
Senior Leader Perspective

A Rebalance Strategy for Pacific Air Forces | 6 Flight Plan to Runways and Relationships

Brig Gen Steven L. Basham, USAF
Maj Nelson D. Rouleau, USAF

Feature

Operationalizing Air-Sea Battle in the Pacific | 20

Maj William H. Ballard, USAF
Col Mark C. Harysch, USAF, Retired
Col Kevin J. Cole, USAF, Retired
Byron S. Hall

Departments

48 | Views

Pacific Air Forces' Power Projection | 48 Sustaining Peace, Prosperity, and Freedom

Lt Col David A. Williamson, USAF

Back to the Future | 61

Integrated Air and Missile Defense in the Pacific

Kenneth R. Dorner
Maj William B. Hartman, USAF
Maj Jason M. Teague, USAF

To Enable and Sustain | 79

Pacific Air Forces' Theater Security Cooperation as a Line of Operation

Lt Col Jeffrey B. Warner, USAF

Empowered Commanders | 99

The Cornerstone to Agile, Flexible Command and Control

Maj Eric Theriault, USAF

Resilient Airmen | 112

Pacific Air Forces' Critical Enabler

Maj Cody G. Gravitt, USAF

Capt Greg Long, USAF

Command Chief Harold L. Hutchison, USAF

131 | Commentary

Leading Millennials | 131

An Approach That Works

Col S. Clinton Hinote, USAF

Col Timothy J. Sundvall, USAF

139 | Ricochets & Replies

A Global Space Control Strategy | 139

Theresa Hitchens, Former Director, United Nations Institute for Disarmament Research

141 | Book Reviews

The Human Factors of Fratricide	141
Laura A. Rafferty, Neville A. Stanton, and Guy H. Walker	
Reviewer: Nathan Albright	
Digital Apollo: Human and Machine in Spaceflight	143
David A. Mindell	
Reviewer: 2nd Lt Jessica Wong, USAF	
Lessons from the Hanoi Hilton: Six Characteristics of High-Performance Teams	146
Peter Fretwell and Taylor Baldwin Kiland	
Reviewer: 1st Lt Matthew Chapman, USAF	
Give Me Tomorrow: The Korean War's Greatest Untold Story— The Epic Stand of the Marines of George Company	147
Patrick K. O'Donnell	
Reviewer: Maj David Glenn Williams, USA	
Stalin's Eagles: An Illustrated Study of the Soviet Aces of World War II and Korea	150
Hans D. Seidl	
Reviewer: Capt J. Alexander Ippoliti, USAF	
Lost Eagles: One Man's Mission to Find Missing Airmen in Two World Wars	153
Blaine Pardoe	
Reviewer: Lt Col Christopher Parrish, USAF	

Internet Architecture and Innovation	155
Barbara van Schewick	
Reviewer: Capt Kyle B. Bressette, USAF	
MiG Killers: A Chronology of U.S. Air Victories in Vietnam, 1965–1973	157
Donald J. McCarthy Jr.	
Reviewer: Scott D. Murdock	

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The *Air and Space Power Journal* (ISSN 1554-2505), Air Force Recurring Publication 10-1, published electronically bimonthly, is the professional journal of the United States Air Force. It is designed to serve as an open forum for the presentation and stimulation of innovative thinking on military doctrine, strategy, force structure, readiness, and other matters of national defense. The views and opinions expressed or implied in the *Journal* are those of the authors and should not be construed as carrying the official sanction of the Department of Defense, Air Force, Air Education and Training Command, Air University, or other agencies or departments of the US government.

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Air and Space Power Journal
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Maxwell AFB AL 36112-6026

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A Rebalance Strategy for Pacific Air Forces

Flight Plan to Runways and Relationships

Brig Gen Steven L. Basham, USAF

Maj Nelson D. Rouleau, USAF



Even before Far East Air Forces formed on 31 July 1944, airpower had played a key role in securing America's interests in the Asia-Pacific. The nation's Pacific Air Forces (PACAF) not only sacrificed tens of thousands of lives in war and peace but also played a leading role in many major theater conflicts, supported multiple

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smaller-scale contingencies, and contributed to several large humanitarian-assistance and disaster-relief missions. PACAF, the modern successor of the Far East Air Forces, has established itself as a permanent, reliable partner fully engaged in regional security, stability, and prosperity. Without a doubt, 7 December 1941 proved that airpower is synonymous with national security, and PACAF is the primary wielder and guarantor of its application towards strategic objectives in US Pacific Command's (USPACOM) area of responsibility (AOR).

Guided by the propositions articulated in the *National Security Strategy*, the *National Defense Strategy*, and the *National Military Strategy*, we recognize that preventing a war in the Asia-Pacific is paramount to being prepared to win a war in the region.¹ In light of this reality, America's Airmen in the Asia-Pacific have thought hard about their contribution to America's regional rebalance. This article presents PACAF's strategy and contribution to the US rebalance by (1) examining the enduring and emerging challenges in the region, (2) exploring the five lines of operations that PACAF's Airmen are executing to contribute to the nation's rebalance, and (3) presenting the force posture and force modernization strategy the command is undertaking.

Enduring and Emerging Challenges in the Asia-Pacific

Without considering anything else, we note that the Asia-Pacific region's vast size and complexity require continued focus and attention. In addition to China, the world's most populous country; India, the most populous democracy; and Indonesia, a secular democracy, the Asia-Pacific contains over half the world's population. More than 1,000 languages are spoken in 36 nations spread across 52 percent of the earth's surface. Two of the three largest economies are located in the Asia-Pacific along with 10 of the 14 smallest.² More than one-third of Asia-Pacific nations are smaller island nations, including the smallest republic in the world and the most diminutive nation in Asia. The region spans 16 time zones and an international date line. In addition, natural disasters are a persistent, random, and unavoidable threat. These facts, combined



with emerging issues—particularly the shifting security environment—present the Asia-Pacific as a unique challenge for the United States.

The 2014 *Quadrennial Defense Review* flags the convergence of a rapidly changing security environment and the urgency to refine our defense efforts in a constrained budgetary environment.³ These concerns were in large part engendered by developments in the USPACOM AOR where significant changes have occurred over the past several years.

In 2009 the People's Republic of China (PRC) laid claim to 90 percent of the South China Sea based on what it refers to as the nine-dash-line map, first hand-drawn in 1947 and still not defined by precise coordinates.⁴ USPACOM continues to assert that maintaining stability in this area of overlapping claims and avoiding violence between the claimants will be crucial to the prosperity of the region.

Actions undertaken by the PRC over the past 18 months show a significant increase in operations and exercises, expansion of operational areas, increasing complexity and integration of functions, and improvement of the capabilities of the People's Liberation Army Air Force (PLAAF) that one might believe are aimed at supporting PRC efforts and strengthening its position on territorial claims. Over the past year, it appears that the People's Liberation Army Navy (PLAN) has been conducting extended out-of-area deployment to the Second Island Chain and throughout the South China and East China Seas. Concurrently, PLAAF/PLAN forces appear to be conducting air operations with deployments and training sorties into these same extended operating areas.

China's recent actions, such as increasing the air activity and asserting its air defense identification zone (ADIZ) in the East China Sea, make it clear that China's leaders are attempting to alter the status quo in the region significantly. Declaration of the PRC's ADIZ in the East China Sea in November 2013 gave rise to a host of new issues: the possibility of declaring additional ADIZs in the South China Sea and Yellow Sea; establishment of an extended Republic of Korea ADIZ to account



for disputed maritime claims; and further escalation of tensions between the PRC and Japan.

The election of Ma Ying-jeou as president of Taiwan has produced mixed results in the region. On the one hand, tensions across the Strait of Taiwan have ebbed as a result of his enhanced diplomatic and economic ties. President Ma Ying-jeou has sought historically closer relations with Mainland China through a number of initiatives and engagements. On the other hand, these efforts have inflamed hard-line independents within Taiwan to the point of rioting. In a July 2012 article in the *Diplomat*, Parris Chang, a ranking member of Taiwan's Parliament, professor emeritus of political science, and former director of the Center for East Asian Studies at Penn State University, stated that on the heels of protest, mass riots, alleged scandal, and discontent, the president's approval rating fell to a dismal 15 percent.⁵ Arguably, President Ma has recovered to a degree, but he is up for election in 2016, and Taiwan could very well see a return of the pro-independence Democratic Progressive Party if he cannot win the election. Should that party take a hard stance on the matter of Taiwan's independence, tensions with the PRC could again flare up.

North Korea continues to generate security concerns in the region. The year 2013 saw President Kim Jong-Un's regime conducting the country's third nuclear test; making preparations to launch Musudan intermediate-range ballistic missiles; threatening nuclear strikes on Hawaii, Guam, and the continental United States; launching two No Dong medium-range ballistic missiles (the first since 2009); and a week later exchanging artillery fire with South Korea at the Northern Limit Line. The pledge of South Korea's President Park Geun-hye to strike back harder than ever in response to the next provocation increases the potential for miscalculation.

Although the potential for regional conflict exists in the USPACOM AOR, the current fiscal environment arguably has the most fundamental impact on how PACAF operates in the Asia-Pacific theater. Competing national priorities limit defense spending, and rebuilding forces that



have spent the last decade on the battlefield will require a large share of the defense budget. Similarly, deep reductions to the US defense budget could lead to decreased confidence in America's ability to fulfill traditional security roles. Daily operations require prudent management of limited fiscal resources.

Flight Plan for Pacific Air Forces: Five Lines of Operations

Guided by our strategy and a deep understanding of that strategy, we have developed five enduring PACAF lines of operations, henceforth referred to as the PACAF Flight Plan: Integrated Air and Missile Defense, Agile and Flexible Command and Control, Theater Security Cooperation, Power Projection, and Resilient Airmen. All five are intended to help guide decision makers and our Airmen during the Asia-Pacific Rebalance and beyond. The flight plan delivers a methodology that allows all Pacific Airmen to understand their particular role in our strategy. For questions about priorities, funding, or manpower, the plan illuminates an answer that circles directly back to our strategy. Though the principles of the flight plan are valid for any fiscal environment, given the current climate this plan is particularly appropriate for the nation's rebalance initiative. Airmen must prioritize efforts within our lines of operations to safeguard our commitment to our allies and partners.

Integrated Air and Missile Defense

We have applied the hard-fought lessons learned from previous US wartime experience to devise an integrated air and missile defense (IAMD) strategy that uses a smart mix of active defense, passive defense, and attack operations. Furthermore, our Airmen are innovating game-changing technologies to overcome missile defense challenges. Given the current security environment, the IAMD line of operation is particularly important for America's rebalance initiative.



Agile and Flexible Command and Control

PACAF's approach in managing its agile and flexible command and control efforts can be summed up through six critical capabilities: (1) battlespace awareness, (2) resilient architecture, (3) defensive cyber operations, (4) combat-support command and control (C2), (5) C2 execution, and (6) war-fighter integration. The ability to command and control our air, space, and cyber resources integrated with our joint and bilateral partners is a revolutionary change in decision superiority. We have matured the Air Force's battle-tested core tenet of centralized control / decentralized execution into something better suited and more relevant to today's complex operational environment: centralized command / distributed control / decentralized execution. This new tenet embodies the spirit of an idea of mission command envisioned by the chairman of the Joint Chiefs of Staff. Essentially, Gen Martin Dempsey's "mission command" empowers all war fighters with the appropriate levels of guidance, authority, and trust to accomplish their missions along with the means to do so. Among the many elements central to distributed control, three stand out: (1) effective communication of mission command throughout the joint force, (2) sustained unity of effort in support of the commander's intent, and (3) an agile, flexible theater air control system.

Theater Security Cooperation

Maintaining existing relationships and building new ones in the Asia-Pacific region are of the utmost importance when pursuing theater security cooperation. Sharing concerns over the growing potential for crisis in Asia's near seas, we have increased our interactions with our counterparts. In close coordination with USPACOM and Headquarters Air Force, we are strengthening our operational exchanges to promote a common picture and understanding of PRC activities, especially in and around the Senkaku Islands. We will support dissuading China from implementing its declared East China Sea ADIZ and from declaring other ADIZs in either the South China Sea or Yellow Sea. In this vein,



we support sending an increased Air Force contingent to the upcoming Military Maritime Consultative Agreement talks to discuss air-safety concerns.

Power Projection

Synonymous with global power, power projection includes rapid crisis response across the full spectrum of military operations. Power projection is the core of the Air Force's mission to fly, fight, and win, as well as its vision of global vigilance, global reach, and global power. Power projection is characterized by PACAF's air, space, and cyber superiority; globally integrated intelligence, surveillance, and reconnaissance (ISR) capabilities; rapid global mobility; and readiness force posture. Our peacetime posture seeks to deter potential adversaries while reassuring friends through shared efforts to exercise and train as we collectively intend to operate. In the future, we will focus on significantly increasing capabilities in space, cyber, and electronic warfare.

Resilient Airmen

Our Airmen serve as the foundation of the Pacific strategy. This line of operation touches everything we do as a force. It all starts with mission-qualified Airmen and their ability to withstand, recover, and grow in the face of stressors and changing demands. The Resilient Airmen line of operation integrates into the other four lines of operations in measurable ways. We are currently looking at areas in which to construct new strategic effects that address our joint, combined, and coalition forces.

Our Resilient Airmen team constantly seeks engagement opportunities and expansion of areas such as training and development. Ultimately this process will ensure that when we step to the fight with our friends, allies, and partners, we do so together as Resilient Airmen.

In light of drawdowns and financial constraints, we are researching manpower and personnel constructs with our component counterparts



that will integrate our Airmen and joint war fighters more closely than ever as they make progress in the IAMD, C2, theater security cooperation, and power-projection lines of operations. We have begun developing cultural-immersion programs that installations will field with their newcomer orientation to assure that our Airmen and families are armed as competent ambassadors in cross-cultural matters. Lastly, we continue to develop new strategies to increase readiness and enhance mental, physical, social, and spiritual well-being.

Force Posture and Modernization

US strategy and its Asia-Pacific derivative—our Pacific theater strategy—both adhere to a central theme: building, maintaining, and nurturing partnerships and relationships. A nuanced forward presence offers the most meaningful way to cultivate such relationships in the region.

For more than 60 years, our forces primarily focused on the Northeast Asia regions of Japan and Korea. In light of our nation's rebalance, PACAF, in coordination with USPACOM, is enhancing its presence in the region by dispersing its defense posture over a wider geographic range. Over the next few years, we will modify our posture while preserving our presence and increasing our commitment to the entire region. Our enhanced posture does not imply that we require new main operating bases (MOB), in military parlance. On the contrary, we will continue to mature our “places, not bases” approach.⁶ This proposition is at once politically sustainable and operationally resilient. Naturally, we will continue to coordinate efforts with sister services to maximize resources. Our force posture concentrates on the strategic triangle of bases in Alaska, Hawaii, and Guam, which endure as the centerpiece of our footprint in the Pacific for two primary reasons: (1) they are located on US soil and thus present minimal access limitations, and (2) Alaska, Hawaii, and Guam lie beyond the range of most conventional threats.⁷



Our relationship with Japan is one of the most important we have. In a region where access is increasingly difficult to maintain, our strong ties with Japan provide tremendous confidence that the United States will have access when needed. In 2015 we operate out of three air bases in Japan: Yokota, Misawa, and Kadena. No one should doubt that PACAF is committed to the long-term security of the Japanese people.

The alliance between the United States and South Korea was originally forged in blood and has flourished ever since.⁸ Over the last 60 years, the partnership has expanded from its security relationship into an alliance that emphasizes global economics, access, and security. Among other reasons for the US presence in South Korea, it discourages an attack from North Korea—and thus demands US commitment.

Increased US Air Force presence in Australia is a concrete example of America's rebalance. The service's fighter, tanker, and bomber training there sends a strategic message that the United States is strengthening alliances and friendships in the Pacific that offer new and meaningful access to the Air Force. Furthermore, Australia is a premier ISR sharing partner whose shared early warning radar performs double duty by improving war-fighter integration in the region while increasing US combat capability.

PACAF is well prepared to expedite reestablishing US air access in the Philippines now that the Enhanced Defense Cooperation Agreement is in place. Their location makes Philippine bases ideal for multilateral military exercises. Presence on these bases provides concurrent opportunities for us to develop the interoperability of Filipino maritime and air defense capabilities.

Our recent visit to Vietnam is a watershed event in our relationship with the members of the Association of Southeast Asian Nations (ASEAN). Vietnam overflight and landing rights would provide flexibility and increased opportunities to assist in the region. The humanitarian-assistance and disaster-relief radius of aircraft operating out of Da Nang could cover some of the most disaster-prone areas on the globe.



Given the proximity to Andersen AFB, airfields such as those located in the Commonwealth of the Northern Marinas, Palau, or Yap supply convenient divert options for US aircraft. Furthermore, nearness to a variety of US Air Force, Marine Corps, and Navy bases provides more joint-force opportunities to validate Air-Sea Battle concepts of operation in a forward environment. We look to invest in significant improvements in airfield infrastructure with a focus on divert capability in the near term and joint training opportunities in the midterm to long term.

Force modernization is another key component of our Asia-Pacific rebalance strategy. We will sustain investments in force recapitalization while we advocate for new capabilities, particularly the KC-46, F-35, and long-range bomber. In addition to these new abilities, our strategy mandates that we pursue innovative solutions. Consequently, Headquarters PACAF recently completed its conversion into our nation's first component major command (C-MAJCOM)—a modernization that creates opportunities to further transform our air and space operations center (AOC) and employ our airpower in innovative ways. Finally, as part of the rebalance, we will smartly employ our command and control, intelligence, surveillance, and reconnaissance capabilities (C2ISR).

The KC-46 Pegasus, central to the Air Force's recapitalization priorities, will assure the ability to maintain global reach and project global power. The role of air refueling in the region can't be overstated. We anticipate that the KC-46 will deploy on a rotational basis throughout the Asia-Pacific to increase combat capability and demonstrate US commitment to USPACOM's AOR.

The Joint Strike Fighter is vital to modernizing the Air Force's aging fleet of multirole fighters and will remain a top priority for the service's recapitalization efforts, particularly in the Pacific. The F-35 increases combat capability and improves war-fighter integration. This aircraft is the most tangible representation of the concept of networked, integrated attack-in-depth to disrupt, destroy, and defeat a potential adversary's antiaccess/area-denial (A2/AD) capabilities. Twelve ally and partner countries, including Japan, South Korea, and Australia, have committed



to purchase the fifth-generation multirole fighter.⁹ As a common platform between the United States and three of our closest, most capable allies in the theater, the F-35 represents a unique opportunity to enhance interoperability and bridge many Air-Sea Battle concepts into operational reality.

We do not have detailed plans on the permanent basing of the future long-range bomber; nevertheless, we continue to advocate for this capability as a critical component of operating in an A2/AD environment. Our future ideas will address the Asia-Pacific's strategic basing options. At present the continuous rotation of B-2s and B-52s to Andersen AFB in Guam creates a continuous presence of US bombers in the AOR: a new long-range bomber will further increase this combat capability.¹⁰

Headquarters PACAF, as a C-MAJCOM, is the Air Force's first war-fighting headquarters on a MAJCOM scale. The PACAF commander assumes multiple leadership roles: commander of an Air Force MAJCOM, USPACOM commander of Air Force forces (COMAFFOR), the USPACOM theater joint force air component commander (JFACC), the theater area air defense commander (AADC), airspace control authority (ACA), and space coordinating authority (SCA). Headquarters PACAF not only gives Air Force component support to USPACOM in all operational phases across the range of military operations but also serves as the senior administrative service headquarters for the commander of PACAF, performing the service's organize, train, and equip functions not appropriate for reachback.

The C-MAJCOM organization structure allows PACAF to perform day-to-day functions with its operationalized staff and total-force-integration team members while preserving the ability to surge and meet the nation's wartime requirements. Depending on the timing, type, and severity of an event, multiple Airmen can fulfill theater COMAFFOR, JFACC, AADC, ACA, or SCA roles. To be sure, PACAF's unique C-MAJCOM structure allows an immediate and tailored presentation of forces to USPACOM.



The evolution of the 613 AOC into a joint air and space operations center (JAOC), located at Joint Base Pearl Harbor–Hickam, is an innovation to an existing capability that will increase war-fighter integration and combat capability. Formally maturing into a combined AOC (CAOC) is a natural advancement for the PACAF AOC. In many ways, it is already a CAOC. The 613 AOC already hosts some of our treaty partners. Further, during contingency operations and multilateral exercises, the center operates as a CAOC with joint and coalition partners. This innovation forces potential adversaries to reassess their prevailing plans and address a more coherent and multinational operational structure in the region.

PACAF understands the necessity of enlarging our C2ISR capability. We will continue to advocate for increased presence of the E-3 Airborne Warning and Control System capabilities and permanent rotational presence of the E-8 Joint Surveillance Target Attack Radar System. Given our current fiscal constraints, America's C2ISR capabilities alone will not likely satisfy theater requirements. Therefore, we will continue to leverage those capabilities with our allies and partners in the spirit of responsible intelligence sharing and mutually beneficial domain awareness.

Conclusion

Preventing a war in the Asia-Pacific is paramount to being prepared to win a war in the region. All Pacific Airmen understand that proposition. Even before formation of the Far East Air Forces, airpower had played a meaningful role in securing America's interests in the Asia-Pacific. Over three-quarters of a century later, Pacific airpower has established itself as a permanent, reliable partner, fully committed to regional security, stability, and prosperity. As the nation rebalances to the Asia-Pacific, America can stand assured, knowing that—as was the case before—US airpower provides an effective deterrent to potential adversaries. ✪



Notes

1. For the treatment of US strategy, see Department of Defense, *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense* (Washington, DC: Department of Defense, January 2012), http://www.defense.gov/news/defense_strategic_guidance.pdf; and Joint Chiefs of Staff, *The National Military Strategy of the United States of America 2011: Redefining America's Military Leadership* (Washington, DC: Joint Chiefs of Staff, February 2011), <http://www.army.mil/info/references/docs/NMS%20FEB%202011.pdf>. See also Hillary Clinton, "America's Pacific Century," *Foreign Policy*, 11 October 2011, http://www.foreignpolicy.com/articles/2011/10/11/americas_pacific_century.

2. The United States has mutual defense treaties with five Asia-Pacific states: Japan, South Korea, Australia, Philippines, and Thailand. The four nuclear armed states are Russia, India, China, and North Korea.

3. Department of Defense, *Quadrennial Defense Review 2014* (Washington, DC: Department of Defense, 2014), http://www.defense.gov/pubs/2014_Quadrennial_Defense_Review.pdf.

4. Originally, an eleven-dash line, the nine-dash line was first drawn on the Chinese map in December 1946 by the Republic of China government. The intent was to enlarge China's living space in the South China Sea. Today, the PRC asserts that the so-called nine-dash line delineates its claim in the South China Sea. For a complete understanding of the origins of the line, see Dr. Andrew Marshall, *China: The Three Warfares* (Washington, DC: Office of Net Assessment, Office of the Secretary of Defense, May 2013), http://images.smh.com.au/file/2014/04/11/5343124/China_%2520The%2520three%2520warfares.pdf?rand=1397212645609.

5. Parris H. Chang, "Can Hu 'Do Something Big' on Taiwan?," *Diplomat*, 19 July 2012, <http://thediplomat.com/2012/07/can-hu-do-something-big-on-taiwan>.

6. The phrase "places, not bases" reflects the emphasis on operational resiliency with regards to PACOM's theater force posture. MOBs are an efficient means of maximizing resources to project power, but they enable the concentration of adversary forces and ultimately increase US vulnerability. In contrast, forward operating sites can provide distributed yet effective means not only to survive attacks but also to recover and quickly generate additional sorties. PACAF's pursuit of these sites supports America's whole-of-government efforts to promote theater security cooperation while discouraging an adversary's ability to accurately and confidently achieve the desired degree of confidence in his precombat forecasts. By maximizing interoperability with allies and partners, building partnership capability, and establishing the necessary agreements with host nations, PACAF can offer global vigilance, global reach, and global power without the constraints of MOBs.

7. The Pacific strategic triangle of today differs from the original triangle. America's twentieth-century notion of a Pacific strategic triangle survives today with Alaska, Hawaii, and Guam. The original triangle included Philippines, Guam, and Hawaii. In the early twentieth century, America strengthened its Pacific military presence to protect these territories and defend America's West Coast. But not until the 1940s did military strategists recognize the importance of what came to be known as the Pacific strategic triangle. Conceiving of a strategic triangle encompassing Alaska to the north, Hawaii to the west, and Panama to the south, these strategists recommended committing military forces to defending all points within its border.

8. The term *alliance forged in blood* describes the relationship between the United States and South Korea. For a complete understanding of the genesis of the relationship, see William



Stueck and Boram Yi, “‘An Alliance Forged in Blood’: The American Occupation of Korea, the Korean War, and the US–South Korean Alliance,” *Journal of Strategic Studies* 33, no. 2 (April 2010): 177–209, <http://www.tandfonline.com/doi/pdf/10.1080/01402391003590200>.

