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Designing Bare Base Systems for Logistics Efficiency in the Joint Operational Environment

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Air Command and Staff College
Wright Flyer Paper No. 28

Air University Press
Maxwell Air Force Base, Alabama

December 2007

This Wright Flyer Paper and others in the series are available electronically at the Air University Research Web site <http://research.maxwell.af.mil> and the AU Press Web site <http://aupress.maxwell.af.mil>.

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Foreword

It is my great pleasure to present another of the *Wright Flyer Papers* series. In this series, Air Command and Staff College (ACSC) recognizes and publishes our best student research projects from the prior academic year. The ACSC research program encourages our students to move beyond the school's core curriculum in their own professional development and in "advancing air and space power." The series title reflects our desire to perpetuate the pioneering spirit embodied in earlier generations of Airmen. Projects selected for publication combine solid research, innovative thought, and lucid presentation in exploring war at the operational level. With this broad perspective, the *Wright Flyer Papers* engage an eclectic range of doctrinal, technological, organizational, and operational questions. Some of these studies provide new solutions to familiar problems. Others encourage us to leave the familiar behind in pursuing new possibilities. By making these research studies available in the *Wright Flyer Papers*, ACSC hopes to encourage critical examination of the findings and to stimulate further research in these areas.

A handwritten signature in black ink, reading "Jay H. Lindell". The signature is fluid and cursive, with the first letters of each name being capitalized and prominent.

JAY H. LINDELL
Brigadier General, USAF
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Abstract

The current service-centric approach to bare base capability has produced capability overlaps and logistics inefficiencies. The two primary bare base systems—the Air Force Basic Expeditionary Airfield Resources (BEAR) and the Army Force Provider—have limited interoperability. In recent conflicts, the lack of joint doctrine or joint bare base architecture has hampered the ability of the services to achieve fully operational forward locations within a satisfactory length of time. The current approach to bare base operations is at odds with Department of Defense (DOD) transformation plans, which direct the development of joint, interdependent capabilities to support the current operating environment, in which interservice operations and rapid deployments are the norm. The DOD also has a domestic requirement to contribute to disaster response and homeland security operations, which may be slowed or complicated by service-specific bare base capabilities. To prepare for operations in a joint environment and eliminate inefficiencies, the services should establish a joint bare base architecture that is simplified, modular, and interchangeable. This study proposes a joint architecture that potentially would reduce the resources required to procure, move, store, and maintain bare base assets. Because expeditionary basing is one of its distinctive capabilities, the Air Force should be designated as the executive agent for joint bare base operations, with each service continuing to train its bare base support forces and meet its service-specific requirements.

Introduction

Joint interdependence is the purposeful reliance on other service and joint capabilities to maximize their complementary and reinforcing effects while minimizing service vulnerabilities.

—2004 Army Transformation Roadmap

In 1991 Operations Desert Shield and Desert Storm marked a milestone in joint and coalition operations. However, they also highlighted interoperability issues, which subsequently drove joint doctrine, tactics, and concepts of operations (CONOPS). Today, the Department of Defense (DOD) transformation is hurtling the services past interoperability towards joint interdependence, but they are not there yet. Capability seams and gaps create suboptimal efficiency and compel the services to pursue organic capability that when aggregated results in an overly redundant structure.¹ This mind-set has driven a service-centric approach to bare base capability and resulted in capability overlap and logistics inefficiency. Considering the fiscal struggle to transform and recapitalize military forces, it is imperative that the DOD find operational efficiency from the simplest to the most sophisticated weapon system. While not glamorous, bare base capability is a critical enabler to expeditionary operations, which in turn, are critical to US national security and defense strategies. Therefore, in the context of a joint operational environment, the goal of the services should be to present a combatant commander with effective bare base capability at the least cost.

The joint operational environment is not a future concept; it is the present. Today, locations such as Bagram and Qandahar, Afghanistan, and Camp Anaconda/Balad Air Base, Iraq, bed down coalition, intergovernmental, and nongovernmental personnel. Many of these joint forward operating locations (FOL) consist of an ad hoc architecture utilizing Army, Air Force, and commercial materiel. Sometimes the materiel is interoperable; often it is not. Despite the logistics inefficiencies inherent in this design, the services continue to develop stovepipe bare base capability. Thus, a capability overlap exists in the basic building blocks of a bare

base—food, water, hygiene, electrical power, and billeting. This overlap is driven by adherence to different CONOPS and a lack of interdependence among the services.

In defense of the services, there is no joint doctrine or joint bare base architecture despite lessons learned from Operation Desert Storm (ODS) to the present. During Operations Enduring Freedom (OEF) and Iraqi Freedom (OIF), the lack of joint doctrine resulted in differing views on required levels of base operating support (BOS), and the reliance of other services on Basic Expeditionary Airfield Resources (BEAR) strained Air Force assets.² Furthermore, no organization exists to integrate bare base development, acquisition, operational use, and sustainment.

Recently, the nation has participated in a debate regarding the military's role in homeland defense and disaster response. An interagency requirement may further increase the complexity of requirements definition and development and fielding of bare base systems.

