Evaluating Civil Engineer Force Presentation Models for Agile Combat Employment

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Abstract

This article examines the need for redesigned force presentation packages within the Air Force Civil Engineer community due to the return to Great Power Competition and the implementation of Agile Combat Employment (ACE). The author initiates the discussion by proposing a standardized lexicon for these emerging concepts, particularly concerning contingency basing. A recent RAND study proposed a base archetype model for classifying installations within the ACE construct. This paper discusses the advantages of this model and proposes a few modifications. The model, in turn, suggests how to redesign force presentation packages for modern operations. Finally, the author conducts a brief review of current progress toward implementing these redesigned force modules within the Civil Engineer community.

Introduction

The United States Air Force Chief of Staff, General Charles Brown, wrote a letter to his force in August 2020 calling for a restructuring of the force to "better support emerging force generation and force presentation models."[1] Previously, he had instructed the Air Force to adapt to "employ global effects on near-immediate timelines."[2] These urgent requests from the Air Force's highest levels of leadership spawn from concepts initiated in the 2018 National Defense Strategy, which called for the Department of Defense to develop a "lethal," "agile," "resilient," and "adaptable" force posture and employment to compete in the global strategic environment.[3] Our nation's defense strategists recognized that despite the continued presence of our forces in counterinsurgency (COIN) and counterterrorism (CT) operations, the greatest threats we now face are peer and near-peer actors. Specifically, China and Russia are the modern competitors in returning to great--power competition (GPC).[4] Drawing upon Graham Allison's Thucydides Trap concept, Major Phillip Ferris emphasizes the inevitability of conflict between the US and China, comparing the scenario to that of Great Britain and Germany prior to World War I.[5]

The modern environment has led to the development of new operational strategies in the Air Force based on eliminating two critical assumptions from COIN/CT operations of the past several decades, "that airbases are sanctuaries and communications reliable"[6] As General Brown took command of the Air Force, his immediate orders directed the development, refinement, exercise, and implementation of this new adaptive and agile strategy. His initial guidance drew upon his time as Pacific Air Force (PACAF) Commander, during which he developed the concept of Agile Combat Employment (ACE). As the Air Force continues to refine and evolve this concept, operations and support communities must work hand in hand to ensure sufficient but realistic options.[7]

In their recent RAND report, Mills et al. suggest two recommendations for the Agile Combat Support (ACS) community to focus on as the Air Force continues to refine and implement adaptive basing concepts: mission and base force package redesign and personnel skill design.[8] Several others, including Priebe et al., identify the current Air Force force presentation model as incompatible with contested environment operations.[9] Thus, we will focus on that challenge here. The report mentioned above further suggests a four-step approach to redesign ACS force packages: (1) decompose the mission demands into their component parts, (2) reconfigure the force package building blocks, (3) train force package designers, (4) develop a library of new force module designs.[10] The Air Force Civil Engineer (CE) enterprise has started following this process loosely. This paper will attempt to evaluate their progress toward the RAND report suggestions and make recommendations for improvements.

Words Matter

Although the CE community has made some progress toward achieving the goals outlined in the four-steps mentioned above, there are still many unsolved issues. Namely, multiple commands are working on the problem from different angles and have failed to standardize their approaches effectively. To address this issue, we suggest starting with a standard language across the force. Carl von Clausewitz states: "The primary purpose of any theory is to clarify concepts and ideas that have become, as it were, confused and entangled. Not until terms and concepts have been defined can one hope to make any progress in examining the question clearly and simply…"[11] However, a quick review of literature on distributed operations in the Air Force returns an exhaustive list of terms: Adaptive Operations in a Contested Environment (AOiCE), flex-basing, adaptive basing, dynamic basing, cluster basing, untethered operations, distributed basing, agile basing, austere airbase, main operating base, forward operating base, forward operating location, forward arming and refueling point, contingency location, hub

and spoke. Suppose we are to adhere to Clausewitz's words. In that case, we must define a consistent set of terms and concepts of the Air Force's dynamic force employment and distributed operations strategies before making any progress in genuinely developing and implementing them.