9. For information on the F-35 Lightning II, see “The Centerpiece of 21st Century Global Security,” Lockheed Martin, accessed 29 September 2014, <https://www.f35.com/global>.

10. The continuous bomber presence mission seeks to deploy Air Force bomber assets into the PACOM AOR and provide a visible deterrence to potential adversaries as well as demonstrate US commitment towards regional security for our allies and partners.



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Operationalizing Air-Sea Battle in the Pacific

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Opposing a great power is a means of asserting one's own power, and several countries aspire to be great powers regionally if not globally. One expression of power is the ability to deny access or disrupt operations, and many countries seek to

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strengthen their antiaccess/area-denial (A2/AD) capabilities as a means of asserting regional control and influence. Take the People's Republic of China (PRC) for example. An emerging superpower at the turn of the century, the PRC published a white paper titled "China's National Defense in 2000" in October of the same year. This document set the tone for the PRC's strategy of attaining great-power status, built upon a foundation of the "Five Principles of Peaceful Coexistence," robust economic development, and military strength.¹ Since 2000 the PRC's unprecedented economic growth and prosperity have allowed it to invest heavily in military modernization. Today the PRC's military forces are exponentially more capable than they were at the turn of the century.² In its 2010 white paper on national defense, the PRC says that it "will never seek hegemony," that it "opposes hegemony and power politics in any form," and that it "pursues a national defense policy which is defensive in nature."³ However, its recent territorial claims and aggressive actions in the South China Sea represent an expansionist view of "self" that threatens regional security. More importantly, to assert these claims, the PRC has built a robust, power-projecting A2/AD capability that could be brought to bear against the United States, its allies, and its partners. Largely due to the PRC's actions in recent years and current military capability, A2/AD has emerged as a national concern, especially when it threatens to deny the global commons or upset regional security.⁴ In June 2012, strategic guidance specifically tasked the US military to project power despite A2/AD.⁵ To deal with the A2/AD problem, the US Department of Defense (DOD) has turned to Air-Sea Battle (ASB), putting concepts into practice.⁶

This article examines how United States Pacific Air Forces (PACAF) is working through United States Pacific Command (PACOM) to evolve ASB concepts into doctrine and operational action as a counter to A2/AD practices and as a means of prevailing in the face of informationized warfare. PACAF's actions not only deal with a potential A2/AD threat from the PRC but also safeguard unimpeded military operations across the spectrum of domains according to international laws and customs in order to preserve the national security interests of the United States,

its allies, and its partners. First, the article offers background information, focusing on the initial development of ASB concepts and their pervasive effects on the DOD. Second, it examines historical examples of A2/AD operations, showcasing lessons learned and demonstrating how they have shaped ASB concepts, PACOM operational considerations, and current PACOM operations. Next, the article dissects five key mission sets in which ASB is beginning to make a difference in the Asia-Pacific, including intelligence, surveillance, and reconnaissance (ISR); long-distance communications; logistics/sustainment; tactical networking; and command and control (C2). Finally, it addresses three tangible benefits of ASB, including better collaboration among the services, a framework for mitigating the looming A2/AD threat, and stronger international partnerships for collective security.

In light of these benefits, PACOM has taken steps to operationalize ASB so that it successfully takes root in the Asia-Pacific area of responsibility (AOR). The United States is not a guest in the Asia-Pacific theater; it is a Pacific nation with states, territories, and allies that depend on it for continued prosperity, security, and protection. To that end, ASB is PACOM's framework to counter any attempt to deny the United States the ability to pursue its interests, gain and maintain access, protect its allies and partners, and conduct military operations regardless of the domain.

The History of Air-Sea Battle

The history of ASB is brief but momentous. A series of significant improvements in the PRC's A2/AD capability during the first decade of the twenty-first century did not go unnoticed, prompting the DOD to action. In July 2009, the secretary of defense directed the Air Force and the Navy to study options for preserving US and allied access to the "global commons"—those areas of air, sea, space, and cyberspace shared by all nations and used for commerce, transportation, and communications. In 2010 the Center for Strategic and Budgetary Assessments (CSBA) published *AirSea Battle: A Point-of-Departure Operational*

Concept, which presents ASB as a strategic alternative to passively accepting A2/AD capabilities pursued by the PRC.⁷ The CSBA authors proposed countering A2/AD primarily through tight integration of Air Force and Navy operations in the Western Pacific theater of operations.⁸ Their ideas gained immediate momentum.

The CSBA's ASB paper led to establishment of the Air-Sea Battle Office in the Pentagon, which has taken point on maturing the ASB concept into operational action. In May 2013, the office published *Air-Sea Battle: Service Collaboration to Address Anti-Access and Area Denial Challenges* (version 9), building upon the concepts presented by the CSBA. The office's ASB paper evolves the original ASB concept as a counter not only to the PRC's A2/AD capabilities but also to anyone who threatens to deny the United States and its allies access and the ability to maneuver or operate in the global commons.⁹

ASB is a modern combined-arms (joint warfare) concept that takes into account the prevailing geographical domains in the Asia-Pacific—air and sea along with the domains of space and cyber.¹⁰ Since the US Air Force and Navy are the primary services operating in the air and sea domains, the original ASB concept emphasized tight Air Force and Navy integration to operate successfully in an A2/AD environment. Because of the name, some people mistakenly believe that the ASB concept excludes the US Army and Marine Corps.¹¹ In fact, numerous Army and Marine missions lend themselves to ASB, including logistical supply, security, special operations, and even ground combat, if required.¹² Just as the Navy and Marines had important roles in the operational practice of AirLand Battle, so do the Army and Marines play a significant part in the operational practice of ASB.¹³ Today, all service components in PACOM actively incorporate elements of ASB into their complementary strategies.

The Problem of Antiaccess and Area Denial

Let us take a moment to define antiaccess and area denial. On the one hand, A2 is “action intended to slow deployment of friendly forces into a theater or cause forces to operate from distances farther from the locus of conflict than they would otherwise prefer. A2 affects *movement* to a theater” (emphasis in original).¹⁴ On the other hand, AD is “action intended to impede friendly operations within areas where an adversary cannot or will not prevent access. AD affects *maneuver within* a theater” (emphasis in original).¹⁵ Denying an enemy access and the ability to maneuver is nothing new in warfare. The weapons now, however, are more precise and have longer ranges than at any other point in history, so the A2/AD environment is larger and more lethal than in the past. With technology rapidly evolving and readily available, a country with the means can more easily develop or acquire the weapon systems necessary to build an A2/AD architecture and capability.

The United States believes that A2/AD capabilities challenge and threaten both its own ability and that of allied forces to reach contested areas and operate effectively there.¹⁶ The PRC’s A2/AD systems and architectures are designed to “make US power projection increasingly risky . . . and prohibitively costly.”¹⁷ Even short of armed conflict, A2/AD seeks to challenge the United States’ ability to operate across the global commons in all domains. Since freedom of action in international waters and airspace is an enduring national interest, along with the defense of our allies, countering A2/AD is a strategic imperative for the United States. US support for the defense of our treaty allies depends on our ability to reach the objective and operate there effectively. Just as the United States needed a credible way to reinforce the North Atlantic Treaty Organization (NATO) during the Cold War, so does it require a similar deterrence to reinforce our treaty allies in the Pacific.

Technology, Domain Dominance, and Information Superiority

History reveals an important truth regarding the character of war: three game changers often translate into an overwhelming asymmetric strategic advantage and eventual victory—superior technology, domain dominance, and information superiority. Time and again, from the campaigns of Alexander the Great to the second Gulf War, asymmetric advantages in these areas win wars. Therefore, to gain and sustain strategic advantage, a country must pursue and realize asymmetric advantages in technology, domain dominance, and information superiority while simultaneously denying the adversary the ability to do the same.

The character of war has been changed by asymmetric technological advantages on numerous occasions throughout history, and the lesson learned is the same—every technological advantage is eventually countered. One of the most significant and decisive changes in warfare was the introduction of gunpowder. When Charles VIII of France moved his army into Italy in 1494, cannons dramatically altered the calculus.¹⁸ Fortifications that had withstood sieges lasting months were now overwhelmed within hours.¹⁹ However, fortress designs soon adapted to contend with cannon fire, and Italian fortification families began building bastion defenses with angular, lower, and thicker walls. These new designs mitigated the effectiveness of cannon fire and eroded its advantage. This example illustrates the race between enhancing one's own technological advantages while countering an adversary's. Today, the race continues between better weapons and corresponding counters.

Blocking access on the two-dimensional battlefields of the past was fairly straightforward. The ancient city of Troy relied upon its impenetrable walls to keep out the invading Greek army. The Romans constructed the “limes” on the Rhine and Danube, as well as Hadrian's Wall in Britain and fortifications in Syria.²⁰ These were designed to defend the empire on the periphery while the majority of Roman cities were unfortified. In China the Great Wall reached a length of nearly 4,000 miles in an attempt to protect the more “civilized” regions of China from warring

tribes and nomadic marauders such as the Mongols.²¹ Prior to World War II, France constructed the Maginot Line at a cost of over seven billion francs to deny the German army access to France.²² Some of these A2 attempts were successful, and some were not. New domains add dimensions to the battlefield.

Domains can be described as the environment in which conflict occurs. History shows that those who dominate the domains generally win the battle, if not the war. For most of history, wars were fought on land or at sea. About 100 years ago, the invention of powered flight expanded conflict to the air; the submarine, to the subsurface. More recently, the domains of space and cyber came into play. Those who adapt quickly and dominate domains generally gain an advantage.

For example, the German blitzkrieg owes much of its success to the simultaneous exploitation of the air and ground domains. In this example, the Luftwaffe worked in direct concert with ground forces using radio communication with devastating effectiveness.²³ The Germans were also quick to adapt to subsurface warfare and were notorious in their use of submarines to attrite Allied forces.

In another example, the United States—an early airpower pioneer—learned full well the advantages of air and sea dominance in World War II. After the war, the United States made it a priority to build and sustain the world's premier air force and navy, relying primarily on technological superiority to gain an asymmetric advantage and to maintain domain dominance. Because of our heavy investments in airpower and sea control, the United States has enjoyed air superiority and control of the sea for a generation. During much of that time, our dominance of these domains was so unrivaled that early air superiority and control of the sea were often planning assumptions.

The United States was also a pioneer in space and cyber, having more space-based systems and satellites than any other country by far.²⁴ Further, as the Internet came into being, the cyber domain was born in the United States, along with tech companies like Google, Microsoft, Apple, and Facebook, which dominate the cyber landscape. Space and

cyber are ripe with cutting-edge technology that affords additional asymmetric advantages to the United States and its allies.

Arguably, as much as technology and the new domains have shaped the character of war, the way people process and use information has also had a massive impact, particularly the sheer amount of automated information available on demand. Since the end of the Cold War, advances in electronics have led to increasing automation in the generation, movement, and interpretation of information. Previously, information was processed by people, and communication consisted of exchange of information between individuals and groups. Today, global information is automated and instantly available, and the military is a massive generator and consumer of information. In fact, information is the foundation on which entire domains (space and cyber) are built.²⁵ Most people equate information with the cyber domain, but in reality, information superiority involves operations that span all domains. However, it is fair to say that most of the information collected across the domains is ultimately synthesized and automated within the cyber domain. Accordingly, information superiority plays a key role in the ASB concept.²⁶

Cross-Domain Integration: “Moneyball” for the Department of Defense

Despite decades of technological advantage and domain dominance, particularly in air, sea, space, and cyber, gaps in the US technological advantage and domain dominance are narrowing. In some cases, US capability has even been rivalled or surpassed.²⁷ Technology is expensive, and the United States has seen increasingly limited returns on its investments in military technology. For example, the F-22 and F-35 were plagued by cost overruns and fielding delays that raised the price per unit so high that the services were forced to purchase fewer units than they wanted. Faced with a decade of costly wars, conflicting national priorities, and budget cuts, the DOD must find other ways to gain and maintain military advantage and domain dominance; it must

be smarter with the limited resources it has. Think of the movie *Moneyball*, in which the manager of the Oakland Athletics built a World-Series-caliber team on a budget. Similarly, the DOD must find ways to create more synergy from the manner in which it combines and employs arms. ASB does exactly that, relying heavily upon cross-domain integration.

As proposed by ASB, cross-domain integration is similar to the integration of various components in land warfare during its evolution. Prior to the advent of firearms, military forces consisted of infantry and cavalry. With the introduction of gunpowder, artillery was added to the order of battle. Armies had to adapt and change their two-component approach into a three-component approach. Armies that integrated artillery, infantry, and cavalry more seamlessly than their opponents usually gained a synergistic advantage. King Gustav Adolph of Sweden pioneered modern combined arms during the Thirty Years' War of the early 1600s, innovatively integrating the whole of his army to create strengths and mitigate weaknesses for each part. The king formed an interdependent system of infantry, cavalry, and artillery that supported and enhanced each other's effectiveness. To this day, King Gustav Adolph is regarded as one of the most brilliant military commanders of all time. As military technology evolved throughout the centuries, so did land warfare. Eventually, armies learned to integrate aviation and mechanized units into their combined operations, along with cavalry, infantry, and artillery. It is easy to see how land warfare and the evolution of combined arms are notable models in the successful integration of new and different components—the same principles apply across domains.

Close integration across or between domains is called cross-domain integration. It seeks to produce synergistic effects by integrating different war-fighting elements—in this case, across domains. At its core, cross-domain integration is a form of combined arms, akin to joint warfare. It is the same concept King Gustav Adolf used to integrate the Swedish Army 500 years ago. It is the same concept Napoleon used to integrate his armies in Europe and secure his empire. It is the same concept ex-

pounded by Luftwaffe general Erhard Milch to integrate his air and ground forces in World War II. Milch said that “the dive bombers will form a flying artillery, directed to work with ground forces through good radio communications. . . . Tanks and planes will be [at the commander’s disposition].”²⁸ It is also the concept the Marine Corps uses to integrate its forces as a Marine air-ground task force. ASB borrows the concepts of combined arms and cross-domain integration to meet the demands of information automation.

Achieving Synergy in Five Key Mission Sets

The goal of ASB is to seize and sustain the initiative in the air, sea, space, and cyber domains, primarily by exploiting decisive advantages in training, integration, and information superiority.²⁹ Since realizing that goal requires the services to work in concert, it follows that the mission sets which span across domains (services) could be either the greatest strength or the most vulnerable weakness. ASB’s success hinges on the effectiveness of service collaboration and synergy, particularly in five mission sets: ISR; long-distance communications; logistics/sustainment; tactical networking; and C2. Collectively, these sets hold the greatest potential for advances in cross-domain integration due to the automation of information. However, they are neither all inclusive nor discrete. A broad examination of cross-domain integration in each of these mission sets reveals considerable overlap between and among them.

Intelligence, Surveillance, and Reconnaissance

ISR assets collect the brunt of information, and reliable data contributes to information superiority. Consequently, we must preserve the quality of our information by protecting our ISR assets while simultaneously degrading the quality of the enemy’s and exploiting or destroying his assets. In fact, countering ISR is the centerpiece of the operational concept presented in the 2010 CSBA paper, mentioned

above.³⁰ ASB seeks to ensure the quality of our information while degrading or denying the enemy's and thus blind him to the "real" battlefield or lure him to act on bad information.

The automation of information does not mitigate—and can even exacerbate—the age-old problem of garbage in / garbage out. Denying targeting and providing false targeting data will degrade the ability of precision ballistic missiles to strike air forces. However, a blinding campaign by itself will likely be insufficient. Although large-scale attacks against multiple air bases will rapidly deplete a ballistic missile inventory, low-level harassing fire can also disrupt operations at fixed facilities—and can do so more cheaply.³¹ Therefore, airpower must adopt maneuver warfare and become more unpredictable.

This lesson seems obvious, but over the last several decades, US airpower has become synonymous with large, fixed main operating bases. These Clausewitzian centers of gravity are a source of strength in many respects but also present a vulnerability that potential enemies could exploit. For example, anyone who has studied American warfare knows that the United States executes a document of timed-phased force and deployment data in response to a contingency. If that document is overly predictable or limited to a select few main operating bases, enemies with a robust artillery or missile capability may inflict crippling damage before we fly our first combat sortie. Why would they watch us build up our forces, knowing attack is imminent, when they can attrite our forces before we even bring them to bear? The 7 December 1941 attack on Pearl Harbor teaches us the danger of putting all of our eggs in one basket, as well as the value of a preemptive strike against a predictable enemy. It's easy to see how incorporating unpredictability and maneuver into the basing scheme while executing a blinding campaign on the information warfare front will help us gain and preserve the airpower initiative in contested environments. This is just one example of how ASB concepts—creating uncertainty by being more unpredictable, maximizing maneuver, and confusing the adversary with bad information—can thwart the effectiveness of A2/AD in practice.

The Navy's inherent mobility gives it an immediate advantage because it is difficult to find, target, and neutralize moving aircraft bases and power-projection platforms. Recognizing the advantages gained by rapid aircraft maneuver and unpredictability, PACAF is following suit, exercising these principles with initiatives like the Rapid Raptor program, among others.³² To protect assets that cannot maneuver quickly, airfields themselves must employ passive and active means to confuse the enemy and survive attack. Our integrated air and missile defense (IAMD) systems must work in concert to concentrate limited fires on the highest-priority threats, synergistically fusing systems and capabilities from all services as well as our allies. Accordingly, PACAF is working to shore up its IAMD capability and has a line of operation dedicated to the task. To date, PACOM has realized significant gains in IAMD.

ASB's success also depends upon ISR's integration across multiple domains and the exploitation of automated information capabilities across the spectrum of operations. The CSBA's ASB concept envisioned airborne ISR networks competing in a "scouting battle" to identify and strike adversary targets.³³ The CSBA paper implies that a significant portion of an airborne ISR network will consist of remotely piloted vehicles, but most of them will need to be autonomous to operate in the degraded communications environment that we anticipate. This is exactly what the automation of information provides. Both collaborative unmanned systems and heterogeneous collaborative control are technologies already under development.³⁴ Using these technologies, unmanned systems could execute as interactive teams to detect, identify, and record intelligence that can be relayed when communications are re-established. These systems are vulnerable to anti-air weapons; however, "relatively cheap drones with advanced sensors and imaging capabilities" are commercially available and can have military application.³⁵ These systems can be launched from multiple domains (land, sea surface, subsurface, air) to overcome limitations in range. At less than \$1,000 each, these systems would force an adversary to engage with kinetic-kill interceptors—a cost-imposing strategy. Providing timely data, however, calls for a long-haul communications capability.

Long-Distance Communications

The DOD's ASB concept also demands robust, long-distance communications systems that can deal with intermittent outages. With the automation of information, the systems used to transmit that information can be considered information logistics. As described in the CSBA's ASB concept, the electromagnetic spectrum will likely be contested, and "dominating the EW [electronic warfare] competition as early as possible would be critical to winning the scouting battle and eventually prevailing in the conflict."³⁶ Until we do, not only will communication likely be challenged, but our radars, radios, data links, Global Positioning System, and other electromagnetic-dependent systems will probably suffer major degradation. Notably, the authors compare this competition to that between Germany and the Allies during the strategic bombing campaigns of World War II.³⁷ Robust, long-distance communication can aid in surviving and prevailing in a challenging electronic warfare environment by leveraging assets geographically removed from the immediate fight.

Logistics/Sustainment

Logistics and sustainment of forces have always presented a difficult problem, but with automated information and new technologies, ASB looks to turn this problem into an opportunity. Since the start of organized warfare, military forces have needed to meet on a battlefield (battlespace) and resource themselves. This was an issue secondary only to combat itself.³⁸ Alexander the Great owed much of his success to a brilliantly planned and executed logistics and sustainment campaign. In a potential future conflict, US forces will face considerable limitations because of ordnance constraints, quickly exhausting peacetime inventories of precision standoff munitions in a high-intensity conflict.³⁹ During the first year of World War I, the combatants literally ran out of artillery ammunition. Large, centralized logistics stockpiles are vulnerable to attack by precision missiles, and centralized databases are vulnerable to kinetic and nonkinetic disruption. To further

complicate logistics, some plausible rivals maintain sizable and highly capable submarine fleets. Given its robust fleet of cargo, scout, and attack helicopters, Army aviation can make a substantial contribution to logistical supply. Trade-offs exist between logistics and ISR. For example, dispersing air assets and making base infrastructure maneuverable would disrupt the adversary's ISR picture, but it also complicates logistics.

In 1942 Gen George Kenney faced a similar situation in New Guinea. He stopped building large, centralized logistics bases and emphasized pushing supplies forward to units at the front, regardless of inventory.⁴⁰ Kenney also directed that requisitions be filled at once by the lowest command level and, whenever possible, that critical parts be flown in and delivered.⁴¹ In light of the automation of information, a similar solution lies in a more diffuse logistics command structure that allows suppliers and combat forces alike to exercise initiative. The example from the business world is known as platform economics. Platforms are defined as “a published standard that lets others connect to it, together with a governance model, which is the rules of who gets what.”⁴² A civilian example—Uber—is an app-based system that matches taxi riders with drivers. In military terms, commander's intent provides the governance model. Future standards, now in development, will allow the exchange of several supply classes across domains based on requirements and priorities. Mobile collaboration technologies, like the one described above, will permit a diffuse supply chain to identify the most effective supply path across domains. For example, fuels can be delivered to an air base via ship-to-shore pipeline. Emphasizing interchangeability of components in future procurement will allow these concepts to expand to other areas. The addition of flexibility and resiliency through information automation and the leveraging of new technologies will make logistics and sustainment a powerful ASB force multiplier and help overcome an adversary's attempts to deny access and disrupt operations.

Tactical Networking

Although considerable overlap exists between tactical networking and communications in general, the former focuses on the digital data links between different platforms. The original CSBA operational concept touches on this requirement in its recommendation for joint data links and data structures, but the operational concept does not envision the employment of those systems.⁴³

The concept of the “combat cloud,” introduced by Gen Michael Hostage, former commander of Air Combat Command, is a good representation of the Air Force component to tactical networking. Under this concept, older fighters “extend the network of linked systems providing reinforcing fires” while modern fifth-generation fighters function “as the core nodes shaping distributed joint capabilities.”⁴⁴ However, reinforcing fires are not limited to fighters or Air Force assets. Bombers provide significantly larger munitions loads than fighters, especially low-observable fighters without external stores. Similarly, autonomous sensors offer additional inputs to the combat cloud. Semiautonomous “small, cooperative, tactical UAVs [unmanned aerial vehicles] for EW” supply additional capability.⁴⁵ Finally, in areas where a potential attacker’s approach is constrained, sea- and surface-based systems give additional mass to reinforcing fires. The key lies in attaining cross-domain integration.

The defense of naval assets from cruise missile threats serves as an example of how cross-domain integration can be leveraged. Large barrages of cruise missiles pose a significant A2/AD problem.⁴⁶ Using terminal guidance, cruise missiles are capable of hitting ships at sea, making them particularly vulnerable. Limited magazine depth also constrains the ability of ships to counter mass salvos. Airpower, however, can concentrate rapidly and counter mass attacks on naval forces. Although kinetic-kill weapons are not cost effective against ballistic missiles, cost-effective kinetic-kill weapons against cruise missiles are feasible.⁴⁷ To produce the needed concentration, large aircraft such as

bombers and transports should carry them. Tactical networks linking semiautonomous weapons provide the necessary sorting of targets.

A second example of cross-domain integration is antisubmarine warfare. Finding submarines is difficult, and modern conventional submarines with air-independent propulsion are particularly hard to find.⁴⁸ However, antiship cruise missiles launched by submarines do not travel far before breaking the water. A network of autonomous sensors in potential submarine launch areas can detect a launch, send the information to a relevant command center (or core node, as described above), and direct an antisubmarine warfare asset to prosecute the target.

Command and Control

One aspect of C2—distributed control—is the process (or the how) of transitioning control authority from one entity to another. Distributed control does not delegate command authorities or command responsibilities from the combined force air component commander (CFACC) or a subordinate commander to another. Over the last two decades, the CFACC has increasingly centralized the C2 of airpower assets. The development of air and space operations centers (AOC) has greatly enhanced the efficiency of airpower and the delivery of effects on the battlefield. Centralization has allowed US air forces to take full advantage of the greater efficiencies of information technology, which increases the speed of the decision cycle.⁴⁹ However, centralized control requires the operational commander to have “complete, actual, precise and reliable information,” which is neither practical nor feasible in a highly contested, robust operational environment.⁵⁰ Further, too much centralization violates a fundamental Air Force tenet learned and reinforced over numerous wars—that is, of course, “centralized control, decentralized execution.”⁵¹ The tendency for overcentralization also creates a potential vulnerability if the control mechanisms (communications, data links, etc.) are disrupted or if the central control facility is degraded or destroyed.