How can the DOD manage bare base capability more efficiently? Existing DOD guidance and joint publications can help answer this question. The DOD should develop and manage an interdependent bare base capability to eliminate capability overlap and satisfy operational requirements at the least cost. Because bare base is an Air Force–distinctive capability,³ the DOD should appoint the Air Force as the bare base executive agent.

This study examines joint management of bare base systems. It begins by describing existing bare base capability and then discusses how bare base systems support national military strategy. The study continues with a discussion of lessons learned and interoperability, followed by a review of published literature concerning the capabilities and limitations of bare base systems as they are managed today. Lastly, it offers recommendations on the future of bare base management.

Bare Base Today

Generally, the Air Force BEAR and the Army Force Provider represent the bare base capability of the DOD. Classified as war reserve materiel, BEAR and Force Provider are glob-

ally prepositioned to provide regional combatant commanders with austere basing capability. BEAR, formerly known as Harvest Eagle and Harvest Falcon, is a critical enabler to rapidly establishing and operating from austere airfields. BEAR consists of seven component subsystems designed for rapid deployment via C-130 or C-17 aircraft: shelters, environmental control, power, waste/water, hygiene, feeding, and airfield support.⁴ The subsystems are prepackaged into sets, including a 150-person shelter and hygiene system supporting rapid air base opening; 550-person sets with billeting, feeding, and hygiene capability; and industrial operations and flight-line support sets containing shelters and equipment supporting maintenance and logistics operations.⁵

The capabilities-based sets support five prebuilt force modules: (1) open the base, (2) establish the base, (3) provide command and control, (4) generate the mission, and (5) operate the base. Several of the subcomponents, such as water and electrical, represent stand-alone capability options that provide combatant commanders with a flexible, modular, and scalable bare base system. In addition to materiel, BEAR also presents limited personnel capabilities, providing technical supervision, planning expertise, initial equipment assembly, and asset accountability critical to establishing the deployed air base in an efficient manner.⁶ According to its CONOPS, BEAR supports the full spectrum of military operations.⁷

Like BEAR, the Army Force Provider system provides the capability to establish and operate from austere bases. Force Provider presents soldiers with temperature-controlled billeting; hot meals; laundry services; showers; latrines; and morale, welfare, and recreation facilities.⁸ Force Provider is modular and supports base camps from 275 to 3,300 personnel.⁹ Embedded and augmented Force Provider units, quartermaster personnel, and engineer personnel build and sustain Force Provider capability.¹⁰ Unlike BEAR, Force Provider is designed around intermodal shipping containers mainly configured for surface transportation. However, just as the Air Force is shifting from large Harvest sets to modular BEAR capability, the Army is redesigning the Force Provider bare base system from a large, mostly immobile system to sets with the capability to rapidly deploy, forward

deploy, and redeploy.¹¹ Force Provider is also applicable to full-spectrum military operations.¹²

Bare Base Systems and National Strategies

Bare base systems are a critical enabler to US national security, defense, and military strategies. The 2002 *National Security Strategy* states that the military must be prepared to deploy to remote nations and transform its forces toward maneuver and expeditionary capabilities.¹³ Likewise, the *National Defense Strategy* states that the United States will deter aggression and counter coercion by maintaining capable and rapidly deployable military forces.¹⁴ Because the DOD must possess the “capacity to move swiftly into and through strategic pivot points and remote locations, increasing the flexibility and support provided by prepositioned equipment and materiel is an important aspect of military capability.”¹⁵ Therefore, national security strategy requires that the military possess efficient bare base capability.

The national strategies also direct joint capability development. The *National Military Strategy* states that the military must develop deployable joint forces and combine the strengths of the individual services, other governmental agencies, and multinational partners. Our national strategy requires new levels of interoperability and systems that are conceptualized, designed, and acquired with a joint architecture. The DOD must ensure that cultural, technical, and doctrinal barriers do not limit its ability to achieve national security objectives.¹⁶ Therefore, expeditionary capabilities are critical to supporting US national strategy, and the development and employment of those capabilities should be accomplished through a joint architecture.

OEF and OIF Lessons Learned

The lack of joint doctrine, BOS standards, and designated lead agencies slowed the services’ ability to achieve fully operational forward locations in support of OEF. At the outset of OEF, without existing forward presence or established operating locations within Afghanistan, coalition forces required the capability to open and operate from austere

bases. At the time, the Air Force's goal was to open an FOL in five days; however, the average time to establish a base in OEF was 44 days. Why the discrepancy? Differences in interservice and coalition CONOPS created challenges and lengthened the time required for a location to reach fully operational status. These challenges included gaining country clearances; poor interservice and coalition site-survey processes and procedures; fragmented site-planning data; and extensive site preparation and buildup that severely stressed engineering forces.¹⁷ Additionally, shifting executive agent responsibilities in joint operations proved cumbersome and delayed FOL establishment and setup. At Karshi-Khanabad, the Army assumed FOL support from Special Operations; however, the Air Force moved forces faster than the Army could support them. As a result, Air Force engineers set up Force Provider assets, and the Army and Air Force both supported bare base operations at Karshi-Khanabad. In addition to assuming Army FOL development, the Air Force also supported Special Operations. Eventually, the Air Force assumed responsibility for 77 percent of the 14 sites developed during OEF, far more than were identified in the campaign plan. These unplanned support operations stressed Air Force bare base assets.¹⁸

