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Implementing New Airpower Concepts

Insights from Agile Combat Employment

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Cover Photo: Artwork portrait of US Air Force (USAF) General (GEN) George C. Kenney, Commander of Far East Air Forces from 15 June 1944 to 29 December 1945. Courtesy National Archives.

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Foreword

The Kenney Papers series from Air University Press, in collaboration with the Consortium of Indo-Pacific Researchers, provides a forum for topics related to the Indo-Pacific region, which covers everything from the western shores of the Americas to the eastern coast of Africa and from Antarctica to the Arctic. Named for General George Churchill Kenney, Allied air commander in the Southwest Pacific during World War II and subsequently commander of Strategic Air Command and then Air University, this series seeks to provide a deeper understanding of the region, the geopolitics and geoeconomics that shape the theater, and the roles played by the US military in providing for a free and open Indo-Pacific.

About the Author

From 2020 to 2025 Dr. Sandeep Mulgund served as a Highly Qualified Expert (HQE) senior adviser to the Deputy Chief of Staff for Operations, AF/A3. He led an Air Force–wide effort to develop and synchronize the implementation of an enterprise strategy for agile combat employment. He previously led AF/A3 efforts related to operations in the environment and joint all-domain operations, whose results informed updates to both Air Force and joint doctrine. Dr. Mulgund regularly presented new Air Force concepts and approaches at Air University's general officer level courses.

Prior to his federal service, Mulgund was a principal scientist in the national security sector for the MITRE Corporation, a federally funded research and development center operating in the public interest. In support of AF/A3, he was involved in the development and application of the Air Force's planning guidance for dynamic force employment, a critical element of the 2018 National Defense Strategy. He also supported the development of operating concepts for multidomain command and control (MDC2). Through extensive engagement worldwide at the US Air Force's air operations centers, the results of this effort contributed key principles and methods for MDC2 to the Air Force's air operations center tactics, techniques, and procedures manual.

Dr. Mulgund holds a doctorate in mechanical and aerospace engineering from Princeton University and a bachelor of applied science degree in Engineering Science from the University of Toronto.

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- Maj Gen Christopher Niemi, Director for Concepts and Strategy, Air Force Futures A5/7, Headquarters Air Force
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Their partnership was invaluable in bringing the ACE vision to life and placing it in the broader context of the continuing evolution of airpower.

Summary

This paper reviews a multiyear effort at Headquarters Air Force (HAF), major commands (MAJCOM), and subordinate elements to develop, implement, and institutionalize concepts for agile employment (ACE), which focuses on launching, recovering, and maintaining aircraft from dispersed operating locations in concert with allies and partners. Insights from this effort span the full range of doctrine, organization, training, materiel, leadership, personnel, facilities, and policy (DOTMLPF-P) issues and can inform future activities in the Air Force, driving continuing change in the application of airpower. Key insights from the worldwide ACE effort were to:

1. **Paint a picture of combat credibility.** When a new concept is in its relatively early stages it may not be apparent what it looks like when fully operationally viable and integrated into real-world operations. Establishing what a combat-ready capability looks like provides a concrete aimpoint.

2. **Establish connective tissue with relevant concurrent efforts.** Any new operating concept will influence and be influenced by a wide range of other efforts with intersecting themes. Distinguishing them will facilitate educating the force on how the parts fit together.

3. **Engage stakeholder organizations spanning DOTMLPF-P equities regularly.** Operationalizing any new concept spans the equities of a wide range of stakeholders at multiple echelons across doctrine, organization, training, materiel, leadership, personnel, facilities, and policy issues. Engaging with all of them helps to move the force forward in a coordinated manner.

4. **Focus on the intersection of multiple mission requirements, not their aggregate.** Developing enterprise-level guidance is more tractable if the effort focuses on what is common across mission sets and functional areas. Each operational community can tailor its approach from a common foundation.

5. **Use doctrinal joint functions as an organizing framework to provide qualitative guidance.** Using joint-aligned language in a service-level concept will facilitate its integration with the rest of the joint force and with allies and partners—and help to educate Airmen on joint lexicon. Separating foundational principles from numeric details related to scale, scope, and duration enables the operational community to determine the specifics that make sense for their theater or force type without imposing a brittle one-size-fits-all solution.

6. **Separate tactical execution from operational orchestration.** Requirements for tactical proficiency and operational art will drive different activities

in different organizations. Separating them helps to clarify who must develop which skills.

7. **Build capability through a systematic crawl/walk/run approach.** Progressing from an initial concept to an operationalized capability is a years-long journey. Developing a roadmap that advances from one to the other systematically makes the enterprise challenge tractable while providing mechanisms for measuring progress.

8. **Drive joint/combined force integration through proactive collaboration and experimentation.** Service-specific concepts must integrate with the overall joint/combined force. Establishing linkages early on can help to address common approaches, potential areas of resource contention, and opportunities for increased overall effectiveness.

9. **Figure out the bill.** Most new operating concepts come with a bill for materiel and non-materiel resources needed to implement it fully. Illuminating the particulars of that bill as early as possible helps the enterprise understand what it will take to turn theory into reality.

10. **Be deliberate about taking risks.** New ways of operating can introduce new hazards, the consequence and likelihood of which may be uncertain at first. Promoting dialogue early and often to identify and resolve such risks collaboratively can accelerate the normalization of new ways of generating and employing airpower.

11. **Enable institutional memory through emerging doctrine.** Formal doctrine helps to codify what has been learned through experimentation and application and helps to preserve knowledge long after the original proponents have faded from the scene. It requires a tight partnership between the operational and educational arms of the Air Force.

Introduction

The US Air Force (USAF) is using the term *agile combat employment* to describe an approach to operations that relies less on large traditional main overseas bases as hubs for projecting airpower and more on launching, recovering, and maintaining aircraft from dispersed operating locations in concert with allies and partners.[1] This approach to generating airpower has been motivated in part by adversarial advances capabilities that can hold at risk those bases that have traditionally been considered sanctuaries as well as by the reduction of the Air Force's overseas basing footprint. ACE enables shifting operations from centralized physical infrastructures to clusters of smaller, dispersed locations that can complicate adversary planning, improve airpower resilience and survivability, and provide more power projection options for joint and combined force commanders.[2] Aircraft are most vulnerable on the ground, and ACE can make it possible to reduce combat losses through maneuver and dispersal. It complements other passive and active defensive measures. ACE is an aspect of the Air Force's contribution to maneuver warfare, which focuses on movement, positioning, speed, and surprise to place an enemy at a disadvantage.[3]

Figure 1 illustrates the overall ACE concept. ACE is a *scheme of maneuver*, a description of how arrayed forces will accomplish commander's intent. In the illustration, the air operation center (AOC) is on the far left, with enemy territory on the far right. Forces are initially arrayed at a set of main operating bases (MOB), with forward operating sites (FOS) identified for potential use during ACE maneuver. Some of those FOSs are protected by integrated air and missile defense (IAMD) capabilities. Key steps in ACE are:

1. **Setting the theater.** ACE is preparation intensive. Well ahead of need, necessary access, basing, and overflight agreements are developed with applicable host nations. As needed, materiel is pre-positioned at or near potential FOSs so that it is readily available for use.

2. **Proactive ACE maneuver.** In response to some triggering event but before a crisis, forces and assets may move between MOBs and dispersed sites to assure allies and partners, alter adversary understanding of friendly intentions and capabilities, and posture to deter aggression and gain advantage.

1. Sandeep Mulgund, "Command and Control for Agile Combat Employment," *Wild Blue Yonder*, August 30, 2021, https://www.airuniversity.af.edu/.

2. Air Force Doctrine Publication (AFDP) 3-0, *Operations*, January 22, 2025, 51, https://www.doctrine.af.mil/.

3. Martin Van Creveld et al., *Air Power and Maneuver Warfare* (Air University Press, 1994), 1.

3. **Reactive ACE maneuver.** This aspect of ACE is the most straightforward. In response to observed, perceived, or anticipated aggression, forces disperse to complicate enemy targeting and survive, redistributing them away from main hubs. They may re-aggregate for any follow-on action as required.

4. **Joint massing of effects.** While strictly outside the scope of ACE as a scheme of maneuver, a critical step in executing air operations while conducting ACE is to create desired effects against enemy targets in coordination with the overall joint/combined force.

5. **Recovery and sustainment.** The last phase is recovering and sustaining aircraft at the network of available dispersed operating locations, in preparation for the next phase of the fight. It is not prescribed beforehand where the recovery and sustainment occur; battlefield conditions and continuing operational requirements drive decision-making on which bases to use.

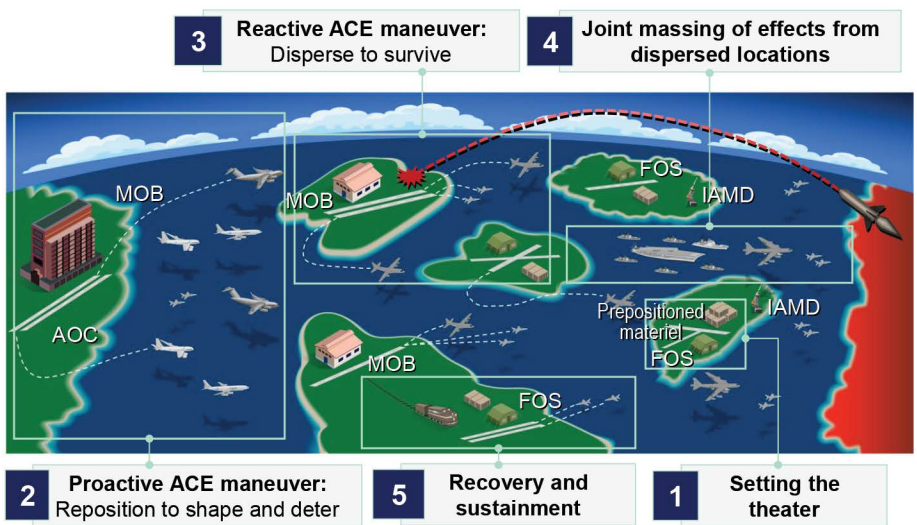

Fig. 1. ACE concept overview. (Adapted from LeMay Center for Doctrine Development and Education)

This paper reviews a multiyear effort at the HAF, MAJCOMs, and subordinate elements to develop, implement, and institutionalize ACE concepts, with an eye toward illuminating insights and lessons learned that can inform future activities driving institutional change. It is less about assessing the state of ACE today than it is about identifying reusable insights to inform future ef-

forts of this nature. As much progress has been made with ACE, work remains to fully resource it and tie it to broader overall joint approaches such as the Joint Warfighting Concept (JWC).[4] Even as ACE matures, airpower approaches are evolving further in response to changes in the threat environment, new imperatives for the joint force, and emerging technologies that can provide an asymmetric advantage. Today, there is extensive exploration and investment occurring with concepts and technologies for collaborative combat aircraft (CCA),[5] autonomous weapons,[6] pulsed operations as per the JWC, and many others. The experience with ACE provides a valuable case study for exploring the successes and challenges in bringing a new idea to life to inform and accelerate such efforts.

