supporting BOS services within its Installation Health Assessment dashboard. The dashboard distinguishes personnel by Air Force Specialty Code and status (officer, enlisted, or civilian). Providing installation commanders with an authoritative source for understanding available BOS resources. Sixteen of 62 AF installations currently have contracted civil engineer functions (excluding firefighting) within their overall BOS portfolio.

G. BASE OPERATIONS SUPPORT SERVICES

This section will place BOS services within several specific common categories leading to our analysis of those categories. Additionally, we briefly look at limitations and restrictions on contracting for BOS services. Finally, we address variables that impact the level of BOS services required at an installation.

a. Similarities

DoDD 3020.40 Mission Assurance (MA) defines mission assurance as "A process to protect or ensure the continued function and resilience of capabilities and assets, including personnel, equipment, facilities, networks, information and information systems, infrastructure, and supply chains, critical to the execution of DOD mission-essential functions in any operating environment or condition" (OUSD, 2018, p. 18). BOS services are integral to mission assurance. While the military services may bucket them differently, common among all BOS services are physical security, infrastructure support, communications, material management/transportation, and human capital/ personnel.

(1) Physical Security

DoDI 5200.08, Security of DOD Installations and Resources and the DOD Physical Security Review Board (PSRB) establishes commander's responsibilities for installations as "DOD installations, property, and personnel shall be protected and applicable laws and regulations shall be enforced" (Under Secretary of Defense for Intelligence, 2015, p. 2). Physical security of installations is a critical mission essential function required to achieve mission effectiveness at every DOD installation. Security requirements vary dependent on installation size and organization, installation missions, personnel mixture, as well as active and passive security measures, however personnel will always be a key required component of physical security.

(2) Infrastructure Support

Built infrastructure includes "installations, facilities and other fixed (i.e., permanent) and man-made assets essential to project, support, and sustain military forces and operations worldwide. These include buildings, airfields, roads/bridges, utility systems, stores of military equipment, and maintenance stations necessary for the support of military forces" (SECAF, 2019b, p. 45). Infrastructure support is the broad category of services that ensure the physical assets of built infrastructure are functional to meet the mission. The military services compartmentalize infrastructure support differently, however, all manner of facilities maintenance and repair, as well as utilities are captured within the infrastructure support.

(3) Communications

Communications systems and support is an increasingly critical role for command and control of military forces. From cameras for security, radios for incident communication, internet access for personnel accountability and infrastructure controls, loss of communications severely reduces mission assurance.

(4) Material Management/Transportation

Material management is focused on supply and equipment tracking and movement to provide on time delivery of equipment to the warfighter. In addition, this

support ensures the proper handling and storage of hazardous materials, weapons, and fuels. Finally, the on-time transportation of personnel and supplies.

(5) Human Capital/Personnel/Administration

Human Capital/Personnel/Administration encompasses support services required to ensure the efficient and effective management of the people, processes, and performance of mission essential functions. This includes key administrative functions such as financial and payment management, legal services, contracting, and safety; as well as quality of life functions such as dining facilities, religious support, and MWR.

b. Limitations

Office of Management and Budget Circular A-76 Performance of Commercial Activities, publishes the "federal policy regarding performance of commercial activities [and the] procedures for determining whether commercial activities should be performed under contract with commercial sources or in-house using government facilities and personnel" (Office of Management and Budget [OMB], 1999, p. 1). A-76 policy states "Whenever commercial sector performance of a Government operated commercial activity is permissible, in accordance with this Circular and its Supplement, comparison of the cost of contracting and the cost of in-house performance shall be performed to determine who will do the work" (OMB, 1999, p. 1). While this policy would impact the ability to contract out work currently performed by military personnel, it does not apply to DOD "in times of a declared war or military mobilization" (OMB, 1999, p. 3).

10 U.S.C 2465—Prohibition on contracts for performance of firefighting or security-guard functions restricts the DOD's ability to contract for security and firefighting. Following the terrorist attacks of 9/11 and impacts of the Global War on Terrorism on active-duty deployments Congress provided a waiver in the 2003 National Defense Authorization Act with the waiver being extended to 2012. Contracting for CONUS installation security requirements will require a waiver from Congress.

20 U.S.C Sec 107, known as the Randolph Sheppard Act (RSA), establishes a priority for blind persons licensed by a State Agency in assigning the placement or

operation of a vending facility on Federal property. From a BOS services perspective this priority impacts dining facilities on military installations and would apply to any new or changed dining facility requirements on installations resulting from a full deployment of military personnel. As the RSA only establishes a priority it would not prevent contracting out of dining facility service, however, if the priority is not given the State Agency may seek arbitration through the Department of Education.

c. Variables and Demand Drivers

The demand drivers for essential Base Operations Support (BOS) services can vary depending on the specific needs of the installation and the mission of the military unit that occupies it. However, some common demand drivers for BOS services include:

- Force Structure and Size: The size and composition of military units occupying an installation can impact the demand for essential BOS services. A larger unit with more personnel will require more support services than a smaller unit.
- Mission Requirements: The mission requirements of the military unit occupying the installation can drive demand for specific BOS services. For example, a unit with a high operational tempo may require more frequent maintenance and logistics support.
- Geographic Location: The geographic location of an installation can impact demand for certain BOS services. For example, an installation located in a harsh climate may require more frequent snow removal and facility maintenance services.
- Equipment and Infrastructure: The type and age of equipment and infrastructure at an installation can impact the demand for essential BOS services. Older equipment and infrastructure may require more frequent maintenance and repair.

- Training and Readiness: The need to maintain training and readiness levels can drive demand for BOS services. For example, training exercises may require additional logistics support, equipment maintenance, and transportation services.
- Personnel Support: The need to support military personnel can drive demand for BOS services, including administrative support, medical and dental services, and morale, welfare, and recreation services.
- Security Threats: The level and type of security threats facing an installation can impact the demand for BOS services, particularly those related to physical security and force protection. For example, increased threat levels may require additional security personnel and enhanced security measures.
- Environmental Factors: Environmental factors, such as natural disasters or severe weather events, can impact the demand for BOS services. For instance, an installation located in an area prone to hurricanes or earthquakes may require additional disaster response planning and infrastructure maintenance.
- Infrastructure Projects: Major infrastructure projects, such as construction or renovation of buildings and facilities, can impact the demand for BOS services. These projects may require additional support services, such as transportation, logistics, and construction management.
- Fiscal Constraints: Fiscal constraints, including budget cuts or resource limitations, can impact the demand for BOS services. In some cases, military leaders may need to prioritize which services are most critical and allocate resources accordingly.

- Technology and Innovation: Advances in technology and innovation can impact the demand for BOS services, particularly in areas such as IT support, cybersecurity, and equipment maintenance. Military leaders may need to invest in new technologies and skillsets to keep pace with changing demands.

By understanding the demand drivers for essential BOS services, military leaders can better anticipate the needs of their installations and allocate resources to ensure that critical services are provided in a timely and effective manner. This can help to maintain the readiness of the force and support the mission of the military unit occupying the installation.

Joint Publication 4--04 *Contingency Basing* Chapter V discusses design and establishment of CLs laying out the process and considerations for planning the installation. When combined with Continuity of Operations planning IAW DoDI 3020.42 installation BOS-I can determine mission demand drivers for BOS services. Plans must first consider the primary mission of the installation and how that mission changes with a full deployment of military personnel. Installations focused on deployed combat employment are significantly impacted by the combat units deploying, while installations that employ combat power from CONUS do not change. For all military branches basic military training and technical training missions remain at the CONUS installation and require significant levels of BOS services to support continuing student training and force replenishment. To understand the supported units, mission planners must identify the unit's functions, determine the unit structures and number of personnel/equipment, and then define relationships among the unit functions. This analysis defines the levels of BOS services required to support the continuing mission of the installation. This analysis must extend to joint installation occupants and tenet organizations as well to ensure mission assurance of all critical DOD missions. Finally, support to affiliated groups such as dependents and retirees must be considered within planning to ensure the level of support and quality of life provided those individuals are addressed.

Once mission essential functions to support mission assurance are identified supporting activities must be identified. BOS services fall within the supporting activities, with many variables impacting the optimal level of BOS support provided. Operationally related variables include number of personnel/infrastructure/equipment supported, condition of infrastructure/equipment supported, weather conditions/threat to installation, and number/classification of information systems. Continual reassessment of the operational conditions and level of support is required to ensure mission assurance continues.

H. HISTORICAL IMPLEMENTATION OF BOS-I AND CAP

This section provides more details on the historical implementation of both BOS-I and CAP programs. The BOS program, according to a budget report by the Officer of the Secretary of Defense, has been used in supporting deployed forces since its establishment to

> provide the resources to operate the bases, installations, camps, posts, and stations of the Military Departments. These resources sustain mission capability, ensure quality-of-life, and enhance work force productivity and fund personnel and infrastructure support. Personnel support includes food and housing services for unaccompanied and deployed forces; religious services and programs; payroll support; personnel management; and morale, welfare, and recreation services to military members and their families. (Office of the Secretary of Defense, 2003, p. 117)

According to a research report by the Air Command and Staff College Air University, the Army was designated by CENTCOM as the BOS-I until November 11, 2008, when this authority was transferred to the Air Force to reduce the level of duplicated efforts while operating more sufficiently to have a single organization providing all BOS support under the joint operating environment (Dwyer, 2009, pp. 21–25). The CAP program, according to a report by the Congressional Research Service (CRS), has also been used in several military operations since its establishment, including Operation Iraqi Freedom, Operation Enduring Freedom, and Operation Inherent Resolve (Congressional Research Service, 2016). Below are some examples of both programs used by the Services:

1. BOS-I

- During Operation Enduring Freedom in Afghanistan, the U.S. Army established a BOS-I program to provide centralized management of base support services such as food, laundry, and housing. This allowed the Army to better coordinate and allocate resources across multiple bases, improving efficiency and effectiveness in support of military operations (Harris, 2011).

- The U.S. Army also implemented a BOS-I program at Fort Bragg in North Carolina in the early 2000s. This program integrated the support functions of multiple units on the base, including logistics, transportation, and maintenance, to reduce redundancy and improve coordination (Koester, 2003).

- In 2012, the U.S. Navy established a BOS-I program at Naval Station Norfolk in Virginia. This program consolidated the management of various base support functions, including facilities maintenance, security, and environmental services, under a single entity to improve coordination and efficiency (Roberts, 2013).