Distributed control mitigates risk associated with overcentralization, empowers lower-echelon commanders, and increases flexibility. One solution is to organize bases or carrier battle groups into clusters under a single commander, based on the ability to reach back to the AOC and provide forward C2. The services have numerous assets available to enable forward C2, including the E-3 Airborne Warning and Control System, E-2 Hawkeye, E-8 Joint Surveillance Target Attack Radar System, RC-135 Rivet Joint, control and reporting centers, Aegis cruisers, and others. Ultimately, layers of distributed control lead to enhanced survivability and flexibility, leaving the enemy unable to render our fielded forces crippled with a single, decisive blow.

ASB in practice usually entails either domain-centric or task-centric approaches to command. Each has strengths and weaknesses, and each lends itself to a different command structure. Normally, the mission determines that structure, but in a degraded environment, bandwidth should drive it. In areas where disruption is minimal, a domain-centric approach is most efficient, allowing fielded forces to collaborate and leverage resources like the AOC and national assets to better orchestrate the fight. Where disruption is greatest, a task-centric approach is more efficient, allowing local commanders to execute according to the commander's intent, even in the absence of centralized control. Both approaches harness the spirit of the concept of mission command as articulated by Gen Martin Dempsey, chairman of the Joint Chiefs of Staff.⁵²

Addition of the space and cyber domains warrants other command considerations. Space and cyber are distinct, but distributing communications across the two domains requires unity of effort. Therefore, we should consider establishing an information warfare commander as a domain-centric command for the space and cyber domains. This individual would be responsible for the long-haul communications systems. Second, a platform-based, diffused logistics system implies that a logistics component commander may have to execute such a platform construct. Finally, cross-domain integration demands the presence of a robust

subject-matter expert, and each headquarters should incorporate from every domain such experts capable of articulating the commander's intent into operational action at lower echelons.

Distributed control can be effectively exercised only within specific types of organizations. Experience in top-down, centralized hierarchies will prove detrimental to officers asked to operate in a fluid, dynamic combat environment. Instead, effective war fighters in an automated information environment must be well versed in dealing with multiple, conflicting sources of information. This is precisely the environment presented by today's open exchange of information on the Internet. In addition, organizational culture must support the delegation of responsibility to subordinates. What then does ASB have to offer war fighters to improve cross-domain integration?

The Benefits of Air-Sea Battle in the Asia-Pacific

In the Asia-Pacific, ASB tangibly benefits war fighters in three areas. First, it facilitates better collaboration among the services. To date, ASB has resulted in a theater forum that translates into persistent relationships, technological advantages, and improved overall cross-domain integration. The services benefit not only from improved collaboration and synergy but also from easier access to shared and emerging technology, which they can leverage into strategic asymmetric advantages. Second, ASB offers the services a framework for defeating a looming A2/AD threat. Training, exercising, and operating within that framework gives war fighters the experience and ability to confidently execute the mission, even in uncertain operational and information environments. Finally, ASB spurs the services to strengthen international partnerships in the name of collective security. Through strong, vigorous relationships, PACOM forces may gain and sustain access, preserve a high degree of unfettered operations, and call upon the force-multiplying architectures and capabilities of close allies, partners, and friends as needed. Let us explore each of these benefits a bit more in depth.

Collaboration

ASB provides better collaboration among the services and between the services and the technology sector. It offers an avenue for war fighters, planners, and analysts to discuss, initiate, and develop new and better ways to work together. Before the 1986 Goldwater-Nichols Department of Defense Reorganization Act initiated reforms, “joint” meant deconfliction and compromise—everyone gave up something for the sake of moving ahead. The prevailing mentality was “I will stay out of your way; you stay out of mine.” During the intervening years, innovations such as AirLand Battle moved “joint” into the realm of cooperation or partnering. The new mantra became “We have to play together, so let’s play together nicely.” Given today’s budget-stressed environment, together with the speed and dexterity of potential adversaries, “joint” must mean collaboration and teamwork. Collaboration entails mutual trust, mutual investment, shared responsibility, collective accountability, and communal benefit. Another synonym for collaboration is “pre-integration.” According to the March 2014 *Air-Sea Battle Newsletter*, “At its core, the ASB concept seeks to develop a ‘pre-integrated’ joint force built from habitual relationships, with interoperable and complementary cross-domain capabilities.” In short, ASB will guide joint forces into a collaborative model of teamwork. The idea of cross-domain synergy is just that: air, space, sea, land, and cyber all working to support each other to achieve the desired effects.

Although preintegration of hardware and weapon systems is an important aspect of collaboration, habitual interaction between service planners and action officers leads to true collaboration. ASB seeks to bridge the gap among planners, operators, and leaders so they work in concert. Providing opportunities to train, execute, think, and reflect on how to better execute the mission is just as important as supporting each other’s mission. To further the idea of collaboration and habitual relationships, the staffs at PACAF and the Pacific Fleet (PACFLT) held talks on 17 December 2013. Their purpose was to identify key areas of interest where PACAF and PACFLT forces could support each other

and practice ASB. One of the outgrowths of the talks was creation of the Pacific Air-Sea Coordination Element (PASCE) (pronounced “Pace”). Residing on the island of Oahu, Hawaii, the PASCE, by charter, is a fully staffed focal point for all matters pertaining to ASB in the PACOM AOR. The PASCE has a cadre of local subject-matter experts well versed in ASB concepts, and its creation marks a big step in realizing a persistent, collaborative effort between PACFLT and PACAF and in incorporating ASB into everyday theater operations.

Led and cochaired by the PACAF chief of staff and the PACFLT deputy commander, the PASCE will serve as the catalyst for implementing ASB in PACOM, building and strengthening ties across PACOM components, improving our war-fighting capabilities, and supporting joint war fighters. Members of both the AOC at PACAF and the maritime operations center at PACFLT, as well as PACAF and PACFLT subject-matter experts, will make up the bulk of the PASCE cadre. This is not just a Navy and Air Force endeavor; representatives from US Army Pacific, Marine Forces Pacific, Special Operations Command of the Pacific, and PACOM are also part of the PASCE. Additionally, PACFLT’s Center of Naval Analyses and PACAF’s Research and Development liaisons are members of the PASCE. Their role is to lend academic rigor to ideas and concepts coming from PASCE associates. Finally, the PASCE forms the nucleus of the cross-domain coordination elements between the air and maritime components. PACOM is wholly committed to ASB, and the PASCE is the primary collaboration element. Through the PASCE, the services are forming habitual relationships, and preintegration is becoming a reality.

Framework

ASB provides the services with a second tangible benefit—the framework for defeating a looming A2/AD threat through exercise integration and joint training. In the Pacific, Exercise Valiant Shield predates the ASB concept, but it has practiced ASB-like concepts since its inception in 2006. The first Valiant Shield exercise, held in June of that year, involved 22,000 personnel, 280 aircraft, and 30 ships, including the

USS *Kitty Hawk*, USS *Abraham Lincoln*, and USS *Ronald Reagan* carriers. Conducted by Joint Task Force 519, it was the largest military exercise held by the United States in Pacific waters since the Vietnam War. One of the better organizational practices that proved valuable at Valiant Shield '06 was the joint force air component commander (JFACC) construct. For this particular exercise, the JFACC was an Air Force lieutenant general (three-star), and the deputy JFACC was a Navy rear admiral (two-star). Their chiefs of staff were O-6s from the opposite services. This arrangement made for seamless integration of airpower during the exercise operation. Valiant Shield continues to this day, and ASB concepts such as seamless service integration and cross-domain integration remain the heart and soul of this massive joint exercise. The level of joint integration has improved greatly over the past 10 years, along with cross-domain awareness in PACOM's action officers. In fact, many current leaders and senior planners are veterans of earlier Valiant Shield exercises and have brought their experience to the planning table. They also owe their high level of cross-domain awareness to experience gained from ASB-influenced events such as this exercise.

A high level of cross-domain awareness fosters intellectual innovation. From lessons learned in exercises such as Valiant Shield, ASB practitioners are building a repository of knowledge and developing a cadre of planners who can solve problems in innovative and collaborative ways; nevertheless, as Harry Summers points out, "we must remember that we are not very good at predicting the future."⁵³ Accordingly, the PASCE and other ASB subject-matter experts are not focused on examining a singular problem set but on maintaining a broader perspective regarding current, evolving, and perceived problem sets. Think of the PASCE as a college where ASB is the curriculum. The goal is not to find a specific answer but to develop operators who can think through and solve complex problems with many possible solutions using an array of tools from a diverse skill set. Further, these ASB subject-matter experts can teach others to do the same. The PASCE seeks to improve the command abilities of future US military leaders by exposing them to truly integrated joint operations at each and every level of

their career development. Rather than conduct joint exercises in the past flavor of “deconfliction,” a new cadre of action officers and planners is (pre)integrated from the start of their careers. As the Pacific grows in economic and commercial importance, it is incumbent upon leaders and planners to analyze current and emerging issues before a crisis develops, properly synthesize the information, and derive the preferred solution. The Pacific military operational environment is one of the most complex and challenging in the world, and any good planner worth his or her salt knows the operational environment intimately. Such is the case at the PASCE.

International Engagements and Relationships

Lastly, ASB in the Pacific also involves international engagement and strengthening relationships. It can be said that Europe is a landscape while East Asia is a vast seascape, and that difference makes the cultivation of relationships problematic.⁵⁴ Nevertheless, the PASCE wishes to include our allies and partners in the Asia-Pacific. Several key allies have liaison officers already residing in Hawaii. Many of them will be invited to participate in the recurring PASCE events to further collaborative planning and execution. AirLand Battle was not a US-only initiative but an outgrowth of the NATO alliance. The Gulf wars were truly a coalition effort, and today’s wars are almost always fought with coalition partners. Even without a NATO-like structure in the Pacific, we may leverage certain habitual relationships to advance ASB goals. As the PASCE matures, it will include representatives from the militaries of South Korea, Japan, and Australia. Much collaborative work has been gained over the last decade from US and allied experiences in the Middle East—take for an example of this growth the realm of close air support (CAS), a highly integrated mission relying on collaborative planning and execution of the joint force. CAS effectiveness grew through innovation and collaboration. Previously, CAS was quite scripted; preferably, the pilots themselves visualized the target directly. However, as technology progressed, CAS missions began relying almost exclusively on Global Positioning System–aided weapons delivery.

Later, technologies such as the remote operational video enhanced receiver (ROVER) kits further refined and expanded CAS to make it a true twenty-first-century mission. ASB will evolve similarly. As hardware improves and war fighters innovate, newer methods of collaboration will ensue. Through leveraging international partnerships, ASB is enabling the US rebalance to the Pacific.

The changes in military operations presented by rapid developments in information technologies are significant but not unprecedented. Militaries have responded to profound alterations in technology in the past. Moreover, the United States has had significant experience in incorporating information technology during the past decade of conflict. By focusing on those areas where the impact is greatest, the United States can leverage that experience to learn to operate in environments where ISR, communications, and logistics are contested. That process requires strengthening ties among the services and building the necessary doctrine and training to implement the changes necessary to adapt to this new environment. Success in these areas will develop an organizational culture that favors cross-domain integration.

Conclusion

PACOM's proactive approach to ASB will enable the United States to gain and preserve access to the global commons in the Asia-Pacific AOR. It will ultimately defeat any attempt to limit US military access or deny military operations to areas where we currently operate and have vital security interests. It will allow the services to strengthen relationships with each other and with our allies as we leverage the full gauntlet of collective capabilities in the practice of shared security interests. Finally, it will enable continued asymmetric technological advantages, domain dominance, and information superiority for the foreseeable future. A Pacific nation, the United States is in the region to stay. It is in everyone's best interests to preserve the peace and to promote regional stability and continued shared prosperity. However, if anyone challenges the right of the United States as well as its allies and partners

to operate freely within the Asia-Pacific AOR according to international law and conventions, or if anyone tests the resolve of US commitment to our allies, then PACOM is poised to respond in kind, using ASB as a framework for mission success. In the Asia-Pacific, there is no doubt that Air-Sea Battle is both “the now” and “the future” of PACOM operations and A2/AD counterwarfare. ✪

Notes

1. The “Five Principles of Peaceful Coexistence” were articulated in the Panchsheel Treaty between China and India in 1954. The principles include mutual respect for each other’s territorial integrity and sovereignty, mutual nonaggression, mutual noninterference in each other’s internal affairs, equality and cooperation for mutual benefit, and peaceful coexistence. Of note, the PRC considers Taiwan part of China while also asserting claims in the South China Sea. Accordingly, it follows that the PRC considers as violations of these principles the United States’ support of Taiwan, the stationing of US forces in neighboring countries like Japan and South Korea, the fact that the United States doesn’t recognize the PRC’s claims in the South China Sea, and other forms of US “interference” in the region. “China’s National Defense in 2000,” Embassy of the People’s Republic of China in the Republic of Estonia, 20 May 2004, secs. 1, 2, and 5, <http://www.chinaembassy.ee/eng/ztlm/zfbps/t112926.htm>.
2. The PRC has a massive arsenal of cruise missiles and theater ballistic missiles; it has replaced third-generation fighters with very capable fourth-generation fighters; and it has fielded layers of upgraded and double-digit surface-to-air missile systems and anti-aircraft artillery on its eastern perimeter. The PRC also has fifth-generation fighters in development, along with a number of other game-changing technologies like hypersonic missiles and cyber capabilities. For a better understanding of China’s current and emerging A2/AD capabilities, see Michael Pillsbury, ed., *Chinese Views of Future Warfare* (Washington, DC: National Defense University Press, 1997).
3. “China’s National Defense in 2010” (Beijing: Information Office of the State Council of the People’s Republic of China, 13 March 2011), [6, 8, 5], http://www.nti.org/media/pdfs/1_1a.pdf?_=1316627912.
4. Established by international treaty in 1982, the United Nations Convention on the Law of the Sea (UNCLOS) establishes economic zones and territorial rights and responsibilities. The United States abides by the UNCLOS for the most part but has not ratified the treaty, objecting to part 11, which it believes undermines American economic and security interests. The PRC ratified the UNCLOS treaty in 1996 but has since altered its territorial claims with the infamous “nine-dash line.”
5. Department of Defense, *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense* (Washington, DC: Department of Defense, January 2012), 8, http://www.defense.gov/news/defense_strategic_guidance.pdf.

6. The Air-Sea Battle Office identifies the problem as follows: “Adversary capabilities to deny access and areas to U.S. forces are becoming increasingly advanced and adaptive. These A2/AD capabilities challenge U.S. freedom of action by causing U.S. forces to operate with higher levels of risk and at greater distance from areas of interest. U.S. forces must maintain freedom of action by shaping the A2/AD environment to enable concurrent or follow-on operations.” Air-Sea Battle Office, *Air-Sea Battle: Service Collaboration to Address Anti-Access and Area Denial Challenges* (Washington, DC: Air-Sea Battle Office, Department of Defense, May 2013), 3, <http://www.defense.gov/pubs/ASB-ConceptImplementation-Summary-May-2013.pdf>.

7. Jan Van Tol et al., *AirSea Battle: A Point of Departure Operational Concept* (Washington, DC: Center for Strategic and Budgetary Assessments, 2010), ix–xii.

8. *Ibid.*, xiv.

9. Air-Sea Battle Office, *Air-Sea Battle: Service Collaboration*, 2–4.

10. “We have titled this concept ‘AirSea Battle,’ in recognition that this theater of operations is dominated by naval and air forces, and the domains of space and cyberspace.” Van Tol et al., *AirSea Battle: A Point of Departure*, ix.

11. “This is not to say that neither the Army nor the Marine Corps have a role to play in AirSea Battle. For comparison, even though the AirLand Battle concept was primarily an Army and Air Force effort, the Navy also had a role to play in securing the sea lines of communication across the Atlantic Ocean and preparing for what was called the Outer Air Battle with Soviet air forces. Likewise, the Marines had contingency plans to reinforce Norwegian forces to preclude a Soviet move in Scandinavia to turn NATO’s northern flank. Similarly, as the core features of AirSea Battle are established, they will likely have significant implications for the two ground Services.” *Ibid.*, 11n21.

12. In World War II, the Army and Marines were essential to the success of the island-hopping campaign conceptualized by General MacArthur and Admiral Nimitz. The broad strategy of that campaign was to capture and secure islands that would accommodate airfields. After taking an island, the United States could base fighters and bombers there and secure a forward presence and project airpower. The islands were captured in sequence as a means of eventually bombing Japan and winning the war.

13. Case in point: Exercise Valiant Shield, PACOM’s biannual ASB concept operational exercise, included over 18,000 participants representing every service.

14. Air-Sea Battle Office, *Air-Sea Battle: Service Collaboration*, 2.

15. *Ibid.*

16. *Ibid.*

17. Van Tol et al., *AirSea Battle: A Point of Departure*, ix.

18. Robert L. O’Connell, *Of Arms and Men: A History of War, Weapons, and Aggression* (New York: Oxford University Press, 1989), 108.

19. John Keegan, *A History of Warfare* (New York: Alfred A. Knopf, 1993), 321.

20. *Ibid.*, 146.

21. *Ibid.*, 148. The wall was so extensive because movement of the Chinese frontier was based on the extent of cultivation. During dryer periods, populations within the wall could become nomadic, negating the protection of that section of the wall.

22. O’Connell, *Of Arms and Men*, 279.

23. Keegan, *History of Warfare*, 370.

24. The Union of Concerned Scientists Satellite Database reports 512 United States satellites as of 31 July 2014. The next runners-up are Russia and China with 135 and 166 satellites, respectively. "UCS Satellite Database," Union of Concerned Scientists, 31 July 2014, http://www.ucsusa.org/nuclear_weapons_and_global_security/solutions/space-weapons/ucs-satellite-database.html#.VDXgTXkcTxg.
25. Keegan, *History of Warfare*, 324.
26. Information superiority is the unconstrained access to, control, and exploitation of reliable information while denying the same to the adversary.
27. For a bit of irony, readers can google "China's cyber capability" and read some of the reputable articles produced by that search.
28. Keegan, *History of Warfare*, 370.
29. Van Tol et al., *AirSea Battle: A Point of Departure*, 67–68.
30. *Ibid.*, 56.
31. *Ibid.*, 57.
32. SSgt Blake Mize, "Rapid Raptor: Getting Fighters to the Fight," Pacific Air Forces, 20 February 2014, <http://www.pacaf.af.mil/news/story.asp?id=123400928>.
33. Van Tol et al., *AirSea Battle: A Point of Departure*, 61.
34. "Unmanned Systems," Georgia Tech Research Institute, accessed 20 November 2014, <http://www.gtri.gatech.edu/atas/unmanned-systems>.
35. Chris Anderson, "Agricultural Drones," *MIT Technology Review* 117, no. 3 (May/June 2014): 58.
36. Van Tol et al., *AirSea Battle: A Point of Departure*, 62.
37. *Ibid.*, 62n98.
38. Keegan, *History of Warfare*, 301.
39. Van Tol et al., *AirSea Battle: A Point of Departure*, 45–46.
40. George C. Kenney, *General Kenney Reports: A Personal History of the Pacific War* (Washington, DC: Office of Air Force History, 1987), 79.
41. *Ibid.*, 56.
42. Antonio Regalado, "The Economics of the Internet of Things," *MIT Technology Review*, 20 May 2014, <http://www.technologyreview.com/news/527361/the-economics-of-the-internet-of-things/>. See, for example, the tech magazine *Uber Technology Review*.
43. Van Tol et al., *AirSea Battle: A Point of Departure*, 88.
44. Robbin Laird, "The Next Phase of Air Power: Crafting and Enabling the Aerospace Combat Cloud," Second Line of Defense, accessed 20 November 2014, <http://www.sldinfo.com/the-next-phase-of-air-power-crafting-and-enabling-the-aerospace-combat-cloud/>.
45. "Unmanned Systems."
46. Dennis M. Gormley, Andrew S. Erickson, and Jingdong Yuan, *A Low-Visibility Force Multiplier: Assessing China's Cruise Missile Ambitions* (Washington, DC: National Defense University Press for the Center for the Study of Chinese Military Affairs, 2014), 43–44, <http://ndupress.ndu.edu/Portals/68/Documents/Books/force-multiplier.pdf>.
47. Van Tol et al., *AirSea Battle: A Point of Departure*, 36.
48. *Ibid.*, 26.
49. Milan N. Vego, *Operational Warfare* (Newport, RI: Naval War College, September 2000), X-19.
50. *Ibid.*

51. Curtis E. LeMay Center for Doctrine Development and Education, *Volume I, Basic Doctrine*, 14 October 2011, 34, <https://doctrine.af.mil/download.jsp?filename=Volume-1-Basic-Doctrine.pdf>.

52. Gen Martin E. Dempsey, "Mission Command White Paper" (Washington, DC: Joint Chiefs of Staff, 3 April 2012), http://www.dtic.mil/doctrine/concepts/white_papers/cjcs_wp_missioncommand.pdf.

53. Harry G. Summers Jr., *On Strategy: A Critical Analysis of the Vietnam War* (Novato, CA: Presidio Press, 1982), 184.

54. Robert D. Kaplan, *Asia's Cauldron: The South China Sea and the End of a Stable Pacific* (New York: Random House, [2014]), 5–6.



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Pacific Air Forces' Power Projection

Sustaining Peace, Prosperity, and Freedom

Lt Col David A. Williamson, USAF

No single core mission offers only one of the three effects of airpower—Global Vigilance, Global Reach, or Global Power—because all five core missions are necessary to provide the integrated global airpower effects that only the Air Force can supply. And each Airman, regardless of their mission-specific specialty, plays a critical role in delivering these effects. For example, a remotely piloted aircraft pilot does not just supply Global Vigilance, a boom operator on a tanker does not just bring Global Reach, and a navigator on a bomber does not just dispense Global Power. Using their innovative natures, these Airmen play a part in providing all three, just as all Airmen do.

—Global Vigilance, Global Reach, Global Power for America

MacArthur's campaign in the Southwest Pacific would not have been possible without air power. General George C. Kenney, MacArthur's airman, proved instrumental to the Allied victory.

—Thomas E. Griffith Jr.

Just as Gen George C. Kenney tenaciously focused the airpower resources under his command to support General MacArthur's historic campaign to liberate the Pacific theater, so does today's Pacific Air Forces (PACAF) concentrate on supporting the broader theater objectives of the commander, United States Pacific Command

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(CDRUSPACOM). To enhance this goal, PACAF categorizes its activities and operations into five distinct lines of operation (LOO): theater security cooperation, integrated air and missile defense, agile and flexible command and control (C2), resilient Airmen, and power projection (see the figure below). This article examines the power projection LOO.

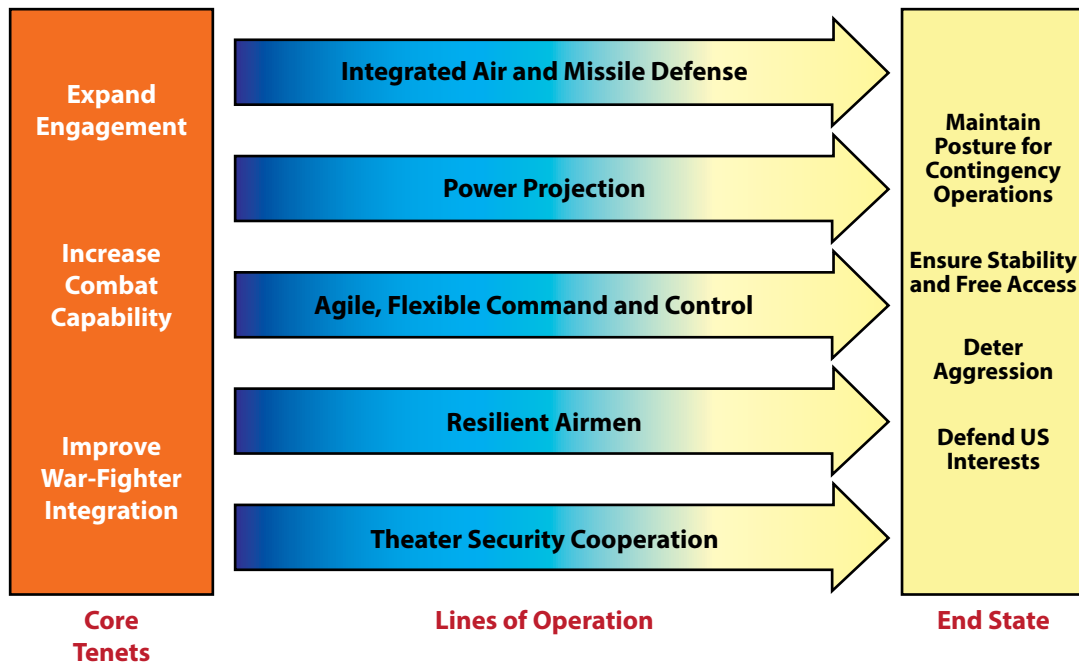


Figure. PACAF strategy construct. (Adapted from “PACAF Strategy,” Pacific Air Forces, accessed 20 November 2014, <http://www.pacaf.af.mil/shared/media/document/AFD-130927-079.pdf>.)