This task is a current instruction from the Chief of Staff of the Air Force (CSAF) to Headquarters Air Force (HAF) and Major Commands (MAJCOMs.)[12] Given that the current CSAF developed comprehensive definitions and lexicon during his time in PACAF, it makes the most sense that the Air Force will adopt PACAF language. Further reasoning for using the PACAF construct is that it is seemingly the most relevant theater for these operations, as outlined by the CSAF himself[13] and as suggested by Ferris.[14] Therefore, for the remainder of this paper, we will use the PACAF term Agile Combat Employment (ACE) to refer to the "proactive and reactive scheme of maneuver executed within threat timelines to increase survivability while generating combat power," including all elements of campaigning such as force employment, command and control (C2), and combat support.[15], [16]

The next clarification involves base terminology. Remaining in the PACAF arena, General Brown identified the following terms in his PACAF Annex to AOiCE:[17]

- Cluster: A network of one or more Main Operating Bases, or hubs, that orchestrate the operations of an associated group of distributed fighting locations or spokes. Clusters may have multiple hubs that are MDS or distribution specific to enhance effectiveness. An Air Expeditionary Wing's (AEW) commander or higher normally commands a cluster.
- Hub/Main Operating Base (MOB): Hub locations embody resiliency and maximum levels of combat support to enable the warfighting effort. Hubs are a conduit between forward operating bases (spokes) and rear-echelon forces and must prepare to both receive follow-on forces and disperse current assets within a cluster's hub and spoke network. Hubs coordinate and support their associated spokes.
- Spoke/Forward Operating Base (FOB): Spoke locations embrace an expeditionary mentality to generate combat power on the front lines of a high-end conflict. Spokes vary greatly in operational capability but should include a suitable runway and appropriate ramp space to support a rapid transition to expeditionary combat operations. Spokes support cluster efforts coordinated by hubs.

We will use the terms regional cluster to refer to a group of hubs and spokes, and we will use hubs interchangeably with MOB and spokes interchangeably

with FOB. The critical piece here is that clusters, hubs (MOB), and spokes (FOB) may classify bases according to operational intent and base resiliency, but they fail to define a specific construction standard. To effectively develop force modules for engineers (and other ACS entities), the Air Force must first assign more specific definitions of airpower projection capability to each installation type. This may require further breakdown than the current two categories of MOBs and FOBs.

Base Archetype Model

Mills et al. developed a suggested matrix (Figure 1) for classifying base archetypes within the ACE environment, using four categories: Traditional, Temporary Use, Dispersal, and Stay and Fight.[18] Although these are additional words added to the lexicon, we can attempt to fit them within our existing categories. Traditional and Stay and Fight bases would fit into the hub / MOB category, and Dispersal and Temporary would fall into spoke / FOB classification. The matrix includes two factors previously mentioned: base-level resiliency and force projection capability. Base-level resiliency refers to the capability level of infrastructure, equipment, and trained personnel to protect (or rapidly regenerate when protection fails) sorties. Resiliency includes Rapid Airfield Damage Repair (RADR), robust fuel storage, and missile defense capabilities. The proposed model's second axis is force projection capability, scaling from low capability and brief duration to high capability and long duration.