- The Navy also implemented a BOS-I program at Naval Air Station Lemoore in California in the early 2000s. This program integrated various support functions, such as logistics, transportation, and personnel services, to enhance overall effectiveness in support of the base's mission (Avery, 2003).

- The U.S. Air Force established a BOS-I program at Bagram Airfield in Afghanistan in the early 2010s. This program centralized the management of various support services, including logistics, transportation, and food service, to improve efficiency and reduce redundancy (Hirsch, 2011).

- The Air Force also implemented a BOS-I program at Joint Base Elmendorf-Richardson in Alaska in the mid-2000s. This program integrated various support functions, such as facilities maintenance, security, and environmental services, to improve coordination and effectiveness (Smith, 2010).

- In the early 2010s, the U.S. Marine Corps established a BOS-I program at Camp Leatherneck in Afghanistan. This program integrated various support functions, such as logistics, transportation, and maintenance, to improve coordination and reduce redundancy (Mays, 2012).

- The Marine Corps also implemented a BOS-I program at Marine Corps Base Camp Pendleton in California in the mid-2000s. This program centralized the management of various support services, including facilities maintenance, and security (United States Marine Corps, 2005).

2. CAP

- During the Iraq War, the Army implemented a Civilian Augmentee Program to support military operations by hiring civilians with specialized skills to work alongside military personnel. One notable example was the deployment of Department of Defense civilians as Provincial Reconstruction Teams (PRTs) in Iraq to assist with rebuilding efforts. (Kaufmann, 2006)

- Another example of the Army's Civilian Augmentee Program was during the Vietnam War, where civilian engineers were hired to assist with construction projects in Vietnam. These engineers were contracted by the U.S. Army Corps of Engineers and provided critical support to the military in building roads, bridges, and other infrastructure. (U.S. Army Corps of Engineers, 1976)

- The Navy implemented the Civilian Augmentee Program during Operation Enduring Freedom and Operation Iraqi Freedom to support naval operations by hiring civilians with specialized skills to work alongside military personnel. For example, civilians were hired to serve as linguists, medical professionals, and engineers to provide critical support to the Navy. (United States Navy, 2011)

- Another example of the Navy's Civilian Augmentee Program was during the Cold War, where civilians were hired to work at Navy shipyards to assist with ship maintenance and repairs. These civilians were critical to the Navy's readiness and helped ensure that ships were able to deploy quickly if needed. (Naval History and Heritage Command, n.d.)

- The Air Force implemented the Civilian Augmentee Program during the Gulf War to support military operations by hiring civilians with specialized skills to work alongside military personnel. For example, civilians were hired to provide logistics support, medical care, and engineering expertise to the Air Force. (United States Air Force, 2017)

- Another example of the Air Force's Civilian Augmentee Program was during the Korean War, where civilians were hired to work at Air Force bases to assist with aircraft maintenance and repairs. These civilians were critical to the Air Force's ability to maintain its aircraft and carry out its mission in Korea. (Air Force Historical Research Agency, n.d.)

I. MILITARY SERVICES BOS DESCRIPTIONS AND PERSONNEL BREAKOUT

This section lays out how each of the military services are organized to provide BOS services. Information is provided describing the breakout of the different BOS

functions within the military service and how it is staffed with active-duty, civilian, and contractors. Within the discussion of the Air Force is provided manpower standards the Air Force utilizes in assessing mission changes to BOS personnel. Finally, a discussion about force readiness reporting within the Air Force and how it can apply to understanding BOS service support requirements in a full deployment.

1. Department of the Army

Within the Army, the base operating support manpower is available within the Force Management System (FMS) commonly referred to as FMSweb. This system is searchable by geographic location, unit code, base name, position number, etc. Another system exists for the Army called Vantage. Vantages provides consolidated manpower data for active-duty and DOD civilians at Army installations along with tons of other information including but not limited to square footage, buildings, and structures. This system was created to track COVID but recently it was opened to track everything.

IMCOM provided a civilian contact listing for the services they provide in San Antonio that was generated by them in FMSweb (Table 7). The list failed to include all the military personnel performing BOS. This may have been in part because the Joint Base San Antonio was formerly an Army base called Fort Sam Houston but is now a joint base managed by the Air Force. The Air Force system and the Army system do not communicate. A Command Sergeant Major for a medical unit in Texas had high enough system access to generate reports in FMSWeb that broke down the IMCOM manpower by active-duty and civilians at Fort Hood. When asked, IMCOM in San Antonio did not have access to data for the number of base support services that were not performed by all civilians. The data existed in a useful format but was not accessible to the IMCOM staff.

Table 7. Army BOS Staffing. Adapted from FMSWeb.

Mission Essential Function (MEF)	***Position***	***Civilian %***	***AD %***
Physical Security	Director Emergency Services/ Provost Marshal/Provost NCO	67%	33%
	Law Enforcement Admin	100%	0%
	Deputy Police Chief	0%	100%
	Game Warden	100%	0%
	Criminal Investigators	100%	0%
	Police Officers-Patrol/Desk/Traffic	99%	1%
	Security Guards/Inspectors/Access Control	100%	0%
	Dispatchers	100%	0%
	Police Operations	100%	0%
	Total:	99%	1%
Infrastructure Support	Housing	100%	0%
	Environmental Conservation & Compliance	100%	0%
	Building & Grounds/Municipal/ Utilities/Energy	100%	0%
	Public Works	100%	0%
	Engineering (General,Civil,Construction, Mechanical,Architect)	100%	0%
	Military Construction (MILCON) & Real Estate	100%	0%
	Fire Protection & Fire Prevention	100%	0%
	Work Management & Engineering Systems	100%	0%
	Total	100%	0%
Communications	IT Systems and Visuals	100%	0%
	Information Management	100%	0%
	Total:	100%	0%

Mission Essential Function (MEF)	***Position***	***Civilian %***	***AD %***
Material Management/ Transportation	Airfield/Aircraft/Flight Operations/ Air Traffic Control	100%	0%
	Total:	100%	0%
Human Capital/Personnel/ Administrative	Garrison Commander's Office	75%	25%
	Army Higher Headquarters Commander/First Sergeant	0%	100%
	Human Resources	100%	0%
	Legal	78%	22%
	Education Admin. And Counselors	100%	0%
	Manpower	100%	0%
	Equal Opportunity	100%	0%
	Plans ANAL & INTG OFC	100%	0%
	ASAP	100%	0%
	Plans/Operations/Force Management/Demobilization	93%	7%
	Public Affairs	100%	0%
	Training Support & Force Training	100%	0%
	Range Operations and Maintenance	100%	0%
	Mission Training Center (MTC)	97%	3%
	Mil Personnel/Soldier for Life/ Casualty Ops/Soldier Separation/ Retirement/In&Out Processing/ID Cards/Deployment Cycle/	100%	0%
	Religious Support/Chaplain	17%	83%
	Auditors/IRAC Office	100%	0%
	Financial Management	100%	0%
	Testing/Counter Narcotics	100%	0%
	Official Mail/ Pub.,Printing,&Forms/FOIA	100%	0%
	Readiness/Volunteers/SHARP/ Social Services/Family Advocacy	100%	0%
	Safety and Occupational Health	100%	0%
	Total:	95%	5%

2. Department of the Navy

Within the Department of the Navy, CNIC is overall responsible for BOS functions across the Navy's installations, in which many services are also in place to support the Marine Corps operations and its personnel such as medical, legal, religious, and MWR services. According to a fact sheet published by the CNIC, as of September 2021, the organization employed approximately 37,000 personnel worldwide, with 73% of its workforce being civilian employees and 27% being active-duty military personnel (Commander, Navy Installations Command, 2021). This research selected the Commander, Navy Region Northwest (CNRNW) to evaluate the current total population mix of both civilian and military workforce. CNRNW is an Echelon III command under CNIC, as shown in Figure 3, and is responsible for the BOS functions for the Northwest Region within the CONUS. The percentage of the population of active-duty and civilian personnel is listed below (Table 8).

Table 8. Commander, Navy Region Northwest Staffing.
Source: DCPDS/TWMS/CMS-ID/FLTMPS Database.

	N-CODE	Position	Civilian %	AD %
Physical Security	N34	Force Protection	38%	62%
	N953	Safe Harbor	0%	100%
Infrastructure Support	N4	Facilities Management	56%	44%
	N4	Facilities Services	100%	0%
	N4	Utilities	100%	0%
	N4	Facilities Management	100%	0%
	N5	Shore Integrated Requirements	100%	0%
Communications	N6	Information Technician	100%	0%
	N6	Cyber Security	100%	0%
	Supporting Command	Jim Creek Naval Radio Station Personnel	83%	17%
	Supporting Command	Navy Information Operations Command Northwest Region Personnel	81%	19%

	N-CODE	Position	Civilian %	AD %
Material Management/ Transportation	Supporting Command	NAVSUP Fleet Logistics Center Puget Sound Personnel	82%	18%
	N32	Air Operations	100%	0%
Human Capital/ Personnel/ Administrative	N00	Command Headquarter	50%	67%
	N00E	Flag Protocol	100%	0%
	N00	Command Admin	27%	73%
	N00G	Inspector General	100%	0%
	N00K	Casualty Assistance Calls Officer	100%	0%
	N00L	Office of the General Counsel	100%	0%
	N00J	Staff Judge Advocate	0%	100%
	N00P	Public Affairs Officers	91%	9%
	N00R	Religious Programs	5%	95%
	N00EO	Equal Employment Opportunity	67%	33%
	N1	Total Force Management	50%	50%
	N11	Manpower & Manning	80%	20%
	N13	Human Resources Office	100%	0%
	N15	Navy Career Counselor	0%	100%
	N142	Transient Personnel Unit	6%	94%
	N91	Family Assistance Program	100%	0%
	N3	Operations	100%	0%
	N30	Fire	96%	4%
	N31	Port Operations	97%	3%
	N35	Safety	100%	0%
	N36	Training & Readiness	100%	0%
	N37	Emergency Management	78%	22%
	N8	Comptroller	100%	0%
	N9	Fleet and Family Readiness	100%	0%
	N91	Family Readiness	100%	0%
	N926	Child and Youth Programs	100%	0%
	N925	Galley Operations	3%	97%
	N93	Housing Programs	100%	0%
	N931C	Privatized Housing Management	100%	0%
	N932	Unaccompanied Housing Management	23%	77%
	Total		68%	32%

This high percentage of civilian personnel reflects the diverse and specialized skills required to support CNIC's mission of providing services and infrastructure to Navy personnel and their families. Many of the functions performed by civilian employees, such as facilities maintenance, logistics management, and quality of life programs such as housing and education, require specialized expertise and experience that may not be readily available among military personnel. Additionally, the use of civilian personnel can help to reduce the strain on the military's operational capabilities, allowing military personnel to focus on their primary missions. Overall, the reliance on a civilian workforce is a cost-effective way for CNIC to ensure that it has the necessary expertise and resources to support Navy personnel and their families, while also maintaining operational readiness.