The self-imposed stresses are the result of stovepiped planning processes, differing service CONOPS, and a lack of joint doctrine. In their article "Retooling Global Mobility and Forward Presence," Lt Col Rodney Croslen, USAF, and Lt Col Marsha Kwolek, USAF, retired, noted that "doctrinal differences between the Army, Air Force, and Special Operations led to piecemeal planning and unclear direction on who should take the basing lead. This confusion led to challenges in planning the right support for beddown, daily operations, base growth, and sustainment. Air Force Civil Engineers stated that the reliance on Air Force capability and quality-of-life assets strained the Air Force."¹⁹ The article also noted that the Air Force is rewriting "base opening" doctrine and coordinating with the Army to reflect these lessons learned.²⁰ However, the services should not stop at writing base-opening CONOPS. Instead, they should extrapolate the lessons learned from the OEF base-opening missteps and apply them to bare base management to ensure the right

capability is available in the right quantity at the right time to meet the combatant commander's requirements.

Expeditionary operations also proved critical to supporting OIF. While the services applied lessons learned from OEF, there were still delays and confusion when establishing FOLs. According to the RAND Corporation, the Army and Air Force integrated civil engineers to establish austere locations; as in OEF, it took on average 44 days to achieve fully operational status.²¹ While the services experienced delays due to political and site-access issues, a considerable amount of time was also required to prepare FOL sites and construct facilities. To relieve stress on engineers, the DOD used contractor reception teams at nine locations to assist in setting up initial housekeeping sets. While this approach may have relieved stress on the engineers, the Army experienced "poor living conditions" because contractors did not perform work. In the end, RAND concluded that the notional Air Force goal of five days is probably not achievable.²² Despite having more planning time than was available in OEF, having more familiarity with the sites than in OEF, and utilizing contract support to relieve stress, there was no decrease in the time required to establish FOLs.

Considering the unpredictable nature of the global war on terrorism, the services may not enjoy lengthy planning cycles or possess extensive FOL site familiarity; therefore, it is critical that combatant commanders have flexible, rapid, and dependable bare base capability. Given the known inefficiencies in bare base operations during OEF and OIF, why is the DOD not planning to establish joint bare base capability?

Bare Base Interoperability

How joint is bare base today? The answer: not very. Because bare base systems lack a joint architecture, there is very little interoperability between the major components of BEAR and Force Provider. While chief of BEAR Operations for the Air Force, I received several combatant command requests during OIF to support Army bare base laundry requirements. Due to different CONOPS and major end-item

components, the Air Force was unable to fill the request despite having available assets.

The lack of interoperability has not gone unnoticed. The Army and Air Force conducted a joint study to determine the interoperability of BEAR and Force Provider. Specifically, the teams were chartered with the following: (1) identify systems and equipment within BEAR and Force Provider, (2) isolate the differences between these assets, and (3) identify the requirements to achieve interoperability in the field.²³ Ultimately, the study found that a lack of joint architecture or doctrine limits bare base interoperability, and the resultant logistical complexity inhibits efficient joint bare base operations. The findings of the joint bare base interoperability study are discussed below.

The study compared major subcomponents such as laundry, kitchen, water, and electrical and determined that BEAR and Force Provider could achieve limited interoperability by supplying the existing sets with varying locally manufactured or commercially procured connectors or adapters. For example, engineers could “join” Army batch laundry and Air Force individual laundry systems by utilizing various connectors. However, the fundamental difference in equipment and operating concepts between batch and individual laundry precludes interoperability. Instead, they provide distinct but overlapping capability. Likewise, Force Provider and BEAR kitchen systems possess limited interoperability, operate under different feeding concepts, and utilize different major end items. Fundamental configuration differences exist in water and electrical systems as well. BEAR utilizes a pressurized-loop water distribution system, and Force Provider utilizes individual bladders; therefore, the systems are completely incompatible. Lastly, the Army and Air Force operate under differing power-generation and distribution architectures. While BEAR operates on a high-voltage electrical grid utilizing 750-kilowatt (kW) generators, Force Provider operates on a low-voltage electrical grid using 60-kW generators. The systems could be connected; however, the connectivity is dependent on local manufacturing availability and capability. The study concluded that engineers could achieve limited interoperability if Force Provider and BEAR were joined. However, the ad hoc design would require various supplied or locally manufactured connectors, suffer

from incompatible water-distribution systems, and possess insufficient power generation and distribution.²⁴

Continuing Service-Specific Capabilities

Does the DOD really need to develop a joint bare base system? Several studies have identified that a lack of joint doctrine or guidance results in inefficient management of the DOD prepositioning program. Despite these findings, the services continue to develop service-specific bare base systems. Over the past decade, the Government Accountability Office (GAO) conducted multiple studies of DOD prepositioning programs, of which the bare base systems are a subset. Generally, it found the DOD prepositioning program lacking in management and oversight. The GAO revealed significant issues with prepositioned equipment during OIF, such as a lack of spare parts and less-than-modern equipment; these issues still exist today. The GAO concluded that combatant commanders would likely face difficult challenges due to the current state of these assets.²⁵