A Brief History of ACE

While the term "agile combat employment" has been in use since roughly 2017, the essential ideas of dispersal for survivability, shifting airpower generation to different operating locations as battlefield conditions and operational requirements evolve, and operating from austere airfields are as old as airpower itself.

World War II

Today's concepts for ACE contain themes that would seem quite familiar to airmen during World War II, in both European and Pacific theaters. In the European theater, the Eighth Air Force conducted extensive strategic bombing operations in western Europe as part of the Combined Bomber Offensive. They operated from numerous often improvised and rapidly constructed airfields scattered across eastern England.[7] Shown in figure 2, these bases accommodated the size of the overall bomber force, which grew considerably over the course of the war. They also reduced the bomber force's vulnerability to a single large raid by the Germans. Dispersal helped to mitigate the risk of an attack on any one base crippling the Mighty Eighth's ability to conduct operations.

4. Thomas Walsh and Alexandra Huber, "A Symphony of Capabilities: How the Joint Warfighting Concept Guides Service Force Design and Development," *Joint Force Quarterly*, no. 111 (October 2023): 4.

5. Secretary of the Air Force Public Affairs, "Air Force Designates Two Mission Design Series For Collaborative Combat Aircraft," March 3, 2025, https://www.af.mil/.

6. "Air Force Vanguards," Air Force Research Laboratory, accessed February 24, 2026, https://afresearchlab.com/.

7. Donald L. Miller, *Masters of the Air* (Simon & Schuster, 2007), x–xi.

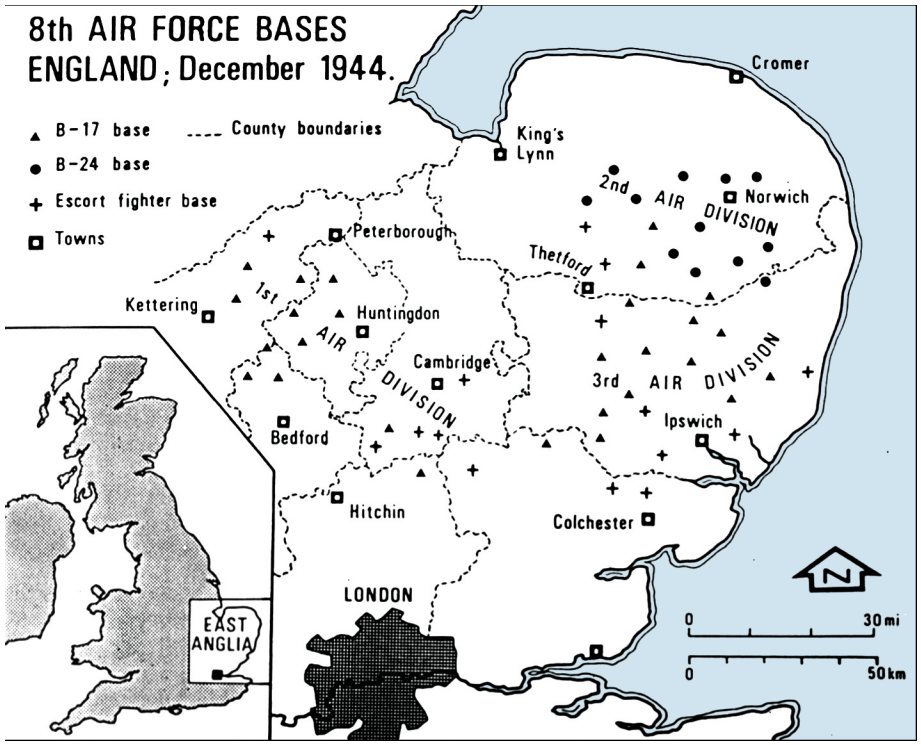

Fig. 2. Eighth Air Force bases in England as of December 1944. (Reprinted with permission from Imperial War Museums [EPH 2210])

Tactics evolved rapidly as Allied forces conducted raids launched from these scattered bases toward common targets in Germany. To concentrate bomb release while massing machine-gun firepower for mutual protection, long-range bombers used what became known as a combat box formation.[8] Radio beacons, flares, and well-defined procedures were used to establish the box formation before proceeding toward the European continent as an integrated unit of massed firepower, equivalent in intent to what the ACE concept today calls joint massing of effects. In the case of the Eighth Air Force, individual bombers would first form up on their squadron, and then the squadron commander would form on the group.[9] A tight formation was integral to effective mutual defense.

While US bomber forces focused on generating airpower for the combined bomber offensive from these dispersed operating locations, tactical forces

8. "Combat Box," Wikipedia, last edited January 5, 2026, 18:15 (UTC), https://en.wikipedia.org/.
9. Philip Kaplan, *Bombers: The Aircrew Experience* (Aurum Press, 2000).

from Ninth Air Force operating in Europe after the Normandy invasion flexed a different aspect of airpower agility, namely relocating operations from one airfield to another as circumstances evolved.

Planning for the Normandy invasion called for fighter groups deploying to airfields built on the Continent by aviation engineers and then supporting Allied ground forces.[10] They enabled the drive across Europe by maintaining air superiority, interdicting flow of reinforcements and supplies to Axis forces, and providing close air support.[11] Unlike the permanent airfields used by the Eighth Air Force in the UK to generate forces for strategic bombardment, airfields on the Continent were temporary and often improvised. A new airfield might be a "virgin" site or a rehabilitated airfield captured from the enemy. Figure 3 shows a P-47 at a rough airstrip near Sainte-Mère-Église in France, nine days after D-Day.

Fig. 3. P-47 fighter-bomber pilots at a rough airstrip near Sainte-Mère-Église on June 15, 1944. (USAF 091002-F-1234S-012)

10. Justin R. Davis, *The Air Force's True Expeditionary Roots: Historical Context and Lessons Learned for the Agile Combat Employment (ACE) Concept*, School of Advanced Military Studies (US Army Command and Staff College, 2021), 11.

11. "Allied Tactical Airpower in the Summer, Fall of 1944," National WWII Museum, October 23, 2024, https://www.nationalww2museum.org/.

Planners in Ninth Air Force's IX Engineer Command developed designs for four types of airfields:

- Emergency landing strips (ELS) were 2,000-ft. rough graded strips intended to provide an area for tactical aircraft to conduct emergency belly landings.
- Refueling and rearming (R&R) strips had one runway, generally 3,600 feet long, with two marshaling areas on either side of it. They had enough infrastructure for R&R near the front line but not for indefinite operations.
- Advanced landing ground (ALG), which was an R&R field with additional facilities for dispersal, access roads, and additional storage.
- A tactical air depot (TAD), which expanded an ALG by adding hangars, shops, hardstands, and roads.

To maximize the effectiveness of close air support for the invasion force, it was desirable for tactical forces to remain relatively close to the front lines. Battle lines could change dozens of miles in a single day, driving a requirement for mobile tactical air forces that could rapidly construct and occupy airfields to keep pace with advancing ground forces.[12] Upon learning the Army was planning an operation, Ninth Air Force would determine if the center of gravity of one of its Tactical Air Commands would need to move as well. If ground force movement placed fighter groups more than 60 miles from the front line, Ninth Air Force would communicate the requirement for more airfields to IX Engineer Command.[13] Airfields in the rear would be used for support or simply abandoned. Between D-Day and V-E Day, the Ninth Air Force built, rehabilitated, and supplied 241 airfields on the Continent.

Airpower maneuver and agility were also key parts of the Allied campaign in the Pacific. Following the Battle of the Coral Sea and the Battle of Midway, in August 1942 US forces mounted their first major amphibious landing at Guadalcanal, northeast of Australia. The overall intent of the offensives in New Guinea and the Solomon Islands was to defend sea lines to Australia and eventually be in a position to attack the major Japanese base at Rabaul on New Britain.[14]

Guadalcanal provided Allied forces with a key airfield, later named Henderson Field after the commander of a Marine bombing squadron killed during the Battle of Midway. Marine engineers used abandoned Japanese assets to make the airfield usable for heavier strike aircraft such as Dauntless dive bombers and Avenger torpedo bombers. Allied aircraft operating out of Henderson airfield came to be known as the Cactus Air Force, named after

12. David C. Johnson, *US Army Air Forces: Continental Airfields (ETO) D-Day to V-E Day* (Research Division, USAF Historical Research Center, 1988), 1.

13. Davis, *The Air Force's True Expeditionary Roots*, 14.

14. James D. Hornfischer, *Neptune's Inferno: The US Navy at Guadalcanal* (Random House, 2011), 5.

the Allied code name for Guadalcanal. Operating from an austere airfield (figure 4) under constant threat, they provided close air support for Marines fighting against the Japanese Army on Guadalcanal and flew both defensive counterair and interdiction missions. Aircraft maintenance took place in the open under tropical conditions, often while under attack. Destroyed aircraft were cannibalized for spare parts, and munitions were hand-loaded into aircraft due to the lack of bomb hoists. Fuel, which was always in short supply, was hand-pumped into aircraft.

Fig. 4. Cactus Air Force aircraft at Henderson Field, Guadalcanal, 1942. (US Marine Corps 127-GR-89-116736)

US forces fought for six months to hold the island, marked by numerous naval and land battles as well as near-continuous air combat. They eventually prevailed, taking the first key step in pushing Japanese forces back in the Pacific theater. With Guadalcanal under control, US and Allied forces continued closing in on Rabaul. Forces under the command of Adm William Halsey moved north through the Solomons, while Gen Douglas MacArthur's forces pushed west along the northern coast of Papua New Guinea.[15] Instead of following this success with a direct assault upon heavily defended Rabaul, the plan called for Allied planes and ships isolating and then neutralizing it from the air and sea. Bypassing Rabaul, the bulk of MacArthur's forces pushed west to invade less well-defended islands. The practice of skipping over heavily fortified islands to seize lightly defended ones came to be known as island hopping. Japanese defenders in isolated strongholds were effectively taken

15. "The Pacific Strategy, 1941–1944," National World War II Museum, https://www.nationalww2museum.org/, accessed February 27, 2026.

out of the fight. Island hopping was a critical part of the success of the Allied campaign in the Pacific.