Power projection is PACAF’s application of control and influence at a distant point from the source of that power. As the essence of airpower, projection consists of three primary elements: vigilance, reach, and power. This article demonstrates how PACAF’s power projection LOO supports the PACOM theater. It introduces unique characteristics of the Pacific theater and then describes how vigilance, reach, and power contribute to the CDRUSPACOM’s ability to establish the necessary

conditions for securing peace, expanding freedom, and sustaining prosperity through the application of air and cyber power.

PACOM's area of responsibility (AOR) is unique among those of the six geographic combatant commands. The Pacific AOR spans 16 time zones and covers 100 million square miles—52 percent of the earth's surface. The geographic area and distances involved affect every conversation, circumstance, and requirement for the application and projection of air, sea, and land power. The Pacific region enjoys a rich history and unique elements of cultural diversity as home to half of the world's population and more than 3,000 languages.¹ Including the United States, the Pacific AOR encompasses 36 nations, all of which desire advancement of their own specific interests. Thus, the great distances, vast areas, history, cultural diversity, and various political equities combine to establish a unique set of regional challenges. Yet, political and cultural issues form only part of the equation.

The Pacific region is greatly affected by a variety of threats, the most pervasive of which are weather and seismic events such as volcanic eruption, earthquakes, and subsequent tsunamis. These natural occurrences transcend cultural barriers and require energetic humanitarian assistance and disaster relief (HADR) teamwork to minimize loss of life and property. Response to such disaster entails more than the sum of juggling logistics challenges and bridging language barriers. Done properly, it is a life-saving triumph spurred by a cooperative, cross-cultural partnership between affected Pacific nations and support from PACOM-assigned (and -attached) forces, C2, and vigilance across all fronts. In support of HADR circumstances, PACAF projects a type of power through long-range aircraft that conduct disaster assessment, evacuation, and airlift of supplies.

Power projection is unique among PACAF LOOs because of the nature of military combat power. In the Clausewitzian lexicon, power projection simply extends politics through military means. Thus, there are conceptual and political limits to its scope, depth, visibility, and intensity. Limitations occur when increases in the type or frequency of ac-

tivity negatively affect the theater, even if resources and opportunities remain available. This situation is less likely with regard to most other PACAF LOOs. For example, the theater security cooperation LOO is greatly influenced by manpower or scheduling availability but not by the idea that increased interaction with partner nations runs counter to US interests in the Pacific theater.

Vigilance

PACAF utilizes air, cyber, and space-based capabilities to detect, evaluate, measure, monitor, communicate, protect, and coordinate its responses to any crisis or hazard. These capabilities embody the first element of PACAF power projection—vigilance. In November 2013, super-typhoon Haiyan gained strength and struck the Philippines with mind-boggling sustained winds in excess of 190 miles per hour—one of the strongest recorded storms to make landfall. PACAF's crisis-action planning teams tracked the storm and diligently monitored the emerging needs of the Philippine government, United States Agency for International Development, and PACOM's joint task force established to direct the command's relief efforts for Operation Damayan. PACAF directed RQ-4 high-altitude sensors to assist with evaluating the extent of the damage. In this example, the vigilance provided by PACAF-assigned (and -attached) intelligence, surveillance, and reconnaissance (ISR) assets determined where Philippine relief resources were needed most and where support from air transport would be necessary. PACAF also projected power through the deployment of C2 elements, leadership, and aerial-port opening capabilities. This action included deployment of a joint force air component command element and portions of the 36th Contingency Response Group, which deployed to manage airfield operations and sustain responsiveness to the emerging situation.

Another notable example was PACAF's support of HADR operations in response to the Japanese earthquake and tsunami in 2011. The Airmen operating the RQ-4 Global Hawk determined damage levels and identified routes that remained passable.² If history is any indicator,

the likelihood of needing a real-world response with HADR currently exceeds the probability of a major regional conflict. Unfortunately, PACAF must exercise vigilance for more than just natural disasters.

PACAF's ISR missions also maintain vigilance by sustaining awareness of the activities and capabilities of potential military threats. Examples of this type of power projection include the management and execution of ISR missions to collect typical components of intelligence, such as images or signals. PACOM prioritizes potential collection targets and directs mission execution based on theater and national priorities. PACAF sustains the ability to collect this data and ensures that the processing, exploitation, and dissemination of the information remain responsive and robust, thus making actionable intelligence available to senior political and military leaders and allowing them to make effective decisions. PACAF's power projection LOO ensures that timely, effective airborne sensors are present and positioned in international airspace to provide necessary domain awareness.

Vigilance in Contested Areas

Thucydides, the ancient Greek historian, recorded the comments of a leadership delegation from a strong power relating to its relatively less powerful neighbor. The members observed that an outcome that is morally or diplomatically “right, as the world goes, is only in question between equals in power, while the strong do what they can and the weak suffer what they must.”³ Unfortunately, this ancient insight still holds true. Potential adversaries threaten the peace and prosperity of the Pacific region through hostile, dangerous, and acquisitive military activity within contested areas. Some nations appear willing to employ their relative might to exploit and threaten their neighbors. Obvious examples include the threat to use, test, acquire, and export dangerous weapons, even while their populations suffer—a prospect that necessitates vigilant and persistent monitoring through space, cyber, and airborne means.

PACAF-assigned and -controlled ISR aircraft exemplify the power projection LOO by flying missions through international airspace at great distances from the continental United States. PACAF relies on the unique capabilities of both manned and remotely piloted reconnaissance platforms to carry out these missions. The very high operating altitude of the RQ-4, a long-duration remotely piloted aircraft, offers extraordinary persistence and a broad area of collection. This platform's ability to fly from multiple Pacific island bases also affords PACAF great flexibility, enabling reconnaissance operations at the farthest reaches of the AOR on a single mission. Together with the RQ-4, manned surveillance platforms—including the U-2, E-3, RC-135 Rivet Joint, E-8C Joint Surveillance Target Attack Radar System, and the US Navy's P-3 and P-8—supply critical information and awareness about what occurs within the theater.

International Norms and Freedom of Navigation

Adherence to international norms and freedom of navigation is critical to sustaining vigilance as well as optimizing the economic viability of the Pacific AOR; consequently, it is vital to the region. PACAF aircrews support and demonstrate compliance with international aviation norms and behavior during the conduct of their missions—especially as it pertains to the routine, legal, and safe operation of aircraft in international airspace. They exemplify the high bar of aviation professionalism by honoring International Civil Aviation Organization standards and demonstrating respect for the sovereign territorial airspace of our Pacific and global neighbors. PACAF (as well as the Pacific Fleet) ensures that freedom of navigation is sustained through routine exercise and maintenance of international standards of aviation safety and discipline.

Cyber Vigilance

PACAF's vigilance in the contested cyber domain is vital to assuring informational and decisional superiority. It enables and sustains efficient

operations by protecting the information and decision support tools inherent in cyber-based systems. The attentiveness of PACAF's cyber operations not only protects the information systems, C2, and data vital to theater power-projection activities but also assures their reliability and availability to authorized users.

Reach

The second key element of PACAF power projection is embodied in PACAF's management, execution, and support of airlift and air-refueling missions. PACAF-based C-130, C-17, and KC-135 aircraft move forces around the theater in support of both PACAF's and PACOM's objectives and strategy. The PACAF air mobility team, in concert with US Transportation Command, guarantees that airlift functions smoothly throughout the theater. Airlift is critical to the movement of everything from combat forces, to equipment, to life-saving and -sustaining medical supplies for relief operations. It also allows specially trained medical teams to provide immediate aeromedical evacuation from remote PACAF locations.

The HADR activities of Operation Damayan in the Philippines serve as an excellent example of the reach of power projection in PACOM's AOR. C-130s from the 374th Airlift Wing supported storm-ravaged areas and provided initial tactical airlift to both the Philippine government and Joint Task Force 505, established to lead PACOM's relief effort in the Philippines. As work progressed and airfield conditions improved, larger aircraft such as the C-17 conducted operations in areas affected by the storm.

Alaska Air National Guard C-17 crew members from the 249th Airlift Squadron stationed at Joint Base Elmendorf-Richardson, Alaska, transported a forklift to assist with the unloading of supplies to areas hardest hit by the storm. However, their mission changed rapidly when they were redirected to conduct emergency airlift. The crew transported 489 victims of the Philippine typhoon to safer areas by loading them in

rows of 40 on the floor of the C-17 and securing them with cargo straps fastened across their laps.⁴ Additionally, crew members relied on their night vision goggles and low-light procedures to mitigate the storm's damage to local navigation equipment. The responsiveness of PACAF airlift to these otherwise inaccessible areas demonstrates the projection of power through airlift's extensive and flexible reach.

PACAF's reach also included deployment of the 36th Contingency Response Group to the Philippines to prepare damaged airfields in hard-hit areas for the influx of supplies and the relocation of people in need of shelter. Working in partnership with airlift, and ultimately led by the Philippine government, PACOM airpower evacuated over 6,000 people and delivered 1.5 million pounds of supplies and cargo.⁵

Finally, aeromedical evacuation exemplifies PACAF's power projection. In addition to conducting preplanned missions, aeromedical-alert aircraft, crews, and support personnel stand ready to respond to medical emergencies. The PACAF aeromedical team is equipped for rapid transport of patients to the appropriate level of care. This type of power projection enables the men and women of the PACOM joint force to accomplish their mission throughout the theater, making medical care available even in remote areas. In April 2013, for instance, a newborn baby in Thailand required life-saving transport to medical facilities in San Diego. The 613th Aeromedical Evacuation Team, along with the 735th Air Mobility Squadron, sprang into action and enabled reassignment of a C-17 for this medical mission, ultimately saving the life of the three-day-old infant. Such responsive care underpins every service member's ability to focus on his or her duties.

Power

This final element is typically the first consideration in discussions about power projection since the latter ultimately involves the ability to effectively conduct combat operations whenever and wherever called upon. As air component to the CDRUSPACOM, PACAF readies

air combat operations for execution throughout PACOM's AOR, including its subunified command—United States Forces Korea. As such, PACAF is home to the F-22, F-15C, A-10, and F-16. The F-35, the newest fifth-generation fighter aircraft, is expected to make PACAF its home in advance of other theaters. This platform will accompany the F-22 to form the world's finest, most formidable team of fifth-generation fighters.

The United States' Pacific theater rebalance policy has increased emphasis on and awareness of the growing importance of the region. It is also cognizant of growing regional threats to peace and prosperity, accompanied by provocative, acquisitive, and dangerous behaviors. This situation calls for greater reliance upon continuous bomber presence (CBP) and the theater security package (TSP).

Continuous Bomber Presence

In recent years, CBP—currently based at Andersen AFB, Guam—has predominantly been filled by B-52 aircraft from Air Force Global Strike Command. The B-52 is ideally suited for the power projection mission because of its massive payload and combat range. From Andersen AFB, CBP bombers can deliver combat power to any area of conflict within the Pacific AOR. An extremely flexible force, CBP routinely operates at long durations and distances from Andersen as it conducts training missions to various locations around the theater. The bombers also demonstrate the flexibility to relocate and disperse throughout the region. Aircraft based at Andersen do not need to recover to that same location.

CBP routinely conducts combat training sorties, supports subject-matter-expert exchange programs, and executes aviation exercises with partner nations throughout the Pacific. Its crews hone their navigation skills; air refueling; mission planning; and combat tactics, techniques, and procedures for antiaccess/area-denial scenarios with forces from the Pacific Fleet. These efforts also support the Air-Sea Battle concept and represent an intense focus area for PACOM and the Department of Defense.

PACAF-directed missions launched from the continental United States offer another sterling example of the flexible, responsive nature of PACAF power projection. B-52, B-2, and B-1 bomber crews and maintainers routinely deploy to PACOM and refine their skills in loading, maintaining, and employing an exhaustive array of weapons. Their arsenal includes Global Positioning System–aided, laser-guided stand-off weapons; weapons designed to destroy deeply buried targets; aerial-delivered maritime weapons; and strategic weapons. Recently, B-2 crews flew routine deployments and training missions to Hawaii and the Republic of Korea, further demonstrating that Air Force Global Strike Command bombers are ready and able to support power projection missions whenever and wherever called upon.

Long-range CBP and global power missions contribute a reassuring message to the Pacific theater that PACOM will not tolerate undue military aggression or restrictions to lawful transit of aircraft through international airspace. The recent declaration by the People’s Republic of China (PRC) of an air defense identification zone (ADIZ) in the East China Sea is an obvious example of an attempt to hamper free transit through international airspace. Former US secretary of defense Chuck Hagel accurately described the PRC’s behavior as “a destabilising attempt to alter the status quo in the region.” Secretary Hagel continued to reaffirm that America’s position concerning the mutual defense treaty with Japan “applies to the Senkaku Islands.” Japan also delivered a “high-level protest.”⁶ PACAF’s power projection responded to the PRC ADIZ by ensuring that the next day’s CBP mission flew as planned through the East China Sea (and PRC ADIZ), a single day after China claimed to have established it. PACAF will freely enjoy, utilize, and exercise international airspace on behalf of the United States, its partners within the region, USPACOM, and fellow component forces throughout the region, regardless of why the claim is made.

Theater Security Package

TSP—the planned, routine flow of fighter forces into the PACOM AOR—also supports PACAF. These forces enhance PACAF's ability to respond immediately to acquisitive or provocative actions of potential adversaries. TSP's forward presence and combat posture also decrease the logistics burden and timeline needed to move forces forward in the Pacific theater. The security package's rotations into the theater also season and enhance theater awareness of non-PACAF units and enable training-integration opportunities between PACAF and TSP units. Take, for example, the recent posturing of F-22 TSP forces from Langley AFB, Virginia, at Kadena AB, Japan. This deployment provided an extremely visible projection of combat power that enabled the honing of integration tactics and training between visiting F-22s and PACAF forces.

Along with PACAF-assigned forces, CBP and TSP units also expand cooperation and engagement with partner nations in the Pacific and improve war-fighter integration. In 2013 PACAF invited the lethal air-to-air combat capabilities of 10 New Orleans F-15Cs from the Louisiana Air National Guard to conduct multilateral training engagements during Cope Tiger 2013—a power projection journey of more than 15,000 miles from home. These aircraft were accompanied by total-force professionals of the Louisiana Air National Guard, exemplifying the projection of power through professional maintenance, air combat training, exchanges of subject-matter experts, and flight discipline. As a final example, during multilateral exercise RIMPAC 2014, the 391st Fighter Squadron, a TSP unit, was temporarily sent to Joint Base Pearl Harbor–Hickam to posture forces, conduct engagements with allies, and practice Air-Sea Battle tactics.

Rapid Raptor

The Rapid Raptor concept offers a final instance of the “power” element of power projection. The concept exploits the enormous capabilities of the C-17 and F-22 aircraft to conduct rapid, lean, and tailored

movements of F-22 combat power throughout the theater, with minimal notice and footprint. Rapid Raptor enables dramatic flexibility and allows any runway in the Pacific to become a launching point for F-22 training and combat operations. This feature is especially useful in an antiaccess/area-denial environment or during threats by medium- and long-range missiles.⁷ Still in development, Rapid Raptor demands thoughtful logistical planning that will enable multiple, simultaneous combat scenarios and locations.

In light of the challenges, threats, and hazards of the vast Pacific AOR, airpower investment and recapitalization must continue to develop and sustain PACAF's ability to provide the CDRUSPACOM with power projection capabilities. Projects such as the Rapid Raptor, KC-46, F-35, and long-range-strike bomber all represent critical emerging capabilities that the PACOM AOR must have to respond to today's crises and tomorrow's conflicts.

Conclusion

During his support of General MacArthur, Gen George C. Kenney learned that the concept of projecting airpower may be very simple but that its execution can prove quite challenging. Today's PACAF power projection LOO is also challenged as it directly and intentionally applies air and cyber power to influence the Pacific theater on behalf of the CDRUSPACOM. Through the element of PACAF's vigilance, surveillance platforms maximize visible forward presence and collect required intelligence. PACAF's reach allows for the forward movement of equipment, personnel, and capabilities throughout the region—whether to facilitate HADR or to move combat units to a distant location and then quickly move them again. PACAF's power, the final element of power projection, is exemplified in the movement, training, and operations of combat aircraft throughout the PACOM AOR. By means of the combined efforts of PACAF-assigned TSP, CBP, and ISR forces, PACAF ensures that the CDRUSPACOM can respond to any crisis facing the PACOM AOR. The projection of air and cyber power inten-

tionally influences the theater to assure that the Pacific AOR is able to sustain the necessary conditions for peace, expanded freedom, and sustained prosperity. ✪

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Back to the Future

Integrated Air and Missile Defense in the Pacific

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One of the main lines of operation, one of our main objectives, is IAMD [integrated air and missile defense], and that is our ability to defend against missile arsenals. The three largest arsenals in the world are Russia, PRC [People's Republic of China], and North Korea, and a good portion of those missiles are pointed at us or our friends and allies. So, our ability to defend against intermediate range cruise missiles, as well as ballistic missiles, is paramount. And my role is the Area Air Defense Commander (AADC).

—Gen Lori “Law” Robinson

Since the end of the Cold War, the United States has enjoyed relatively uncontested access from which to stage and generate air-power worldwide. Coupled with the lack of a credible threat to airfields, access led the Air Force toward a model of air base operations that emphasized the use of main operating bases (MOB). These bases, fortified with substantial numbers of aircraft, had little concern for their vulnerability to high-end antiaccess, area-denial (A2/AD) attack simply because a credible threat did not exist. In Clausewitzian terms, these MOBs are centers of gravity—not only a source of strength for the United States and its allies but also a potential vulnerability subject

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to attack and exploitation by a savvy and capable adversary.¹ The A2/AD formula is straightforward and persistent throughout history: use all available means to gain control of an area while simultaneously denying the enemy the ability to do the same, primarily by preventing access and disrupting operations. Although the concept is ancient, in the last decade, new and emerging A2/AD tactics and technologies have allowed possible adversaries to challenge the US and coalition airpower advantage. In light of these increasingly capable A2/AD systems and tactics, today's security environment demands that we operate differently, particularly in the Pacific theater where distance and diversity rule supreme and where controlling an area while denying the same to the opponent is particularly difficult.

This article emphasizes the importance of IAMD in the Pacific theater to counter the threats highlighted by General Robinson (above), among others. First, it focuses on IAMD in joint doctrine, showcasing its relevant historical evolution. Second, the article articulates current IAMD initiatives in Pacific Air Forces (PACAF), meant to guarantee continued access and improve survivability in a contested environment. Finally, it examines the future of IAMD in PACAF. Ultimately, the article seeks to give the reader a solid understanding of the need for robust IAMD in the Pacific, demonstrate what PACAF is doing about it, and point the way ahead. Given the current security environment, the IAMD flight plan is particularly important for America's rebalance initiative; furthermore, it has a broader application in other geographic commands and operational theaters as an expression of airpower.

IAMD in Joint Doctrine and Its Historical Evolution

PACAF's IAMD strategy is rooted not only in the evolution and history of airpower but also in joint doctrine. Strategy begins with a well-defined desired end state, and we need only look to PACAF's strategy to see its end state, guided by Pacific Command: "[The] U.S. and its interests are protected from air, space, and cyberspace threats. Regional security cooperation is advanced by improvements to and ex-

pansion of allied and partner nation capabilities, interoperability, access and multi-lateral engagements. Access to the global commons and theater stability are ensured, aggression is deterred, and forces are ready and postured for contingency operations.”² Thus, PACAF seeks to prepare itself for contingency operations, ensure stability and free access, deter aggression, and defend US interests. It desires to remain in “phase zero”—continued peace with the capability to project airpower as required. To synergize the staff toward this end state, the PACAF commander (COMPACAF) has directed work toward five lines of operation: (1) theater security cooperation; (2) power projection; (3) agile, flexible command and control (C2); (4) resilient Airmen; and (5) IAMD, the subject of this article. These five lines of operation do not function independently of each other but are mutually supportive and act in concert to attain the desired end state. For example, IAMD is built upon the foundation of theater security cooperation and agile, flexible, C2. Given the desired end state, then, what exactly is IAMD, and how does it enhance airpower in PACAF?

According to joint doctrine, IAMD is an “evolving approach that uses the counterair framework at the theater level.”³ It is defined as “the integration of capabilities and overlapping operations to defend the homeland and United States national interests, protect the joint force, and enable freedom of action by negating an adversary’s ability to create adverse effects from their air and missile capabilities.”⁴ At its core, IAMD is the joint integration of offensive and defensive operations against air-breathing and missile threats, meant to counter an enemy’s ability to degrade or disrupt our operations and projection of airpower in a contested environment. That is, (1) IAMD is evolving since it is driven by capabilities, which constantly change; (2) it is explicitly integrated and inherently joint, drawing upon the capabilities of each service to produce the desired effects; and (3) because it seeks to gain and maintain our access and the ability to operate, IAMD helps us counter A2/AD strategies. The latter is especially important in the Pacific, where unresolved conflicts and territorial disputes linger as potential hot spots for future conflict.

A robust IAMD strategy is essential if PACAF wishes to carry out the many missions under its purview. Its strategy for IAMD consists of a smart mix of active defense, passive defense, and attack operations built on a bedrock of theater security cooperation and agile, flexible C2. Active defense is “direct defensive action taken to destroy, nullify, or reduce the effectiveness of air and missile threats against friendly forces and assets.”⁵ Passive defense is “all measures, other than active AMD, taken to minimize the effectiveness of hostile air and missile threats against friendly forces and assets. These measures include detection, warning, camouflage, concealment, deception, dispersion,” hardening, redundancy, dispersal/mobility, and recovery/reconstitution.⁶ Attack operations are offensive action by the joint force against surface targets which contribute to the enemy’s air and missile capability, which entails taking the fight to the enemy.⁷ All of this is made possible through theater security cooperation and agile, flexible C2, which provide the framework and means to leverage capability and synchronize operations. Let us now delve briefly into the history of IAMD to demonstrate how PACAF has learned the importance of constant IAMD innovation, commitment, and evolution.

IAMD during World War II

Much of PACAF’s IAMD strategy is based upon lessons learned from history. One of the early examples of evolving IAMD occurred during the Battle of Britain when the British effectively integrated offensive and defensive counterair tactics with a new technology—radio detection and ranging (radar)—to produce air defense.⁸ This early example set the stage for C2 integration with air defenses. As the war progressed, Germany developed new technologies of its own to overcome Britain’s air defenses—the first ballistic missile (V-1) and the first cruise missile (V-2). Although they arrived too late in the war to tip the balance in Germany’s favor, these new systems had an immediate and lasting impact on the need for IAMD.⁹

IAMD during the Cold War

The United States produced many new weapons systems and developed a multipronged strategy to improve IAMD against the threat posed by the Soviet Union during the Cold War, including a combination of active, passive, and attack operations. These years saw missiles emerge as an airpower weapon of choice. Launched from the ground or aircraft, they offered unprecedented range, speed, payload, and accuracy. To counter this threat, nations produced even more missiles. The country with the most or best missiles ultimately gained a strategic advantage. Such was the case when visionary Air Force colonel (and future general) Bennie Schriever led the development and acquisition of the US nuclear intercontinental ballistic missile (ICBM) system arsenal from the mid-1950s to the early 1960s.¹⁰ The fact that no viable technology existed to intercept ICBMs during this period gave the United States a tremendous strategic advantage, spurred further evolution in defense designs and IAMD, and, of course, prompted the USSR to do the same.

Active defense greatly evolved during the Cold War. From the 1950s through the early 1970s, the Air Force procured an array of tactical fighters, each optimized for a different portion of the defensive counter-air mission. For instance, the century-series fighters (F-100 to F-106) were primarily optimized for high-altitude air-to-air combat and designed to intercept strategic bombers. Additionally, in 1958 the secretary of defense assigned the mission of strategic active defense to the Army, which made IAMD a joint endeavor. To execute its new mission, that service researched missile systems like the Nike-Zeus to defend against USSR ICBMs.¹¹ Eventually, the Army fielded several versions of the Nike weapons system, along with the Hawk and Stinger missiles, to combat theater ballistic missiles and air-breathing threats.

The colossal challenge of active defense against ballistic missiles and high-altitude strategic bombers, coupled with the overwhelming weaponry available to the Soviets, led the United States to invest earnestly in its passive defense capabilities, including detection and warning, redun-

dancy, and hardening, among other measures meant to increase survivability. America enhanced its detection and warning capability by using space-based and terrestrial systems that supplied initial launch indications of Soviet ballistic missiles and bombers. Further, the nation improved redundancy—and therefore resiliency—of C2 systems by incorporating the Airborne Battlefield Command and Control Center and Minuteman ICBM's Emergency Rocket Communications System, thereby creating an alternate means to command and control forces during or after an attack. ICBM silos, aircraft hangars, and C2 nodes such as the North American Aerospace Defense Command were hardened and reinforced with concrete shelters or buried deep to prevent destruction during an attack.