The GAO also noted that a lack of joint doctrine is the root of many of the problems. For example, the GAO stated,

In the absence of a department-wide plan or joint doctrine to coordinate the reconstitution and future plans for [prepositioning] programs, the military services have been recapitalizing some stocks and developing future plans for their programs without a clear understanding of how they will fit together to meet the evolving defense strategy. This service-centric approach to pre-positioning is out of step with the department's goals of transforming the military to be more joint and expeditionary, and potentially misses opportunities to achieve greater efficiencies where service programs overlap in making future investment decisions.²⁶

Furthermore, "the DOD cannot provide assurances to Congress that future programs will operate jointly, support the needs of the war fighter, and are affordable."²⁷ In response, Air Force commanders stated they could overcome shortfalls and any maintenance problems in the event of a conflict by using supplemental funding or cross-leveling equipment from other theaters.²⁸ Does the "robbing Peter to pay Paul" mentality truly meet all combatant commanders' requirements? Should not the services be seeking efficient management solutions?

The service-centric approach to developing and sustaining bare base capability misses opportunities to achieve greater efficiencies where service programs overlap. The GAO notes a 2003 Joint Staff-sponsored study on prepositioning strategies prepared by the Logistics Management Institute, which found that the

military services continue to program for prepositioning materiel to meet individual service rather than joint requirements. As a result, the services may overstate operational requirements and put unnecessary burdens on limited transportation assets that would be required to move these prepositioned assets from their storage locations to the operational sites. For example, although the Army and Air Force have separate bare base programs, there is a lack of commonality among the design and components of these programs even though basic capabilities are the same. Moreover, the service-centric approach to prepositioning is out of step with [the] DOD's transformation guidance, which states that developing concepts to operate in a joint environment and a continuing emphasis on the importance of expeditionary operations is key to the department's transformation efforts. . . .

Without a plan or joint doctrine to guide their efforts, the services are planning for the future of their programs without an overarching framework that establishes priorities for prepositioning among competing initiatives, develops performance goals to measure success, and identifies resources to implement plans. Until the department determines how prepositioning fits into future military plans, it cannot provide assurances to Congress that the substantial investments required to recapitalize the stocks will be affordable.²⁹

In August 2004, the Science Applications International Corporation completed a comprehensive review and assessment of DOD bare base capabilities across the services and identified a number of problems. The study, prepared for the Joint Staff director of logistics, found that the

primary deficiency was the lack of a common understanding of doctrine that should provide the foundation for the services' bare base programs. This lack of understanding of doctrine (1) impacted all aspects of bare base support, to include its relationship to other basing operations, the methods of providing bare base support, and the responsibilities associated with bare base support; and (2) inhibited the ability of combatant commanders to articulate requirements, and the ability of the services to develop the appropriate capabilities. The study also found no simple solutions to the challenge of bare base, that the procurement of additional or new bare base assets was not the key, and those materiel solutions that were not linked to doctrinal requirements and not part of a coordinated solution would result in inefficient and less effective support.³⁰

The DOD partially concurred with the GAO findings and embarked on a study to assess the ability of its prepositioning program to deploy forces to a distant theater in 10 days.³¹

Transformation Plans, Doctrine, and Directives

Since the end of the Cold War, the United States has been engaged increasingly in interservice and coalition operations such as ODS, OEF, and OIF. Over the same period, the DOD has written guidance directing the services to establish joint, interdependent capabilities. The DOD *Transformation Planning Guidance* highlights a requirement for substantive joint capabilities planning that enables forward-deployed and CONUS-based forces to rapidly deploy, employ, sustain, and redeploy in austere regions and antiaccess and area-denial environments. The transformation plan states that the DOD should integrate forward-deployed, CONUS-based, and coalition forces into the overall joint operation, enabling the near-simultaneous synergistic employment and deployment of air, land, sea, cyber, and space war-fighting capabilities. The plan also directs the services to transform through jointness and to link integrated architectures.³²

The Air Force wishes to set the DOD standard for BOS. The Headquarters Air Force A4 Directorate (Installations and Logistics) seeks to improve the responsiveness, deployability, and sustainability of combat air and space forces to achieve a more agile, responsive, and effective sustainment process for the combat support community. Specifically, it is an Air Force goal to “define base operating support in Air Force terms, and ensure integration into Joint Doctrine to allow for a standardized view of BOS and the process required.”³³ The A4 wants to ensure that Airmen are the combatant commanders’ first choice and codify in doctrine that Airmen will “open and establish” airfields.³⁴