According to the CNIC, contingency planning is a critical aspect of its operations. Therefore, CNIC relies heavily on its civilian workforce to provide continuity of operations and expertise in emergency response and recovery efforts. In the event of natural disasters, terrorist attacks, or other emergencies that may impact its installations and operations, the use of civilian personnel can help to mitigate the risks associated with military personnel being deployed or otherwise unavailable (Commander, Navy Installations Command, 2021). This suggests that CNIC has developed a structure that allows it to sustain the base without its active military personnel, at least for its BOS functions. As a result, the current manning structure of the CNIC reflects the organization's reliance on its civilian workforce to carry out its Base Operating Support (BOS) functions, even during full-scale forward deployed military operations.

3. Department of the Air Force

Within the Air Force the Base Operating Support functions manpower is available within the AFIMSC Installation Health Assessment (IHA) dashboard. The dashboard provides active-duty and DOD civilian manpower for forty-four Air Force Specialty Codes within the BOS portfolio. The IHA Dashboard provides the ability to filter data by functional groupings, Major Command, installation/location, Wing, unit/squadron and

AFSC. The AFSC's and percentage of the population of active-duty and civilian personnel total across all CONUS AFB's are listed in Table 9.

Table 9. Air Force BOS CONUS Staffing. Adapted from AFIMSC IHA Dashboard.

	AFSC	Position	Civilian %	AD %
Physical Security	3P0	Security Forces	13%	87%
	31P	Security Forces Officer	76%	24%
Infrastructure Support	3E0	Facility Systems	43%	57%
	3E1	Heating, Ventilation, Air Conditioning and Refrigeration	58%	42%
	3E2	Heavy Repair	45%	55%
	3E3	Structural	57%	43%
	3E4	Infrastructure Systems	48%	52%
	3E5	Engineering	62%	38%
	3E6	Operations Management	76%	24%
	3E7	Fire Protection	51%	49%
	3E8	Explosive Ordinance Disposal	2%	98%
	3E9	Emergency Management	19%	81%
	32E	Civil Engineer Officer	81%	19%
Communications	1D7	Cyber Defense Operations	18%	82%
	3D0	Cyberspace Operations		
	3D1	Cyberspace Systems		
	17D	Warfighter Communications Officer	82%	18%
	17S	Cyberspace Effects Officer	30%	70%
Material Management/ Transportation	2F0	Fuels Operations	9%	91%
	2G0	Logistics Plans	36%	64%
	2S0	Materiel Management	34%	66%
	2T0	Traffic Management Operations	43%	57%
	2T1	Ground Transportation	29%	71%
	2T2	Air Transportation	18%	82%
	2T3	Vehicle Management	30%	70%
	21R	Logistics Readiness Officer	89%	11%

	AFSC	Position	Civilian %	AD %
Human Capital/Personnel/ Administrative	30C	Support Commander	26%	74%
	3F0	Personnel	43%	57%
	3F1	Services	37%	63%
	3F2	Education and Training	72%	28%
	3F3	Manpower	37%	63%
	3F4	Equal Opportunity	36%	64%
	3F5	Administration	62%	38%
	38F	Force Support Officer	88%	12%
	3N0	Public Affairs	31%	69%
	35P	Public Affairs Officer	57%	43%
	5R0	Religious Affairs	6%	94%
	52R	Chaplain Officer	4%	96%
	6C0	Contracting	45%	55%
	64P	Contracting Officer	90%	10%
	6F0	Financial Management and Comptroller	56%	44%
	65F	Financial Management Officer	93%	7%
	65W	Cost Analysis Officer	89%	11%
	15A	Operations Analysis Officer	83%	17%
		Total AF BOS Population	47%	53%

Through the mixture of military and civilian personnel the Air Force achieves BOS services continuity and experience at installations with the civilian workforce, while ensuring a trained and ready deployable military force. AFI 38–101 establishes a methodology that may be utilized for calculating the overall impact to BOS personnel as installation missions change through two different base support tail (BST) factors (SECAF, 2019a). The weapons system BST factor "estimates common installation support requirements as well as those that indirectly support aircraft or other weapons system operations" (SECAF, 2019a). While the general BST factor "estimates common installation support for activities moving into or from an installation" (SECAF, 2019a). The weapons system BST of 7.0% applies to most installation missions involving flightlines, while the general BST of 5.4% applies to movement of functions of a more

administrative mission such as headquarters. Utilizing the weapons system BST of 7% this means for every 100 weapons system personnel (pilots and maintainers) 7 BOS personnel are required. The BST only applies to mission changes due to a mission moving onto or off an installation and assumes the BOS support is fully supported prior to application of the BST. The limitation of the BST is that the general nature of it only provides an overall baseline for minor mission changes, major mission changes require specific analysis at the career field level. Each career field is impacted differently by mission changes and have their own standards for establishing manpower levels which provide the most accurate analysis of mission change impact, but the BST provides an accepted methodology for overall BOS impacts due to mission changes.

Additionally, 16 of 62 CONUS AF installations currently have some level of BOS support contracted with a minimum of civil engineer functions (excluding firefighting) but several with significantly more of their overall BOS portfolio contracted out (Table 10).

Table 10. Air Force Contracted Civil Engineer Support. Source: BOS PM Update (R. Weniger, PowerPoint slides, December 5. 2022).

Contracted CONUS AFB Civil Engineer Support	
Air Combat Command	Joint Base Langley
Air Combat Command	Offutt
Air Education and Training Command	Maxwell
Air Mobility Command	MacDill
Air Force Test Center	Arnold
Air Education and Training Command	Sheppard
USAFA	USAFA
Air Mobility Command	Joint Base McGuire

Contracted CONUS AFB Civil Engineer Support	
Space Force	Los Angeles AFS
Air Force Material Command	Tinker
Air Combat Command	Tyndall
Air Education and Training Command	Laughlin
Air Education and Training Command	Vance
Global Strike Command	Kirtland
Air Education and Training Command	Keesler
Air Combat Command	Creech

Air Force Instruction 10–201 Force Readiness Reporting provides the Air Forces procedures for implementing an objective measure of a units resources and training for executing the mission for which it is designed (SECAF, 2022). Within readiness reporting the Air Force utilizes an overall percentage effective rate or A-Level to report on unit readiness to accomplish deployed missions. One factor in determining the A-Level is the personnel percentage or P-Level which is calculated based on the personnel authorized, assigned and available to execute its assigned mission. Table 11 combines personnel percentages as assigned to P-Level and the definitions assigned in the A-Level to provide an approximation of how the Air Force equates personnel percentages to mission capability.

Table 11. Force Readiness Reporting Definitions.
Adapted from SECAF (2022).

Personnel Percentage	P-Level	A-Level Definition
90–100%	P-1	A-1. Unit possesses required resources (personnel and/or equipment) and is trained to undertake assigned mission(s).
80–89%	P-2	A-2. Unit possesses the required resources (personnel and/or equipment) and is trained to undertake most of the assigned mission(s).
70–79%	P-3	A-3. Unit possesses the required resources (personnel and/or equipment) and is trained to undertake many, but not all, portions of the assigned mission(s).
0–69%	P-4	A-4. Unit requires additional resources or training to undertake the assigned mission(s); however, the unit may be directed to undertake portions of the mission(s) with the resources on hand.

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III. METHODOLOGY

This chapter describes a process for assessing mission impact from mission forward deployment and impacts to BOS requirements at CONUS installations. Within this discussion we establish BOS services as either mission essential or supporting activities, as well as discuss capabilities and limitations of current CAP contracts. Application of this process is then applied to two Air Force bases with distinctly different missions. The first is the training mission at Goodfellow AFB. The second a significantly deployed Air Force Special Operations Command mission at Hurlburt Field.

A. BASE OPERATING SUPPORT ANALYSIS

In the event of a bench clearing event with all the military on an installation deployed OCONUS, the installation could maintain continuity of services for family members left behind in several ways. The impact on BOS will vary by installation and mission but overall with the right mixture of implemented mitigating measures and CAP support, the lights can be kept on and security ensured. Augmentation of certain functions will be needed but it may be necessary to sunset some services to save money when the supported service members are deployed. Several potential courses of action are available to commanders in addressing continuity of operations during a full deployment event. In practice a combination of these courses of action will likely be utilized. These courses of action are discussed below, followed by a framework for commanders to utilize in analyzing the courses of action, and finally the listing of mission essential BOS services we utilize in our analysis.

1. Status Quo

While it may be necessary to change the level of BOS support and assets in certain situations, there are several factors that suggest that the military services may not need to make any changes to the current CONUS installation operations during full-scale forward deployed military force requirements by prioritizing readiness and leveraging technology. By adopting these approaches, the military services can ensure that they have

the resources they need to meet mission requirements without unnecessary changes. Here are some recommendations for arguments to support this position:

- Utilize Existing CAP Contracts: As discussed previously, CAP contracts can be a valuable tool for augmenting existing BOS-I services to increase capacity and capability during periods of high demand. By utilizing these contracts, the military services can avoid the need to change their current BOS support and instead leverage the expertise and resources of the private sector.

- Prioritize Readiness: By focusing on increasing readiness across the force, the military services can be better prepared to respond to full-scale forward deployed military force requirements. This includes investing in training, equipment maintenance, and supply chain management to ensure that the force is ready to deploy at a moment's notice. By prioritizing readiness, the military services can avoid the need to change their current BOS support and instead ensure that existing assets are operating at peak efficiency.

- Leverage Technology: Advances in technology can enable the military services to operate more efficiently and effectively, reducing the need for additional organic assets. For example, unmanned aerial vehicles (UAVs) can provide real-time situational awareness and intelligence, reducing the need for additional reconnaissance assets. Similarly, advances in logistics and supply chain management can enable the military services to move supplies and equipment more quickly and efficiently, reducing the need for additional transportation assets.