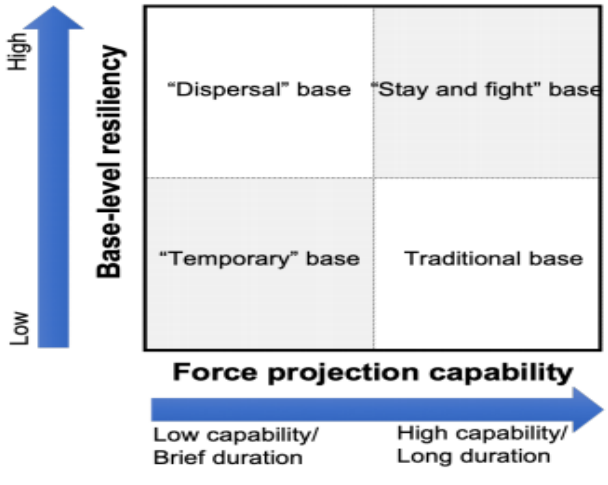

Figure 1 – Mills et al. Proposed Framework for Characterizing Adaptive Basing Archetypes.[19]

One significant change is required if we are to integrate this model into our existing base planning and design concepts. We recommend breaking the force projection capability axis into two separate axes: operational capability and projected duration. This separation would result in a three-dimensional model with three axes: base-level resiliency, operational capability, and projected duration. See Figure 2 for an illustrated model; imagine the original RAND model as the blue and green axes in our proposed model. There are two reasons we must add the third dimension, 1) geopolitical differences across theaters suggest varying levels of existing infrastructure, and 2) traditional base planning and design rely upon the projected duration of the base.

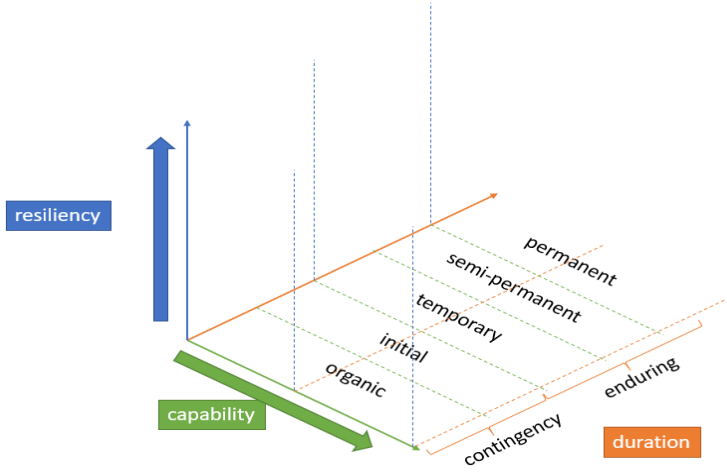

Figure 2—Proposed modified base archetype model

Before discussing the two reasons for separating duration as a third axis, it is important to understand existing DoD construction standards. DoD guidance outlines construction standards in JP 3-34, broken into 2 phases: (1) Contingency Phase (Typically 0 to 2 Years), which consists of Organic, Initial, and Temporary standards, and (2) Enduring Phase (Typically 2+ Years), which consists of semi-permanent and permanent. Unified Facilities Criteria (UFC) provide standards and specifications (e.g., building codes) for DoD installations classified as temporary, semipermanent, and permanent.

With these classifications in mind, we can discuss the reasoning for separating duration on the base classification matrix. Consider a geopolitical scenario in which we have a plethora of existing, high-quality platforms from which to launch operations, including a large number of friendly forces that would permit us to

use their facilities (i.e., NORTHCOM or USAFE). This type of scenario suggests an ACE implementation that does not require much new construction. Therefore, the shell game of maneuvering assets among the regional cluster may involve robust bases well within the Enduring phase. In these cases, all or most of the MOB and FOB locations will have facilities at permanent construction standards, regardless of proposed operational capability.

On the other hand, consider a theater in which the US maintains only a handful of robust Enduring locations and can access only a few allies (i.e., Air Force Central Command, AFCENT). ACE implementation here may permit the use of the few existing Enduring locations as MOBs but will require renovation, repair, or even construction of new installations to use as FOBs. The existing locations probably are built to temporary or semipermanent construction standards at best. Any new construction will not exist past the initial standard of construction given the timeline constraints of GPC. A third scenario exists somewhere such as PACAF: we have plenty of existing Enduring locations to use as MOBs and several local allies, but our potential enemies' strength and adjacency prohibit the first scenario's security levels. This portfolio of scenarios shows that duration (and thus construction standard) is not directly tied to operational capability as the RAND model proposes. The separation of projected duration and force projection capability is necessary because of the differences in ACE operations in different theaters.