There is no better way to leverage change than to transform the planning, programming, and budgeting process for the services. Today, the military services provide most DOD resources. This arrangement leads to gaps or redundancies within capability areas as each service attempts to supply a complete war-fighting package rather than depending on capabilities provided by other military depart-

ments.³⁵ Therefore, the 2006 *Quadrennial Defense Review* (QDR) emphasizes the needs of combatant commanders as the basis for budget priorities. It directs the development of joint capability portfolios rather than individual, stovepiped programs. Furthermore, the DOD will begin to break out its budget according to joint capability requirements such as the ability to deploy rapidly, assemble, command, project, reconstitute, and reemploy joint combat power from all domains to facilitate assured access.³⁶ The DOD believes that “using such a joint capability view—in place of a Military Department or traditional budget category display—should improve the understanding of the balancing of strategic risks and required capability trade-offs associated with particular decisions.”³⁷ By shifting the focus from service-specific programs to joint capabilities, the DOD should be better positioned to understand the implications of investment and resource trade-offs among competing priorities.

While each service is responsible for organizing, training, and equipping its forces, it is the joint task force commander’s responsibility to maximize the unique but complementary capabilities of each in integrated action.³⁸ Existing doctrine does not specifically direct the services to develop a joint bare base capability; however, the guidance implies that services should present a unique but complementary capability. It does not imply that services should develop overlapping, service-specific capability. For example, Joint Publication (JP) 4-07, *Common-User Logistics*, directs the services to “eliminate duplication of effort provided by services, DOD, host nation support, and contract support. By utilizing common-item and common-service support, the combatant commander may be able to produce significant savings in equipment, personnel, and supplies deployed to a particular joint operations area (JOA). These savings may further reduce the requirement for strategic lift, the logistic footprint within a JOA, and possibly the overall cost of an operation.”³⁹

Bare Base in an Interagency Environment

To this point, this study has focused on providing joint expeditionary bare base capability. However, there also exists an equally critical interagency requirement. The 2004 *Na-*

tional Response Plan lists the DOD as a supporting agency to Emergency Support Function Six, which includes mass care, housing, and human services. Specifically, “the DOD may be called upon to coordinate non-medical mass care services to include sheltering of victims, organizing feeding operations, providing emergency first aid at designated sites, as well as assistance for short- and long-term housing needs of victims. In the future, should other catastrophes overwhelm civilian capacity, the Department may be called upon to respond rapidly with additional resources as part of an overall U.S. Government effort.”⁴⁰ The exact role of the DOD during catastrophic events is still under debate. However, the *QDR* clearly states that “in order to respond effectively to future catastrophic events, the Department will provide U.S. NORTHCOM with authority to stage forces and equipment domestically prior to potential incidents when possible.”⁴¹ Using Hurricane Katrina as an example, one could assume that any DOD response would likely be a joint response. Multiple configurations of bare base capability would only serve to exacerbate the complications of an interagency effort and potentially preclude a rapid response.

Analysis and Recommendations

To support US national security, defense, and military strategies, the services must be prepared to conduct expeditionary operations in a joint environment. OEF and OIF present classic examples of joint expeditionary warfare where joint and coalition forces opened, established, and operated from many of the same forward locations. However, bare base capability, as a critical enabler to expeditionary operations, is not a joint system. Hence, during OEF and OIF, confusion regarding BOS requirements delayed the achievement of full operational capability at expeditionary locations. Furthermore, the services face an unknown interagency requirement to support homeland catastrophes. In spite of the lessons learned and the unknown homeland defense requirements, the services continue to develop service-specific bare base capabilities with limited interoperability. This approach generates logistics inefficiencies, limits the DOD’s ability to articulate requirements, and does not support the evolution

to establish joint, interdependent capabilities. Therefore, to present a coherent capability to regional combatant commanders and interagency partners and eliminate existing confusion and inefficiencies, the services should establish a joint bare base architecture.

Incorporating Logistics Efficiency

The services should design a bare base system to satisfy combatant command requirements and incorporate logistics efficiency. Incorporating logistics efficiency into design includes (1) simplifying the design to reduce the number of models and parts and eliminate chunks of administrative and production work, (2) basing the design on practical specifications which incorporate realistic requirements, (3) designing standardized components to maximize scale leverage and allow economically feasible stocking, and (4) designing interchangeable component modules.⁴²

Current bare base systems were not designed for logistics efficiency. For example, a key performance parameter for the design and procurement of BEAR equipment is the ability to be airlifted on C-17 aircraft.⁴³ Hence, BEAR sets are configured and stored in airlift configurations. While storing BEAR in an airlift configuration supports rapid air mobility, it is not always the most efficient method of storage, maintenance, and transportation. Because of timing and tempo, it may be more economical to transport BEAR via surface transportation rather than high-demand, low-density airlift. However, BEAR is not intermodal and requires reconfiguration to support surface transportation. Also, to minimize the strain on strategic lift, the services incur a cost to store and maintain bare base sets at prepositioned locations around the globe. Therefore, would it not make sense to develop a joint, simplified, modular bare base architecture incorporating both rapid air movement and efficient bulk surface movement to satisfy timing and tempo requirements while eliminating extensive global prepositioning sites?