- Force Integration: The military services can share the burden of full-scale forward deployed military force requirements. This can help to reduce the need for additional BOS support by leveraging the capabilities and resources across the services.

2. Reduced Services

While reductions in services may present challenges, this is another viable option for military services during full-scale forward deployed military force by prioritizing core mission requirements, implementing efficiency measures, leveraging external support, and maintaining flexibility. Overall, the military services can ensure that they are able to meet their objectives even in the face of reduced services. Below are recommendations considering the reduction in services as an option:

- Prioritize Core Mission Requirements: In times of reduced services or resources, it is important to prioritize core mission requirements to ensure that the most critical tasks are being addressed. By focusing on the most critical requirements, the military services can ensure that they are able to meet their primary objectives without the need for additional support.
- Implement Efficiency Measures: During periods of reduced services, the military services can implement efficiency measures to reduce waste and optimize the use of existing resources. For example, streamlining administrative processes, reducing energy consumption, and optimizing supply chain logistics can help to ensure that existing assets are being used effectively and efficiently.
- Leverage Cross-Services Support: In addition to utilizing CAP contracts, the military services can also leverage support and cross military services to access a wider range of resources and expertise to augment their existing capabilities.
- Maintain Flexibility: Finally, it is important for military services to maintain flexibility during periods of reduced service. This includes the ability to rapidly adapt to changing circumstances and adjust priorities as needed. By maintaining flexibility, the military services can optimize their use of existing resources and respond more effectively to emerging threats and challenges.

3. CAP Utilization

Ultimately CAP programs can help military services meet their needs during full-scale forward deployed military force requirements by leveraging the expertise and

resources of the private sector, in which military services can access cost-effective, specialized support services that improve readiness, increase flexibility, and enhance efficiency:

- CAP can be cost-effective alternatives by leveraging the expertise and resources of the private sector, military services can access the necessary support and services without incurring the high costs associated with increasing their organic assets.
- CAP can help military services increase flexibility during periods of high demand. By utilizing these programs, military services can quickly scale up or down as needed, enabling them to respond more effectively to changing circumstances and emerging threats.
- CAP provides specialized expertise available in the private sector that may not be available within military services. By partnering with private sector companies, military services can access a wider range of skills and knowledge to augment their existing capabilities.
- CAP can help military services optimize their use of existing resources by providing efficient and effective support services. By outsourcing non-core functions, military services can focus on their primary objectives and reduce the burden on their organic assets.

A significant problem that might arise from a full deployment of military personnel would be the exodus of contractors who also deploy forward to support the wartime effort OCONUS. This may not be a problem when factoring in the availability of Third Country Nationals (TCN) and Local Nationals (LNs) available at OCONUS but not CONUS. The lead civilian providing law enforcement and security at an Army base in San Antonio had one major concern if the military deployed. Currently when there are not enough Army civilian law enforcement officers or security, the military police will fill the gaps. If the military could not fill the gaps, then maybe a mutual aid type of agreement could be made with local, San Antonio law enforcement to do so.

In conclusion, sustaining base services during full-scale forward deployed military force requirements requires effective contingency planning, leveraging technology, increasing the use of civilian contractors through CAP, cross-training personnel, and prioritizing critical functions. By implementing these measures, all military services can ensure that essential services continue to operate and support the mission. All military services can take several measures:

- Develop and implement effective contingency plans: Military services must develop and implement contingency plans to ensure that essential services continue to operate even when a significant number of assets are deployed. These plans should identify critical functions and prioritize their continuity, as well as identify potential sources of support from other military services, allied forces, or civilian agencies.
- Leverage technology to enhance BOS capabilities: Military services can leverage technology to optimize their BOS capabilities and reduce the burden on organic assets. For instance, automated inventory management systems and predictive maintenance systems can help optimize the use of existing assets and reduce maintenance downtime.
- Increase the use of civilian contractors through CAP: Military services can utilize CAP to supplement their existing workforce during periods of high demand. Outsourcing non-core functions to civilian contractors can reduce the workload on organic assets and increase their flexibility to respond to changing circumstances.
- Cross-train personnel: Military services can cross-train personnel to perform essential functions outside their primary occupational specialty. This will increase the flexibility and adaptability of the workforce and ensure the continuity of essential services during deployments.

Prioritize critical functions: Military services can prioritize critical functions, such as security and infrastructure support, during full-scale forward deployed military force requirements. By focusing on these critical functions, military services can ensure that essential services continue to operate and support the mission.

4. BOS Mission Assurance Analysis Framework

Mission assurance is provided through capabilities which DoDI 3020.42 defines as "Communications, facilities, information technology, trained personnel, and other assets necessary to conduct mission essential functions (MEF) and supporting activities" (Principal Deputy Undersecretary of Defense for Policy, 2006, p. 1). Properly and accurately identifying MEF or tasks is the first critical element of creating an installation Continuity of Operations (COOP) plan and policy to achieve mission assurance, making it key to planning for full deployment of military personnel. Second is identifying supporting activities required to enable MEF. BOS services fall in both the MEF and supporting activity categories. The level of required BOS service is driven by mission, however certain minimum levels of service in some categories are required.

With mission assurance as the primary requirement of DOD units, from the information presented in our literature review we synthesized the various areas of MEF; BOS MEF; the military services structure and personnel data; and CAP capabilities into a framework process for analyzing the impact of mission changes on BOS services personnel and ultimately how to address shortfall requirements. Below is the process framework for analyzing required BOS services and how to maintain them dependent on mission (Figure 5).

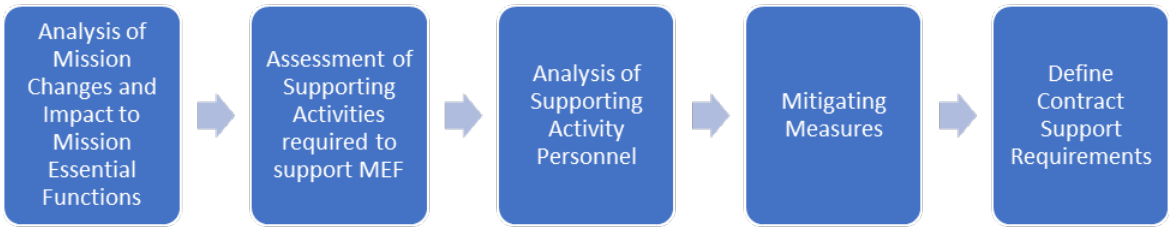

Figure 5. BOS Mission Assurance Analysis Framework

The framework above starts with analyzing installation mission changes resulting from a full deployment scenario informing continuing mission essential functions of the installation. MEF's for installations supporting non-deployable missions such as training required for continuing force reconstitution or those accomplished from CONUS such as

ICBM command and control will not significantly change. Installations with primarily forward deployable missions such as special operations missions may only need to provide BOS MEF's of life safety with reduced other supporting activities to installation residents and employees. Depending on primary organization and tenant organization missions, any combination of BOS MEF's is possible. Certain BOS functions are mission essential functions on their own while others are supporting activities, but the level of BOS services varies depending on installation mission. These are discussed further below.

Once changes to mission essential functions of the installation are understood assessment of the mission essential BOS and supporting activities required to enable MEF's is accomplished to understand BOS personnel demands. Analysis of the installation's active-duty and civilian BOS personnel informs the level of remaining BOS capability to support the MEF's. Application of force readiness reporting standards provides a standard for understanding remaining installation BOS capabilities. Installation commanders then determine any mitigating measures which can be applied to reduce the impact of lost BOS capability due to the deployment. Finally, determine capability gaps requiring filling through contractor support to ensure continuing mission accomplishment. Force readiness levels and definitions provide a baseline for analyzing CONUS mission capability of remaining civilian personnel in the BOS services function and will be utilized in this analysis.

5. Mission Essential BOS Services and Supporting Activities

a. Installation Physical Security

Physical security on installations across DOD services are primarily provided by active-duty personnel and civilians. Regardless of the mission that resides at the installation, physical security is required for mission accomplishment. As stated in JP 4-04 "CLs facilitate mission accomplishment by enabling power projection and security. Measures to protect the force are maximized" (JCS, 2019a, p. I-1). The same principle applies to CONUS installations, mission accomplishment is enabled by physical security of the installation.

Utilizing the AF security forces enlisted personnel as a baseline, 87% of the manpower for installation physical security will be deployed in a full scale deployment event. This leaves few resources to cover the physical security mission requiring mitigating measures to meet the mission. Mitigating measures primarily include reducing required security personnel footprint by closing installation gates and relying on more passive measures such as fences, barricades, and cameras. With a congressional waiver from 10 U.S.C. 2465 DOD could contract for security just as it did in the post 9/11 timeframe when security personnel were heavily engaged in both Afghanistan and Iraq.

b. Infrastructure Support

Infrastructure support is required to sustain and ensure continued mission operations as well as to protect the safety of the installation and personnel. The operational mission remaining at CONUS installations will drive the level or required infrastructure but regardless some level of support to existing infrastructure is required to mitigate risk to the installation. Infrastructure support work can typically be divided into four categories: emergency work, preventative maintenance, sustainment, and enhancement. "Emergency work is unscheduled work requiring immediate response to sustain or ensure continued mission operations, prevent significant additional damage to facilities and infrastructure or protect the safety and security of the installation, mission, or personnel" (SECAF, 2019b, p. 11). Preventative maintenance is work to keep "equipment and facilities in satisfactory operating condition through inspection, detection, and correction" (SECAF, 2019b, p.11) of normal wear and tear before failure. Sustainment work is work required to repair an unsatisfactory facility condition. Enhancements are work which is not required to meet mission requirements but supports the mission through facility improvements. Minimum capability to address emergency work is required to mitigate impacts from weather conditions such as water line bursts from freezing pipes or damaged base fence. While ideally preventative maintenance tasks are performed, they can be deferred if personnel are not available to support.

c. Communications

Command and control of personnel is dependent on the ability to communicate. Short term communication interruption can be mitigated, however long-term communications systems must be maintained to support MEF. Whether radios providing for incident command or cameras as a layer of physical security support to communications infrastructure and systems is essential for continued mission assurance.

d. Material Management and Transportation

The capability to obtain, track and move equipment and transport personnel is a key enabling function required for long term installation BOS service required to support mission assurance

e. Human Capital and Administrative

Personnel management, financial management, contracting, and dining facilities are mission enablers that can be interrupted in the short term but are critical to long term accomplishment of MEF. As mission enablers any interruption of these services have potential impacts to the other BOS services capabilities. For example, interruption of contracting and financial management personnel makes contractor support impossible.