A primary focus of post-capture operations during island hopping was the rapid construction of airfields on newly acquired islands.[16] This sometimes required engineers to construct airfields hours after Japanese forces had been repelled, so that air operations could commence within days.[17] Such infrastructure facilitated a range of aircraft deployments, including fighters, bombers, and reconnaissance aircraft. Captured islands became launching points for subsequent offensives, and the new airfields provided the infrastructure needed to support the next set of amphibious assaults. They extended the operational reach of Allied forces. Airpower enabled island hopping through the control of the air around captured islands, interdiction of Japanese logistics, and progressively extending operational reach westward.[18] Between June and August of 1994, American forces seized Saipan, Guam, and Tinian, 1,500 miles south of Tokyo. Engineers built runways, housing, and support facilities for the Twentieth Air Force's expanding bomber fleet.[19] By the end of that year, the Allies were preparing to return to the Philippines and to establish bases in the Marianas from which B-29 bombers could begin attacking Japan directly.

Another story of airpower agility and inventiveness in the Pacific during World War II comes from the First American Volunteer Group, better known as the Flying Tigers, formed to help oppose the Japanese invasion of China.[20] Commanded by Army officer Claire Chennault, the Flying Tigers consisted of pilots recruited from the Army and Navy who volunteered to fight for China before the US had entered World War II. The original recruits consisted of 100 pilots and roughly 200 ground crew and administrative support personnel. They would fly the Curtiss P-40B Tomahawk, which even in 1942 was being superseded by new aircraft in production in the United States. It was slower and less maneuverable than many Japanese fighters, but it was ruggedly built, heavily armed, and had superior diving speed. Two squadrons were based at Kunming in China (figure 5) with a third near Rangoon in Burma. Their first combat mission was on December 20, 1941, shortly after the Japanese bombing of Pearl Harbor, when Japanese bombers attacked Kunming.

16. Kevin P. Kane, "Army Aviation in the Indo-Pacific Theater: Historical Insights from World War II to Provide Options for Future Strategic and Operational Commanders" (master's thesis, National Defense University, 2024), 18.

17. Corbin Williamson, "Expeditionary Airfields in the Pacific," *Wild Blue Yonder*, July 19, 2021, https://www.airuniversity.af.edu/.

18. Wesley Craven and James Cate, eds. *The Army Air Forces in World War II,* vol. 4, *The Pacific: Guadalcanal to Saipan* (Office of Air Force History, 1983), ix.

19. Barrett Tillman, *Whirlwind: The Air War Against Japan 1942–1945* (Simon & Schuster, 2010).

20. Daniel Ford, *Flying Tigers: Claire Chennault and His American Volunteers, 1941–1942* (Harper Collins, 2007).

Fig. 5. Repairing a Flying Tiger P-40 at Kunming, China. (USAF)

Over the next several months, the Flying Tigers fought across Burma and southern China. Protection of the Burma Road between Rangoon and China was a key priority, as it was a crucial supply line into China. They also sought to protect Chinese cities from Japanese air raids. Chennault emphasized hit-and-run tactics, avoiding turning dogfights with more maneuverable Japanese fighters in favor of altitude advantage and diving attacks.

The Flying Tigers operated from primitive airfields, lacked spare parts and adequate repair facilities, and at any given time they had typically 30 serviceable aircraft facing enemy air regiments of nearly 500 aircraft.[21] Their method of operating exemplified agility: They operated with unpredictable supply lines and cannibalized wrecked aircraft to keep others in the air. Their ground crews were less than half the normal size. Local laborers built multiple landing strips for their use, pre-positioning fuel, building shelters, and providing food, water, and security. They used a locally devised air warning network to enable their aircraft to launch more quickly than the enemy.

The Flying Tigers were officially credited with 297 enemy aircraft destroyed, though later analyses suggested a much lower figure. Fourteen of their pilots were killed in action, captured, or went missing. They averaged a 15:1 kill ratio. The Flying Tigers disbanded in July 1942; five pilots and 29 ground crew remained to become part of the 23rd Fighter Group of the newly established Fourteenth Air Force, led by Chennault. Contemporary ideas for ACE would have seemed quite familiar to the Flying Tigers.

21. Russell Cook, "Commentary: Lessons from Our Past – Claire Chennault on Agile Combat Employment," AirForce.mil, October 21, 2022, https://www.af.mil/.

Cold War

During the Cold War, several countries in Europe built road runways that would allow military aircraft to continue operating even if their primary airfields were degraded, damaged, or destroyed.[22] The German government established emergency landing sites on the autobahn as an alternate option. Aircraft would land on the autobahn, be refueled and rearmed, and execute new tasks as required.[23] Forces would be spread out to reduce the density of targets in any one location. The 1984 NATO exercise "Operation Highway 84" (figure 6) was the largest multinational test of this capability, executing 416 full-stop landings, 1,475 touch-and-go approaches, and 517 radar approaches. New capabilities such as mobile airfield lighting systems were tested for the first time. These landing sites were largely decommissioned after the Cold War.

Fig. 6. C-130 Hercules on the autobahn near Ahlhorn, Germany, during NATO Exercise Highway 84. (Source: https://www.warhistoryonline.com/)

Both the Finnish and Swedish air forces have maintained the practice of using civilian roads and highways as alternate landing sites, making agility

22. "Road Runway," Wikipedia, last modified February 21, 2026, 16:53 (UTC), https://en.wikipedia.org/.
23. Thomas Skiba, "German Highways Served as Military Infrastructure During the Cold War," Bundeswehr, April 24, 2023, https://www.bundeswehr.de/.

intrinsic to their manner of operations. As the newest NATO members, they are now bringing their long-developed insights to the alliance.[24]

Contemporary Efforts

The modern precedent for what the Air Force now calls ACE was the series of Rapid Raptor experiments first conducted by Pacific Air Forces (PACAF) in the 2013–2014 timeframe, in which F-22s deployed forward with a single C-17 and their maintenance and munition crews, bringing them to combat-ready status in 72 hours or less.[25] Such experiments continued and evolved in subsequent years, and the term "ACE" began to emerge to describe it in 2017.[26]

The 2018 *National Defense Strategy* (NDS) highlighted the importance of investments to enable transitioning from large, centralized, unhardened infrastructure to smaller, disperse, resilient, so-called adaptive basing.[27] The Department of the Air Force subsequently published the Adaptive Operations in Contested Environment (AOiCE) concept, articulating an enterprise approach that would improve the ability of air and space forces to project power in and operate from contested environments.

From 2019 through 2021, Air Force MAJCOMs and components continued the development and evaluation of their own ACE concepts, framed as implementations of AOiCE. One milestone event in this timeframe was Operation Rapid Forge in Europe (figure 7), one objective of which was to test the Air Force's ability to operate in an austere environment.[28] It also tested emerging concepts for what was then called a "multifunctional Airman," that is, an Airman trained to perform a variety of tasks outside of their own specialty.

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24. Clement Charpentreau, "Finnish and Dutch Fighter Jets Turn Highway into Runway During Baana 25 Exercise," Aerotime, May 26, 2025, https://www.aerotime.aero/; Peter Suciu, "It Lands on Highways: Sweden's JAS 39 Gripen Fighter Is Truly Special," *The National Interest*, July 22, 2024, https://nationalinterest.org/; and "NATO Allies Showcase Agile Combat Employment in Nordic Highway Exercises," NATO, May 28, 2025, https://ac.nato.int/.

25. Michael Trent Harrington, "Rapid Raptor Moves JBER F-22s Closer to the Fight," Pacific Air Forces, May 15, 2014, https://www.pacaf.af.mil/.

26. Amy Hudson, "Ace in the Hole," *Air and Space Forces Magazine*, March 30, 2017, https://www.airandspaceforces.com/.

27. Department of Defense, *Summary of the 2018 National Defense Strategy of the United States of America*, 6, https://media.defense.gov/.

28. Kyle Cope, "Operation Rapid Forge Concludes," AirForce.mil, July 28, 2019, https://www.af.mil/.

Fig. 7. F-15E Strike Eagles from 4th Fighter Wing at Spangdahlem Airbase during Rapid Forge. (USAF 190718-F-EQ149-0097)

Fig. 8. F-15E Strike Eagles from 389th Fighter Squadron at Tinian during Pacific Iron 2021. (USAF photo by Dr. Sandeep Mulgund)

Fig. 9. German personnel refueling F-16s from 52nd Fighter Wing at Buchel Airbase during Castle Forge 2021. (USAF photo by Dr. Sandeep Mulgund)

Following Rapid Forge, MAJCOMs recognized a need to coordinate the efforts and formed a global governance structure in late 2019 to share lessons learned, align activities, and identify common investment needs. Each MAJCOM's Deputy Commander (DCOM) would be the senior representative to this overall governance structure. ACE exercises and experiments would continue in subsequent years, growing in scope and complexity.[29] Two capstone events in 2021, shown in figures 8 and 9 above, were PACAF's Pacific Iron and US Air Forces in Europe's (USAFE) Castle Forge.[30] Both events centered on demonstrating and testing preliminary ACE capabilities.

In 2021 the MAJCOMs reached out to HAF to request the development of enterprise-level guidance to point overall Air Force activities in a uniform direction. There was a concern that even with the existing governance structure, divergence between approaches was emerging. If each MAJCOM continued pursuing its own approach semi-independently without a clearer common organizing construct, there would be too many different interpretations of ACE, varying by geographic theater or type of force (fighter, mobility, special operations, etc.). This would create a considerable burden in effectively organizing, training, and equipping the force, potentially inhibiting interoperability within

29. Teri Bunce, "AGILE FLAG 21-2: Airpower From Anywhere," AirForce.mil, May 15, 2021, https://www.af.mil/; and Brooke Moeder, "31 FW Conducts ACE Training During Agile Wyvern," Aviano Air Base, September 16, 2021, https://www.aviano.af.mil/.

30. Moses Taylor, "Pacific Iron 2021: A Fast, Flexible Force," Pacific Air Forces, August 4, 2021, https://www.pacaf.af.mil/; and Amy Hudson, "USAFE Conducts Agile Combat Employment Capstone Exercise," *Air and Space Forces*, October 6, 2021, https://www.airandspaceforces.com/.

the Air Force and with joint/combined force partners. It also had the potential to create confusion during execution, as different force elements implemented different interpretations of ACE without shared common ground.