Meanwhile, military personnel began to operationalize resiliency. Dispersion and mobility, two aspects of passive defense, helped create a more resilient force. US Army air defense crews across Europe maintained an alert posture that allowed them to shoot and disperse within minutes. US Air Force squadrons sat alert with their weapons loaded, fueled, and ready to rapidly launch prior to missile impact. A “Christmas tree” parking design expedited aircraft departures during mass takeoffs. Entire wings exercised minimum-interval takeoffs and aircraft dispersal to other bases to prepare for and ensure survival of their assets in case of attack.¹² In Europe, Tactical Air Command aircraft remained on alert, ready to fend off Soviet fighters and bombers. They also practiced robust camouflage, concealment, and deception exercises, incorporating those practices into their infrastructure.

Post–Cold War IAMD

As the Cold War came to an end, the United States began to operationalize its defense against air-breathing threats and short-to-medium-range missiles. This development led to highly capable defensive weapons such as the Patriot Missile System and Aegis Combat System—new technologies heading into the late 1980s and 1990s. By the time of the first Gulf War, our forces were primed to decisively over-

come and destroy a Soviet-style integrated air defense system (IADS) and to defend themselves against theater ballistic missiles. The first and second Gulf Wars against Iraq in 1991 and 2003 showcased effective coalition airpower specifically built and structured to defeat an otherwise capable Cold War-era IADS.

However effective we were, it is important to note that the first and second Gulf Wars against Iraq started 23 and 11 years ago, respectively. Meanwhile, potential opponents have steadily eroded the asymmetric technological advantages we enjoyed with an entirely new generation of highly capable fighters, double-digit surface-to-air missiles, and elite missile systems for their IADS. Their offensive arsenals include faster, more maneuverable cruise missiles; maneuvering ballistic missiles; and robust electronic warfare capabilities. While we have concentrated on the global war on terrorism, near-peers and would-be adversaries have continued to advance their A2/AD expertise.

History is crystal clear on the matter: endless variables and new capabilities spur constant IAMD innovation and evolution, and maintaining an advantage requires constant commitment. We cannot rely on past successes and dated technological advantages as we remain prepared to defend the Pacific. PACAF is committing itself to the task of innovating and evolving IAMD to realize strategic objectives, giving particular attention to the integration aspect of air and missile defense.

PACAF's Current IAMD Initiatives

Building robust IAMD architectures demands theater security cooperation with our allies in the Asia-Pacific. Additionally, agile, flexible C2 ties it all together and is the means by which the combined force air component commander (CFACC) / AADC executes mission command.¹³ Because theater security cooperation and agile, flexible C2 are so closely intertwined with IAMD, let us dissect them first.

Theater Partnerships

Theater security cooperation—the relationship line of operation in PACAF—plays a key role in building and maintaining a robust IAMD. Naturally, IAMD planning must contain a combination of infrastructure, systems, and capabilities among nations, commands, services, and other actors. “Runways and relationships” and “places not bases,” two catchphrases commonly heard around PACAF, capture PACAF’s strategic narrative and reflect its theater security cooperation priorities. IAMD in the Pacific theater depends upon relationships built and nurtured in the name of shared interests and collective security—not only among countries but also among services, commands, and anyone else who has a stake in regional security.

Command and Control of IAMD

IAMD needs C2—agile, flexible C2 to be exact. In fact the “I” in “IAMD” is made possible by C2. Agile, flexible C2 bridges the gap between commander’s intent and battlefield execution by providing the means to control at all echelons. In the spirit of mission command as articulated by Gen Martin Dempsey, chairman of the Joint Chiefs of Staff, agile, flexible C2 (conducted correctly) empowers battlefield commanders with a clear understanding of what needs to be done and the proper authority to do it.¹⁴

The effective use of the air and space operations center (AOC) is crucial to the effectiveness of the AADC. COMPACAF relies on the 613 AOC for all IAMD operations in-theater with the exception of the Korea theater of operations, a subunified command with its own AOC.¹⁵ Over the last two decades, the AOC has evolved into a complete weapons system manned by dedicated, well-trained, full-time operators who attend formal initial training, obtain mission-focused unit qualifications, and accomplish annual evaluations. The modern AOC can turn a few paragraphs of a commander’s guidance into a 3,000-sortie-per-day air tasking order (ATO) that synchronizes the spectrum of IAMD operations in time and space. AOC operators regularly participate

in a number of small- and large-scale real and virtual exercises to hone their skills; moreover, agile, flexible C2 intertwined with IAMD remains at the forefront of everyone's mind.

The theater AADC uses the 613 AOC to plan, coordinate, execute, and modify the area air defense plan. The deputy area air defense commander chairs the joint theater air and missile defense board, a process complementary to the ATO that recommends and executes changes to the defense design. During execution of the ATO and defense design, the AADC and the combat operations division's theater missile defense cell use a common operational picture and other devices to monitor execution of the plan and make real-time changes, ensuring accomplishment of the assigned missions. In the spirit of mission control, PACAF is studying ways to empower lower C2 echelons in the IAMD architecture by using such items as mission-type orders and such ideas as distributed control. The E-3 Airborne Warning and Control System and E-8 Joint Surveillance Target Attack Radar System platforms provide redundant layers of control. Further, other means can effectively distribute control to lower echelons, such as the empowered air component coordination element (ACCE) concept, which proved effective in Operation Enduring Freedom. An empowered ACCE has been delegated control authority by the CFACC for air assets within his or her operational area. When it comes to C2, PACAF is looking at all options to realize the world's most agile, flexible C2 architecture fully integrated with the world's most capable IAMD. In this light, it is easy to see that IAMD and agile, flexible C2 are intertwined, mutually supportive lines of operation, complementing and reinforcing each other toward PACAF's desired end state. Now, let us examine how PACAF is building resiliency in IAMD through active defense, passive defense, and attack operations.

Protecting the Tip of the Spear: Active Defense

Active defense is the most visible and apparent concept in IAMD strategy. The Pacific theater has placed cutting-edge missile defense technology

at forward stations, ready to defend the United States and its allies, partners, and friends. The US Navy's Seventh Fleet boasts Aegis ballistic missile defense system ships that regularly work with their counterparts in the Japan Maritime Self-Defense Force and the Republic of Korea Navy. Meanwhile, the US Army has stationed Patriot battalions in South Korea and on Okinawa. Additionally, complementing regional defense, a Terminal High Altitude Area Defense battery forward-deployed on Guam defends the US homeland, and AN/TPY-2 radars monitor North Korea, ready to track any ballistic missile launched toward our friends or our homeland. Although this forward array of assets is impressive, when broken down between the homeland defense mission and the regional defense mission, our resources quickly spread themselves thin. Additionally, ballistic missile defense is only half of our IAMD problem set; cruise missiles and remotely piloted vehicles constitute another growing threat.

Planning for the defensive counterair mission has evolved significantly in PACAF over the last several years. We have optimized our layered defense with a lethal combination of airborne aircraft, including fourth- and fifth-generation fighters, airborne early warning, jammers, and electronic warfare aircraft. Add to those the Aegis system, ground-based air defense, and short-ranged air defense to destroy an adversary's inbound air threats. By combining US assets with those of our allies and partners, we have optimized our defense design, preventing the waste of precious interceptors. The Pacific defended asset list has never been better, but active defense must be complemented by a passive defense designed to help us remain in the fight.

Changing the Calculus: Passive Defense

Similar to our highlighting of passive defense during the Cold War in response to the massive threat, the combination of missile quantity and proximity to US assets in the Pacific theater has driven the need for more complete passive defense planning. PACAF has made considerable progress in this area during the last few years, committing itself

to the Pacific Airpower Resiliency Plan by taking steps to further incorporate resiliency into IAMD infrastructure. Take for example the capability to rapidly repair damaged runways and restore them to an operational state. PACAF is also committed to exercises such as Cope Sumo that add resiliency.

Redundancy preserves combat power by duplicating elements, systems, and infrastructure critical to generating combat power in regions within reach of an opponent's air and missile threats. Because of both the importance and fragility of US air base fuel systems, PACAF is investing in expeditionary, redundant fuel systems at all planned air bases. These systems not only duplicate the fixed fuel systems but also, because they are moveable, support another tenet of passive defense—mobility. Both PACAF and the Air Force have significant experience using this type of fuel system to support the robust generation of combat sorties.

Hardening, a passive defense measure designed to mitigate or minimize the impact of enemy missile systems, safeguards a base's most important sortie-generation infrastructure not subject to protection by other means or so important that it must survive direct enemy strikes. PACAF/A7 partnered with the Air Force Civil Engineering Center to develop a full range of hardening solutions to counter enemy weapons systems, doing so via the Hardened Installation Protection for Persistent Operations (HIPPO) Joint Capabilities Technology Demonstration. Designed to protect critical, vulnerable assets through the most cost-effective application of hardening/resiliency methods (see the figure below), HIPPO developed new technology and materials that have proven effective against a variety of threats.



Figure. Hangar with HIPPO technology scheduled for construction at Andersen AFB, Guam. (From briefing, US Air Force Civil Engineering Command, subject: HIPPO JCTB, 10 September 2013.)

PACAF is implementing a dispersed basing strategy—pioneered in the Cold War but applicable today—to reduce the vulnerability of aircraft at bases within range of adversary missile systems. PACAF is investing significant resources into several forward locations. Furthermore, it is dusting off lessons learned from World War II and the Cold War to resurrect the ability to “flush-launch” (rapid engine start, taxi, and takeoff) alert aircraft upon receipt of warnings of tactical inbound missiles and continue to generate combat airpower despite missile attacks. Cope Sumo, PACAF’s new resiliency exercise concept, is based upon the successful Salty Demo exercise held in Germany (US Air Forces in Europe) in 1985. Cope Sumo will test our ability to rapidly disperse, flush, and recover aircraft within the theater.

Recovery and reconstitution entail withstanding the impact of an enemy attack and then restoring sortie generation. Because of problems encountered in applying the other elements of passive defense (difficult to hide, harden, or replicate) to PACAF's airfields, reconstitution via airfield damage repair has come to the forefront. Again teaming with the Air Force Civil Engineering Center, PACAF/A7 has supported critical runway assessment and repair (CRATR), a combination of new technology materials and a streamlined 11-step process designed to repair as many as 120 airfield craters within 8 hours. Under the new process, Airmen clear debris from the surface of the flight line, cut a square hole around the damaged area with a specialized saw, and remove the remaining concrete. They then fill the hole with a high-strength concrete, followed by a rapid-set concrete cap. The repaired area is ready for use in as little time as 30 minutes. PACAF has programmed for CRATR at its MOBs to ensure the restoration of combat-sortie generation quickly despite enemy attacks.

The Best Defense Is a Good Offense: Attack Operations

Power projection is, and always will be, the bread and butter of the US Air Force. Only the United States can project airpower at the time and place of its choosing anywhere on the planet. Accordingly, attack operations—another important aspect of IAMD—are synonymous with offensive counterair or strike operations, whereby we destroy the enemy's systems first so he cannot use them against us. Eliminating threats before terminal defenses must engage seizes the initiative and alleviates the need to survive an air attack. If so directed, PACAF can contend with threats at the time and place of its choosing. Toward this end, it can leverage offensive counterair assets with global capability, inside or outside the theater, including fifth-generation fighters like the F-22 and F-35. PACAF's diverse, highly responsive, and extremely lethal attack operations translate into a huge IAMD advantage. The previously mentioned joint theater air and missile defense process integrates attack operations with active defense. It is centered on the ATO cycle, giving the AADC a blended means to coordinate offensive opera-

tions (joint force air component commander) with defensive-natured attack operations (AADC). By fusing both of these functions, COMPACAF truly integrates air and missile defense.

The Future of IAMD in PACAF

Because the Asia-Pacific is replete with challenges and potential threats to regional security, a robust IAMD is a strategic imperative. China, which is stockpiling ballistic missiles and air-breathing systems, has a tremendous inventory capable of reaching beyond the second island chains. Meanwhile, North Korea continues to progress in its ballistic missile program, realizing steady gains in range and accuracy while regularly testing missiles. Additionally, the constant competition for oil, fishing, and other resources continues to spur disputes over the ownership of these resources. Pacific Command does not want to be caught on the wrong side of the IAMD mismatch should tensions flare. Therefore, PACAF's IAMD strategy ensures a mismatch in our favor.

To thwart a threat, we must be aware of it. Therefore, PACAF has generated IAMD initiatives that enhance regional awareness and better sharing of information. For instance, it has set the goal of expanding its real-time, joint common operational picture and establishing persistent, joint data-link architectures. These pictures and shared data-link architectures will allow PACAF to constantly monitor activity in the area of responsibility, reducing the chance of surprise. With enhanced early warning and greater operational awareness, we are more likely to have our forces positioned and ready to deal with any threat.

In line with the publication *America's Air Force: A Call to the Future*, PACAF's IAMD strategy also calls for the development and fielding of new, game-changing technologies.¹⁶ Rail guns, hypersonic missiles, and other cutting-edge technologies will give us an advantage for years to come and prove incredibly costly and difficult for our adversaries to overcome. Further, PACAF is looking at future requirements so that strategy drives the development of new capabilities.

To counter the proliferation of cruise missile, PACAF advocates renewed emphasis on and higher prioritization for specific defensive systems and persistent early warning systems—for example, an elevated and persistent cruise missile detection capability. Moreover, PACAF promotes prioritization of investment in short-range air defense capabilities as an affordable, in-depth IAMD solution. Systems like these add layers to our IAMD architecture, increasing resiliency, responsiveness, and lethality.

A robust IAMD architecture would not be possible without the cooperation of Japan, an important ally of the United States, in the name of collective security interests. Accordingly, PACAF also continues to lead ambitious and monumental IAMD endeavors with that country. The first is the establishment and execution of a bilateral area air defense plan with the Japan Self-Defense Forces that optimizes and incorporates highly capable in-theater resources available to the alliance. The second is a passive defense plan that will add resiliency and the ability to generate combat capability, even if we come under attack.

Finally, PACAF is improving IAMD expertise through training and education. Recently, it established the Pacific IAMD Center, which will reach initial operational capability by October 2015. The center will train theater joint and international IAMD professionals by using simulation tools and component subject-matter experts. It will coordinate IAMD exercises and training events to create balance for IAMD professionals across the theater, all the while engaging with allies and partners, ensuring them of our dedication to regional defense. These strategic initiatives are the way ahead. Without a doubt, PACAF is taking point on shoring up US and allied IAMD capability within the Asia-Pacific.

Conclusion

Viewing IAMD as its number-one priority, PACAF has learned from the lessons of history: IAMD is evolutionary, and we must remain committed in order to gain and maintain the strategic advantage. To

realize the desired end state, PACAF has established the IAMD line of operation committed to this task. It is strengthening theater relationships to add capability and share the burden of regional IAMD. Simultaneously, PACAF is fortifying the foundation of IAMD with agile, flexible C2. Finally, it is improving IAMD with active defense, passive defense, and attack operations through a series of current and future initiatives designed to improve capability and resiliency. Under PACAF's leadership, the United States, our allies, and our partners will continue to enjoy a robust IAMD capability in the Asia-Pacific for the foreseeable future, ensuring regional stability and the continued protection of US forces, allies, and vital security interests. ✪

Notes

1. Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1976), 331–34.
2. “End State,” Pacific Air Forces Command Internal Webpage, accessed 13 November 2014, <https://pacaf.eim.pacaf.af.mil/default.aspx>.
3. Joint Publication 3-01, *Countering Air and Missile Threats*, 23 March 2012, I-1, http://www.dtic.mil/doctrine/new_pubs/jp3_01.pdf.
4. *Ibid.*, GL-13.
5. *Ibid.*, I-4.
6. *Ibid.*
7. *Ibid.*, I-3.
8. The British used a network of radar stations termed “Chain Home” to provide early warning and scramble their fighters against the Germans’ aircraft. This approach proved so effective that the British were eventually able to defeat the Luftwaffe.
9. During the war, these weapons accounted for about 24,000 British casualties, proving the feasibility of attacking the enemy from long range without risking either people or aircraft. In the long term, the introduction of missiles sparked an ongoing arms race and influenced the direction and advancement of modern IAMD.
10. Schriever’s monumental success not only reflected the fruition of Billy Mitchell’s ideas of producing strategic effects through airpower, but also forever changed airpower and tipped the balance of power in America’s favor at a crucial time during the Cold War. For a better understanding of General Schriever’s contribution to IAMD, see Neil Sheenan, *A Fiery Peace in a Cold War: Bernard Schriever and the Ultimate Weapon* (New York: Random House, 2009).
11. However, the Nike-Zeus antimissile system was an ambitious project for the time. In the end, the technology simply wasn’t advanced enough to hit a bullet with a bullet.

12. Strategic Air Command devised another tactic—dispersal—that it used in the late 1950s and 1960s to complicate enemy planning. Dispersal divided large B-52 wings of 45 aircraft into smaller wings of 15 aircraft each and relocated them to other bases. Such tactics increased the number of targets confronting Soviet planners and reduced the time to get the alert force off the ground. Office of the Historian, Alert Operations and Strategic Air Command, 1957–1991, 4–5.

13. Gen Martin E. Dempsey, “Mission Command White Paper” (Washington, DC: Joint Chiefs of Staff, 3 April 2012), 3–6, http://www.dtic.mil/doctrine/concepts/white_papers/cjcs_wp_missioncommand.pdf.

14. Ibid.

15. The PACAF commander is the theater commander of Air Force forces (COMAFFOR), theater joint force air component commander (JFACC), and theater AADC. The commander of Seventh Air Force is the designated AADC for the Korean theater.

16. Headquarters US Air Force, *America's Air Force: A Call to the Future* (Washington, DC: Headquarters US Air Force, July 2014), http://airman.dodlive.mil/files/2014/07/AF_30_Year_Strategy_2.pdf.



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To Enable and Sustain

Pacific Air Forces' Theater Security Cooperation as a Line of Operation

Lt Col Jeffrey B. Warner, USAF

You can't surge trust or "request for forces" . . . relationships.

—Gen Hawk J. Carlisle
Former Commander, Pacific Air Forces

The complexity of coordinating a multinational airlift response cannot be understated. The Marines did a super job of setting the conditions for success and we simply expanded on their foundation.

—Col Mike Minihan, Operations Office
Air Component Coordination Element
Joint Task Force 505

Devastation, hunger, disease, and vulnerability were Typhoon Haiyan's known effects on the people of the Philippines in November 2013. However, there were other effects—those that demonstrated the strong responsiveness and leadership of the Philippine government and the international partnership and commitment in the aftermath—including those between Pacific Air Forces (PACAF) Airmen and their joint, interagency, allied, partner, and Philippine counterparts. The resulting synergy was the delivery of relief aid and safe transport of thousands affected by the storm. In only days, in coordination with the Philippine government, Airmen from the 36th Contingency

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Response Group landed in Tacloban, and the concluding humanitarian assistance exercise Cope South turned “real world.”¹ The need was great: airfield repair, security, cleanup, and infrastructure. They immediately established contacts with key stakeholders on the ground, assessed requirements, and began restoring the airfield to functionality, enabling it to receive supplies and transport people to safety by airmen from 11 nations.² How was PACAF able to effectively, quickly, and accurately partner with an important ally and other stakeholders to support the United States Agency for International Development? How did we know how to partner with the joint team, the US Embassy in Manila, and fellow airmen from allied and partner nations to provide tailored, effective response in the wake of a humanitarian security incident? Among many reasons, five stand out as representing the groundwork laid over many years to promote success in a crisis: (1) by building relationships, we learned our Philippine partner’s viewpoint and the actions that would appropriately demonstrate US security commitment; (2) we learned how our fellow airmen in the Philippines found solutions; (3) we learned how our joint partners would contribute; (4) we learned how our allied and partner air forces could and would contribute to a security challenge; and (5) we practiced what we learned in bilateral and multilateral settings.

Effective theater response doesn’t “just happen.” It comes from a long-term investment of strategy, planning, relationships, and engagement. PACAF’s theater security cooperation (TSC) line of operation (LOO) supplies a framework to integrate PACAF’s operations, activities, and actions (OAA). This concept of security cooperation assures alignment with higher guidance, builds efficiencies, and mitigates what has been referred to as the “tyranny of distance.” In short, PACAF’s successful contribution to Operation Damayan can be found in its TSC LOO.

PACAF organizes its TSC into a LOO as an integrative framework to advise and guide all of its security cooperation OAAs towards end states that support US Pacific Command’s (USPACOM) strategy—and, ultimately, national priorities in the rebalance to the Asia-Pacific. What

follows is not TSC theory but a practical framework of how security cooperation with Asia-Pacific allies and partners succeeds—by asking four fundamental questions: (1) What is TSC, and how does PACAF define it as a LOO? (2) Why conduct air-centric TSC in the Pacific theater, and how does it assure success for both the air component and partner? (3) How does that strategy become a framework for engagement? (4) What does the future hold for PACAF's security cooperation?

This article first clarifies commonly used (but frequently misunderstood) terms and describes PACAF's organization of TSC into a LOO. It then explores the reasons why TSC is important (the fact that it draws on national-level strategy, demonstrates regional commitment, empowers partners, and overcomes regional operational challenges). From this foundation, the article examines how we use the strategy to develop joint, interagency, and intracomponent processes that guide, plan, and resource security cooperation. It then surveys the types of engagements affecting Operation Damayan, describing the investment in the Asia-Pacific with allies and partners and their influences on the outcomes. Finally, the article discusses both the issues and the way ahead.

What Is Theater Security Cooperation, and How Does Pacific Air Forces Define It as a Line of Operation?

The wide variety of terms associated with security cooperation, as well as its interagency nature, often leads to a misunderstanding of the concept. That said, we should first explore its official definitions and then address how PACAF organizes security cooperation into a LOO.

Security cooperation is a broad, overarching term that describes diplomatic and military activities to increase cooperation among countries.³ Security assistance is a type of security cooperation that can focus on both civilian and military activities to develop specific capabilities in a country.⁴ Building partner capacity as a type of security assistance involves the process of identifying and developing a partner nation's military capabilities needed for both diplomatic and military objectives.

Because security cooperation can involve diplomatic and military objectives, it is primarily financed through both types of funds allocated by Congress—Title 10 for the Department of Defense and Title 22 for the Department of State.⁵

Building partnerships reflects the “human element” of security cooperation—where PACAF is most directly involved. Building partner capacity deals with things, organizations, and abilities whereas building partnerships concerns the relationships and understanding between stakeholders, which are developed through purposeful interaction to solve common security problems.⁶ PACAF’s Airmen work towards these ends in the following three ways:

Learning Who Our Partners Are

During face-to-face interaction, relationships and trust are built at senior-leader- and working-group-level visits as we get to know those who either share in our military profession or serve as key civilian stakeholders.

Learning How Our Partners Approach Issues

Exchanges of subject-matter experts, observer programs, enlisted engagements, and other forums increase knowledge about approaches to security that entail using airpower—among the United States and its allies and partners.

Learning What Our Partners Do

One minute we would be coordinating airlift slot times with a member of the Japan Air Self-Defense Force and the next, an Australian airman. . . . All of us were speaking the same language, though—how to best support our Philippine allies.

—Capt Mark Nexon
Air Component Coordination Element
Foreign Airlift Liaison
374th Airlift Wing

Combined exercises and initiatives provide the real-time application that allows us to practice cross-cultural competency, learn interoperability, and promote mutual understanding about decision making, processes, and priorities. Clearly, the above definitions suggest the need for PACAF to understand these security cooperation mechanisms, policies, and legal guidelines—and to immerse itself deeply in the customs, culture, politics, and capabilities of partner nations. At the same time, PACAF must assess what it needs in order to succeed in USPACOM's area of responsibility.

The US Air Force develops international Airmen with unique knowledge to advise and guide security cooperation activities of the command. This expertise helps to ensure that TSC activities remain aligned with US government and combatant command priorities, properly resourced within legal guidelines, and capable of maximizing human relationships with allied or partner air forces; furthermore, they influence the Air Force cooperation situation in the theater towards stability and support the success of Air Force airpower in the region. These regional and political-military strategists (also known as “desk officers”) offer proficiency that guides TSC in a continuum from national and theater guidance to US and partner-nation airmen working together at engagements to promote Asia-Pacific security.⁷

Joint Publication 5-0, *Joint Operation Planning*, reveals two ways of conceptualizing a LOO. One way describes the orientation of forces in a combat situation, and the other portrays the sequencing of activities towards an objective. As it relates to security cooperation, PACAF uses this concept of “connecting actions on decisive points” to focus on and provide clarity to TSC activities.⁸ For PACAF, this concept provides a way to think about and apply security cooperation planning in an organized, thoughtful manner.