The second concept involves a bit more discussion. Traditional Air Force base planning and development relies on AFH 10-222, last updated in 2012.[20] The planning process involves a gradual force module concept seen in Figure 3; open the airbase, establish the airbase, operate the airbase, robust the airbase. The first few blocks have one goal: generate airpower. This process enables the establishment of air superiority, after which we can transition to an enduring location, i.e., move to "robust the airbase." This block involves planning and building toward the temporary, semipermanent, or permanent standard of construction mentioned previously, based upon the *duration* we plan to remain at the location.

In the AFCENT theater and COIN and CT wars, in which established air superiority was assumed, these durations were appropriate. Generally, our bases in AFCENT all transitioned to the Enduring phase. However, the return to GPC suggests an operating environment in which this assumption is invalid, thus retaining a majority of our installations in the Contingency phase and never reaching the "robust the airbase" block of base development. Thus, the requirement for an agile, integrated, distributed, and resilient base infrastructure dictates a review of the existing construction standards for Air Force installations.

Figure 3—Base Development Force Modules as presented in AFH 10-222, Volume 1.[21]

The existing Enduring classifications—temporary, semipermanent, and permanent—have suitable existing specifications primarily defined in UFC 1-200-01.[22] They are typically appropriate for traditional, "home-station" and rear-echelon bases. However, in some well-established theaters, they may contain MOBs or even FOBs (think of the USAFE scenario), depending on the Combatant Commands (COCOMs) intent with ACE implementation. We should focus on the Contingency phase—Organic and Initial—because there are no standards or specifications for these classifications. No definitions exist here because the expected duration is so short that tents and mobile equipment are more feasible than hardened facilities and infrastructure. Service construction standards typically retain the Organic classification for Army and Marine base camps. Although training such as Silver Flag emphasizes the initial phases of bare-base development, Air Force engineers rarely think in terms of Organic or Initial standards because the typical operation we have grown used to exceeds that standard. The CE enterprise currently emphasizes a cost-effective asset management model based on long-term planning, and thus the use of permanent standards. For example, Castaneda analyzed the cost benefits of such thinking, concluding that it is cheaper, in the long run, to produce permanent facilities than temporary or semi-permanent if an endured location duration is expected.[23] Our military's fiscal constraints and the long-lasting operations in the AFCENT theater heavily influence this thinking.

However, in the modern times of GPC, ACE dictates that the Air Force also operates in the Organic and Initial arena. Canfield suggests embracing lower construction standards to coincide with the larger number of distributed bases required for ACE within the constrained financial environment previously men-

tioned.[24] Instead, we propose that the Air Force embrace the Organic and Initial standards of construction as the most applicable minimum for most ACE installations. This step furthers progress toward a consistent joint standard of construction called for by Scott and Canfield and minimizes the amount of new administrative work required to update standards, regulations, and specifications.[25],[26] Therefore, we recommend the Air Force CE enterprise work to normalize Organic and Initial standards from JP-4 within its lexicon. Although the terms currently exist in AFH 10-222, their definitions and explanations may require expansion.

Concerning Organic standards, an essential difference between the Army and Marines and the Air Force is that the latter requires a projection platform—an airfield—to project combat power.[27] The Air Force already has clearly defined standards for airfield pavements, facilities, and infrastructure (with specific considerations for each aircraft when appropriate) within its portfolio of UFCs (primarily UFC 3-260-01 and UFC 3-260-02).[28], [29] At its core, engineers use the number of required "passes" for different aircraft types to complete airfield pavement design. This design method is compatible with currently evolving ACE concepts. It is scalable based on operational intent (i.e., type of aircraft and number of sorties), and existing bare-base development guidance, AFH 10-222, already references this procedure. Therefore, airfield specifications should not require additional modification once the CE enterprise normalizes Organic construction standards.