In response to this request, the Deputy Chief of Staff for Operations (AF/A3) assembled a team led by the author to develop enterprise-wide ACE guidance and coordinate its implementation in partnership with relevant stakeholders within HAF and at MAJCOM leadership and staff levels. The goal was not to create "one ring to rule them all," but rather, to provide a coherent North Star to orient Air Force–wide ACE-related operations, activities, and investments (OAI). An enterprise-wide approach to ACE would:

- maximize useful commonality in how to organize, train, and equip air forces to conduct ACE in support of joint force requirements, and
- enable commanders to effectively integrate and synchronize ACE maneuver over all facets of airpower and with joint/combined forces.

This request led to a multiyear effort to effect change in many different aspects of airpower. While it was an institutional planning problem rather than an operational one, the overall approach broadly followed doctrinal planning processes,[31] including activities such as end state identification, mission analysis, and course of action development. In this case, execution of the plan was the continued development, evaluation, refinement, and codification of ACE approaches across the Air Force enterprise.

The enterprise-wide ACE effort encompassed a range of DOTMLPF-P issues.[32] Table 1 summarizes ACE-driven DOTMLPF-P impacts to date.

Table 1. ACE-related DOTMLPF-P impacts

DOTMLPF-P Element	Impact
Doctrine: The way we fight	Publication of initial ACE doctrine note[33] followed by incorporation into Air Force operations doctrine[34] Incorporation of ACE considerations in Air Force mission command doctrine[35]
Organization: How we organize to fight	Incorporation of ACE requirements into Air Force Force Generation Model (AFFORGEN)[36] force element designs

31. Joint Publication (JP) 5-0, *Joint Planning*, December 1, 2020, xi.

32. Chairman of the Joint Chiefs of Staff Instruction 5123.01J, "Charter of the Joint Requirements Oversight Council and the Joint Force Requirements Process," January 15, 2026, https://www.jcs.mil/.

33. Air Force Doctrine Note (AFDN) 1-21, *Agile Combat Employment*, August 23, 2022, 1, https://www.doctrine.af.mil/.

34. AFDP 3-0, *Operations*, 51.

35. AFDP 1-1, *Mission Command*, August 14, 2023, 7, https://www.doctrine.af.mil/.

36. Secretary of the Air Force Public Affairs, "New Force Generation Model Builds High-End Readiness, Sustainability for Joint Force," AirForce.mil, August 5, 2021, https://www.af.mil/.

Table 1. (*continued*)

DOTMLPF-P Element	Impact
Training: How we prepare to fight	ACE has become a regular feature of wing-level and major MAJCOM-wide exercises. Increasingly integrated into joint and combined force exercises
Materiel: The "stuff" we need	Unit-driven bottom-up innovation to address ACE capability requirements[37] Addition of ACE requirements into annual budgeting and capability planning processes
Leadership: How we prepare our leaders	Addition of ACE-related topics into dialogue with senior leaders from joint/combined force partners
Personnel: Availability of qualified people	Incorporation of ACE considerations into Ready Airman Training program, intended to develop skillsets for surviving and operating during contingencies at home station and in deployed environments[38]
Facilities: Physical installations supporting the force	Infrastructure investments to develop alternate operating locations[39]
Policy: The rules governing how we fight	Development of policies and guidance for mission-ready airmen (MRA), trained in expeditionary skills and capable of accomplishing tasks outside their core specialty

The journey with ACE is by no means complete; efforts continue to this day to fund and deliver materiel solution and infrastructure enablers, plan and execute increasingly realistic exercises, refine operating approaches based on improved threat understanding, develop necessary human capital, and connect it to the objectives of the JWC.

37. Brian Erickson, "Aviano Pilot Seeks Air Force Backing for Collapsible F-16 Ladder," *Stars and Stripes*, October 3, 2023, https://www.stripes.com/; Dario Leone, "The F-22 Raptor Now has a Boarding Ladder That Can Be Collapsed and Stowed Inside the Cockpit," The Aviation Geek Club, May 5, 2023, https://theaviationgeekclub.com/; Shannon Carabajal, "ANG Multi-capable Equipment Initiative Wins 2023 AFIMSC Innovation Rodeo," Air National Guard, July 31, 2023, https://www.ang.af.mil/; and Chase Sullivan, "Bomber in a Box: ACE Exercise Showcases BOCS Capability," Barksdale Air Force Base, August 23, 2022, https://www.barksdale.af.mil/.

38. Secretary of the Air Force Public Affairs, "Air Force Introduces New, Foundational Ready Airman Training Program," AirForce.mil, October 3, 2022, https://www.af.mil/.

39. Secretary of the Air Force Public Affairs, "USAF Senior Leaders Visit Mariana Islands on ACE Trip," April 5, 2024, https://www.af.mil/.

Enterprise-Level ACE Guidance Development and Implementation

The going-in belief was that we would codify enterprise-wide ACE guidance in the form of a product such as an Air Force Policy Directive (AFPD). It soon became clear an AFPD was not the right tool for the job. AFPDs typically have a long development cycle, and they are intended to capture mandatory, solidified guidance to the force. Given the pre–initial operating capability (pre-IOC) state of ACE at the time, we were not in a position to articulate and publish mandatory guidance. ACE was very much in a state of experimentation and discovery learning, so issuing mandatory guidance would have been premature and likely to stifle innovation.

Instead, consistent with guidance on mission orders in (then) recently revised Air Force doctrine,[40] we opted to develop a tasking order (TASKORD) to go out to the field under Chief of Staff of the Air Force (CSAF) authority. The TASKORD would establish an overall vision for ACE and enterprise-wide lines of effort (LOE) to achieve that vision and issue tasks to HAF organizations and the MAJCOMs. Conversations with MAJCOM leadership indicated some considerations they wanted HAF-level guidance to address:

- Do not "over-legislate" or be overly prescriptive in specifying how ACE should evolve.
- Let the practitioners at the unit level sort out the tactical details.
- Identify and resolve "unhelpful divergence" between MAJCOM efforts.
- Recognize that what makes sense in Europe may not work in the Pacific, and vice versa.
- Recognize that ACE may look different for fighter, bomber, mobility, and special operations forces.

Insight 1: Paint a Picture of Combat Credibility

At the outset of the enterprise-wide effort in 2021, critical first steps were to precisely define the problem to be solved and to understand the current situation across the Air Force enterprise in ACE implementation. It would be fair to say that at the time, ACE was "all over the map." MAJCOMs were in different stages of progress in developing their own ACE concepts of operation (CONOP) and more detailed concepts of employment (CONEMP). Accordingly, there was no consistency or uniformity in training approaches by

40. AFDP 1, *The Air Force*, March 10, 2021, https://www.doctrine.af.mil/.

theater or force type. Largely independent ACE-related materiel investments were occurring through MAJCOM and unit-level spending rather than as a coordinated activity across the Air Force. That was in part a reflection of the fact that there did not yet exist formal materiel solution requirements that could inform the annual Project Objective Memorandum (POM) process. There were several other change initiatives occurring across the Air Force that would impact and be impacted by a formalized approach to ACE.[41] Overall, ACE could broadly be characterized at that time as being "pre-IOC."

Against this backdrop, the working group established our concrete objective as guiding ACE toward *combat credibility* by providing a roadmap for the evolution of ACE-capable forces and capabilities effective across the spectrum of deterrence and conflict.

While there is no doctrinal definition of combat credibility, we framed it in terms of getting to the point that a Joint Force Air Component Commander (JFACC) could use the approach to improve airpower survivability and resilience in support of a real-world flexible deterrent option (FDO) or flexible response option (FRO), or to set the theater for operations plan (OPLAN) execution. To meet this overarching criterion would require:

- codifying ACE into a repeatable and understandable process;
- organizing, training, and equipping forces to conduct ACE worldwide;
- preparing theaters with appropriate equipment, assets, and host-nation agreements; and
- achieving robust integration and interoperability with joint and combined forces.

We sought to achieve the envisioned combat credibility through integrated materiel and non-materiel solution approaches, which were yet to be defined at this point in 2021.

Insight 2: Establish Connective Tissue with Relevant Concurrent Efforts

Over the course of the formal development of ACE, there were numerous other activities ongoing that focused on evolving some aspect of the presentation and application of airpower, as listed in table 2 below.

41. Sandeep Mulgund, "Driving Change in the Presentation and Employment of Airpower," *Wild Blue Yonder*, February 3, 2023, https://www.airuniversity.af.edu/.

Table 2. ACE-intersecting Air Force efforts (approx. 2019–2024)

Activity	Description	Relationship to ACE
AFFORGEN	Air Force's new model for presenting forces to joint force commanders (JFC), intending to enable operational preparedness and readiness through a predictable and sustainable force offering.	AFFORGEN cycle provides a framework for incorporating progressively demanding ACE elements into training and exercise events. ACE maneuver becomes a requirement for AFFORGEN force elements.
Mission command	Airman's philosophy for the command and control (C2) of airpower.[42] Mission command empowers subordinate decision-making for flexibility, initiative, and responsiveness in accomplishing commander's intent.	Doctrinal construct for centralized command, distributed control, and decentralized execution emphasizes delegation of planning and coordination activities to dispersed locations or subordinate echelons as required in ACE.
Wing A-staff	Facilitate joint integration of Air Force units through standing A-staffs that are ready to support commanders before crises occur.[43]	Requirements to support ACE maneuver become a focal point for A-Staff activities during distributed operations.
Integrated by design	Expand cooperation with allies and partners in defining threats, sharing information, and using airpower.[44]	Effective ACE interoperability with allies and partners requires deliberate attention to effective integration.
Ready Airman Training (RAT)	Foundational training for all Airmen to ensure they have skillsets to survive and operate during contingencies at home station and in deployed environments.[45]	RAT construct for MRA develops skills required to operate effectively in austere forward operating locations with light-footprint teams.
Secretary of the Air Force (SecAF) Operational Imperatives	Critical capabilities and functions in which the Department of the Air Force must invest to protect the United States' ability to deter conflict and project power.[46]	Operational Imperative #5 on resilient basing drove investment priorities to improve survivability of forward operating locations.
Operations in the information environment	Establish how to lead with information in operational planning, execution, and assessment to shape attitudes, perceptions, and behaviors of relevant actors in the operating environment.[47]	Drove an ACE line of effort to establish how to use information effectively to support friendly force objectives through overt messaging, deception, and deliberate concealment.