What are the implications of these concepts? First, TSC LOO objectives can be derived from the other LOOs. This situation creates a prioritization hierarchy with regard to TSC objectives—especially in these resource-restricted times. Second, since all of the LOOs are adequately

empowered by TSC activities, then by implication they support USPACOM's strategy. Third, TSC as a LOO implies sequenced activities leading to a desired end state—regional stability and prosperity.

Why Conduct Air-Centric Theater Security Cooperation, and How Does It Promote Regional Stability?

Security cooperation in the Asia-Pacific region supports the US whole-of-government strategic plan—the national security strategy. This awareness of national priorities is essential to assure mission alignment. Furthermore, for some security responses in the Asia-Pacific region, airpower is uniquely positioned to support USPACOM's role in national security—by promoting coordinated responses, empowering partners in areas of common interests, and overcoming the “tyranny of distance.”

The National Security Strategy Vector and Defense Strategic Guidance

The national security strategy emphasizes the importance of engaging “nations, institutions, and peoples around the world on the basis of mutual interests and mutual respect” and directs our military to “pursue military-to-military ties with a broad range of governments.” This group includes our alliances, which the strategy describes as the “bedrock of security in Asia.”⁹ Moreover, in the defense strategic guidance of 2012, we see areas of emphasis for security cooperation regarding the Asia-Pacific region.¹⁰

Promotion of Coordinated Responses and Regional Commitment

Further, the national military strategy speaks specifically of our commitment to the Asia-Pacific region: “We will expand our military security cooperation, exchanges, and exercises with the Philippines . . . working with them to address domestic and common foreign threats to their nation’s integrity and security.”¹¹

Empowerment of Partners for Their Own Security and Our Common Interest

The ACCE [air component coordination element] has met all air coordination requirements and assistance benchmarks set by the Philippine government and the JTF [joint task force]. The PAF [Philippine Air Force] is thankful for their support during the initial and surge response phases. . . . We are confident that their assistance is no longer required.

—Lt Gen Lauro Dela Cruz
Commanding General
Philippine Air Force

The national military strategy gives PACAF the joint context of how the military is used to support national priorities. For example, the strategy describes military use as follows: “Leveraging our capabilities and forward presence, we must play a supporting role in facilitating U.S. government agencies and other organizations’ efforts to advance our Nation’s interests. In some cases, we will serve in an enabling capacity to help other nations achieve security goals that can advance common interests.”¹² Empowered partners can become increased contributors to regional security.¹³

Overcoming the “Tyranny of Distance”

The Asia-Pacific region covers 16 time zones and 52 percent of the earth’s surface—most of it covered by water.¹⁴ The extreme distances necessary for global reach are uniquely matched to airpower’s ability to get to a crisis location quickly. The defense strategic guidance of 2012 describes military capacity in the wake of disasters as “rapidly deployable capabilities, including airlift . . . medical evacuation and care . . . that can be invaluable in supplementing lead relief agencies.”¹⁵ Additionally, the *US Air Force Global Partnership Strategy* of 2011 notes that airpower possesses “unique capabilities that can mitigate some of the global challenges we face while we operate with our Joint partners to meet our national security objectives.”¹⁶ In the case of Operation

Damayan, rapid global mobility, one of our service's core functions, met this need. When such mobility is enhanced by joint, allied, and partner contributions, the results are significant.

How Does Theater Security Cooperation Strategy Become a Framework for Engagement?

The TSC LOO provides a mechanism to advise and guide the planning of all TSC-related OAs conducted by the other four LOOs and PACAF as a whole. But where do we start? PACAF's international affairs specialists identify the TSC-related emphasis in the higher-level guidance and “crosswalk” the priorities and emphasis from the broad objectives to the specific tasks. What follows is our TSC LOO sequence of strategy to plan.

US Pacific Command Guidance

To support the above strategic priorities, USPACOM's strategy and plans guide PACAF in areas of emphasis on regional security cooperation, joint teamwork, and the joint needs of its Air Force forces for cooperative end states. Doing so gives PACAF two ways of supporting USPACOM's security cooperation objectives: (1) through ways specific to an air component (through the LOOs), and (2) through other cooperative activities that are part of the joint contribution to regional stability. As we built relationships and interoperability with our allies and partners, we learned how each partner's forces could and would contribute to a successful Damayan response. Many countries of widely varying capabilities, commitments, and interests worked together across all of our components in all domains to support the humanitarian effort.¹⁷

Interagency and Host Nation Coordination

To assure unity of effort, USPACOM's security cooperation offices align their country security cooperation plans to support the national security strategy through a synergy of military and embassy objectives. The

plan is then synchronized with host nation interests to yield a “bottom-up” and “top-down” integrated strategy that serves as a unified “demand signal” to shape PACAF’s (and other components’) cooperation planning.

Other Lines of Operation

As a component major command, PACAF functions in two capacities: First, it communicates the organization, training, readiness, and equipping requirements of our forces (including those having interoperability implications with allies and partners) to Headquarters Air Force. Second, PACAF provides USPACOM the airpower-planning perspective needed for the joint team as an air component.¹⁸ By means of this second function, the LOOs can influence the arrangement of OAAs necessary to support USPACOM’s airpower requirements. Understanding of the airspace, ground aviation infrastructure, security demands, and needed common skills for missions with partners made the power projection of airlift possible to the Tacloban airfield after the storm.

In sum, the strategy “crosswalk” and the needs of the other four LOOs shape the priorities for security cooperation planning. As a result, the TSC LOO stands apart from the others as a unique, integrative LOO in that it serves two requirements simultaneously: (1) it assures PACAF as the air component cooperates with our allies and partners in a way that successfully contributes to the USPACOM strategy, and (2) it influences the region towards stability in its activities, in coordination and cooperation with our joint partners and the interagency—particularly the Department of State.

Plans for the Theater Security Cooperation Line of Operation: Advise, Guide, and Prioritize

Through long- and short-term adaptable planning, we develop possibilities of how best to work together with allies and partners. Since PACAF’s TSC developed into a LOO, the common security cooperation mechanisms already in place are evolving into a more sequenced and deliberate plan towards a defined cooperative end state. This iterative

process also assists the resourcing communication—either through USPACOM or the secretary of the Air Force’s International Affairs Office. Ideally, PACAF’s security cooperation concept can also shape synchronization with ongoing security assistance activities that occur in the Asia-Pacific but are directed through non-PACAF entities, such as the Air Force Security Assistance Training Squadron and foreign military sales or financing activities. Careful communication is necessary to assure proper alignment and unity of effort.

Security cooperation in the Asia-Pacific also reflects an effort of the total force. The State Partnership Program is the National Guard’s contribution to security cooperation efforts in the region. In the Asia-Pacific, eight nations are paired with state National Guard organizations—providing continuity of experience with personnel and the inclusion of Air National Guard civilian experience that can enhance a sustained relationship. PACAF’s continuing efforts to synchronize State Partnership Program initiatives with air-component objectives will improve efficiencies through the optimal matching of partnership opportunities.¹⁹

The TSC LOO’s road map is encapsulated in an engagement resource plan that reflects the alignment of higher guidance and is designed to advise and guide the command’s activities in the region. Joint in its essence, it communicates and integrates air-component TSC plans to complement the joint team. With all stakeholders issuing TSC plans to support joint intent, we produce three important results: (1) assured alignment with USPACOM’s theater strategy; (2) synchronized OAAs from other allies, partners, and interagency (particularly the United States Agency for International Development) and joint components; and (3) integrated guidance from the embassy’s security cooperation office, which has face-to-face interaction with the partner nation and knows where common interests overlap.

Clear combatant command and diplomatic guidance is not enough. Which PACAF OAAs receive priority? For TSC to be effective, awareness of the other four LOOs offers insight. For example, to develop resilient Airmen who work cross culturally with our allies and

partners, we must provide opportunities to develop those cooperative relationships.

Resourcing Security Cooperation

Without proper resourcing, security cooperation plans are merely theory. Because of the broad variety of legal funding authorities, a “patchwork” must be designed that assigns security cooperation funding towards goals within the legal guidelines set by Congress.²⁰ Finding optimal combinations of these varied funding streams takes a combination of problem solving, legal sensitivity, and unity of effort across the components and interagencies.

TSC resourcing is a cyclical process—subject to developing events and the timing of planning cycles. As available resources dwindle, stakeholder planning becomes more important to assure proper prioritization of TSC effort. OAAs and plans should require sufficient lead time to assure opportune inputs for inclusion in USPACOM and Headquarters US Air Force planning. Finally, plans require review and validation in order to follow defined legal guidelines regarding the use of Title 10 or Title 22 funding—and to point the way ahead for development of new security cooperation capabilities or activities not currently existing in-theater. At this point, the TSC LOO offers policy guidance.

PACAF uses many of the traditional security cooperation authorities to fund OAAs. Title 10 authorities supply resourcing to assess interoperability, build relationships for future combined efforts, gain access to and knowledge about future cooperation opportunities, facilitate exercise participation and preparation, and promote information sharing in arenas of mutual benefit.²¹ These types of authorities can come from within PACAF’s operation and maintenance, or may be provided through special funding from USPACOM. The following addresses three types of such funds utilized by PACAF:

USPACOM’s area of responsibility includes the Asia-Pacific Regional Initiative, a unique funding source. As the name implies, this initiative allows USPACOM to apportion some Title 10 funding to build partnerships in areas where an emerging security relationship is widely beneficial

to the Asia-Pacific region. USPACOM uses these resources to enable a variety of security cooperation activities with allies and partners.²²

Combined exercises provide real-time experience and interaction with our partners to increase understanding, communication, and security problem-solving. The Developing Country Combined Exercise Program authority permits exercise participation towards that end.²³

With some partners, defraying expenditures increases the opportunity for participation in subject-matter-expert exchanges (SMEE), exercise plans, and other Title 10-funded activities. Personnel Expense, a USPACOM funding authority, pays incremental travel expenses for allies and partners to attend PACAF-hosted events that improve combined knowledge.²⁴

USPACOM prioritizes these funds across the Army, Navy, Marine Corps, Air Force, and Special Operations Command components in the Asia-Pacific to maximize contribution to its strategy for the region. PACAF receives about \$2.5 million each fiscal year in these authorities towards Title 10 security cooperative engagements that expand collaboration to enable regional responses like those to Typhoon Haiyan. This small addition to PACAF resources garners huge dividends in access, trust, and improved interoperability.

These types of Title 10 funds have two major legal limitations: First, they cannot be used for certifiable training of our partner nations. This falls into the realm of security assistance, overseen by the Department of State. Second, not all countries are eligible to receive this type of funding. In such cases, the Department of State delegates to the Department of Defense the management of funding set aside to build partner capacity (through purchases or training) in accordance with US law.²⁵

Advocating for Theater Security Cooperation Capabilities

Host nation aerovac planning and execution have been extremely successful and key to easing patient burden on local healthcare assets. . . . I continue to be impressed with host nation aerovac planning and response.

—36th Contingency Response Group
Operation Damayan Situation Report

Interoperability is a word that gets used often during this exercise. . . . We want to not only get safe, effective training, but also want to learn from our partners and share lessons learned.

—Col John Parker
Cope North Exercise Director

The activities of PACAF, the air component to USPACOM, reveal opportunities for better and broader engagement in the region, requiring PACAF-specific security cooperation capabilities to fill capability gaps. In some cases, they involve proposed additions or modifications to PACAF capabilities to better execute TSC or may entail advocacy for resources, funding, and manpower.

Some dimensions of building partner capacity in the Pacific Region include the following:

- Foreign military sales, foreign military financing, or direct commercial sales are types of security cooperation not directly managed by PACAF, but the command provides coordination as necessary to those involved in the case management.
- Training to standard involves training classes and certification in areas deemed mutually important. Again, PACAF may coordinate or advise, but the actual training is conducted through Title 22–funded entities such as the Air Force Security Assistance Training Squadron—through mobile training teams.
- Regarding international military education and training, PACAF advises on opportunities for our allies and partners to gain military education at our professional military education schools.

Although not directly involved in the management of these security assistance initiatives, PACAF monitors, coordinates, and advises on Pacific-relevant political-military issues to the Department of Defense’s Security Cooperation Office (located at the embassy) and to the Headquarters Air Force Directorate of International Affairs (SAF/IA).

The TSC LOO culminates with the execution of OAAs by individuals, units, and staffs to fulfill the PACAF commander’s desired end states and support USPACOM’s TSC. Alongside the complementary security cooperation activities of the secretary of the Air Force’s International Affairs Office and Air Force Security Assistance Training Squadron, PACAF monitors Title 22 activities and negotiated agreements to maximize unity of effort. It also executes Title 10 cooperative activities through individual Airmen subject-matter exchanges, combined exercises, and multilateral forums, to name a few. Below are a few examples of the types of engagements PACAF uses to promote interoperability, stability, and multilateral security solutions in the region. In short, the execution of TSC occurs through the other four LOOs.

Title 10 cooperative activities can be grouped into two main bilateral and multilateral categories: (1) SMEE, an organized forum of sharing of best practices, up-to-date developments, and opportunities to gain better understanding of our partners’ narrative and methods, and (2) the

combined exercises and activities that put the lessons learned over time into action. Prior to Operation Damayan, PACAF promoted access, interoperability, and security empowerment through the following types of initiatives:

Over the years, Pacific Defender—a security forces SMEE—has developed into a multilateral annual event with 23 partner nations participating in the last five years. Focusing on key functions such as crowd control, non-lethal weapons, law enforcement operations, antiterrorism / force protection, and airfield security established a foundation for partnership with the Philippine military to provide security for Tacloban airfield in the wake of the typhoon.²⁶

Pacific Unity develops military-civilian interaction with the partner nation through projects that contribute to mutual understanding of infrastructure, development, and humanitarian efforts. A recent Pacific Unity in the Philippines in 2012 forged relationships with our Philippine Air Force counterparts that not only served local humanitarian interests (such as the building of schools) but also developed stronger relationships and understanding that can make a difference when security challenges such as a natural disaster arise.²⁷

Pacific Angel, PACAF's premiere medical engagement, allows real-time sharing of medical and civil engineering expertise in the local environment.²⁸ The benefits of these engagements are enormous: PACAF gains situational awareness of health issues and exercises our ability to meet them; we learn our partners' best practices to deal with their local health problems; and we discover how to create complementary methods that offer tangible humanitarian solutions.²⁹

Air Force international health specialists (IHS) are critical enablers in the joint community for regional security cooperation. These individuals operate globally to build partnerships and promote interoperability with partner nations to achieve regional security objectives. Health security expertise, coupled with advanced security cooperation, operational planning, and cultural and language training, defines the IHS capability. These specialists use health and medical services as

the mediums through which to engage regional partners to improve resilience to man-made and natural disasters. PACAF's IHS activities concentrate on the Air Force Medical Service's core competencies of aviation medicine, patient movement (specifically aeromedical evacuation), health protection of the force, and disease surveillance and containment. To promote common security goals, IHS activities engage partner military and civilian institutions in which unique language and cultural knowledge is necessary in combination with military medical expertise.³⁰ PACAF's IHSs conduct roughly 20 activities per year as stand-alone health engagements or as components of operations or exercises. The dividends from IHS activities became obvious in Operation Damayan: three years of capacity-building activities related to patient movement resulted in the self-sufficiency of a partner nation and negated the need to deploy Department of Defense aircraft and aeromedical evacuation crews to support humanitarian assistance and disaster-relief operations. Airpower exercises like Red Flag–Alaska include an Executive Observer Program that gives allies and partners real-time insight into airpower operations.³¹ During the exercise, leaders representing the Pacific and various other regions throughout the globe bring a diversity of perspectives—promoting interoperability and developing relationships and trust.

Cope engagements exercise with our partners the provision of airlift, humanitarian assistance, and disaster response under a variety of different operational environments. These engagements can be bilateral and multilateral—providing ample opportunity for expanding participation to new partners and new roles. For example, the coordinated response that made PACAF's role in Damayan successful came from the improved integration and communication stemming from regular participation in Cope North by allies and partners over the years.³² The 36th Contingency Response Group participated in the Cope North exercises in Guam, creating the context to apply their cross-functional skills in a real-world humanitarian situation like Damayan.³³ Airmen-to-Airmen talks and enlisted engagements increase common understanding of the development of the force and ways of recruiting, training,

educating, and developing personnel. The relationships we build with leaders from across the region create a network that we can call on in a crisis and promote interoperability. Here we learn our partners' narrative, explore how they address challenges, and promote military aviation institutions that contribute to regional security.

Challenges

Security cooperation in the Asia-Pacific carries notable challenges as well. First, it is collaborative—by intent and necessity. This interaction creates unknown, difficult-to-assess effects until a crisis erupts. These security relationships are built with the consent and support of our allies and partners, requiring long-term partnership in areas of common interests, operating with cross-cultural awareness, and—most importantly—listening.³⁴ Second, because security cooperation is inherently an inter-agency effort, teamwork with the diplomatic community is essential—to assure that goals and objectives are complementary. This calls for time for coordination and an awareness of how to best orchestrate the collaboration.³⁵ Third, enthusiasm for security cooperation's promise could possibly develop redundant activities and create “engagement fatigue” with our partners. The combination of these challenges with the necessity of merging multiple legal authorities creates the need for a long-term perspective to mitigate such issues.

Conclusion

All of that said, where is PACAF's security cooperation going? First, the trend is distinctly multilateral. PACAF wishes to make beneficial contributions to multilateral efforts with our allies, the Association of Southeast Asian Nations, and other regional partners.³⁶ Second, the organization of TSC into a LOO demands refinement and process improvement. Greater integration with the other LOOs and more synchronization will become crucial in a resource-constrained environment. Above all, PACAF seeks to sustain the greatest benefits

of TSC: improved theater response to crises, reduced chances of misunderstanding, and better stability and prosperity for all.

Regional security and stability in the Asia-Pacific is a team sport. The security cooperation activities that promote it flow from national-level strategy guided by the combatant commander, synchronized with joint and interagency entities, planned and practiced as a LOO, and proven in crisis. In PACAF this use of the LOO concept offers a construct to think about using TSC to (1) enable airpower's unique contribution to the joint and allied team, (2) increase the region's ability to handle humanitarian and natural disasters, and (3) move the region towards stability. Although PACAF is ready to respond and succeed in the face of crises, it is far better to prevent them from occurring in the first place, establish cooperative arrangements ahead of time, and reduce misperceptions and miscalculation.³⁷ The investment in TSC must take the long view to assure realization of these benefits and to provide the time to incorporate lessons learned. Operation Damayan stands as an example of the United States standing by an ally and—under the leadership of the Philippine government and its military—working closely with a broad coalition of international partners to help save lives. ★

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Empowered Commanders

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Maj Eric Theriault, USAF

We cannot solve our problems with the same thinking we used when we created them.

—Albert Einstein

One glaring lesson that the US Air Force should learn from the wars in Iraq and Afghanistan is the need to empower subordinate commanders to meet the dynamic challenges of combat. History has repeatedly shown us that to attain our goals, frontline commanders must have the flexibility to outmaneuver and defeat the enemy. The Air Force has always recognized flexibility as a tenet of airpower and has traditionally sought to achieve it through its principle of centralized control/decentralized execution (CC/DE).¹ The common practice of the theater commander, Air Force forces (COMAFFOR), who normally also serves as the theater combined force air component commander (CFACC), supported by the theater combined air operations center (CAOC), did not provide the integration and flexibility needed for the operations in either Iraq or Afghanistan. In those complex counterinsurgencies, the Air Force experienced an evolution of command and control (C2) from air component coordination cells, to empowered cells, to air expeditionary task forces with delegated control authorities.² In short, operational and tactical operations demanded more than the theater CFACC construct offered. They needed

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face-to-face integration between the air component and other coalition commanders to build trust, understanding, synergy, and resiliency.³ Above all, combat required commanders at all levels to be empowered to support the joint fight and defeat the enemy.

As the United States shifts its focus from the Middle East and rebalances towards the Pacific and its antiaccess/area-denial (A2/AD) challenges, we realize that “the simplicity of centralized control and decentralized execution renders it incomplete when applied to modern contested and denied operations.”⁴ Whether due to the complexity of a counterinsurgency mission or a large force-on-force operation in a contested, degraded environment (CDE), the result is the same—airpower innately requires delegated control if it is to become part of the C2 solution. That is not to say that delegated control is the solution, but it definitely must be *part* of the calculus. For Pacific Air Forces (PACAF), that delegated control would be dispersed across multiple C2 nodes separated by vast distances but would remain unified under one commander. Herein lies PACAF’s C2 strategy of *centralized command, distributed control, and decentralized execution*.⁵ This article addresses the necessity of this paradigm shift, the common challenges of C2, PACAF’s six critical capabilities of C2, and the requirement to properly empower subordinate commanders to execute the CFACC’s operational design.

The joint community has long embraced the notion of empowering tactical commanders with operational responsibilities, as evidenced by joint doctrine and practices (e.g., mission command, command by negation, and mission-type orders).⁶ Airpower and the Air Force, however, are different. Airpower’s range, speed, mass, and ability to simultaneously affect the tactical, operational, theater, and strategic levels of war have led the Air Force to rely more heavily on centralized control to better balance “tactical needs with strategic requirements.”⁷ That reliance on centralized control and cyberspace superiority, though, has led to complacency and atrophy. Nonconventional warfare, counterinsurgency, and operations in a CDE all demonstrate that Airmen

must not only operate from centralized control or distributed control but also *flex* back and forth between the two—and do so while maintaining momentum, preserving efficiency, and honoring the CFACC's intent. This daunting requirement is obtainable when subordinate commanders are properly empowered.

Defining the Problem

Although C2 issues regarding airpower are not unique to PACAF, some characteristics of US Pacific Command's area of responsibility exacerbate PACAF's C2 efforts. Specifically, the tyranny of distance leads to extended air, land, sea, space, and cyberspace lines of communication; vast spaces call for larger force protection and sustainment; greater areas necessitate more intelligence, surveillance, and reconnaissance requirements—all of which drive C2 demands higher and higher. Regardless, PACAF's C2 problems are fundamentally the same as those faced by every command today. That is, we all have become gluttons of information; we all have become reliant upon cyberspace superiority; we all are challenged with turning terabytes of information into usable intelligence; and we all have grown complacent by regarding centralized control at the theater level as the “one size fits all” answer to C2 airpower.⁸ To complicate matters even more, C2 is a topic so broad and interconnected that it is difficult to define and build consensus on how best to manage it. Airpower advocates often fail to capture its complexities and intricacies, assuming that mission success is synonymous with sound C2 practices.⁹ Rarely is that the case. Collectively, these issues lead to the tendency to talk about C2 as a science of control wherein human actions are predictable and controllable, rather than an art of command—the “skillful use of authority, instincts, intuition, and experience in decision-making and leadership.”¹⁰ Consequently, how do we discuss a subject so ubiquitous and undefined—one that has different meanings to different people and that changes, depending upon the level, phase, and type of conflict under discussion?

Six Critical Capabilities

PACAF's approach to this dynamic, complex problem involves analyzing and managing C2 by six (PACAF identified) critical capabilities: battlespace awareness, resilient architecture, defensive cyberspace operations, combat support C2 (CSC2), C2 execution, and war-fighter integration. Such capabilities remain consistent regardless of the level, phase, or type of war under discussion. (For example, commanders at both the operational and tactical levels require battlespace awareness; they just have different parameters.) These six capabilities allow PACAF to develop C2 policies and address issues and opportunities for commanders throughout the command.

Battlespace Awareness

We refer to the degree to which a commander can keep situational awareness over his or her operational area as “battlespace awareness.” Given the speed, range, and mass that airpower brings to the joint fight, the speed and accuracy of information are absolutely vital to the successful command of airpower. However, unlike today's practice of flooding commanders with every piece of information, battlespace awareness seeks to supply the commander with tailored information. Undoubtedly, what constitutes battlespace awareness for the theater CFACC differs from that for other commanders and/or tactical battle management C2 assets. Clearly, not everyone needs to know everything, everywhere, all the time. Commanders, therefore, must determine their information priorities, articulate them to their staffs, and develop information-management procedures that support C2 requirements. This guidance is especially critical for operations in a CDE where real-time guidance may not be available.

These battlespace awareness efforts, though, do not address *how* that information is collected, managed, or transferred to C2 nodes throughout an A2/AD environment. PACAF's power-projection team is addressing that matter. From a distributed control perspective, each subordinate node must assume, to some degree, intelligence functions

traditionally performed by the CAOC to support the commander in executing air and space operations. This additional workload drives a new set of organize, train, and equip requirements for the commander, PACAF (COMPACAF).