B. CIVILIAN AUGMENTATION PROGRAM ANALYSIS

This chapter explains the current CAP capacity and limitations to manage the BOS workload. Recommendations to address some of these limitations are also provided here.

1. Capacity

Civil Augmentation Program contracts are in place to support CONUS BOS requirements as needed. LOGCAP and AFCAP successfully fill CONUS contingency requirements for natural disaster and Presidential directives. With a combined total of $90B in contract ceiling and scope covering all DOD services there are no issues with contract scope to support immediate contract support needs. However, considering potential CL BOS support by CAP contractors is priority, prioritization of CONUS support may be required to not impact deployed missions. Not surprising several of the contractors appear in some form across all of the available contracts between the Army,

Air Force, and Navy so capacity to manage work throughout CONUS installations is a limitation should any singular company obtain most task order awards, however, the multiple award nature CAP contracts provides opportunities to evaluate capacity to meet the need at the time of award.

2. Limitation

CAP contracts are readily available to provide BOS services within short lead times. Contractors must maintain 24-hour, 7 days a week on call capability and dependent on urgency provide task order proposals within 24 hours of a proposal request. Absent the urgency of responding to a contingency operation CAP should be considered for use only as a bridging vehicle to a better planned and defined long term contract vehicle. CAP contractors can provide all services but could minimize small business participation and agreements in place with municipalities. According to the MICC Director in San Antonio, Texas, IAAs are interagency agreements where the military is working with the local municipality. They sometimes outsource things like street sweeping and trash removal instead of contracting it out. They are contracting with the local municipality, whether the city, county, or state, for some of those services rather than contracting out to a contractor (M. Vicory, MICC Director, personal communication, February 13, 2023).

C. RESULTS AND FINDINGS

To demonstrate how an installation might utilize the framework to determine the need for contracted BOS support in a full deployment scenario, we look at two examples of Air Force installations with different mission sets on either extreme of non-deployable mission or fully deployable mission. Air Force installation and military service missions in general will fall between one of the two extremes of non-deployable and fully deployable. The first is Goodfellow AFB consisting of a training mission that does not significantly change despite the deployment of active-duty BOS personnel. The second is Hurlburt Field consisting of a special operations mission that deploys the primary mission. These examples walk through the analysis of mission changes and impact as

well as the assigned BOS personnel analyzed through the lens of force readiness reporting to assess the need for contracted support to the remaining mission.

1. Air Force Training Installation Example

Goodfellow AFB in San Angelo, Texas is the Air Education and Training Command AETC installation responsible for the mission of training intelligence, surveillance, and reconnaissance (ISR), as well as fire protection processionals for the United States Air Force, other DOD services and allies. Around 3,500 students are in training at Goodfellow AFB at any one time with a total installation population of 12,500 personnel (Military One Source, n.d.a). As a training mission the 17th Training and 517th Training Groups do not forward deploy, continuing the ISR and fire protection training missions and providing a pipeline of qualified personnel to the Air Force. Military BOS services personnel do deploy, leaving the installation with a potential capability gap should all military BOS personnel deploy. So, no mission changes or mission essential functions change from the full deployment scenario. BOS services to Goodfellow AFB are provided by the 17th Mission Support Group consisting of six squadron: 17th Civil Engineer Squadron, 17th Communications Squadron, 17th Contracting Squadron, 17th Logistics Readiness Squadron, 17th Force support Squadron, and 17th Security Forces Squadron (Goodfellow Air Force Base, n.d). Additionally, BOS services of finance, public affairs, religious affairs, equal opportunity, legal and safety are provided through wing staff agencies. According to the AFIMSC IHA Manpower and Personnel database Goodfellow requires 978 BOS personnel to support the current mission. Below is the civilian and active-duty breakdown of BOS services personnel.

Table 12. Goodfellow AFB BOS MEF and Supporting Activities Percentages. Adapted from AFIMSC IHA Dashboard.

	AFSC	Position	Civilian %	AD %
Physical Security	3P0	Security Forces	43%	58%
	31P	Security Forces Officer	25%	75%
		Physical Security Total	16%	84%
Infrastructure Support	3E0	Facility Systems	100%	0%
	3E1	Heating, Ventilation, Air Conditioning and Refrigeration	100%	0%
	3E2	Heavy Repair	91%	9%
	3E3	Structural	100%	0%
	3E4	Infrastructure Systems	100%	0%
	3E5	Engineering	86%	14%
	3E6	Operations Management	100%	0%
	3E7	Fire Protection	53%	47%
	3E8	Explosive Ordinance Disposal	0%	100%
	3E9	Emergency Management	0%	100%
	32E	Civil Engineer Officer	79%	21%
		Total	74%	26%
Communications	1D7	Cyber Defense Operations	28%	72%
	3D0	Cyberspace Operations		
	3D1	Cyberspace Systems		
	17D	Warfighter Communications Officer	88%	12%
	17S	Cyberspace Effects Officer	0%	0%
		Total	35%	65%
Material Management/ Transportation	2F0	Fuels Operations	100%	0%
	2G0	Logistics Plans	33%	67%
	2S0	Materiel Management	100%	0%

	AFSC	Position	Civilian %	AD %
	2T0	Traffic Management Operations	100%	0%
	2T1	Ground Transportation	100%	0%
	2T2	Air Transportation	0%	0%
	2T3	Vehicle Management	100%	0%
	21R	Logistics Readiness Officer	80%	20%
		Total	92%	8%
Human Capital/Personnel/ Administrative	30C	Support Commander	0%	100%
	3F0	Personnel	43%	57%
	3F1	Services	100%	0%
	3F2	Education and Training	87%	13%
	3F3	Manpower	33%	67%
	3F4	Equal Opportunity	33%	67%
	3F5	Administration	67%	33%
	38F	Force Support Officer	98%	2%
	3N0	Public Affairs	29%	71%
	35P	Public Affairs Officer	50%	50%
	5R0	Religious Affairs	20%	80%
	52R	Chaplain Officer	0%	100%
	6C0	Contracting	28%	72%
	64P	Contracting Officer	75%	25%
	6F0	Financial Management and Comptroller	54%	46%
	65F	Financial Management Officer	67%	33%
	65W	Cost Analysis Officer	0%	0%
	15A	Operations Analysis Officer	0%	0%
		Total	67%	33%
		Total Goodfellow AFB BOS Population	57%	43%

Based on the AFIMSC IHA data 43% of Goodfellow AFB BOS personnel are active-duty and would deploy in a full deployment scenario. This equates to 420 of the 978 authorized BOS personnel. Considering the Air Force BST factor of 7% for mission change a reduction of 6,000 mission personnel would be required to maintain BOS services at the current level with the remaining 57% of civilian BOS personnel. Considering the student population of Goodfellow is only 3,500 and the total population is 12,500 personnel this demonstrates the limitations of the BST for large scale mission changes. Since Goodfellow has no change in mission, contract support will be required to provide continuing support to the mission. Further analysis utilizing Air Force AFI 10–201 force readiness reporting definitions is discussed in the following sections.

2. Physical Security

With no change in core mission at Goodfellow physical security requirements remain the same, so with a total of 84% of security personnel deploying mitigating measures and additional contract personnel will be required to ensure physical security of the installation. Utilizing force readiness reporting definitions 16/100 equates to 16% personnel readiness, physical security would report as P-4 with the unit requiring additional resources to undertake the assigned mission. In the short-term mitigating measure of reducing access gates to one manned gate and potentially increased time on shift (overtime for civilians) may provide the time necessary to contract for security support outside of utilizing CAP but should immediate support be required recommend utilizing AFCAP to support.

3. Infrastructure Support

With no change in core mission continued infrastructure support is required to remain close to the same level. Based on the current civilian to military ratios in the infrastructure support portfolio 74/100 equates to 74% personnel readiness, Goodfellow falls within the P-3 reporting range meaning it has the resources to undertake many but not all portions of the assigned mission. Based on that reporting they should manage the required support with remaining personnel through mitigation measures of differing sustainment and enhancement work and only focusing on emergency and preventative

maintenance work. The one significant exception is firefighting. At 53% manning remaining contractor support will be required to meet the mission. As a life safety concern, AFCAP would provide the fastest means to address the shortfall.

4. Communications

As a technical training location Goodfellow requires communications networks to optimize the learning environment and relies on IT systems to achieve the mission. Based on the total percentage data 35/100 equates to 35% personnel readiness of communications AFSC personnel at Goodfellow, communications would rate as a P-4 indicating the mission will require contract support to meet mission requirements. Greater insight into the specifics of the mission and the number of personnel authorized is required for a complete assessment. Should the assessment indicate personnel are not sufficient and contractors are required AFCAP could provide service but utilizing a GWAC specific to IT support would likely result in better long-term results.

5. Material Management/Transportation

With no change in core mission continued material management/transportation is required to remain close to the same level. Based on the current civilian to military ratios in the material management/transportation portfolio, 92/100 equates to 92% personnel readiness, Goodfellow would report as P-1 meaning the unit is resourced to undertake the assigned mission and should manage the required support with remaining personnel and minimal mitigation measure. Additional contract support should not be required.

6. Human Capital/Personnel/Administrative

As this BOS category contains a wide range of activities a singular assessment of the 67% civilian workforce (67/100 personnel are civilian) is not effective in assessing the capabilities to maintain the training mission without active-duty personnel. From a total personnel perspective administrative personnel are in the P-4 rating category. Further breaking down the category, personnel, manpower, equal opportunity, public affairs, and religious services are significantly impacted by the deployment of all active-duty. These services could be contracted out through AFCAP, however, based on the

ability of these functions to mitigate the lack of manpower through reduced service in the short term, smaller specific contracts would be more appropriate providing a better value and contract monitoring.