Designing logistics efficiency into a joint bare base system is feasible and satisfies the logistics principles of responsiveness, economy, attainability, and sustainability. The services should eliminate capability overlap while maintaining required service-specific capabilities. Core capabilities can

provide for feeding, billeting, and hygiene and include modular capability for kitchens, water storage and distribution, power generation and distribution, cold weather, and laundry. Additionally, services would maintain required service-specific capability such as the Air Force flight-line sets supporting flying operations at austere airfields.

A Joint Architecture

The following is a suggested architecture for a joint base system. First, develop a joint “open the base” capability configured for rapid air movement. Second, develop a joint, intermodal “establish the base” capability. These modular sets would be configured for either air or surface movement depending on the combatant command requirements and base buildup scenario. Third, develop a modular “operate the base” capability. Since history has proven that it takes longer than 14 days to reach the operate-the-base phase, these sets could be designed and configured for surface transportation. The building blocks of each set would consist of common capability modules, such as power, water, feeding, billeting, and hygiene, that would “plug together” to establish an FOL. Based on site-specific requirements, storage and maintenance units would deploy only the capability modules required to build the base. For example, if commercial power and water were available, then those modules would not deploy. This approach avoids unnecessarily moving materiel not required for base operation.

An intermodal and joint architecture could eliminate multiple overseas storage and maintenance requirements. Reducing the airlift burden, increasing reliance on surface transportation, and focusing on effective materiel movement could potentially reduce the reliance on prepositioned assets for rapid response. Sets configured for rapid airlift could be stored and maintained at CONUS locations. Sets configured for surface transportation could be sea-based or stored at CONUS locations. By defining realistic requirements and designing a system to take advantage of both air and surface movement capability, the DOD could consolidate storage and maintenance locations and reduce the associated administrative and contract costs.

A joint bare base architecture can result in efficiencies throughout the supply chain. Eliminating competing service-specific requirements and establishing common operational concepts for systems such as power, water, kitchen, hygiene, and laundry would result in fewer overall configurations and systems. Potentially, fewer configurations and systems would require less materiel procurement, readiness spares packages, maintenance, bench stock and supply, storage, and personnel to manage the supply chain. Furthermore, one would expect consolidating requirements to result in some economies of scale from volume procurement and fewer facilities, support equipment, and maintenance and management personnel.

Developing a joint bare base system could also simplify training and bare base operations. The services could eliminate service-specific training and utilize joint bare base training centers and exercises such as Eagle Flag. Currently, joint bare bases consist of ad hoc systems made up of Air Force, Army, and contract-procured equipment and systems. This architecture delays base buildup and sub-optimizes logistics support. However, having common technical data, specifications, tools, and spares means that personnel are trained and equipped to erect and support the entire base, and the supply chain is prepared to sustain it. Furthermore, a joint architecture presents a common planning perspective to combatant commanders, so they understand the capability it represents.

Providing a common planning perspective will aid bare base responsiveness. JP 4-0, *Doctrine for Logistics Support of Joint Operations*, describes responsiveness as getting the right support, in the right quantity, to the right place, at the right time.⁴⁴ A joint bare base architecture would present planners with a common, clearly articulated capability. To achieve a joint architecture, the services must first agree on a single BOS standard. Developing this standard and a joint bare base capability to support it would eliminate the current confusion over whose BOS standards to follow. A single bare base standard would simplify mission-capability status reporting and provide planners with a more accurate estimate on what capability is available to support a contingency.

Furthermore, having one distinct bare base system would assist the services in determining total bare base require-

ments. For example, US Central Command (USCENTCOM) guidance on sustained expeditionary operations and contingency base camp standards states that if a base is projected to operate for more than 180 days, then USCENTCOM recommends utilizing commercial lease or purchase of prime power.⁴⁵ Using this type of data, USCENTCOM planners can clearly articulate power requirements, and the supply chain will procure and sustain only to that requirement. Today, equipment buys are based on sets, not capability modules; therefore, power is purchased to support a set, whether or not there is an actual requirement. This is just one example; the GAO has documented findings on many ill-defined requirements over the past decade.⁴⁶ If the DOD cannot define requirements, then the services cannot be sure they are procuring, sustaining, and deploying the right capability. Because the Air Force is reducing manpower to pay for recapitalization, it is crucial that the DOD find operating efficiencies in both manpower and materiel.

Codifying Joint Bare Base Capability

Achieving a joint architecture means having to codify joint bare base operations. The DOD does not need more doctrine telling the services how to operate their individual systems within a larger joint system. Instead, when possible, the DOD should attempt to eliminate seams altogether. Bare base can accomplish this by designing a joint, interdependent architecture. First, the services should review existing service and joint doctrine, existing and proposed CONOPS, and other DOD guidance such as the *QDR* and the transformation plan. Central to establishing a joint bare base architecture is identifying core bare base capabilities and required service-specific capabilities. Once the joint capabilities are identified, the services must adopt a joint architecture that supports both DOD joint evolution and combatant command plans and conduct joint technical, acquisition, and sustainment reviews. The services must also generate supporting documentation such as acquisition and sustainment strategies; training requirements; and tactics, techniques, and procedures to operate and sustain bare base capability.