Resilient Architecture

Along with defensive cyberspace operations, resilient architecture seeks to raise the overall mission assurance of PACAF—hopefully, to avoid a communications-denied environment. It concentrates on defensive measures such as dispersed, duplicate, and redundant circuits and processes, as well as the manpower to execute cyberspace functions. These efforts complement the line-of-operations defensive measures of PACAF's integrated air and missile defense to improve the command's overall resiliency—specifically, hardening of facilities, dispersing and flexing of basing operations, establishing continuity of operations plans, and so forth. Resilient architecture's purpose is to support the communication requirements for commanders at all levels. Towards that end, PACAF has begun mapping mission-essential functions to the area of responsibility's cyberspace lines of communications. This cyberspace key terrain will allow commanders at all levels to maintain situational awareness of critical infrastructure and appropriately direct cyberspace measures. Recognizing that each region will likely have varying degrees of cyberspace capabilities, PACAF is developing tactics, techniques, and procedures for commanding and controlling these disparate nodes.

In part, these complex endeavors have led to advocacy for providing cyberspace support to disconnected war fighters throughout the command. According to Gen Michael Hostage and Larry Broadwell, "While never a panacea, technical solutions can certainly aid in the implementation of distributed control."¹¹ These developmental efforts by the Department of Defense include the combat cloud, joint information environment, and joint aerial layered network initiatives. These C2 systems not only offer greater cyberspace resiliency and support to

centralized command but also empower subordinate commanders by giving them access to shared data and a common operating picture—an urgent necessity for operating in a CDE. These multiple, distributed data centers limit the vulnerability of a central node and offer the trusted data needed for effective C2. The joint aerial layered network supplies the added advantage of extending cyberspace's range through the medium of air—a vital requirement for a maritime environment with limited terrestrial lines of communications. These collaborative efforts will create a living, reactive cyberspace domain and dramatically increase the overall resiliency of the theater's cyberspace architecture.

Defensive Cyberspace Operations

Complementing resilient architecture's *physical* efforts with *virtual* ones, defensive cyberspace operations include updated configurations, patches, firewalls, routing programs, sound information assurance practices, and encryption—in short, basic cyberspace hygiene. These operations also prioritize C2 systems and information requirements—PACAF's "Thin Blue Line." Simply put, defensive cyberspace operations are the C2 of C2 systems. Of course, in terms of a global commons, these efforts must be coordinated throughout the theater and with other Department of Defense and governmental agencies.

Combat Support Command and Control

Commanders at all levels can prioritize and direct resources between competing demands by means of CSC2, which implements combat plans in support of the C2 function and the agility to modify those plans as necessary to meet evolving operational requirements.¹² This important capability synergizes battlespace awareness with C2 processes to meet commanders' sustainment requirements. CSC2 enables a commander to concentrate mass as well as achieve unity of effort, efficiency, and the other principles of war and operations to meet his or her objectives.¹³ To enable this capability, PACAF has developed a

logistical common operating picture for the theater. Again, sustainment and other AFFOR duties have been traditionally carried out through centralized control at the theater level. In a CDE, these processes must be assumed by lower-command echelons that have to coordinate with other distributed control nodes throughout the theater to ensure that resources are provided in accordance with the COMPACAF's priorities. As before, this mission set drives new organize, train, and equip requirements for subordinate commanders and their staffs.

Execution of Command and Control

The “main effort” of the six critical capabilities, C2 execution takes the genius of the commander and transforms his or her operational design into executable plans and orders. Over the last three decades, the theater air and space operations center has conducted this effort. Today's fight, however, calls for all commanders, to some degree, to plan and execute operations to meet their commander's intent.¹⁴ The CFACC's intent, purpose, and expectations from subordinate command echelons are published in two ways: first, with broad, theater-wide guidance such as the joint air operations plan and the air operations directive; and second, with daily orders such as the air tasking order. In a CDE, these daily orders will likely not be available. Therefore, the CFACC's standing guidance must thoroughly articulate his or her design and purpose yet still allow subordinate commanders the flexibility to capitalize on fleeting enemy mistakes. Additionally, these documents must account for varying degrees of degradation throughout the command and offer simple, clear guidance to minimize the fog and friction of war during distributed control operations.

Due to the countless number of operational scenarios, the majority of PACAF's C2 efforts have concentrated on countering a communications *denied* environment, with subordinate C2 nodes working autonomously. In this denied environment, PACAF has addressed the following questions:

1. How does distributed control affect the COMAFFOR and all of the other operational command responsibilities (CFACC, area air defense commander, airspace control authority, space coordinating authority)?
2. How does the COMPACAF as the CFACC ensure that the operational plan is comprehensively understood throughout the area of responsibility?
3. Are subordinate commanders properly resourced and empowered to execute this plan?
4. What are the command relationships for a denied communications environment?
5. What are the “triggers” and tactics, techniques, and procedures for transitioning between centralized control and distributed control?
6. What missions should subordinate commands expect and for how long?

These questions and many more must be thoroughly articulated in standing COMPACAF guidance to enable distributed control, decentralized execution. For distributed control responsibilities, subordinate nodes must be properly organized, trained, and equipped to execute this new mission set.

War-Fighter Integration

Synchronizing the CFACC's operational design with the joint and coalition force produces war-fighter integration. PACAF actively engages with its sister components to maximize joint training exercises and opportunities. Furthermore, it has created the theater security cooperation line of operation to help foster the capability and understanding of partner nations. Ultimately, twenty-first-century conflicts require a whole-of-government approach, maximizing the capabilities from each component and partner nation to offset shortfalls caused by today's fiscal realities. All branches and partner countries have constrained re-

sources, and each party brings a unique perspective and capability to the joint team. Simply put, the United States does not have the resources to go it alone, nor does the world's political landscape support unilateral military actions. Therefore, any discussion of PACAF strategy must include war-fighter integration, and that begins with sound C2. Every critical capability addressed above must have joint/coalition considerations integrated throughout its efforts—information sharing, multinational cyberspace systems, common operational pictures, bilateral/multilateral operational plans, multinational sustainment processes, and so forth.

Operational Art and the Distributed Control Challenge

No discussion of *command* and control is complete unless it addresses operational art—the commander's ability to assess the political, military, informational, social, and economic landscape and then manipulate the factors of space, time, and force to harmonize tactical actions to meet national and theater-strategic military objectives.¹⁵ The commander's operational design is the core purpose of C2; all efforts are aimed at executing and supporting that design. Battlespace awareness, cyberspace superiority, CSC2, and war-fighter integration do nothing of strategic value if tactical actions lie outside the commander's operational design or if the design itself is flawed.

In distributed control operations, the responsibility of executing this operational design is delegated to tactical commanders. They are expected to execute operational functions to some degree—C2, intelligence, movement and maneuver, logistics, operational fires, and force protection—in addition to carrying out their tactical responsibilities. How do we expect that? The tactical level of war is ugly, personal. It demands that commanders turn chaos into logic and military victories.¹⁶ Battle requires total immersion and commitment as well as a feel for both the battlespace and the enemy—knowledge normally gained by contact. Conversely, the operational level of war requires that commanders be thoroughly immersed in national and theater

strategy; moreover, they must maintain both an awareness of the enemy's order of battle and a long-term vision that harmonizes tactical actions with operational objectives—leadership normally acquired by years of experience, study, and reflection.

Distributed control, however, presumes that tactical commanders have the capability and capacity to execute these operational responsibilities—that they can plan and execute operations beyond their tactical scope of responsibility. Executing the CFACC's operational art is the fundamental challenge to PACAF commanders and to distributed control. How will subordinate commanders plan and execute both tactical and operational operations simultaneously? Is staff augmentation sufficient, or is an entirely separate chain of command necessary? In either case, how do we expect subordinate commanders to execute and—more importantly—think operationally when it takes a CFACC years to develop that wisdom? Answering this question will call for deliberate efforts by the CFACC to groom, train, and exercise subordinate commanders to develop this skill set. Ultimately, the CFACC must trust those individuals to execute his or her operations in any environment. Building that trust and understanding, especially for operations in a CDE, will take practice, patience, and time.

Centralized Control, Decentralized Execution

Advocates for CC/DE argue that *distributed control* is already embodied in *decentralized execution*—that every echelon has a single commander who should have C2 processes that enable subordinate forces to execute their mission, regardless of connectivity. The concept of centralized command, distributed control, and decentralized execution embraces those same beliefs. *Centralized command/distributed control*, however, offers the recognition that command authorities are not only different than control responsibilities but they are also delegated differently. For example, a subordinate commander who is delegated tactical control would exercise it over his or her forces only—not on the forces above. Delegated control, on the other hand, does task tactical

commanders to execute both tactical- *and* operational-level control responsibilities. Delegated control requires commanders to look beyond their sphere of influence and coordinate across other Air Force, joint, and coalition nodes to achieve theater-wide effects. Collectively, these distributed operations equate to the COMPACAF's operational execution—summarized by Gen Hawk Carlisle's statement “the AOR [area of responsibility] will become a CAOC.”¹⁷ CC/DE fails to capture either this delegation or the nuances between operational- and tactical-level control. In short, CC/DE confines control within their tactical command borders whereas distributed *control* charges subordinate commanders with operational responsibilities and purpose. Distributed control directs commanders to plan and execute the CFACC's operation design with other command nodes. This empowerment of networked distributed commanders, which differs fundamentally from CC/DE, is necessary to command and control joint/coalition airpower effectively in an A2/AD environment.

Conclusion

No doubt, the asymmetric power of PACAF is its Airmen.¹⁸ They are smart, creative professionals who routinely reach their objectives by adapting operations to their environment. This innate flexibility and resiliency at the tactical level must transcend into operational C2. In an A2/AD fight in which cyberspace superiority is not assured, C2 of airpower necessitates *centralized command, distributed control, and decentralized execution*. The status quo is not an option. In modern warfare, tactical commanders must plan and execute both tactical and operational operations. To do so, PACAF recognizes that commanders must have six critical capabilities: battlespace awareness, resilient architecture, defensive cyberspace operations, CSC2 processes, C2 execution, and war-fighter integration, all of which drive new requirements for organizing, training, and equipping—the primary C2 effort for PACAF. In the end, though, the decisive factor in PACAF's success will be its empowered commanders and their ability to execute the COMPACAF's

intent—possibly in complete isolation and in a situation that no one planned for. That is, after all, the nature of war. ★

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Resilient Airmen

Pacific Air Forces' Critical Enabler

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The sun never sets on Pacific Air Forces (PACAF). From Alaska to Antarctica and from California to India, PACAF's area of responsibility (AOR) encompasses over half of the earth's surface. Few regions are as culturally, socially, economically, and geopolitically diverse as the Asia-Pacific, home to 36 nations. In this challenging operational environment, PACAF's Airmen relentlessly provide continuous global vigilance, reach, and power for the United States and its allies. To this end, PACAF needs "high performing, combat-ready, cross-culturally competent and mutually supportive airmen and families advancing regional security cooperation, minimizing vulnerability, and ensuring persistent presence and quality forward."¹ These attributes comprise the intent of the resilient Airmen (RA) strategic line of operation (LOO) and the foundation upon which we build and sustain PACAF.

In the face of such a vast, diverse, and demanding operational environment, force resiliency is a must, and that resiliency begins and ends with PACAF's Airmen. Built on the three core tenets of expanding engagement, increasing combat capability, and improving war-fighter integration, PACAF has instituted the RA strategic LOO as one of five interdependent LOOs that work in concert to posture forces for contingency operations, ensure stability and free access, deter aggression,

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and defend US interests. This article not only addresses the meaning of resiliency but also—and more importantly—examines why it is critical to the success of PACAF's mission. The article then scrutinizes the RA LOO in terms of specific initiatives, objectives, and desired effects. Finally, it demonstrates how the RA LOO is part of larger, strategic game plan to inject resiliency into our entire force structure as a means of fulfilling national objectives and reaching desired end states. Armed with better resiliency and an understanding of how each Airman can make a difference, PACAF's RAs will continue to stand ever vigilant, peerlessly capable, and unequivocally ready to take on the operational demands of the Asia-Pacific theater.

What Is Resiliency, and Why Is It Important?

A discussion of resiliency is not just rhetoric; it is mission capability, and we can always use more capability. Those who see resiliency training or initiatives as a waste of time would do well to view it in this light. Resiliency permeates our Air Force heritage, and it has been the deciding factor in countless wars and other military operations. We are all familiar with Giulio Douhet's axiom "flexibility is the key to air-power."² As it were, flexibility is an expression of resiliency. During World War II, resiliency allowed the "Mighty Eighth" Air Force to fly bomber missions despite over 47,000 casualties, including more than 26,000 killed in action.³ To put these numbers into perspective, during the war, more Eighth Air Force Airmen were killed in action in Europe than Marines in the Pacific.⁴ Furthermore, resiliency enabled Air Transport Command's India-China Division, commanded by Brig Gen William Tunner, to carry out the mission of airlifting supplies to China from India over "the Hump," an extremely dangerous portion of the Himalaya Mountains. Upon taking command, Tunner noted a delivery rate of around 12,000 tons per month and an accident rate of "two per every thousand hours flown," most of which were "total losses."⁵ For every 1,000 tons flown into China, three Americans lost their lives.⁶ By August 1945, Tunner's RAs had reduced the accident rate to 2 per every

13,600 hours and delivered 71,000 tons of air cargo.⁷ Resiliency was the inspiration for Executive Order 10631, Code of Conduct for Members of the Armed Forces of the United States (1955), and the source of strength for American prisoners of war in Vietnam as they endured torture, starvation, and mental and physical anguish—sometimes for years. Today, resiliency even lies at the heart of the “Airman’s Creed.” Consider the last stanza: “I am an American Airman: wingman, leader, warrior. I will never leave an Airman behind, I will never falter, and I will not fail.”⁸ Resiliency in the Air Force is nothing new; it exemplifies where we came from, who we are, and where we are going.

The nuances of the many definitions of resiliency are generally not that important. At its core, resiliency denotes the ability to remain strong, bounce back as required, and ultimately succeed. The Air Force defines it as “the ability to withstand, recover, and grow in the face of stressors and changing demands.”⁹ Operational resiliency is the capacity of the joint force to withstand attack, adapt, and generate sufficient combat power to achieve campaign objectives despite continued, adaptive enemy action. Granted, operational resiliency applies more to bases and force structures than people. However, Airmen embody the strength of the Air Force; they lead and execute the “bounce back”; and they execute the mission successfully. Therefore, force resiliency begins and ends with Airmen.

Although the perfect definition of resiliency matters little, the effect of applied resiliency is priceless, especially when it is collective, institutionalized, and part of our culture. Because resiliency equates to capability, resiliency in PACAF translates into strategic advantage. Resiliency not only helps us preserve the peace but also enables us to surge operations across the spectrum of domains and accomplish any mission we take on. Airmen are in the business of perpetuating and preserving the interests of the United States and our allies, and that is no small thing. Resiliency is the key to fulfilling this demanding responsibility, perhaps more than any other thing.

Gen Lori Robinson, PACAF commander, stated that “our Airmen’s success is the command’s success.”¹⁰ Arguably asymmetry wins wars, and at the end of the day, “our [greatest] advantage over any enemy” is our Airmen.¹¹ They personify American strength, ingenuity, flexibility, adaptability, and perseverance. No other country has air-minded warriors like ours. Throughout the history of powered flight in warfare, America’s Airmen have been at the forefront, innovatively shaping the many expressions of airpower to attain strategic objectives. Armed with greater resiliency, Air Force Airmen will continue to overcome any challenge and pioneer airpower into the future. PACAF’s broad strategy involves injecting force resiliency at all levels, and it all begins with the RA LOO.

The Resilient Airmen Line of Operation

The RA LOO is one of five PACAF LOOs, each having its own champion, operations planning group (OPG), and road map (also called a flight plan).¹² To manage and execute the RA LOO, the PACAF staff uses the same methodology for producing effects on the battlefield—the joint operation planning process. Explained in greater detail in Joint Publication 5-0, *Joint Operation Planning*, this orderly, analytical process consists of a set of logical steps to examine a mission; develop, analyze, and compare alternative courses of action; select the best one; and produce a plan or order.¹³ Using this methodology, the RA champion—through the OPG—builds, manages, and executes the RA road map, which includes specific objectives, subobjectives, desired effects, and measures of effectiveness. Since PACAF’s five LOOs are mutually supportive and interdependent, the OPGs also synchronize with one another, ensuring unity of effort towards shared strategic objectives and desired strategic end states. It is truly a cross-functional, team effort.

The mission of PACAF’s RA OPG is to build and sustain a resilient and mutually supportive PACAF ethos that fosters combat readiness; cross-cultural competence and responsible choices; and mental, physical, social, and spiritual fitness (see the figure below).¹⁴ In execution, the

RA strategy emphasizes three objectives: combat readiness, cross-cultural competence and commitment to making responsible choices, and comprehensive fitness and awareness. Using the RA road map, the RA OPG reaches these three strategic objectives through a number of initiatives.



Figure. PACAF's model for resilient Airmen

Combat Readiness: The First Effect of Resilience

PACAF is charged with organizing, training, and equipping its forces as a force provider to US Pacific Command (PACOM). The combat-ready objective of the RA LOO ensures that we can meet those requirements. One of Seventh Air Force's command objectives—"Ready to Fight Tonight"—captures the essence of combat readiness. The United

States, our allies, and PACOM count on our Airmen to provide the full spectrum of PACAF capabilities anywhere and anytime—even if tonight. Accordingly, the combat-ready objective has three corresponding desired effects that essentially involve being properly organized, trained, and equipped: (1) PACAF Airmen are postured for immediate response (organized); (2) they are instructed to perform their steady-state and wartime mission as required by their Air Force specialty codes and to carry out general contingency skills required of all Airmen (trained); and (3) they are prepared and fit to fight to perform their steady-state and wartime mission (equipped). According to the PACAF vision, “combat-ready American Airmen . . . are the foundation of Pacific stability and security.”¹⁵

Organized. To assure our forces’ organization for combat, PACAF uses the air and space expeditionary force (AEF) concept. Because every deployable Airman is assigned to an AEF, we always have combat-ready forces available on demand. Further, this concept empowers Airmen with an element of control. Knowing their period of deployment vulnerability, they can better prioritize and manage their professional and personal responsibilities. Going into an AEF deployment, Airmen can prepare their personal lives while training, honing their skills, and certifying in their professional lives. Coming out of an AEF, they have a chance to reconnect with family, take leave, and recharge, at the same time capturing and passing valuable lessons learned to the next AEF. Regular deployment schedules not only enable PACAF to meet its force-provider obligations but also afford predictability and empowerment, which Airmen can leverage into resiliency.

Certainly, the AEF concept supplies ready forces on demand, but PACAF is also constantly improving its organizational structures to optimize operational effectiveness and resiliency. For example, the 613th Air and Space Operations Center is more fully integrating itself with both PACAF staff and our regional allies. These organizational moves will clarify lines of command, bridge the discontinuity between strategy and operations, help us overcome current and future capability gaps,

and better posture our forces to accomplish the mission. To take another example, PACAF is more fully integrating itself with our allies in Japan and Korea to enhance integrated air and missile defense (IAMD). By utilizing host-nation architecture and assets, we improve security for everyone. As it perpetuates the RA LOO, PACAF will continue to find ways to organize forces for maximum effect.

Trained. PACAF forces constantly build resiliency through training. Most Airmen arrive in-theater with a high degree of training, and PACAF builds upon this foundation, improving upon it. PACAF leads and participates in over 200 exercises and engagements annually. PACAF Airmen not only exercise and train constantly to better themselves but also seek opportunities to better integrate and elevate every service component's game. A case in point is exercise Valiant Shield. Featuring more than 18,000 participants representing every service, Valiant Shield 2014, which dealt primarily with air and sea integration, represented a monumental step forward in shaping Air-Sea Battle operations, which fuse interservice and allied capabilities. Because they increase the breadth and depth of our joint capabilities, such exercises enhance resiliency at every level, especially in the face of an anti-access/area-denial (A2/AD) threat or a contested environment. PACAF leverages tools like the Status of Resources and Training system to monitor unit training and readiness at the organizational level. Combat readiness includes fitness to fight, and PACAF tracks this prerequisite as well, ensuring that Airmen meet physical standards and that fitness programs enable success. These few examples indicate how training permeates the RA LOO. The RA OPG constantly looks for and incorporates new resiliency opportunities into the RA road map to produce tangible, measurable gains in combat readiness and resiliency.

Equipped. PACAF actively equips its forces with the right resources to increase resiliency. It must have the right systems, gear, and support at all levels to maintain the strategic advantage. Equipping ourselves for combat is a team effort, and every Airman has a voice. In

fact, PACAF Airmen are charged with seeking “innovation that maximizes the use of Total Force resources.”¹⁶

Equipping our forces with these new systems and capabilities increases Airmen’s resiliency and enables them to continue to fly, fight, and win. At the theater level, PACAF actively advocates for new and existing game-changing technology. Since acquisitions are determined by strategy and since our national strategy calls for a rebalance to the Asia-Pacific, it is only natural that PACAF should be the theater of choice for basing cutting-edge F-35 multirole fighters and KC-46 tankers as they become operational. The emergence of Air-Sea Battle as an operational counter to A2/AD only strengthens this argument because a common platform like the F-35 will enable a host of service synergies and complementary capabilities. Additionally, PACAF is looking at ways to shore up IAMD and to inject agile, flexible command and control into the AOR. These LOOs will include improvements to existing systems along with entirely new systems (e.g., the Terminal High Altitude Area Defense system) that will allow PACAF’s war fighters to do their jobs.

While PACAF is equipping Airmen with new and better systems at the theater level, the RA LOO refines resiliency primarily by taking care of Airmen and their families on the home front. This aspect includes everything from personal, professional gear to the full spectrum of mission support, administrative services, medical care, recreation, and other proactive and reactive needs. PACAF’s Airmen must maintain personal readiness and the ability to deploy at a moment’s notice with their personal affairs in order. The RA LOO helps guarantee that they are personally equipped with resiliency that translates into performance, confidence, and peace of mind. Such assurance is just as important as equipping them with new jets, and it will continue to be a priority.

Comprehensively Fit and Aware: The Second Effect of Resilience

In their article “Military Resilience: A Concept Analysis,” Dr. Angela Simmons and Dr. Linda Yoder highlight some of the unique demands of military culture:

Regardless of why people choose to join the military, they must be willing to serve the country and risk their lives to protect the freedom of every citizen in the United States. This is the foundation of the military, placing the mission first. While the missions of most civilian organizations demand that employees come to work and give 100% support to the organization, few require their employees to be on call 24 hr a day, 7 days a week, without additional monetary compensation, regardless of any family or personal plans. This is required of SMs [service members]; they must be selflessly committed to serving the country first.¹⁷

This paragraph effectively embodies the Air Force’s core value “service before self.” At first glance, it might seem that service before self and resiliency are at odds with each other in a zero-sum game, but this assessment is not the case. Resiliency and service go hand in hand, reinforcing and complementing each other. For example, being comprehensively fit and aware—more resilient—mitigates many of the sacrifices and demands of associated military service.

To be comprehensively fit is directly in line with the Air Force’s broader vision of Comprehensive Airman Fitness (CAF). According to Secretary of the Air Force Deborah Lee James, “CAF is a lifestyle and culture that focuses on making sound choices while building a thriving Air Force comprised of comprehensively balanced individuals that are engaged in becoming mentally, physically, socially and spiritually fit.”¹⁸ To build comprehensive fitness, PACAF utilizes the CAF standard—the four pillars of resiliency (social and family, physical, mental and emotional, and spiritual aspects), which constitute the holistic approach to resiliency that we are all familiar with from our training. However, given the complexity of the AOR, PACAF elevates this requirement.

True, comprehensive fitness is important, but it is not enough. PACAF Airmen must also be comprehensively aware. Sun Tzu observed that

“if you know the enemy and know yourself, you need not fear the result of a hundred battles. If you know yourself but not the enemy, for every victory gained you will also suffer a defeat. If you know neither the enemy nor yourself, you will succumb in every battle.”¹⁹ To be fully aware, you must know yourself, know others, and know your environment. This awareness includes strengths, resources, and assets at your disposal, as well as weaknesses, problems, and obstacles to overcome. A lapse in awareness can lead to a bad decision with strategic-level impact. Conversely, high awareness prompts exceptional decisions that benefit the United States and our allies at the strategic level. Therefore, comprehensive awareness in PACAF is a strategic imperative that goes hand in hand with comprehensive fitness.

The RA LOO seeks opportunities to build enduring, comprehensive fitness and awareness in PACAF’s Airmen. This process may occur by means of professional military education, formal education, unit training, organized fitness events, social events, learning a new language, community outreach programs, feedback/mentorship, and other initiatives. By knowing themselves, others, and their environment, PACAF’s resilient Airmen are inherently more mission capable.

Cross Culturally Competent and Committed to Making Responsible Choices: The Third Effect of Resilience

In PACAF, roughly 17,500 military personnel, 8,200 civilians, and 10,800 dependents are stationed on foreign soil. Another 12,200 military personnel, 3,200 civilians, and 14,100 dependents live and operate in areas of rich Polynesian or native Alaskan culture and heritage. In total, some 65,800 Airmen and family members reside in the PACOM AOR. In PACAF, cultural diversity reigns, and PACAF Airmen are ambassadors—willing or not.