D. AIR FORCE SPECIAL OPERATIONS INSTALLATION EXAMPLE

Hurlburt Field in Florida is home to the 1st Special Operations Wing (1st SOW) with the core missions that "include close air support, precision aerospace firepower, specialized aerospace mobility, intelligence, surveillance and reconnaissance (ISR) operations, and agile combat support" (Hurlbert Field, n.d.). With those core missions the majority of 1st SOW deploys to execute the mission. The installation currently has a population of 8,261 active-duty, 1,863 civilian, and 784 reserve personnel (Military One Source, n.d.b). BOS services at Hurlburt Field are provided through the "1st Special Operations Mission Support Group [consisting of:] 1st Special Operations Civil Engineer Squadron, 1st Special Operations Communications Squadron, 1st Special Operations Contracting Squadron, 1st Special Operations Logistics Readiness Squadron, 1st Special Operations Force Support Squadron, 1st Special Operations Security Forces Squadron" (Hurlbert Field, n.d.), as well as Wing Staff Agencies supporting BOS services of finance, public affairs, religious affairs, equal opportunity, legal and safety. According to the AFIMSC IHA Manpower and Personnel database Hurlburt requires 3,012 BOS personnel to support the current mission. In addition to the 1st SOW Hurlburt also hosts forty tenant organizations. Many of these organizations would also deploy in a bench clearing event, but not all. Therefore, consideration of tenant missions is also required for a full understanding of the continuing requirements at Hurlburt. Below is the civilian and active-duty breakdown of BOS services personnel.

Table 13. Hurlburt Field BOS MEF and Supporting Activities Percentages. Adapted from AFIMSC IHA Dashboard.

	AFSC	Position	Civilian %	AD %
Physical Security	3P0	Security Forces	31%	69%
	31P	Security Forces Officer	64%	36%
		Total	14%	86%
Infrastructure Support	3E0	Facility Systems	12%	88%
	3E1	Heating, Ventilation, Air Conditioning and Refrigeration	15%	85%
	3E2	Heavy Repair	1%	99%
	3E3	Structural	6%	94%
	3E4	Infrastructure Systems	24%	76%
	3E5	Engineering	21%	79%
	3E6	Operations Management	44%	56%
	3E7	Fire Protection	21%	79%
	3E8	Explosive Ordinance Disposal	10%	90%
	3E9	Emergency Management	0%	100%
	32E	Civil Engineer Officer	65%	35%
		Total	18%	82%
Communications	1D7	Cyber Defense Operations	19%	81%
	3D0	Cyberspace Operations		
	3D1	Cyberspace Systems		
	17D	Warfighter Communications Officer	88%	12%
	17S	Cyberspace Effects Officer	65%	35%
		Total	33%	67%
Material Management/ Transportation	2F0	Fuels Operations	0%	100%
	2G0	Logistics Plans	20%	80%
	2S0	Materiel Management	10%	90%
	2T0	Traffic Management Operations	17%	83%

	AFSC	Position	Civilian %	AD %
	2T1	Ground Transportation	12%	88%
	2T2	Air Transportation	0%	100%
	2T3	Vehicle Management	3%	97%
	21R	Logistics Readiness Officer	43%	57%
		Total	11%	89%
Human Capital/Personnel/ Administrative	30C	Support Commander	25%	75%
	3F0	Personnel	31%	69%
	3F1	Services	4%	96%
	3F2	Education and Training	67%	33%
	3F3	Manpower	47%	53%
	3F4	Equal Opportunity	0%	100%
	3F5	Administration	63%	37%
	38F	Force Support Officer	82%	18%
	3N0	Public Affairs	15%	85%
	35P	Public Affairs Officer	43%	57%
	5R0	Religious Affairs	0%	100%
	52R	Chaplain Officer	0%	100%
	6C0	Contracting	24%	76%
	64P	Contracting Officer	69%	31%
	6F0	Financial Management and Comptroller	41%	59%
	65F	Financial Management Officer	78%	23%
	65W	Cost Analysis Officer	0%	0%
	15A	Operations Analysis Officer	0%	0%
		Total	45%	55%
		Total Hurlburt AFB BOS Population	28%	72%

Based on the AFIMSC IHA data 72% of Hurlburt Field BOS personnel are active-duty and would deploy in a full deployment scenario. This equates to 2169 of the 3012 authorized BOS personnel. Considering the Air Force BST factor of 7% for mission change a reduction of 30,980 mission personnel would be required to maintain BOS services at the current level with the remaining 28% of civilian BOS personnel. This reduction is significantly more than the total personnel at Hurlburt, so again the BST factor is a poor measure of impact as the level of change is so dramatic. Since Hurlburt will deploy most of its mission, therefore, to establish a basis for analysis of the remaining CONUS mission we assume the breakdown of mission deploying and mission remaining mirrors the active-duty vs. civilian in the overall personnel breakout. With a total population of 10,908, with 8,261 active-duty personnel 75% of the Hurlburt mission would forward deploy. Leaving 25% of the mission supported by the remaining BOS personnel. Establishing 25% mission as the new mission baseline for application of the remaining personnel 25 out of 25 is full mission capability or 100% force readiness. Further analysis utilizing Air Force's force readiness reporting definitions of AFI 10–201 is discussed in the following sections.

1. Physical Security

Despite most of the mission deploying from Hurlburt Field the physical security requirements remain primarily the same since the installation perimeter and footprint remain the same. Some protection details are reduced as aircraft leave and fewer personnel are entering and exiting the installation, but the mission does not significantly change. With 14% total civilian security personnel, mitigating measures and additional contract personnel will be required to ensure physical security of the installation. Utilizing force readiness reporting 14/25 equates to 56% personnel readiness, so physical security would report as P-4 with the unit requiring additional resources to undertake the assigned mission. In the short-term mitigating measures of reducing access gates to one manned gate and potentially increased time on shift (overtime for civilians) will not provide the time necessary to contract for security support outside of utilizing CAP. Immediate contract support will be required to ensure physical security.

2. Infrastructure Support

With most of the mission deploying from Hurlburt field the infrastructure support requirements will decrease significantly. This can be further reduced if remaining personnel and functions are consolidated into fewer facilities. While the overall percentage of civilian personnel in infrastructure support is 18%, Utilizing force readiness reporting 18/25 equates to 72% personnel readiness and infrastructure support would report as P-3 with the unit able to undertake many, but not all, portions of the assigned mission. With a consolidation of personnel into fewer facilities, placing unused facilities into a cold (vacated and not ready for immediate use) status, as well as focusing on emergency and preventative maintenance of only occupied facilities, civilian personnel may be sufficient to minimally maintain the installation. Fire protection with only 21% of personnel remaining is a key capability gap that will require contract support to ensure life/safety of personnel and facilities is maintained.

3. Communications

With most of the mission deploying from Hurlburt field the communications support requirements will decrease significantly. Consolidation of personnel into fewer facilities will reduce the IT infrastructure to be maintained as well as helpdesk type requirements from individual users. Utilizing force readiness reporting 33/25 equates to 132% personnel readiness and communications would report as P-1 fully resourced to undertake the assigned mission.

4. Material Management/Transportation

With most of the mission deploying from Hurlburt field the material management/ transportation support requirements will decrease significantly. Many personnel in this BOS category support the airfield operations which are not required when the aircraft deploy. Utilizing force readiness reporting in total 11/25 equates to 44% personnel readiness, however removing the specific categories of personnel required to support the airfield mission (fuels management, air transportation, and vehicle management) improves the percentage to 16%. While 16/25 improves the personnel percentage it still only equates to 64% material management/transportation personnel readiness so would

still report as P-4 with the unit requiring additional resources to undertake the assigned mission. Specifics of the remaining mission may allow mitigation to reach mission capability but if not contract support is required. AFCAP would be the best choice to achieve immediate support.

5. Human Capital/Personnel/Administrative

With the 1st SOW mission forward deployed much of these services are only minimally required to support civilian employees and dependents who remain. From a singular assessment of the 45% civilian workforce remaining in this category is likely to be able to maintain required service with some mitigating measures of reduced service hour windows or levels of service. Utilizing force readiness reporting 45/25 equates to 180% personnel readiness for human capital/personnel/administrative functions would report as P-1 with the unit resourced to undertake the assigned mission.

These two examples highlight a potential overarching capability gap in that in both scenarios' above is physical security and fire protection are primarily manned by active-duty military. This is a risk to the continuing mission of the installation that requires significant mitigation or contract support. The importance of understanding the installation mission and how BOS services are manned is key to continuity of operations planning. The appropriate mix of military and civilian personnel will ensure minimal impacts from a full deployment scenario.

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IV. SUMMARY, CONCLUSIONS, AND FURTHER RESEARCH

A. SUMMARY

Through exploratory data analysis and research, this applied capstone provides valuable insights into the current BOS-I and CAP capabilities. Drawing on empirical evidence, this study sheds light on the key elements and has successfully addressed each research question that was formulated in Chapter I.

1. Research Question 1

What essential services are required for sustaining CONUS military installations when all deployable assets are concurrently deployed?

When all deployable assets are concurrently deployed, military installations within the CONUS require essential services and supporting activities to sustain their operations. These essential services and supporting activities provide critical support to ensure the installation's continued functioning and maintenance. The essential services and supporting activities required to sustain CONUS military installations during such situations typically include:

- Security and law enforcement—to ensure the safety and security of the installation and its personnel
- Fire and emergency services—to respond to emergencies such as fires, natural disasters, and other incidents that require immediate attention
- Public works—to maintain the infrastructure, facilities, and utilities (e.g., water, power, sewage, and waste management) on the installation
- Supply and logistics—to ensure that the installation has the necessary supplies and equipment to continue its operations
- Communications—to maintain communication channels between the installation and external parties (e.g., higher headquarters, local authorities, and civilian agencies)

- Morale, Welfare, and Recreation (MWR)—to provide recreational and social programs to maintain the morale and welfare of military personnel and their families.

Civilian augmentees, on the other hand, are non-military personnel workforce who are contracted to work on the installation to provide support services. These personnel are typically hired from the local community and can be used to supplement the essential services listed above. Civilian augmentees can perform a variety of roles such as administrative support, food service, janitorial services, and other duties that are critical to the installation's functioning.

In summary, the base operations support and civilian augmentee program essential services required for sustaining CONUS military installations when all deployable assets are concurrently deployed include security and law enforcement, fire and emergency services, public works, supply and logistics, communications, and MWR. Civilian augmentees can also be used to supplement these essential services as needed.

2. Research Question 2

What BOS-I functions (capability and capacity) can CAP contractors perform in CONUS to increase deployable military personnel?

CAP contractors can perform a variety of BOS-I functions in CONUS military installations to increase the number of deployable military personnel. These functions include:

- Security and Law Enforcement: CAP contractors can perform duties such as gate guard, perimeter security, and access control to release military personnel for other mission-critical duties.
- Supply and Logistics: CAP contractors can handle supply and logistics operations, including inventory management, shipping and receiving, and equipment maintenance, allowing military personnel to focus on their core duties.