Addressing the Force Module Question

Now that we have reviewed Air Force construction standards, we can return to the initial question of Air Force CE enterprise progress toward redesigning force modules in the ACE environment. Other than the proposed third axis of the RAND model, redesigning CE force modules relies on clarifications for the other two axes: force projection capability and base resiliency.

Mills et al. have suggested a framework here as well, using the four classifications described earlier: Traditional, Stay and Fight, Dispersal, and Temporary Use.[30] The report uses Airfield Damage Repair (ADR) and Explosive Ordnance Disposal (EOD) capability in the base resiliency axis and combat operations intensity (i.e., number sorties) and maintenance capability on the force projection axis. Our operational entities should identify what combat operations intensity looks like for our entire aircraft inventory. Nordhagen takes a reliable approach regarding the A-10, ultimately confirming that the Warthog community can conduct ACE operations with a few minor adjustments to training, regulations, and exercises.[31] Other aircraft communities should follow this evaluation model, ulti-

mately attempting to define various levels of operational intensities for their aircraft.

Operational intent suggests support provided. Thus, once operational communities define the above operational intensities and accompanying force modules for our aircraft inventory, the ACS community can effectively develop support force modules. Most important is the aircraft maintenance component. Mills et al. suggest three categories: rearm-refuel-repair, rearm-refuel, and refuel only, although an "under fire" category may be necessary.[32] Next, based on the operational intensity and base resiliency requirements, Engineer support modules could be designed.

The CE enterprise is currently developing standard modules to present forces—really just modified Unit Type Codes (UTC)—that provide appropriate levels of support for the directed operational intent. These modules provide traditional Base Operating Services (BOS) engineering services, airfield damage repair capability, and emergency services (Fire, EOD, and chemical, biological, radiological, and nuclear (CBRN) support. PACAF, USAFE, and AFCENT have all proposed various iterations of new "ACE UTCs" designed for MOBs and FOBs. These proposals need to be discussed and standardized as much as possible. Flexibility and scalability are essential to remaining consistent with ACE tenets and account for the various geopolitical scenarios (i.e., different means of implementation) described previously. These different scenarios may ultimately prevent a one-size-fits-all solution. However, if the Air Force can implement the naming convention and base archetypes discussed above, discussions across theaters will be less confusing. Perhaps it is possible to break down Mills' archetypes even further within our 3-D model above in a way that can encompass all theaters, although this is unlikely.

Additionally, the CE enterprise is evaluating alternative equipment kits to support operations on a more flexible scale. One such example is the Air Rapid Response Kit, an alternative to the less agile Force Provider and Basic Expeditionary Airfield Resources (BEAR) kits.[33] These alternatives focus on providing support within the timeframes focused on earlier (i.e., less than 30 days) and much smaller footprints, consistent with ACE operations. Finally, the CE enterprise is attempting to optimize global asset management via pre-positioned equipment. PACAF has developed pre-positioned equipment kits (RBCP), and USAFE has developed "dabs," both of which strive to support an integrated basing model, rapid scalability, and increased resiliency through distribution.[34] These new developments are essential progressions along the four-step process outlined by Mills et al. to redesign ACS force packages within the ACE construct.

Conclusion

The return to GPC has led to the development of new force presentation methods and a discussion of integrated basing networks. This article sought to discuss current force presentation and ACE basing challenges that the Air Force CE Enterprise is facing. The current lexicon around these concepts is jumbled at best, so we recommend standardizing the PACAF naming convention of ACE, including clusters, hubs (MOB), and spokes (FOB). We also suggest employing the base archetype matrix discussed in Mills et al. – Traditional, Temporary Use, Dispersal, and Stay and Fight. The matrix uses base resiliency and force projection capability, to which we add a third dimension of projected duration. This three--dimensional matrix provides a framework for Combatant Commanders to classify their MOBs and FOBs, enabling combat support entities to shape their provider packages and capabilities appropriately.