Who should oversee the development of a joint, interdependent bare base capability? The US Joint Forces Com-

mand is a logical choice to lead the development of a joint bare base architecture. However, it does not have the authority to plan, program, and budget for the acquisition and sustainment of bare base capability. Since the services are required to organize, train, and equip forces, and the Air Force has declared expeditionary basing as one of its distinctive capabilities, the DOD should designate the Air Force as executive agent for joint bare basing. Each service would retain the responsibility to organize and train forces to support bare base capability, as well as equip their service with any required service-specific capability. This would likely result in significant manpower, budget, and organizational impacts as well as significant organizational resistance. However, since ODS and as recently as OIF, the Air Force has set the standard and demonstrated its capability to open, establish, and operate austere bases. Additionally, the *QDR* states that services should no longer expect to supply a complete war-fighting package, but instead should be able to rely on another service to provide that capability.⁴⁷ Therefore, the DOD should designate one service to organize and equip joint bare base capability.

Conclusion

The joint operational environment is not a future concept—it is the present. However, there is very little jointness in bare base capability. The services continue to develop stovepipe bare base systems with minimal interoperability. The capability overlap between the services and the ad hoc design of joint FOLs lead to logistics inefficiencies. This study examined how the DOD can more efficiently manage bare base capability. Specifically, the DOD should develop and manage an interdependent bare base capability to eliminate capability overlap and satisfy operational requirements at the least cost. The Air Force should serve as the bare base executive agent. There is no existing joint bare base doctrine or architecture despite lessons learned from ODS to the present. However, ample guidance and doctrine, while not specific to bare base, imply that the services should further examine developing a joint bare base architecture.

Developing a joint bare base system is not a new topic. The Joint Staff reviewed bare base interoperability, and several studies identified that the lack of joint focus in the bare base program resulted in management and logistics inefficiencies. Additionally, lessons learned from OEF and OIF and an unknown interagency homeland defense requirement clearly demonstrate the need for a joint base-opening capability and joint BOS standards. Therefore, this study proposes a joint bare base architecture. This proposal is not meant as a definitive answer, but rather as a starting point for continued study on joint bare basing options. For example, it would be interesting to see a cost-benefit analysis of globally prepositioned materiel versus sea-based and CONUS-based storage and maintenance. Nevertheless, even without major program changes, there is room to improve the efficiency and effectiveness of bare base systems. The real challenge is not developing a logistically efficient bare base system; the real challenge lies in overcoming organizational resistance to joint interdependence. This is a leadership challenge that the DOD can no longer afford to ignore.

Notes

1. Department of the Army, *2004 Army Transformation Roadmap* (Washington, DC: Department of the Army, 2004), 2-7.
2. Lt Col Rodney L. Croslen, USAF, and Lt Col Marsha Kwolek, USAF, retired, "Retooling Global Mobility and Forward Presence," *Air Force Journal of Logistics* 29, no. 2 (Summer 2005): 21.
3. Air Force Doctrine Document (AFDD) 1, *Air Force Basic Doctrine*, 17 November 2003, 81.
4. Department of the Air Force, *Basic Expeditionary Airfield Resources: An Enabling Concept* (Langley AFB, VA: ACC/LG, 6 October 2005), 16.
5. *Ibid.*, 22.
6. *Ibid.*
7. *Ibid.*, 8.
8. Maj Eddie Rosado, "Proposed Force Provider Company Redesign," *Quartermaster Professional Bulletin*, Winter 2003, http://www.quartermaster.army.mil/oqmg/professional_bulletin/2003/Winter03/Proposed_Force_Provider_Company_Redesign.htm.
9. *Ibid.*
10. *Ibid.*
11. *Ibid.*
12. *Ibid.*
13. Pres. George W. Bush, *National Security Strategy of the United States of America* (Washington, DC: The White House, 2002), 30.