42. AFDP-1, *The Air Force*, 12.

43. Christopher Auger and Joseph Witherspoon, "Why the A-Staff," *Wild Blue Yonder*, June 1, 2023, https://www.airuniversity.af.edu/.

44. Air Force Chief Touts 'Integrated by Design' as Competitive Edge," *Fedweek*, July 28, 2022, https://www.fedweek.com/

45. Secretary of the Air Force Public Affairs, "Air Force Introduces New, Foundational Ready Airman Training Program," October 3, 2022, https://www.af.mil/.

46. "Operational Imperatives," Department of the Air Force," 1, https://www.af.mil/.

47. Sandeep Mulgund and Mark D. Kelly, "Command and Control of Operations in the Information Environment," *Air and Space Power Journal* 34, no. 4 (2020): 15, https://www.airuniversity.af.edu/.

While each of these efforts had a specific motivation, focus, and timeline, they could easily blur in the eye of the beholder, especially for those far removed from the Pentagon. Questions such as "how does this fit into AFFORGEN? Isn't this the same thing as Ready Airman Training?" would frequently arise. Accordingly, the ACE team made a concerted effort to articulate how these efforts related to and relied upon one another and where the boundaries lay. They were each a part of the ongoing evolution of airpower. Understanding the relationships between efforts did not relieve the workload of implementing multiple new requirements near-simultaneously, but it did help to bring clarity as to their purpose.

Insight 3: Engage Stakeholder Organizations Spanning DOTMLPF-P Equities Regularly

In both developing the TASKORD and then educating the force on its implementation, proactive engagement with stakeholders worldwide was crucial. Given the scope and complexity of the material, disseminating the order electronically and conducting quarterly reviews would not suffice.

There were two dimensions to the need for stakeholder engagement: first, synthesizing the perspectives from multiple echelons of any military organization, and second, ensuring that the ensemble of organizations spanned DOTMLPF-P perspectives and equities. It was the synthesis of these vantage points that enabled effectively framing ACE combat credibility and developing a roadmap for achieving it.

On the first point, it became apparent quickly that there were distinct perspectives to be gained from continued engagement at different levels across the Air Force:

- MAJCOM leadership (commander, DCOM, A-Code directors) provides a strategic perspective on how ACE fits into their overall priorities amid guidance from applicable combatant commands.
- MAJCOM staff (colonel and below) had a picture on overall ongoing activities such as exercise plans and new capability rollouts.
- Unit-level personnel (wing and squadron) offered the "in the trenches" perspective on what it would take to make ACE work in practice, what they'd already learned, and what assistance (authorities, resources, manning, etc.) they needed from higher headquarters.

Engaging at each of these levels deliberately aided in assembling a comprehensive picture of the challenges involved in bringing ACE to life.

The second key aspect was to ensure that the guidance encompassed the full range of perspectives spanning DOTMLPF-P concerns. For example, op-

erators, educators, technologists, and budget planners often have complementary points of view. The record here is somewhat mixed.

The Air Force operational and training/education communities were well represented in the worldwide ACE working group. Engagement with them was at a high tempo throughout. The materiel solution R&D and acquisition community was a part of the group as well, but the engagement operations tempo or "revisit rate" with them was not as high as with the operational side of the Air Force. While there were a variety of bottom-up Airman-driven innovation activities occurring across the Air Force, their effects tended to be localized due to limited awareness outside the immediate organization. More deliberate exploration of promising technical innovation activities would have been beneficial to identify opportunities for wider adoption and potential injection into formal acquisition mechanisms. Similarly, greater deliberate engagement with industry would have been beneficial to communicate ACE needs and better understand the range of available solutions to address them.

A valuable but potentially overlooked resource in such efforts is the Air Force analytic community, which can leverage modeling and simulation tools to provide some perspective on issues to consider in concept implementation and resourcing. The Secretary of the Air Force's Studies and Analysis (SAF/SA) organization conducted several studies that intersected with requirements for ACE, SecAF Operational Imperatives for resilient basing, and the general topic of sortie generation under attack.[48] The results of those analyses were valuable in understanding the potential benefits of ACE by itself as compared to ACE along with other passive and active measures for improving airpower resilience and survivability.

Insight 4: Focus on the Intersection of Multiple Mission Requirements, Not Their Aggregate

An early question in the development of the TASKORD was how to bound and scope enterprise-level criteria for achieving ACE combat credibility. It was necessary to find a balance between being too vague (and thus not actionable) and too specific, which could be inapplicable in many circumstances and throttle innovation. To address this question, we made use of the construct of *coupling* from the field of systems engineering. A loosely coupled system is one where components are not highly dependent on one another, and changing one only minimally impacts another with which it interacts. Conversely, in tightly coupled systems a change in one component causes a

48. *Air Force Future Operating Concept Summary*, March 6, 2023, https://www.af.mil/.

ripple effect of changes in others. Loosely coupled systems allow for modularity in design.

Figure 10 illustrates this concept in action in Venn diagram form. ACE spans combat air forces (CAF), mobility air forces (MAF), special operations forces (SOF), and strategic bomber forces (SBF). A tightly coupled approach would look at the *union*—the entire aggregate—of their respective requirements. This would become an unwieldy problem to solve, as there would likely be no single answer for some specific ACE functional criterion that would be equally valid for all of CAF, MAF, SOF, and SBF.

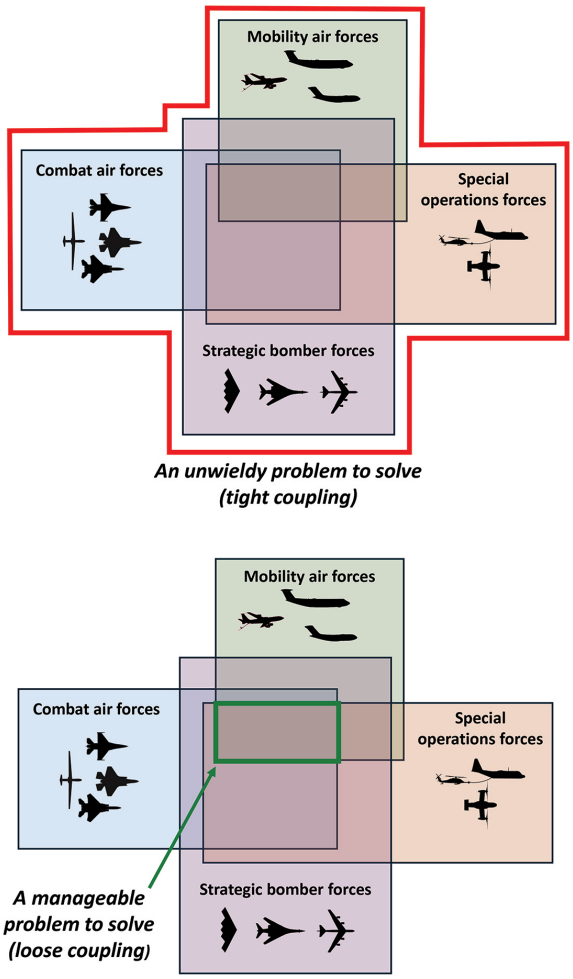


Fig. 10. The intersection rather than union of requirements

Instead, a loosely coupled approach is shown at the bottom of the figure. Here, the focus is on addressing what is *common* to all of CAF, MAF, SOF, and SBF: the *intersection* of their Venn diagram bubbles. This is a much more manageable problem to address. As the number of perspectives (Venn diagram bubbles) grows, their mutual intersection tends to shrink. Anchored in the minimally necessary commonality, it provides each of the respective communities with freedom of maneuver to define their mission-specific, threat-centered requirements, overlapping with others only to the extent needed. It also allows each community or theater to adapt their approaches based on better understanding of the threat and the practicalities associated with conducting ACE maneuver gleaned through discovery learning.

The starting point for discussions with each of these communities was to understand the following:

- Current operational challenges
- The relevance and focus of ACE in the context of those challenges
- Circumstances under which they would see a need for proactive or reactive maneuver
- What such maneuver looks like for their forces
- The potential obstacles for success

Continuing exercises provided the opportunity to explore these questions and to flesh out the touchpoints between Venn diagram bubbles. For example, Agile Flag 22-2 (figure 11) served as a certification event for the 23rd Wing at Moody Air Force Base (AFB). An Air Force Special Operations Command (AFSOC) Mission Sustainment Team (MST) deployed to Moody during the exercise to support forward operating site activities. The MST's involvement provided the opportunity to discuss how CAF and SOF can support and leverage one another when conducting ACE.

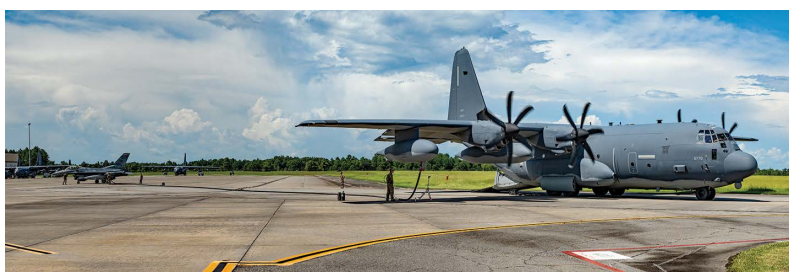


Fig. 11. Forward arming and refueling point operations at Moody AFB during Agile Flag 22-2. (USAF photo by Dr. Sandeep Mulgund)

Insight 5: Use Doctrinal Joint Functions as an Organizing Framework to Provide Qualitative Guidance

Having zeroed in on an approach to focus enterprise-wide ACE guidance on the intersection of CAF, MAF, SOF, and SBF perspectives, the next question was how to express the guidance in an actionable, concrete way.