Within the CE enterprise, the transition to ACE within the above framework suggests a review of current planning and construction guidance. Although there is no need to create new standards, existing guidance such as AFH 10-222 requires review to ensure the normalization of Organic and Initial standards of construction compulsory for the ACE environment. Additionally, the planning process and force modules presented for bare-base development may require updating to reflect the time constraints and increased scalability (back-and-forth) of ACE.

Current CE staffs are discussing, developing, and exercising new force presentation models to help support ACE. They have proposed a variety of different modules in the form of modified UTCs. They are also evaluating new equipment packages and toying with pre-positioned assets. All these efforts differ across theaters according to the unique characteristics of the respective Area of Responsibility.

There are many challenges the Air Force faces as it stages for the modern GPC. As the force evolves this new means of operating, consistency across the force is vital. Consistent communication using a common language between operations communities and ACS entities is essential to realizing the modern Air and Space Forces outlined in our service priorities. This paper outlined several recommendations to help standardize that common language to permit shaping the modern and agile force our nation requires.

Further Considerations and Additional Research

The discussions above bring forth a plethora of other challenges and questions outside this paper's immediate scope. These items require further consideration

and additional research to help solve. We have outlined a few of them, as well as potential starting points for research, below.

Within most theaters, the United States and its allies own pre-existing locations that could meet the requirements of one of the base archetypes discussed above. Combatant Commanders should already maintain at least some information on such locations. Is this information accurate and up-to-date? Is it easily and rapidly accessible to use within the time constraints of ACE operations? Moreover, is it robust enough to outline the types of operations and airframes each location could support? Patrick Kelly develops an analytical model for evaluating the feasibility of fielding various systems at different airfields based on their respective infrastructure.[35] It is also essential that we know what construction standards our allies rely on at these locations, for example, do our European partners use the same pavement design methodology as we do?

How do we effectively pre-position assets, equipment, and personnel to support a resilient and integrated base network? Lynch et al. evaluate a methodology for the global management of Air Force War Reserve Materiel. They argue that the Air Force should move away from inventory management and toward capability management for mission support assets, should develop a method to determine priority for War Reserve Materiel (WRM) pre-positioning, and should optimize its WRM pre-positioning posture.[36]

How do we rapidly determine requirements for ACE bases, personnel, equipment, and assets, project corresponding mobility needs and effectively deploy? Another RAND team developed a Lean-START tool that takes user inputs and uses various planning factors to output UTC requirements.[37] If this tool considers an updated force module library, ACE planners and employers could effectively use it.

JP 5-0 states: "Joint planning is resource informed and time-constrained."[38] In the GPC environment, the joint planning environment will be more time--constrained than ever before. Therefore, the ACS community must perform their portion of "resources informed" better than ever before. From the ACS perspective, this involves providing accurate, up-to-date data on available airfields and their capabilities, as outlined in some of the questions proposed above. Further, In an ACE operational environment, planning and execution may happen much more simultaneously than in previous operations; therefore, aligning modern operational command and control (JADC2) methodologies identified by Fitle and Terino with ACS planning and execution is essential.[39],[40] Joint Planners must understand how to rapidly and effectively employ these capabilities; thus, these JADC2 methodologies must incorporate the ACS tools and capabilities outlined in the first few questions.

Finally, achieving appropriate readiness levels will require the CE enterprise to reassess the relevance and effectiveness of current training efforts, specifically in the areas of bare-base planning, design, development, and rapid airfield damage and repair. The successful implementation of ACE may require an increase in the frequency and intensity of training in Organic and Initial standards, as well as rapid and scalable bare-base development, to support new force presentation modules and the requirements of a dynamic GPC strategic environment. ✪

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