- Administrative Support: CAP contractors can perform clerical duties such as data entry, recordkeeping, and other administrative functions to free up military personnel for more critical tasks.
- Public Works: CAP contractors can provide public works services such as road and facility maintenance, landscaping, and snow removal to maintain the infrastructure of the installation.
- Morale, Welfare, and Recreation (MWR): CAP contractors can manage the operation of MWR facilities such as gyms, clubs, and recreational centers, allowing military personnel to have access to these amenities without the need for direct military oversight
- Facility Management: CAP contractors can handle facility management tasks such as building maintenance, repair, and renovation. This can include tasks such as electrical work, plumbing, and HVAC system maintenance.
- Information Technology (IT) Support: CAP contractors can provide IT support for installation systems, including hardware and software maintenance, network management, and cyber security.
- Transportation and Vehicle Maintenance: CAP contractors can manage transportation services, including the maintenance and repair of vehicles and equipment.
- Medical and Dental Services: CAP contractors can provide medical and dental support, including general medical care, dental care, and mental health services.
- Food Service and Hospitality: CAP contractors can manage food service operations, including meal preparation and dining facility management.

By outsourcing these BOS-I functions to CAP contractors, the military can increase the number of deployable military personnel while maintaining essential installation operations. Additionally, it can also allow for greater flexibility and cost savings by tapping into the specialized skills and expertise of civilian personnel while allowing military personnel to focus on mission-critical tasks, thereby increasing the readiness of the force.

It is important to note that the capacity and capability of CAP contractors to perform BOS-I functions may vary based on the specific task and installation. Therefore, it is crucial to have a thorough assessment of the specific needs and requirements of each installation before contracting CAP personnel for BOS-I support.

3. Research Question 3

What are the demand drivers for essential BOS services?

Demand drivers for essential Base Operations Support (BOS) services vary depending on the specific needs of the installation and the mission of the military unit that occupies it. However, significant demand drivers for BOS services, measures of variability, and CAP services to support are listed in Table 14. Through understanding of these demand drivers for essential BOS services, military leaders can adjust continuity of operations plans for their installations and allocate resources to ensure that critical services are provided in a timely and effective manner meeting mission assurance.

Table 14. BOS Demand Drivers, Measures and CAP Capability.

BOS Demand Driver	Measure	CAP potential use
Force structure and size	Number of personnel and supported dependents	All
Mission Requirement	Deployable or non-deployable	All
Geographic location	Area of the country; rural or city; normal weather patterns and impact to facilities/equipment	All
Environmental factors	Weather and environmental threats such as hurricane, tornado, flooding, drought	Security and law enforcement; Supply and Logistics Public works; Facility Management
Equipment and infrastructure	Size and age of infrastructure as well as equipment driving maintenance and repair frequency	Public works; Facility management; Transportation and vehicle maintenance

BOS Demand Driver	Measure	CAP potential use
Personnel support	Number of personnel and dependents	Supply and logistics; Administrative support; MWR; Facility management; IT; Medical and dental services; Food service and hospitality
Training and readiness	Training exercises requiring BOS support such as transportation	Supply and logistics; Administrative support; IT
Security threats	Type of threats to force protection	Security and law enforcement
Infrastructure projects	Planned major infrastructure projects	Public works; Facility management
Fiscal constraints	Prioritization of services based on budget	All
Technology and innovation	Communications and IT support, artificial intelligence, robotic process automation	IT Support

4. **Research Question 4**

How can CAP contracts be used to sustain CONUS military bases during a full-scale forward deployed military force requirement?

CAP contracts can be a valuable tool for sustaining CONUS military bases during a full-scale forward deployed military force requirement by providing additional support services to fill gaps in capacity and capability. Here are some specific ways in which CAP contracts can be used:

- Maintenance and Repair: CAP contractors can provide maintenance and repair services for buildings, facilities, and equipment on military bases. This can help to ensure that installations are well-maintained and ready to support mission requirements, even during periods of high demand.
- Logistics Support: CAP contractors can provide logistics support services, including transportation, supply chain management, and inventory control. This

can help to ensure that essential supplies and equipment are available when needed, even during periods of high demand.

- Information Technology (IT) Support: CAP contractors can provide IT support services, including hardware and software maintenance, network management, and cybersecurity. This can help to ensure that critical IT systems are operating effectively and securely, even during periods of high demand.
- Medical and Dental Services: CAP contractors can provide medical and dental support services, including general medical care, dental care, and mental health services. This can help to ensure that military personnel have access to the care they need, even during periods of high demand.
- Food Service and Hospitality: CAP contractors can manage food service operations, including meal preparation and dining facility management. This can help to ensure that military personnel are well-fed and have access to quality food, even during periods of high demand.
- Janitorial and Custodial Services: CAP contractors can provide janitorial and custodial services, including cleaning and sanitation services for military facilities. This can help to ensure that military personnel are operating in a clean and safe environment, which is particularly important during periods of high demand.
- Waste Management: CAP contractors can provide waste management services, including the collection, transport, and disposal of solid and hazardous waste. This can help to ensure that waste is managed safely and efficiently, even during periods of high demand.
- Grounds Maintenance: CAP contractors can provide grounds maintenance services, including landscaping, mowing, and pest control. This can help to ensure that military installations are well-maintained and present a professional appearance, even during periods of high demand.
- Training and Development: CAP contractors can provide training and development services, including leadership training, professional development, and technical skills training. This can help to ensure that military personnel have

the skills and knowledge they need to perform their duties effectively, even during periods of high demand.

- Recreation and Leisure Services: CAP contractors can provide recreation and leisure services, including fitness facilities, outdoor recreation, and community events. This can help to ensure that military personnel have access to a range of activities to help them relax and unwind, even during periods of high demand.

By utilizing CAP contracts to augment existing BOS-I services, military bases can increase their capacity and capability to sustain forward deployed military forces during full-scale deployments. This can help to maintain the readiness of the force and ensure that mission requirements are met, even in challenging circumstances.

B. CONCLUSIONS

This paper provides a brief overview of BOS services, how they are currently accomplished in CONUS by the military services, and the CAP vehicles available to augment services. This analysis led to several recommendations.

1. Recommendation 1

The AFIMSC IHA AF Installation & Mission Support Manpower & Personnel Dashboard provides commanders with a powerful tool for understanding their POS personnel mission personnel and capabilities. Unfortunately, Navy CNIC and Marine Corps MCIMCOM do not appear to actively track this type of data which provides commanders and planners ready access to data to conduct a BOS services gap analysis.

> **Recommendation 1:** Each service establish a database similar to the AFIMSC IHA dashboard, which can provide valuable data on the number of military personnel and civilians present on each installation. Additionally, ensure installation commanders are aware of the database, its capabilities, as well as have access.

2. Recommendation 2

Through this research the essential BOS services of security, law enforcement and fire protection appear to be critical capability that is significantly manned by active-duty

military personnel. This creates a key life/safety capability gap in the event of a full deployment scenario that requires immediate mitigating measures and contract support. Due to 10 U.S.C. 2465 a congressional waiver is required prior to contracting for these services.

> **Recommendation 2:** Develop plans and agreements for local mutual aid until congressional waiver of 10 U.S.C. 2465 is obtained to contract for this critical BOS service with an apparent capability gap if all military forward deploy. This recommendation is raised in other research relating to a large-scale contingency response as stated in a Harvard Business Review article titled, *How business leaders can prepare for the next health crisis.* (HBR, 2021)

3. Recommendation 3

Each services CAP programs are centrally managed and have been historically successful in meeting the contingency and natural disaster requirements. In a full deployment scenario those government and contractor program managers are likely to be quickly overwhelmed if all CONUS installations begin to request support simultaneously. As every installation seeks priority of their requirements the ability for program managers to establish which requirements will be difficult.

> **Recommendation 3**: Each service develop a priority hierarchy of missions for CAP program managers to apply when resources are stretched to provide clear guidance in establishing mission critical services for each CONUS installation.

C. RECOMMENDATIONS FOR FURTHER RESEARCH

Further research is required to establish the baseline for BOS and CAP level of support. By conducting this research, military services can ensure that essential services continue to operate during full-scale forward deployed military force requirements. Additional research is required in the following areas:

- Data collection and analysis: Data was limited to that available in the referenced dashboards or through personal contact with individuals with the data. The collection and analysis of data on the number of military personnel, civilians, and

contractors on each base is critical to determining the level of support required. This data should include information on the number of personnel required to maintain critical functions such as security, medical, and communications services.

- Cost analysis: This research did not look at the determination to outsource or the cost implications of that decision. A cost analysis of BOS and CAP services is required to determine the financial implications of outsourcing non-core functions to civilian contractors. This analysis should consider the costs of hiring, training, and managing civilian contractors, as well as the potential cost savings resulting from reduced workload on organic assets.

- Capability gaps analysis: This research did not look at the specifics of individual installations missions or the specific capability gaps as a result of unfilled personnel authorizations or personnel authorizations filled with individuals in upgrade training. A capability gaps analysis should be conducted to identify areas where additional support is required. This analysis should consider the impact of forward deployed military force requirements on existing support structures and identify areas where additional support is needed.

- Performance metrics: This research did not look at current levels of quality provided by active-duty or contractor personnel to determine if current services are meeting the mission. The development of performance metrics is required to measure the effectiveness of BOS and CAP services. This should include metrics for service delivery, cost-effectiveness, and customer satisfaction.

D. SUMMARY OF CONCLUSION

Lack of planning for a full deployment of military BOS support personnel likely leaves our CONUS installations ill prepared for continuation of the mission. Continuity of operations planning for such an event will allow those service members to deploy overseas and not leave a void in support for non-deployable missions and dependents. Through exploratory data and research, we found that the Air Force, Army, Navy and

Marines already rely heavily on civilian and contracted support for the majority of their installation base life support services. We concluded that security forces would be the biggest concern for continuity of operations and that manpower information was not readily available to military installation commands and their staff. If it's not being done already, we recommend that civilian and military law enforcement and security guard service providers develop plans for mutual aid in the event that all military personnel are deployed. To facilitate planning for the next large-scale war we also recommend non-deployable missions be prioritized for contractor support to ensure CAP program managers contract to meet critical missions over non-critical.