To promote a common lexicon with the rest of the joint force, the TASKORD expressed common ACE requirements in terms of doctrinal *joint functions*,[49] which are groupings of capabilities and activities that enable JFCs to synchronize, integrate, and direct joint operations. Air Force doctrine had previously adopted this framework in a publication on joint all-domain operations, now incorporated into overall operations doctrine.[50]

Based on AOiCE, the ACE TASKORD added *posture and preparation* as a new function given the importance of plans, agreements, and pre-positioned materiel. Overall ACE-related requirements for each function were as follows:

- **Posture and preparation**: Plans, agreements, and pre-positioned equipment and supplies that enable effective distribution of forces.
- **Movement and maneuver**: Execution of proactive and reactive maneuver within timelines that meet joint force commander requirements for generation and employment of airpower.
- **Command and control**: Execute C2 through the tenets of centralized command, distributed control, and decentralized execution.[51]
- **Fires**: Synchronize and mass all-domain fires from potentially dispersed operating locations.
- **Information**: Integrate and synchronize all information capabilities to enhance mission effectiveness by revealing capabilities that can deny adversary benefits or punish aggression, concealing or obscuring aspects that provide perishable advantage, or suggesting elements to mislead adversaries.
- **Intelligence**: Provide commanders with current, time-sensitive, critical information needed to make maneuver-related risk assessments and decisions.
- **Protection**: Ensure the ability to operate in and through contested environments using a combination of active and passive defensive measures.
- **Sustainment**: Provide robust, resilient, and responsive logistics and infrastructure support for airpower generation that can withstand an adver-

49. JP 3-0, *Joint Campaigns and Operations*, June 18, 2022, III-1.
50. AFDP 3-0, *Operations*.
51. AFDP 1-1, *Mission Command*, 1.

sary's disruption strategy. This may include both pre-positioned materiel and delivery of materiel under fire.[52]

Additional details in the TASKORD amplified these overall requirements in relation to AOiCE and emerging MAJCOM ACE CONOPs. The language was shaped deliberately to apply equally to all facets of airpower but allowing for greater amplification and prioritization at individual MAJCOM levels. A side benefit of using joint functions as the organizing framework was that it introduced joint lexicon to more junior Airmen less familiar with it, which would pay dividends as they progress in their careers.

ACE requirements in the TASKORD for each of the joint functions were deliberately *qualitative* in nature to characterize the common elements of ACE for all facets of airpower, deferring *quantitative* details to the MAJCOMs and subordinate levels. As an example, the requirement for the movement and maneuver function laid out overall principles for both proactive and reactive maneuver, but it did not specify how many dispersal locations to use, for how long, and in support of how many aircraft simultaneously. Any single set of numbers would not apply to all elements of airpower at all potential global operating locations in all circumstances. The enterprise-level guidance thus focused on core concepts and governing principles without specifying numbers.

This delineation of qualitative and quantitative elements seems obvious in hindsight, but initial development with the TASKORD did explore quantitative parameters for consideration. They quickly proved unworkable, and the team recognized the value of separating foundational principles from specific numbers. The TASKORD directed individual MAJCOMs to determine what quantitative specifics would make sense for their own theater or force type and then to train and seek resourcing to those levels as required. This approach provided necessary commonality—the qualitative core principles—without tying the hands of operators in the field or forcing a top-down, one-size-fits-all solution. It also gave MAJCOMs and subordinate elements the flexibility to adjust their requirements as they improved proficiency and better understood the considerations limiting execution. A key consideration there was to account for just how much ACE training would be feasible in a typical two-to-three-year duty assignment.

Insight 6: Separate Tactical Execution from Operational Orchestration

ACE drives challenges and opportunities related to both tactical proficiency and operational art. Tactical ACE execution pertains to generating airpower

52. Korey Lantes, "REFORPAC's Pacific Playbook: Survive, Surge, Sustain, and Synchronize to Win," *Journal of the Air Force Historical Foundation* 72, no. 3 (2025): 10–11.

from a single base cluster—a main operating base and associated dispersal sites—to meet JFACC tasking requirements. It is the domain of executing force elements. By contrast, the operational level is the concern of the JFACC, the AOC, and staff at an air component. It pertains to orchestrating or synchronizing the use of multiple base clusters in a theater in support of overall JFC requirements. They are certainly related: Operational requirements drive tactical execution, and tactical realities place limits on what is operationally achievable. But the activities, timelines, and skillsets involved are different.

Recognizing this distinction, the ACE TASKORD and subsequent guidance delineated between objectives and criteria applicable at tactical (force element) and operational (theater/air component) levels. As an example, a force element requirement for the C2 joint function is to establish and operate a wing operations center to synchronize with the theater AOC; at the operational level, the corresponding theme is to establish and execute an integrated battle rhythm across the MOB, FOSs, and contingency locations in use. It requires building an integrated picture of the operating environment from multiple units who may be dispersed or disaggregated. The perspective, aperture, tasks, capabilities, time horizon, and skills required are different.

This distinction proved useful for developing exercise desired learning objectives (DLO). Force element training aligned with the AFFORGEN cycle would focus on tactical execution, while those for the AOC could focus on operational employment. They were somewhat decoupled so that, for example, command post exercises without a live-fly component could focus on AOC activities needed to plan and enable ACE maneuver. Wing-level exercise DLOs could address just those issues related to executing proactive and reactive maneuver within an overall hypothetical operational scenario. Large-scale MAJCOM-wide, joint, or combined force exercises would bring them together in a coordinated way. This deliberate separation also helped to make it clear what kind of training and enabling materiel capabilities were needed at each level.

An area that we overlooked in this regard was in the interface between operational and tactical and in the nuances of Air Force command relationships. Air Force doctrine generically refers to the "air component commander" as the person who may wear three or more "hats" in the execution of their duties:[53]

- The Commander of Air Force Forces (COMAFFOR), with the responsibility to organize, train, and equip assigned and attached forces to support the JFC's operational requirements
- The JFACC, responsible for leading joint air operations for the JFC

53. AFDP 3-0, *Operations*, 27–28.

- The Area Air Defense Commander (AADC), responsible for defensive counterair (DCA) operations, to include the IAMD system for the joint operations area

The ACE effort was largely centered on teasing out requirements for the JFACC lane. There was comparatively less effort on framing the role that the COMAFFOR staff may play in ensuring the ability to sustain ACE activity over time and what considerations come into play for forces that are supporting DCA requirements while conducting ACE. There was little attention given to what role numbered air force (NAF) leadership and staff would play in supporting ACE, particularly when at an echelon below the overall air component. For any new operating concept, all these perspectives and dimensions should come together within an overall framework of mission command, and it remains an area for further development with ACE.

Insight 7: Build Capability Through a Systematic Crawl/Walk/Run Approach

It was never expected that the progression from IOC to full operating capability (FOC) or objective combat credibility could occur overnight. The DOTMLPF-P impacts listed earlier in table 1 did not manifest simultaneously, and work continues to resource necessary materiel solutions, develop infrastructure and host-nation agreements, fund robust exercises, and build ACE-related tactical and operational proficiency. There were multiple layers to driving organizational learning and long-term improvement in ACE execution and employment:

- Build progressive training requirements into the AFFORGEN cycle.
- Increase exercise scope and complexity over time as best practices emerged and proliferated through successive events.
- Adapt the approach as understanding of what is necessary and achievable evolves.
- Measure progress across the enterprise.

AFFORGEN establishes a 24-month cycle divided into four, six-month phases as shown in figure 12. Airmen and units build readiness through the prepare and certify phases, deploy as required during the available phase, and then reintegrate and reconstitute during the reset phase.[54]

54. Secretary of the Air Force Public Affairs, "Airmen to See Changes in Deployment Cycles with AFFORGEN," June 27, 2023, https://www.af.mil/.

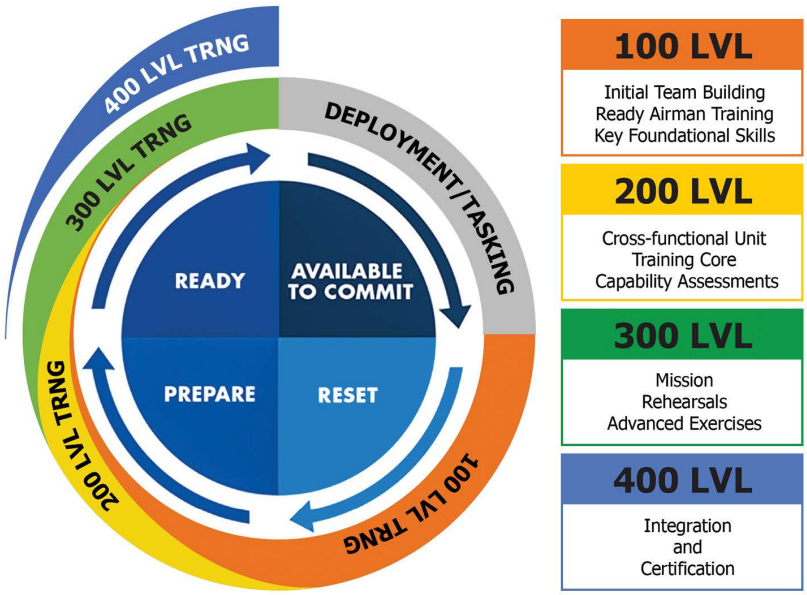


Fig. 12. Progressive training through the AFFORGEN cycle

ACE training guidance overlaid a 100–400 training model on this cycle, with 100-level training focusing on initial team building, progressing upward to high-fidelity integrated/joint training at the 400 level. ACE requirements for applicable units would build in complexity through this cycle, starting off with individual Ready Airman Training requirements, working toward theater-wide events at the 400 level where possible. This provided a structured approach for building competence and confidence within the time horizon of a single AFFORGEN cycle.

A longer-term effort was to increase the fidelity and scope of higher-level training events overall through increasingly demanding and *combat-representative* scenarios.[55] Earlier ACE events in 2020 and 2021 had limited emphasis on pivoting from proactive/reactive maneuver into air tasking order execution and synchronized delivery of fires; they focused primarily on building fundamental ACE skills in basic tactical scenarios. This changed over time, through a deliberate feedback loop of

- organizational learning and improved proficiency in units that had already conducted ACE exercises and were ready to increase scope and complexity;

55. 57th Wing Public Affairs, "Bamboo Eagle 25-3: Honing C2 Concepts Through Combat-Representative Scenarios," August 12, 2025, https://www.acc.af.mil/.

- establishing how to coordinate and integrate maneuver by participating CAF, MAF, SBF, or SOF elements;
- making exercise scenarios increasingly combat-representative, to account for the challenges that will arise in near-peer conflict;
- sharing lessons learned from exercises and real-world operations;
- developing and sharing best practices in tactics, techniques, and procedures (TTP);
- formal CONOP/CONEMP refinement to better define what proactive and reactive maneuver look like in practice, specifically in relation to the scope and duration of support required at alternate operating locations; and
- presenting technical innovation insights and opportunities for operational integration.