14. Department of Defense, *National Defense Strategy of the United States of America* (Washington, DC: DOD, March 2005), iv.
15. Ibid., 19.
16. Joint Chiefs of Staff (JCS), *National Military Strategy of the United States of America* (Washington, DC: JCS, 2004), 13.
17. Robert S. Tripp et al., *Supporting Air and Space Expeditionary Forces: Lessons from Operation Enduring Freedom* (Arlington, VA: RAND Corporation, 2004), 36–37.
18. Ibid., 44–45.
19. Croslen and Kwolek, “Retooling Global Mobility,” 21.
20. Ibid., 26.
21. Kristin F. Lynch et al., *Supporting Air and Space Expeditionary Forces: Lessons from Operation Iraqi Freedom* (Arlington, VA: RAND Corporation, 2005), 47.
22. Ibid., 58–59.
23. Alex Szumanski, *Report to AF/ILGM: Force Provider and BEAR Equipment Compatibility Study*, n.p.
24. Ibid.
25. Government Accountability Office, *Defense Logistics: Better Management and Oversight of Defense Prepositioning Programs Needed to Reduce Risk and Improve Future Programs: Report to Subcommittee on Readiness, Committee on Armed Services, House of Representatives* (Washington, DC: GAO, September 2005), 4.
26. Ibid., 6.
27. Ibid.
28. Ibid., 16.
29. Ibid., 29, 33.
30. Ibid., 40.
31. Ibid., 48.
32. DOD, *Transformation Planning Guidance* (Washington, DC: DOD, April 2003), 33.
33. Department of the Air Force, Deputy Chief of Staff, Installations and Logistics, *Transformation Roadmap for Fiscal Years 2005–2011* (Washington, DC: Department of the Air Force, 22 July 2004), 8.
34. Ibid., 21.
35. DOD, *Quadrennial Defense Review Report* (Washington, DC: DOD, 6 February 2006), 68.
36. Ibid., 4, 31.
37. Ibid., 67.
38. JP 1, *Joint Warfare of the Armed Forces of the United States*, 14 November 2000, i.
39. JP 4-07, *Joint Tactics, Techniques, and Procedures for Common-User Logistics during Joint Operations*, 11 June 2001, I-2.
40. Department of Homeland Security (DHS), *National Response Plan* (Washington, DC: DHS, December 2004), ESF-6.
41. DOD, *QDR*, 26.
42. Ken Homa, “Designing Products for Efficient Global Logistics,” *Global Sites and Logistics*, August/September 1997, available at <http://faculty.msb.edu/homak/kensweb/logistics.html>.

43. Department of the Air Force, *Base Expeditionary Airfield Resources*, 14.

44. JP 4-0, *Doctrine for Logistics Support of Joint Operations*, 6 April 2000, II-1.

45. US Central Command Regulation Number 415-1, *Construction and Base Camp Development in the USCENTCOM Area of Responsibility*, 1 December 2004, 53.

46. GAO, *Defense Logistics*, 39–42.

47. DOD, *QDR*, 68.

Bibliography

- Air Force Doctrine Document (AFDD) 1. *Air Force Basic Doctrine*, 17 November 2003.
- Bush, Pres. George W. *National Security Strategy of the United States of America*. Washington, DC: The White House, 2002.
- Croslen, Lt Col Rodney L., USAF, and Lt Col Marsha Kwolek, USAF, retired. "Retooling Global Mobility and Forward Presence." *Air Force Journal of Logistics* 29, no. 2 (Summer 2005): 18–29.
- Department of the Air Force. *Basic Expeditionary Airfield Resources: An Enabling Concept*. Langley AFB, VA: ACC/LG, 2005.
- . Deputy Chief of Staff, Installations and Logistics. *Transformation Roadmap for Fiscal Years 2005–2011*. Washington, DC: Department of the Air Force, 2004.
- Department of the Army. *2004 Army Transformation Roadmap*. Washington, DC: Department of the Army, 2004.
- Department of Defense (DOD). *National Defense Strategy of the United States of America*. Washington, DC: DOD, 2005.
- . *Quadrennial Defense Review Report*. Washington, DC: DOD, 6 February 2006.
- . *Transformation Planning Guidance*. Washington, DC: DOD, 2003.
- Department of Homeland Security (DHS). *National Response Plan*. Washington, DC: DHS, 2004.
- Government Accountability Office (GAO). *Defense Logistics: Better Management and Oversight of Defense Prepositioning Programs Needed to Reduce Risk and Improve Future Programs: Report to Subcommittee on Readiness, Committee on Armed Services, House of Representatives*. Washington, DC: GAO, 2005.
- Homa, Ken. "Designing Products for Efficient Global Logistics." *Global Sites and Logistics*, August/September 1997. Available at <http://faculty.msb.edu/homak/kensweb/logistics.html>.
- Joint Chiefs of Staff (JCS). *National Military Strategy of the United States of America*. Washington, DC: JCS, 2004.

- Joint Publication (JP) 1. *Joint Warfare of the Armed Forces of the United States*, 14 November 2000.
- JP 4-0. *Doctrine for Logistics Support of Joint Operations*, 6 April 2000.
- JP 4-07. *Joint Tactics, Techniques, and Procedures for Common-User Logistics during Joint Operations*, 11 June 2001.
- Lynch, Kristin F., John G. Drew, Robert S. Tripp, and Charles Robert Roll, Jr. *Supporting Air and Space Expeditionary Forces: Lessons from Operation Iraqi Freedom*. Arlington, VA: RAND Corporation, 2005.
- Rosado, Maj Eddie. "Proposed Force Provider Company Redesign." *Quartermaster Professional Bulletin*, Winter 2003. http://www.quartermaster.army.mil/oqmg/professional_bulletin/2003/Winter03/Proposed_Force_Provider_Company_Redesign.htm.
- Szumanski, Alex. *Report to AF/ILGM: Force Provider and BEAR Equipment Compatibility Study*. N.p.
- Tripp, Robert S., Kristin F. Lynch, John G. Drew, and Edward W. Chan. *Supporting Air and Space Expeditionary Forces: Lessons from Operation Enduring Freedom*. Arlington, VA: RAND Corporation, 2004.
- US Central Command Regulation Number 415-1. *Construction and Base Camp Development in the USCENTCOM Area of Responsibility*, 1 December 2004.