LIST OF REFERENCES

Air Force Historical Research Agency. (n.d.). *The Korean War: Civilian employees*. Retrieved from https://www.afhra.af.mil/About-Us/Fact-Sheets/Display/Article/433000/the-korean-war-civilian-employees/

Air Force Installation Contracting Agency 772 ESS/PKD (2018). *FA805118R3013 Attachment J1—Performance work statement dated 31 Jul 18*. Department of the Air Force. https://sam.gov/opp/cdc4058089067ab6fb8e1a2767a81d83/view

Army Regulation 7159. (2017). *Operational contract support planning and management.* Retrieved May 12, 2023, from ARN2772_AR715-9_Web_FINAL.pdf (army.mil)

Avery, B. W. (2003). *Base Operations Support Integrator (BOS-I) at Naval Air Station Lemoore.* Naval Facilities Engineering Command.

Breaking Defense (2020). *How an Air Force-industry team saved a critical asset.* https://info.breakingdefense.com/hubfs/Pathfinder%20%7C%20Tyndall%20AFB%20LR%20%7C%20KBR%204.20.20.pdf

Commander, Navy Installations Command. (2021). *Commander, Navy Installations Command fact sheet.* Retrieved September 2021, from https://www.cnic.navy.mil/content/dam/cnic/cnrnw/pdfs/CNIC%20Fact%20Sheet%20September%202021.pdf

Commander, Navy Installations Command. (n.d.a). *About CNIC.* Retrieved April 23, 2023, from https://www.cnic.navy.mil/About/

Commander, Navy Installations Command. (n.d.b). *Regions*. Retrieved April 23, 2023, from https://www.cnic.navy.mil/Regions/

Congressional Budget Office. (2019, November). *The cost of supporting military bases.* https://www.cbo.gov/system/files/2019-11/55849-CBO-BOS-costs.pdf

Congressional Research Service. (2016, September). *The Civilian Augmentee Program: Providing support to military operations.* https://crsreports.congress.gov/product/pdf/R/R44679

Department of Homeland Security. (2017, January 17). *Federal Executive Branch national continuity program and requirements.* Federal Emergency Management Agency Federal Continuity Directive 1. Retrieved from https://www.gpo.gov/docs/default-source/accessibility-privacy-coop-files/January2017FCD1-2.pdf

Dwyer, R. E. (2009, April). *Who's The BOS-I. Base Operating Support Integrator and Senior Airfield Authority at Deployed Bases*. Air Command and Staff College Air University. https://apps.dtic.mil/sti/pdfs/ADA539439.pdf

Flour (n.d.). *Operation Allies Welcome—Holloman Air Force Base support*. https://www.fluor.com/projects/operation-allies-welcome

Goodfellow Air Force Base. (n.d.) *17th Training Wing*. https://www.goodfellow.af.mil/Units/

Handfield, R., Finkenstadt, D., & Guinto, P. (2021, February 15). *How business leaders can prepare for the next health crisis.* https://hbr.org/2021/02/how-business-leaders-can-prepare-for-the-next-health-crisis

Harris, K. (2011). Base operations support-integrator. In J. Tucker & W. England (Eds.), *The Encyclopedia of Middle East Wars: The United States in the Persian Gulf, Afghanistan, and Iraq Conflicts* (Vol. 1, pp. 111–112). ABC-CLIO.

Headquarters United States Air Force. (2015, February 25). *Program Action Directive (PAD) 14–04 Implementation of the Air Force Installation and Mission Support Center (AFIMSC)*. https://usaf.dps.mil/sites/13942/Mission%20Directives/PAD%2014-04%20Basic%20Plan%20and%20Annex%20A%20-%20Approved%2025%20Mar%2015.pdf

Hirsch, M. (2011). *Bagram Airfield Base Operations Support Integrator (BOS-I) program.* Air Force Civil Engineer Center.

Hurlbert Field. (n.d.) *1st Special Operations Wing.* https://www.hurlburt.af.mil/About-Us/Fact-Sheets/Fact-Sheets/Article/204524/1st-special-operations-wing/

Joint Chiefs of Staff. (2019a). *Contingency basing* (JP 404). https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp4_04.pdf

Joint Chiefs of Staff. (2019b). *Operational contract support* (JP 410). https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp4_10.pdf

Kaufmann, W. (2006). *A "civilian surge" in Iraq and Afghanistan. Insights from the Pentagon's Civilian Personnel System*. Santa Monica, CA: RAND Corporation.

Koester, J. W. (2003). *Army base operations support integrator: The future for Fort Bragg.* U.S. Army War College.

Marine Corps Installations Command. (n.d.). *About MCICOM*. Retrieved April 23, 2023, from https://www.mcicom.marines.mil/About-MCICOM/

Mays, L. (2012). *Base operations support integrator (BOS-I) at Camp Leatherneck, Afghanistan.* Marine Corps Engineer School.

Military One Source. (n.d.a). *Goodfellow Air Force Base*. https://installations.militaryonesource.mil/in-depth-overview/goodfellow-afb

Military One Source. (n.d.b). *Hurlburt Field*. https://installations.militaryonesource.mil/in-depth-overview/hurlburt-field

Naval Facilities Engineering Systems Command. (2021, July 16). *NAVFAC Atlantic awards $5B global contingency construction contract*. https://www.navfac.navy.mil/Home/News-Detail/Article/3008178/navfac-atlantic-awards-5b-global-contingency-construction-contract/

Naval History and Heritage Command. (n.d.). *Cold War: Navy civilian employees*. Retrieved from https://www.history.navy.mil/research/library/online-reading-room/title-list-alphabetically/c/cold-war-navy-civilian-employees.html

Naval Supply Systems Command Office of Corporate Communications. (2020, October 02). *NAVSUP's new husbanding contract offers worldwide support*. https://www.navy.mil/Press-Office/News-Stories/Article/2369929/navsups-new-husbanding-contract-offers-worldwide-support/

Office of Management and Budget (1999, June 20). *Performance of commercial activities* (Circular No. A-76). Executive Office of the President. https://www.whitehouse.gov/wp-content/uploads/legacy_drupal_files/omb/circulars/A76/a076.pdf

Office of the Secretary of Defense. (2003). *Operation and maintenance overview: FY2004 budget estimates*. https://comptroller.defense.gov/Portals/45/Documents/defbudget/docs/fy2004_overview.pdf

Office of the Under Secretary of Defense for Policy. (2018, February 14). *Department of Defense continuity policy*. (DOD Directive 3020.26). https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodd/302026p.pdf

Office of the Under Secretary of Defense for Policy. (2018, September 11). *Mission Assurance (MA)*. (DOD Directive 3020.40). https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodd/302040p.pdf?ver=2018-09-11-131221-983

Principal Deputy Under Secretary of Defense for Policy. (2006, February 17). *Defense continuity plan development* (DOD Instruction 3020.42). https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/302042p.pdf

Roberts, B. A. (2013). *Base Operations Support Integrator (BOS-I) Program at Naval Station Norfolk.* Naval Facilities Engineering Command.

Secretary of the Air Force. (2019a, August 29). *Manpower and organization* (AF Instruction 38–101). Department of the Air Force. https://static.e-publishing.af.mil/production/1/af_a1/publication/afi38-101/afi38-101.pdf

Secretary of the Air Force. (2019b, October 25). *Civil engineer operations* (AF Instruction 32–1001) Department of the Air Force. https://static.e-publishing.af.mil/production/1/af_a4/publication/afi32-1001/afi32-1001.pdf

Secretary of the Air Force. (2022, June 23). *Force readiness reporting* (AF Instruction 10–201). Department of the Air Force. https://static.e-publishing.af.mil/production/1/af_a3/publication/afi10-201/afi10-201.pdf

Smith, M. C. (2010). *Base Operations Support Integrator (BOS-I) at Joint Base Elmendorf-Richardson.* U.S. Air Force.

Under Secretary of Defense for Intelligence. (2015, November 20). *Security of DOD installations and resources and the DOD Physical Security Review Board (PSRB)*. (DOD Instruction 5200.08). https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/520008p.pdf?ver=2019-04-22-104600-590

Under Secretary of Defense for Personnel and Readiness. (2010, April 12). *Policy and procedures for determining workforce mix*. (DOD Instruction 1100.22). https://www.esd.whs.mil/portals/54/documents/dd/issuances/dodi/110022p.pdf

United States Air Force. (n.d.). *United States Air Force vision*. https://www.airforce.com/vision

United States Air Force. (2017). *Civilian Personnel Flight (CPF)—Civilian Augmentee Program (CAP)*. Retrieved from https://www.afpc.af.mil/Support/Civilian-Personnel/Civilian-Augmentee-Program/

United States Army. (2022). *Base operations support*. Retrieved April 23, 2023, from https://www.army.mil/info/organization/basesupport/bos

United States Army (n.d.). *United States Army mission*. https://www.army.mil/about/

United States Army Corps of Engineers. (1976). The Corps of Engineers in Vietnam: Civil Works Construction. Washington, D.C.: U.S. Army Center of Military History. United States Government Accountability Office. (2012, December). *Base operations support integrator: Additional actions needed to improve oversight and inter-service coordination*. https://www.gao.gov/products/GAO-13-117

United States Department of Defense. (2023). Retrieved from https://www.usa.gov/agencies/u-s-department-of-defense

United States Marine Corps. (2005). *Base Operations Support Integrator (BOS-I) at Marine Corps Base Camp Pendleton*.

United States Navy. (2011). *Civilian Augmentee Program (CAP)*. Retrieved from https://www.public.navy.mil/necc/cew/Pages/CivilianAugmenteeProgram.aspx

United States Navy (n.d.). *United States Navy mission*. https://www.navy.mil/About/Mission/

Warfighter support: *Continued actions needed by DOD to improve and institutionalize contractor support in contingency operations, U.S. House subcommittee on defense, committee on appropriations.* 111th Cong. (2010). (Testimony of William M. Solis). https://www.gao.gov/products/gao-10-551t

Williamson, R. L. (2022, May 18) Statement Of Vice Admiral Rick Lee Williamson Deputy Chief of Naval Operations for Fleet Readiness and Logistics U.S. Navy Before the Senate Subcommittee on Military Construction, Veterans Affairs and Related Agencies, Of the Committee on Appropriations. 117th Cong. (Testimony of Rick Lee Williamson). https://www.appropriations.senate.gov/imo/media/doc/VADM%20Williamson%20Statement%20SAC%20MilCon%20Budget%20Hearing%20FY23.pdf

Acquisition Research Program
Naval Postgraduate School
555 Dyer Road, Ingersoll Hall
Monterey, CA 93943

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