The 31st Fighter Wing's exercise Fighting Wyvern in 2023 (figure 13) exemplified this evolution, incorporating the synchronized maneuver of fighter, rescue, and air control and battle management assets across multiple locations in Italy, Slovenia, and Croatia.[56]

Fig. 13. F-16s and HH-60s returning to Aviano Air Base during Exercise Fighting Wyvern. (USAF photo by Dr. Sandeep Mulgund)

Exercises such as the Air National Guard's Maple Thunder (figure 14) and the ongoing Bamboo Eagle series have further increased the emphasis on using ACE as a building block for distributed operations and delivery of

56. Tad Clark and Sandeep Mulgund, "Advancing Airpower Agility," *Wild Blue Yonder*, September 5, 2025, https://www.airuniversity.af.edu/.

effects in combat-representative contested environments, in line with the aims of the JWC.[57]

The overall framework described here provided a methodical and accessible approach for unpacking ACE requirements and attacking them systematically: an overall vision for an operationalized, combat-credible capability placed in a broader context of airpower evolution, mission requirements expressed through core qualitative principles using doctrinal joint functions, and tactical execution distinguished from operational orchestration.

A key point we made to units tackling their first ACE exercises was that there was no expectation that they had to "eat the whole elephant" at once. We recommended choosing one or two key areas as cornerstones and building around them. Some units gravitated toward C2 as an initial focus area, while others addressed sustainment. We sought to capitalize on whatever energy was present in any unit with whom we engaged, using that as an entry point into the larger set of ACE objectives. From different starting points based on their organizational strengths and experience, through multiple training events, they worked toward the common ends established in the ACE TASKORD and subsequent guidance. Through successive events over time the MAJCOMs were better able to articulate concretely how ACE should look different by theater or force type and how they come together in larger-scale actions.

Fig. 14. Forward arming and refueling point operations at Exercise Maple Thunder, 2024. (USAF photo by Dr. Sandeep Mulgund)

57. Richard Mekkri, "Vermont Airmen Test Agility During Multi-State Exercise," AirForce.mil, February 8, 2024, https://www.af.mil/; and Deb Henley, "Forging the Fight Together: Synchronizing Joint Operations in Bamboo Eagle 25-3," AirForce.mil, August 19, 2025, https://www.af.mil/.

Lastly, measuring long-term progress was key to understanding the extent to which we were "moving the needle" on ACE. The ACE governance structure provided a mechanism for reporting and assessing progress (or lack thereof) in each of the TASKORD's LOEs. Using a systematic scale, each LOE lead provided regular updates to MAJCOM DCOMs on progress assessed as

- no plan or plan off-track,
- plan under development but not yet in execution,
- plan execution under way and on track, or
- objectives achieved.

Illuminating challenges inhibiting progress enabled the DCOMs to provide advocacy, issue guidance, or take other actions needed to overcome obstacles.

Insight 8: Drive Joint/Combined Integration Through Proactive Collaboration and Experimentation

Two key dimensions of collaboration and engagement outside of the Air Force were with the rest of the joint force and with the air forces of allied and partner nations. Over the course of the formal ACE TASKORD effort, there was more of the latter than the former, illuminating an area for attention and prioritization in such efforts.

Within the joint force, it is the Joint Staff at the Pentagon that develops concepts and doctrines for how forces will operate together. That does not preclude services working together directly to explore common interests. While the Air Force was pursuing ACE, the Army was developing its approach to multidomain operations (MDO),[58] the Navy was tackling distributed maritime operations (DMO),[59] and the Marine Corps was exploring expeditionary advanced base operations (EABO).[60] All four approaches have similar themes related to operations in contested environments.[61] Eventually they must coexist within overall approaches such as the JWC and require an overall joint approach to C2 at the combatant commander level. Air Force engagement with the rest of the joint force on ACE developed slowly over time, particularly as respective concepts and approaches became more concrete. Some informal cross-pollination did occur, but more deliberate engagement earlier in the effort would have been

58. Army Field Manual 3-0, *Operations*, October 1, 2022, 2, https://armypubs.army.mil/.

59. Congressional Reports Service, "Defense Primer: Navy Distributed Maritime Operations (DMO) Concept," US Naval Institute, November 20, 2024, https://news.usni.org/.

60. Walsh and Huber, "Symphony of Capabilities," 7.

61. Sandeep Mulgund, "Mission Command and the Joint Warfighting Concept," *Modern War Journal*, no. 1 (Spring 2025): 3–7, https://mwi.westpoint.edu/.

advantageous to establish common vernacular and tackle joint integration perspectives sooner.

An area that remains ripe for further development and experimentation is the role that ACE will play in *operational art* within overall joint operational constructs as envisioned by the JWC. Operational art is the approach by commanders and staffs to develop strategies, campaigns, and operations to organize and employ forces through the integration of ends, ways, means, and risks.[62] It is the planning, preparation, synchronization, and sustainment of tactical activity over an extended period of time, a large geographic expanse, or both.[63] Examination of ACE and the other service concepts together suggests that the operational art for joint operations against peer adversaries in contested environments will call for multiple dimensions of integration and synchronization of forces, actions, and effects within a framework of *pulsed operations*.[64]

- Coordinate stand-in forces operating inside a contested environment with stand-off forces delivering fires from a distance.
- Coordinate theater-assigned forces with globally managed forces such as those for strategic airlift, strategic bombing, space operations, or cyberspace operations.
- Use joint force packages consisting of traditionally manned platforms, remotely controlled unmanned platforms, and increasingly autonomous systems.
- Distribute or disperse forces for increased survivability and resilience combined with massing of effects (but not necessarily massing of forces).
- Generate combat power from austere operating locations.
- Ensure the sustainment apparatus can meet the requirements of current and future pulses in a contested environment.

Emerging tactical and operational practices for ACE are directly relevant to such constructs for operations. As just one example of joint integration and resource allocation challenges, intra-theater airlift will be at a premium in any conflict scenario with a near-peer adversary. Those assets will be in high demand, supporting the needs of the entire joint force as described above, not just those for ACE maneuver. Similar considerations apply for allocation and distribution of consumables such as fuel. When it comes to C2, should dispersal of air and maritime forces occur "in phase" (that is, at the same time with the same velocity) or out of phase, so that, for example, air forces recover and regenerate while maritime forces press forward for the next pulse? Who directs it? The

62. JP 3-0, *Operations*, II-3.
63. B. A. Friedman, *On Operations* (Naval Institute Press, 2021), 5.
64. Mulgund, "Mission Command and the Joint Warfighting Concept," 9.

answers will depend on a myriad of factors that require systematic, collaborative, in-depth analysis and planning. Concepts for distributed operations encompass not just maneuvering force elements but C2 approaches as well. Just as dispersing forces reduces the risk from a single debilitating strike at a main operating base, disaggregating the capabilities, personnel, and functions that enable C2 can make it more resilient as well. Events such as Project Convergence and Bamboo Eagle have enabled exploration of such joint integration challenges in distributed operations, but there is much more to do.[65] The experience with ACE provides a starting point for the reexamination of airpower and operational art and an entry point for interservice dialogue.

Collaboration on ACE was and remains extensive with allied/partner air forces. Regular interactions between the USAF and its counterparts in other nations provided venues for discussion and conceptual exploration. The exchange of insights was very much two-way. While the USAF was pursuing ACE, the French Air and Space Force was developing their operational concept for MORANE, which called for rapid implementation to deploy and operate quickly with a small logistical footprint. Events such as Atlantic Trident have enabled exploration of mutual best practices with the USAF.[66] Exercises such as Mobility Guardian '23 (figure 15) enabled experimentation and dialogue with both NATO and Pacific allies on ACE approaches.[67]

Fig. 15. French, Canadian, and UK aircraft at Andersen AFB, Guam, for Mobility Guardian '23. (USAF photo by Dr. Sandeep Mulgund)

In 2023, the USAF and the UK's Royal Air Force signed a combined vision statement on ACE to better establish how to take a collaborative approach

65. Jen Judson, "Project Convergence to Plant a Flag in the Pacific," DefenseNews, October 14, 2024, https://www.defensenews.com/.

66. Michael Hardy and Andrew Stephens, "US Air Force Concludes Participation in Multinational Atlantic Trident 2023 Exercise," AirForce.mil, November 16, 2023, https://www.af.mil/.

67. Air Mobility Command Public Affairs, "AMC's Largest Global Exercise Proves Success in Indo-Pacific Theater," AirForce.mil, July 24, 2023, https://www.af.mil/.

for agile combined airpower.[68] The UK/US Agile Shield exercise a year later (figure 16) enabled exploration of interoperability challenges and opportunities when operating from dispersed locations around the UK, particularly from those not typically used for fast-jet operations.[69]

Fig. 16. Eurofighter Typhoons from RAF Coningsby at RAF Cranwell during Agile Shield, September 2024. (USAF Photo by Dr. Sandeep Mulgund)

In 2024, HAF hosted an ACE interoperability and integration conference with seven allies and partners to share national perspectives on how best to use ACE-like concepts for improving airpower survivability and resilience.[70] The discussion explored issues related to ACE interoperability across all aspects of DOTMLPF-P. Key differences in perspectives related to the use of ACE for airpower survivability within a nation's sovereign borders vs. power projection beyond those borders, regionally or globally. Building on insights from these collaborative efforts and others, the USAF has contributed ideas to NATO's alliance-level ACE concept as well.[71] New NATO members Sweden and Finland have shared their insights on airpower agility with the USAF during ongoing combined force exercises.

An interesting area for further development with allies and partners will be how ACE integrates with other ideas for combined force airpower. One concept under exploration is how to assemble an effective combined force from the capabilities of different nations whose contributions may vary in terms of quantitative capacity and qualitative capability. The thesis is that the aggregate effectiveness of

68. Secretary of the Air Force Public Affairs, "US Air Force, RAF Leaders Sign Combined Vision Statement on Agile Combat Employment," AirForce.mil, September 12, 2023. https://www.af.mil/.

69. Emili Koonce, "UK, US Air Forces Strengthen Interoperability at ACE Exercise Agile Shield," Royal Air Force Lakenheath, https://www.lakenheath.af.mil/.

70. Adam R. Shanks, "Air Force Holds Multinational ACE Conference," AirForce.mil, February 28, 2024, https://www.af.mil/.

71. "NATO Further Advances on ACE Deployment Concept," NATO, April 19, 202, https://ac.nato.int/.

combined force airpower will derive from a combination of high-end scarce or exquisite capabilities reinforced with affordable lower-end mass at scale operating from locations that provide effective reach, resilience, and flexibility.[72] This will be reflective of physical assets and skilled personnel, as well as of the advantages deriving from geography, access, capacity, and political will. It does not require that all cooperating air forces field fifth-generation capabilities such as the F-35; instead, it may entail nations specializing to integrate high- and low-end capabilities with the depth and mass to credibly deter, and if required, defeat diverse threats. Such a "high-low" mix provides top-end capabilities for the most challenging missions while providing the mass needed to sustain ongoing commitments. Combining this idea with ACE, it could entail

- larger air forces providing comprehensive capabilities for long-range strike, fighter assets, inter- and intra-theater airlift, and others, as well as several large MOBs further away from primary threats;
- mid-sized air forces contributing fighter forces, intra-theater airlift, and quick-response SOF; and
- smaller air forces offering well-placed small-footprint operating locations with basic infrastructure to support sortie generation, rescue assets, and ground-based surveillance capabilities, and low-cost asymmetric attack capabilities such as one-way attack drones.

An effective approach to combined force ACE will leverage what each participant can offer in terms of mass, agility, sustainment, and geographic advantage.

Insight 9: Figure Out the Bill

Most new operating concepts come with a bill, whether for materiel solution requirements, supporting infrastructure, realistic team exercises, or individual training. At the outset, those requirements may be ambiguous, as it is not clear what success looks like yet (and thus, what it will cost). But as those contours come into focus, it is valuable to start engaging the Planning, Programming, Budgeting, and Execution (PPBE) community to articulate resource/budget needs in the years to come. Eventually there will be a need to develop POM inputs to inform the Future Years Defense Program. The POM process is competitive, and not all requirements will be funded, no matter how important or critical they seem to the proponents of the new concept. Accordingly, it is valuable to understand how to maximize chances for success

72. James B. Hecker, "Air Superiority: A Renewed Vision," *Aether: A Journal of Strategic Airpower and Spacepower* 3, no. 2 (2024): 9, https://www.airuniversity.af.edu/.

and to orient POM inputs as best as possible. Otherwise, the concept runs the risk of becoming another unfunded mandate and falling short of the vision.

Early in the ACE effort, MAJCOMs funded their materiel (e.g., infrastructure, communications equipment, consumables) and non-materiel (e.g., individual training, exercises) ACE requirements largely through existing budgets. As discussed earlier, there were a variety of Airman-driven innovation activities to tackle unit-specific challenges. ACE was a "bolt-on" to existing exercises, generally within previously established operations and maintenance budgets for such events. There was therefore no clear USAF-wide picture of the "cost of doing business" using ACE. This was not a sustainable approach long-term, driving the development of ACE-related inputs for the POM process as the effort proceeded. Those efforts were coordinated with the SecAF's Operational Imperative on resilient basing. It generated roughly $5B of investments to purchase base support, runway repair, communications, and military construction to help to set the theater (the first step in figure 1 presented earlier) in the Indo-Pacific theater in fiscal year 2024 through 2027 POMs. This remains only one step in fully resourcing ACE requirements globally, efforts that are continuing. A more proactive approach enacted sooner would have been beneficial to create a clearer picture of the level of resourcing required to fully realize the ACE vision and to start making it part of the budget baseline as part of the cost of generating airpower.

Insight 10: Be Deliberate About Taking Risks

A tenet of Air Force mission command doctrine is to accept prudent risk.[73] Informed risk-taking creates opportunities for advantage. Doctrine encourages commanders to analyze risks in collaboration with subordinates to balance the tensions between force protection and accepting and managing risks inherent in mission accomplishment. It is further recognized that risk tolerance is derivative of competence; the ability to assess and mitigate risk increases through mentoring, education, training, and practical experience. As risk can vary at each echelon of command, it is important for commanders to accurately communicate what constitutes risk at their level. Open communication is key.

This advice would have been beneficial to incorporate into the introduction of ACE to the broader force in the first place. ACE entails new ways of generating airpower, including but not limited to activities such as the following.

- Hot pit refueling (that is, refueling a jet whose engines are running) on aircraft for which it is not standard practice

73. AFDP 1-1, *Mission Command*, 9.

- Airmen conducting airfield tasks outside of their core specialty area, especially those related to handling of petroleum, oil, and lubricants (POL) and munitions
- Generating airpower with a much smaller team than usual
- Operating from unfamiliar airfields with less advance planning than might typically be the case
- Dispersing aircraft, equipment, and personnel from airfields that may come under attack

Unfamiliarity can create a sense of risk, particularly if there is uncertainty as to whether a new way of operating may conflict with existing regulations. During collaboration with the RAF on ACE, their then–Air and Space Forces commander expressed the sentiment that he wanted his aviators to "be comfortable with being uncomfortable." It would have been advantageous to embrace this mindset early on ourselves, to accelerate finding a way to "get to yes" when such issues arose. Early dialogue with applicable stakeholders and the keepers of relevant Air Force policies would have helped establish a conscious path forward. Eventually this did happen in most cases. Policy updates enabled delegating authorities to lower-level commanders to make decisions related to airfield operations more typically made at higher headquarters. Regardless, a more proactive approach with reinforcement of messaging by commanders at all levels could have accelerated the process of becoming comfortable with being uncomfortable to create opportunities for operational advantage. It is a consideration that will apply to the practical experimentation required for most (if not all) new operating concepts.

Insight 11: Enable Institutional Memory Through Emerging Doctrine

Finally, one area for discussion is often overlooked amid the rapid pace of efforts such as ACE is that of doctrine and long-term knowledge capture. In any military organization it is the norm that projects come and go, lessons learned are filed away after exercises end, staff rotate to new duty assignments, and new priorities emerge. Teams that were once operating in lockstep dissipate. A challenge in this environment is to build long-term institutional memory that will endure well after the people most identified with the effort have moved on.

Beneficially for this effort, the Air Force's Air Education and Training Command (AETC) was well represented and integrated into the global ACE working group. In the same timeframe when the TASKORD effort was launching, AETC's LeMay Center for Doctrine Development and Education initiated an

effort to prepare an initial doctrine note as a starting point for codifying ACE best practices.[74] Less detailed than full doctrine publications, doctrine notes provide an initial mechanism for capturing fundamental principles and guidance.[75] The initial ACE doctrine note was an effective tool for getting the word out broadly and accessibly.

Any doctrine preparation effort must determine how to balance too much vs. too little detail. Too much detail can become overly prescriptive, brittle, and communicate too much to potential adversaries. Conversely, too little detail provides minimal educational value beyond soundbites. This effort had the additional challenge that ACE terms and concepts were very much in flux, so any formal doctrine product could become quickly outdated. The initial revision of the doctrine note published in 2021 sought to balance these tensions, deferring force and theater-related details to MAJCOM-specific CONOPs and CONEMPs. It was updated less than a year later to capture further evolution of concepts and terminology. Earlier this year, a revision to primary Air Force doctrine on operations incorporated content on ACE, weaving it into a wider discussion on air operations.[76]

74. AFDN 1-21, *Agile Combat Employment*, 1.

75. Chairman of the Joint Chiefs of Staff Instruction 5120.02F, *Joint Doctrine System*, May 31, 2023, GL-3, https://www.jcs.mil/.

76. AFDP 3-0, *Operations*.

The Way Ahead

The global ACE working group disbanded in late 2024, having reached the point that ACE was widely understood and detailed plans were in execution. Although ACE materiel and non-materiel requirements were not yet fully resourced, there was no longer a need for a separate ACE-specific team. The HAF and MAJCOMs could handle ongoing issues through regular staff processes for conducting Air Force business. The enterprise effort had introduced and promoted a more expeditionary mindset for the generation and employment of airpower in all its forms. ACE will continue to evolve as new capabilities come online, new operating locations become available, and Airman-driven innovations demonstrate wider utility. Continuing large-scale events such as REFORPAC'25 are extending and improving ACE approaches.[77]

Just as constructs such as RAT provide a foundation for ACE, ACE will become one starting point for more comprehensive approaches to distributed operations in accordance with the JWC. Emerging technologies for autonomous systems, hypersonic weapons, directed energy, and others are likely to enable new operating concepts not yet envisioned.[78] As combined force "high-low mix" compositions come into focus, ACE will become just one aspect of how they operate together. Emerging threats in the global security landscape will motivate others. The insights discussed in this paper, which primarily have been about shaping, communicating, and implementing institutional change, can inform and accelerate such efforts to improve effectiveness of airpower against the wide range of threats and opportunities that the future operating environment will present.

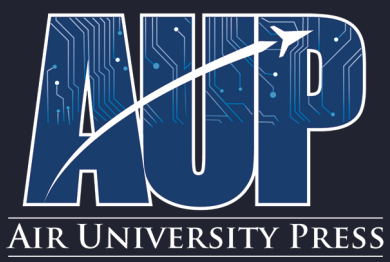
77. Pacific Air Forces Public Affairs, "REFORPAC 2025: US Air Force Executes Unprecedented Surge Into Pacific Theater," AirForce.mil, July 17, 2025, https://www.af.mil/.

78. Congressional Research Service, "Emerging Military Technologies: Background and Issues for Congress," CRS Report R46458, February 22, 2024. https://www.congress.gov/.

Abbreviations

AADC	area air defense commander
ACE	agile combat employment
AETC	Air Education and Training Command
AFB	Air Force Base
AFPD	Air Force Policy Directive
AFSOC	Air Force Special Operations Command
ALG	advanced landing ground
AOC	air operation center
AOiCE	Adaptive Operations in Contested Environment
CAF	combat air forces
COMAFFOR	Commander of Air Force Forces
CONEMP	concepts of employment
CONOP	concepts of operation
CSAF	Chief of Staff of the Air Force
DCA	defensive counterair
DCOM	Deputy Commander
DLO	desired learning objectives
EABO	expeditionary advanced base operations
ELS	emergency landing strips
FDO	flexible deterrent option
FOC	full operating capability
FOS	forward operating sites
FRO	flexible response option
HAF	Headquarters Air Force
HQE	Highly Qualified Expert
IAMD	integrated air and missile defense
IOC	initial operating capability
JFACC	Joint Force Air Component Commander
JFC	joint force commanders
JWC	Joint Warfighting Concept
LOE	lines of effort
MAF	mobility air forces
MAJCOM	major commands
MOB	main operating bases
MRA	mission-ready Airmen

MST	mission sustainment team
NAF	numbered air force
NDS	National Defense Strategy
OAI	operations, activities, and investments
OPLAN	operations plan
PACAF	Pacific Air Forces
POL	petroleum, oil, and lubricants
POM	Project Objective Memorandum
PPBE	Planning, Programming, Budgeting, and Execution
RAF	Royal Air Force
R&R	refueling and rearming
RAT	Ready Airman Training
SBF	strategic bomber forces
SecAF	Secretary of the Air Force
SOF	Special Operations forces
TAD	tactical air depot
TASKORD	tasking order
USAF	US Air Force



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