In a 1999 article, Gen Charles Krulak, commandant of the Marine Corps at the time, introduced the idea of the “strategic corporal.” As he put it, “In many cases, the individual Marine will be the most conspicuous symbol of American foreign policy and will potentially influence

not only the immediate tactical situation, but the operational and strategic levels as well. His actions, therefore, will directly impact the outcome of the larger operation; and he will become . . . the Strategic Corporal.”²⁰ In a recent roundtable conversation with Secretary of the Air Force Debra James, General Robinson articulated a similar proposition: “Every Airman is an Ambassador, and because of the frequency and level of engagement we have with allies and partners and with half of our bases on foreign soil, our Airmen must be cross-culturally competent. Without this competency, a tactical level mistake can have strategic implications.”²¹ The essence of the generals’ statements holds true regardless of service or rank. In some situations, often exacerbated by cultural ignorance and/or differences, a seemingly minor or inconsequential action may have strategic-level effect. Thanks to advances in social media and other information technologies, access to information has never been easier. In an operational environment where a video, sound bite, or picture can go viral in a matter of hours, cross-cultural competence is of utmost importance.

In 2005 noted military theorist Dr. Colin S. Gray identified 12 distinct characteristics of the American way of waging war, including the assertion that Americans are “culturally ignorant.” Gray elaborated: Americans are “not inclined . . . to be respectful of the beliefs, habits, and behaviors of other cultures. . . . The American way of war has suffered from the self-inflicted damage caused by a failure to understand the enemy of the day.”²² Although the comment is stinging, Dr. Gray’s assessment rings true. However, the Department of Defense has recognized the need for increased cultural competency and is doing something about it. Our military culture is changing to become more cross culturally competent, not only through education and training but also through engagement and relationship building. Nowhere is this truer than in PACAF, and the RA LOO is one mechanism towards this end.

PACAF’s Airmen must be cross culturally competent for a number of reasons. First, cross-cultural competence is a manifestation of awareness and mutual respect. It shows tolerance for diversity and open-

mindedness, paving the way for mutual understanding and stronger relationships. Second, cross-cultural competency not only perpetuates the RA LOO but also serves as an important component of several other LOOs.²³ Finally, although the “strategic corporal” is an important notion to keep in mind, it is not meant as a scare tactic to promote cross-cultural competence—only to demonstrate that we should consider our actions carefully. Everything we do sends a message. The message received is almost always more important than the one sent, and cross-cultural competence helps us shape our messages so they are received as intended. By building cross-cultural competence, the RA LOO helps us attain our objectives, strengthen relationships with our partners and allies, and shape our messages so they are received as we want them to be.

Being cross culturally competent and making responsible choices help us reach three desired end states: (1) PACAF Airmen and families are culturally competent, disciplined ambassadors who understand the impact of their actions and the importance of interaction on an international level; (2) PACAF Airmen are combined, joint, and total force integrators; and (3) PACAF Airmen and families have a steadfast commitment to dignity and respect for everyone. General Carlisle commented that “the most important thing in the Asia-Pacific region is our presence. We have to be here. We must get to know the people, spend time with them, and see what the environment is like. . . . It is critical we build our capacity, as well as that of our friends and partners. There must be a move from bilateral to multilateral. Our Airmen are doing just that every time we plan and exercise with our partners.”²⁴

For many people, the experience of living immersed in a new and exotic culture can be an adventure filled with rich experiences and great memories. However, for others it can result in culture shock that can manifest itself in a variety of ways, ranging from physical symptoms to animosity towards others.²⁵

Base involvement in the local community can help Airmen and their families acclimate to new cultures and build deep, meaningful rela-

tionships. Units across PACAF work tirelessly to create community outreach activities as part of the RA LOO.²⁶ Their efforts produce a deeper, more meaningful bond between PACAF Airmen and the communities in which they live, which in turn strengthens the bond between nations and enables our collective strategic objectives and end states. Cross-cultural competence helps Airmen strengthen relationships and make more responsible decisions. In turn, stronger relationships and responsible decisions build resiliency.

The Broad Strategy of Pacific Air Forces' Resiliency

Let us further examine how the RA LOO complements the other four LOOs, enables the broader PACAF strategy, and helps PACAF reach its desired end states. A number of unresolved territorial conflicts involve the United States, our allies, partner nations, and others.²⁷ At various points in history, these territories were owned by one regional actor or another, and with potentially vast resources at stake, conflicting claims and assertions of ownership have surfaced, even in the face of generally agreed-upon international conventions and laws. To enforce their claims, some actors have shown aggressive behavior towards others. Additionally, tensions still exist between the People's Republic of China and Taiwan regarding Taiwan's future and the issue of reunification. Lastly, China is investing heavily in A2/AD architectures that could limit US regional access and impugn our ability to operate.

In the face of these issues, the United States desires and promotes a regional security environment that contributes to peace and shared prosperity. America has long believed that diplomacy should be complemented by military strength.²⁸ Accordingly, it advocates peace on one hand while it works to ensure a continuous military strategic advantage on the other, particularly with its allies and partners who rely on the United States for protection and security. A firmly entrenched Pacific nation with states, territories, allies, partners, and vital national security interests in the Asia-Pacific, the United States is actively

strengthening its relationships in the region to preserve the peace while remaining ever prepared for potential conflict.

PACAF's greatest challenge concerns operating within a contested environment against another nuclear-armed country, near peer, or emerging superpower. A contested environment may include total war, or it may be more limited in scale (e.g., a blockade or small military exchange). A2/AD, which can block domain access and/or disrupt and degrade one's ability to operate within a domain, is a means of contesting an environment. Even though A2/AD actions may fall short of total war, the United States cannot allow another country's A2/AD capabilities to remove it from the equation. Therefore, in 2012 the Department of Defense charged the US military as well as our allies and partners with being "capable of operating in A2/AD, cyber, and other contested operating environments."²⁹ Our guidance is clear: we must find ways to gain and maintain a strategic advantage and operate effectively, regardless of the environment, even in the face of a robust A2/AD capability.

PACAF's drive to instill resiliency in Airmen is part of a larger PACOM initiative to increase resiliency within our total force for the reasons listed above. Resiliency helps us counter the problem of operating successfully within a contested environment. Remember, resiliency (survivability and flexibility) equates to mission capability. Resiliency also helps us maintain the initiative and keep the fight on our terms. It affords us layers of depth and breadth so that no single attack or action can take us out of the fight or result in decisive action for the adversary. If we can survive, we can still fight; and if we can fight, we will win. Despite the existence of an entire LOO dedicated to RAs collectively, PACAF's five strategic LOOs instill resiliency throughout our entire force structure.

For instance, IAMD is one of the five LOOs. To build resiliency into the IAMD infrastructure, US and allied bases alike are training to repair damaged runways rapidly; hardening sites to withstand attack; layering defensive architecture with multiple weapons systems; and

incorporating agile, flexible command and control elements and capabilities. Combined, these initiatives make our IAMD architecture more survivable, agile, responsive, lethal, and capable—in other words, more resilient, even in the face of an attack.

Theater security cooperation is another LOO that leverages resiliency for strategic effect. As we engage with other countries within the region, we build trust, understanding, and assurance. When our allies, partners, and friends know and trust us (and vice versa), we all benefit. When we conduct an exercise that includes Singapore's small but very capable air force, we all benefit. If we secure agreements with Vietnam or the Philippines for basing and support, we all benefit. When we advocate for and build robust professional military exchange programs, especially those that emphasize standardized doctrine and formal education, we all benefit. All of these actions have strategic effect.

Through encouraging cultural competence and by cultivating meaningful relationships, we increase our options in the face of contingency operations. Rather than go to war, one of our partners may mediate on our behalf and deescalate a crisis. Rather than operate from a remote location, one of our partners may afford us a base of operations to conduct humanitarian assistance or disaster relief in the wake of a natural disaster. If we must go to war, our partners may lend support or even join in the coalition. Through relationships forged from theater security cooperation, we increase our total force resiliency.

It is easy to see how force resiliency can help us overcome some of the security problems that we encounter in the Asia-Pacific theater. It is also easy to see how the personal resiliency we build as part of the RA LOO can have a collective strategic effect and contribute to the desired end states of peace and prosperity for all concerned. As it turns out, the resiliency training you had recently is valuable after all.

Conclusion

PACAF's RA LOO is a conscious, deliberate effort to holistically institutionalize force readiness and increase military capability. Because PACAF's Airmen operate in the world's largest, most diverse, and arguably most challenging AOR, they must be able to go at a moment's notice—combat ready, comprehensively fit and aware, cross culturally competent, and committed to making responsible choices. To this end, PACAF is committed to the RA LOO. By perpetuating it as one of five interdependent, complementary LOOs, PACAF ensures its continued strategic military advantage within the extremely important PACOM AOR. For the foreseeable future, PACAF will persist in proudly safeguarding the vital security interests of the United States and its allies in the Asia-Pacific as we have for over half a century—one resilient Airman at a time. ✪

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18. SSgt Carlin Leslie, "Comprehensive Airman Fitness: A Lifestyle and Culture," US Air Force, 19 August 2014, <http://www.af.mil/News/ArticleDisplay/tabid/223/Article/494434/comprehensive-airman-fitness-a-lifestyle-and-culture.aspx>.
19. Sun Tzu, *The Art of War* (Calgary, Alberta: Theophania Publishing, 2011), 42.
20. Gen Charles C. Krulak, "Strategic Corporal: Leadership in the Three Block War," *Marines* 28, no. 1 (January 1999): 26.
21. Robinson, roundtable discussion.
22. Colin S. Gray, "The American Way of War: Critique and Implications," in *Rethinking the Principles of War*, ed. Anthony D. McIvor (Annapolis, MD: Naval Institute Press, 2005), 29.
23. For example, theater security cooperation depends upon stronger relationships in the name of shared security interests. If we demonstrate cross-cultural competence, it enhances our ability to work with partners and allies, increasing our ability to meet this objective. In another example, power projection depends largely upon access. If we demonstrate respect for and understanding of other cultures, they are more likely to invite us in and support us rather than turn us away.
24. Gen Herbert J. Carlisle, commander, Pacific Air Forces (address, Air Force Association Air and Space Technology Exposition, Washington, DC, 18 September 2013).
25. Ibid.
26. Kunsan Air Base, South Korea, has an outreach initiative called the "Good Neighbor" program whereby service members visit local orphanages and schools, exposing Korean students to the Air Force while enjoying cultural events hosted by the local community. Kunsan also designates "Resilience Days" to focus on the importance of community service and encourage Airmen to help out at local libraries, women's shelters, elementary schools, kimchee farms, and retirement homes. In Japan, Misawa Airmen recently organized efforts to remove heavy snow from around the homes of elderly citizens in the local community.
27. For example, the Korean War never officially ended; instead, it is in a cease-fire status, and tensions between the Democratic People's Republic of Korea (DPRK) and the Republic

of Korea (ROK) regularly run high. The DPRK leadership continues to pursue a disruptive and destabilizing nuclear weapon program, regularly threatens the ROK and its other neighbors, and routinely commits acts of aggression. In another example, the South China Sea, Senkaku Islands, Paracel Islands, Spratly Islands, and other areas are under dispute.

28. Teddy Roosevelt famously popularized the saying, “Speak softly, but carry a big stick.” This sentiment reflects the US belief in diplomacy from a position of strength, and in an AOR mostly dominated by air, airpower is “the big stick.”

29. Department of Defense, *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense* (Washington, DC: Department of Defense, January 2012), 8, http://www.defense.gov/news/defense_strategic_guidance.pdf.



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Command Chief Harold L. Hutchison, USAF

Chief Hutchison (BS, Arizona State University) is the command chief master sergeant for Pacific Air Forces, Joint Base Pearl Harbor–Hickam, Hawaii. His background includes various duties in security forces at wing, major command, and joint command levels. Chief Hutchison also served as an operations group superintendent before becoming a command chief master sergeant at the wing, air expeditionary wing, and numbered air force level. He has deployed numerous times supporting various missions throughout the Middle East. Before assuming his current position, Chief Hutchison was chief of the Air Force Chiefs' Group, Pentagon, Washington DC.

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Leading Millennials

An Approach That Works

Col S. Clinton Hinote, USAF

Col Timothy J. Sundvall, USAF

Our Air Force is full of millennials. The military “pyramid” force structure means that there will always be considerably more young people than old, and the millennial generation (roughly defined as those born from 1980 to 2000) has filled our ranks, especially the most numerous ranks of staff sergeant and captain. It will not be long before the oldest of them become senior leaders, but they will have left their mark on the military services long before then. In fact, as a group, they wield widespread influence today, making some senior leaders very uncomfortable.

A recent article in the US Naval Institute's *Proceedings Magazine* takes the measure of millennials, and it is not pretty. Millennials question authority, are unwilling to wait their turn, exhibit signs of laziness, use technology to bypass the chain of command, and routinely let customs and courtesies slip. The article concludes that millennials must be “course-corrected” if they are to be assimilated into the culture and traditions of the military.¹

We have just recently left the 8th Fighter Wing in Korea, where we were honored to serve as the wing's commander and vice-commander, respectively. During an intense year, we worked and lived with millennials in the Wolf Pack, gaining experience and insights in leading them and observing their capabilities firsthand. We continue to have the

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privilege of leading and working with millennials. Perhaps most important—and a bit scary—is the fact that both of us have children who are millennials!

Although we acknowledge that the standard criticisms leveled against millennials contain grains of truth, we disagree with their overall tone. Like any generation, millennials have strengths and weaknesses, but we believe that their strengths far outnumber their weaknesses. Moreover, if we are truly committed to “strategic agility” in our force, we must harness the creative power, enthusiasm for service, and teamwork they bring to our institution.

Whenever representatives of a new generation flood into an institution, they inevitably shape it according to their beliefs, values, and norms. Our job as leaders on the front of this wave is to adapt our institution—and our approach to leadership—so that we can benefit from the change that will occur anyway. We need to ride the wave of energy and creativity—not be swamped by it. The following includes some observations and suggestions on how to do that.

First, we need to acknowledge the millennials' value to our force. Our millennial Airmen are as technically competent as any who have gone before them. They have become the true experts on operating and maintaining our weapons systems. They are the best in the world, and we should not take this fact for granted. We created tough training regimens for them, and they have made the sacrifices necessary not only to survive those programs but also to thrive as operators in air, space, and cyberspace. We cannot defend our country without them.

Second, we need to stop questioning the millennial commitment to “service before self.” At a time when the probability of being sent to dangerous places remains high, the possibility of being killed is real, and the war weariness of the American people is palpable, millennials still answer the call to serve. The war in Afghanistan alone has produced numerous millennials who have received the Medal of Honor, Purple Heart, Silver Star, and Distinguished Flying Cross. If we have any chance of leaving Afghanistan better than we found it, millennials

will do most of the heavy lifting. As in our generation, some millennials are self-centered and narcissistic, but as a whole, we find that their generation is as committed to service as any before it.

In fact, millennials crave opportunities to serve, and in many cases, they want to involve themselves in service outside work. At Kunsan Air Base, South Korea, our Airmen volunteered their precious time repeatedly, serving at the local orphanage and teaching English to our Korean neighbors. When we proposed a wingwide service project on the day prior to Thanksgiving, our millennials did most of the organizing and leading for efforts such as preparing food for the hungry, visiting the elderly, and cleaning the local schools, parks, and playgrounds.

Third, we need to understand millennials' view of authority, reinforcing the positive and shaping their views only when necessary. We believe that millennials' general distrust of institutions is a good thing. Why? Because many of our institutions are deeply flawed as they attempt to adjust to the complex and rapidly changing world around them. The Air Force is no exception. We should remember that Galileo went to prison, critics openly scoffed at Robert Goddard, and institutions resistant to new ideas court-martialed Billy Mitchell. In the same way, we are a force susceptible to groupthink. We can inoculate ourselves against this tendency by bringing millennials into the conversation early and often. Given an invitation, they will not hesitate to share their opinions.

Unlike us, millennials grew up in a world where communication technology made the world "flat." During their youth, the average person could gain access to information previously restricted to those "in the know." Furthermore, advances in social media made it possible to talk directly to almost anyone, including people in authority. Consequently, many millennials don't think twice about engaging senior leaders directly on issues, and they don't understand why their leaders can't give them rapid and personal feedback.

This approach can make those of us with a more traditional sense of authority uneasy. We certainly do not want to devalue the chain of

command, yet in this area we might do well to let their generation shape us in some ways. Specifically, we need to harness their desire to interact with their leaders while simultaneously taking advantage of their competence and creativity. In our case, we found that bringing them in early to the brainstorming phase yielded fantastic results, especially as we tackled problems that had no answers from books. Our technique was simple and repeatable. We gathered key millennial leaders from throughout the wing into an ad hoc idea-generating team, provided broad guidance and intent, gave them a deadline, and let them brainstorm, both together in the group and as individuals. In most cases, we then allowed them to organize and execute many of the concepts they created. This approach produced excellent results. More on this later.

Customs and courtesies always present challenges, but we believe that millennials are not especially different from previous generations, and in any case, the problem stems primarily from leadership. Only rarely did we observe a millennial Airman who would not respond positively to respectful correction. The key lay in providing that correction on the spot so that standards and expectations remained high. Recent graduates from basic military training had no issues with customs and courtesies. If they adopted bad habits, they learned them on our watch.

Finally, millennials want to know “why.” As stated earlier, they share a distrust of institutions. These Airmen can execute orders as well as anyone, but when the reasons behind the directives are not apparent, millennials want a dialogue with their leaders. We decided to use this desire as an opening to develop the next generation of leaders. As time allowed, we tried to explain the logic behind policies and instructions. Sometimes, this approach took on the feel of a classroom setting, sharpening our leadership—especially our ability to communicate and teach—and stretching our millennials’ minds. In the end, we decided that we wanted our subordinates to know “why” because when things changed, they would find themselves better equipped to adapt accord-

ing to our intent. In short, we attempted to build a culture with an important norm: “respect the leader but challenge the approach.”

No wing or base is perfect, but Kunsan Air Base is better off because of the leadership, creativity, and old-fashioned hard work put in by millennials. Here are just a few examples of their accomplishments:

1. We had only a short time to organize our Sexual Assault Awareness Day, scheduled for the middle of the command changeover season at Kunsan. We brought together a leadership team composed mostly of millennials, and we told them to “do something different.” They did. In less than two weeks, they organized an incredible day of training, including a groundbreaking survey, a “silent walk” commemorating victims of sexual assault, and live training that used actors portraying uncomfortable situations. Their ideas kicked off a wave of creativity concerning the problem of sexual assault, and Kunsan eventually won an Air Force-level award for innovation in this area.
2. As the only place where US and Korean combat air forces are stationed together, Kunsan is unique on the Korean peninsula. We decided that we would be the model of how US and Korean airmen should work, live, and, if necessary, fight together. Our millennial pilots developed an exchange effort with their counterparts in the Republic of Korea Air Force, which included formal and informal exchanges that occurred almost weekly. These sessions led to the development of professional and personal relationships with our Korean partners that they can build on for decades to come.
3. After the success of our Sexual Assault Awareness Day, we challenged our millennials to come up with new ways to talk about this subject. We intentionally did not dictate how they should do so. The result floored us. Two advertising campaigns—one video series and one set of posters—took advantage of the millennials’ energy and passion on this issue. The “Signs” video series consisted of Airmen holding up signs about sexual assault (they

wrote the messages themselves). The set of posters also included millennial Airmen in dramatic lighting, staring at the camera with a single word such as “think” or “respect” displayed prominently on the poster. In our opinion, these campaigns had the effect of communicating to the base the idea that “our generation is not going to let this happen anymore.” Perfect.

Not everything was rosy. At times we had to make “course corrections.” The following examples might help others who are dealing with similar issues:

1. We had to confront a case of cyberbullying. Specifically, Airmen in a particular career field created an invitation-only website to post malicious and untrue accusations about other Airmen (this practice was not limited to Kunsan but extended across the Air Force). Although most participants on the site were millennials, they were clearly following the lead of older Airmen who, frankly, lacked integrity. This situation not only gave our squadron commander a chance to model good leadership but also gave us an opportunity to have a tough talk about cyberbullying. The outcome was that one of the younger millennials who had posted on the site developed a presentation on cyberbullying that she presented to the rest of the squadron.
2. We dealt with a case of vandalism that involved the overturning of numerous large flower pots that lined the road approaching the main gate. The wing commander personally called for those responsible to turn themselves in and make it right with the local community. Kunsan enjoys incredible support from local Koreans, and we did not want to jeopardize this relationship. Within hours, the Airmen responsible confessed their involvement. When the squadron members heard about this, they decided to go into the community to repair the damage, clean the streets, and personally ask residents if they could do anything to preserve our special relationship. Millennials led this effort.

In the end, we are responsible for creating an environment where our Airmen can be successful. To do so, of course, means that we must attend to the basics, such as offering clear direction, sufficient resources, and realistic expectations. We also think that we must establish a setting where we can leverage the characteristics that make millennials unique. Even though this means that we have to adjust as leaders and move away from our comfort zone, we view this discomfort as an investment with high potential for major payoffs. None of us is as smart as all of us, and as we try to tackle today's wicked problems, we want the millennials on our side. ✪

Note

1. Cdr Darcie Cunningham, "Now Hear This—Millennials Bring a New Mentality: Does It Fit?," *Proceedings Magazine* 140/8/1,338 (August 2014), <http://www.usni.org/magazines/proceedings/2014-08/now-hear-millennials-bring-new-mentality-does-it-fit>.



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Colonel Hinote (USAFA; MPP, John F. Kennedy School of Government, Harvard University; PhD, Air University) is a Military Fellow at the Council on Foreign Relations in New York. He is a command pilot with over 2,000 hours in fighter and trainer aircraft, including the F-16 and F-117, with aerial participation in Operations Northern and Southern Watch. His operational assignments include instructor duty at the USAF Weapons School and chief of the Air Forces Central Strategy Division, where he led planning efforts for air operations in Iraq and Afghanistan in 2006 and 2007. He has served as a squadron commander of a fighter training unit and as vice-commander and commander of a wing. Colonel Hinote is also a graduate of the USAF Weapons School, Air Command and Staff College, School of Advanced Air and Space Studies, and Joint and Combined Warfighting School.



Col Timothy J. Sundvall, USAF

Colonel Sundvall (USAFA; MS, Air Force Institute of Technology; MAAS, School of Advanced Air and Space Studies; MS, Industrial College of the Armed Forces) is commander of the 35th Fighter Wing, Misawa Air Base, Japan. He is a command pilot with over 2,400 hours in fighter and trainer aircraft, including the F-16 and T-37. Colonel Sundvall's assignments include instructor duty in the T-37, joint tours at US Pacific Command and US Transportation Command, and six tours flying F-16s, serving as a squadron commander and both vice-commander and commander of a wing.

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A GLOBAL SPACE CONTROL STRATEGY

Disturbingly, the strategy laid out in Dr. B. T. Cesul's article "A Global Space Control Strategy" (November–December 2014) essentially is a throwback to the "space dominance" policies and ambitions set out by the administration of President George W. Bush, following from the 2001 Rumsfeld Space Commission report. Furthermore, the strategy it espouses is just as unobtainable and undesirable now as it was then. Ironically, the article itself cites several of the key reasons why.

First, the United States is the most vulnerable to "space war" because of the disproportionate (versus other space powers) reliance of the US military and intelligence community on space assets. However, counter to the article's assumptions, an offense-dominant strategy that involves destructive antisatellites and space-based weapons will not fundamentally reduce this vulnerability. More stuff—especially scarier (to potential adversaries and even allies/friends) stuff—simply equals more targets. Second, space systems are expensive. Yes, they are, and space-based weapon systems cannot pass any reasonable cost-benefit analysis, given their expense and the relatively limited target set versus the cheaper and more available technologies to counter them. Third, a first-strike space posture is "provocative." That is, on your way (your very long way, given the time and expense for developing space systems) to trying to achieve that posture, your potential adversaries are "provoked" into spending more time, energy, and money to counter your possible advances. Fourth, the fact that military-related space technologies are proliferating means that more potential adversaries, if they so choose, could pursue robust counterspace programs once they

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are provoked. Fifth, the space economy is globalized and can thrive only in a benign security environment, partially because of the capital costs involved. Yes, and the specter of space war, increased levels of dangerous space debris, and the fact that commercial satellites would ipso facto become targets do not a benign environment make. Making commercial satellite operators' jobs more difficult—and costly—will not help improve national security. Sixth, omniscient space situational awareness is impossible, and without it a dominance strategy cannot succeed. (Oh, and by the way, “complete electromagnetic dominance” can be achieved only with unobtainium.)

In reality, a space arms race—exactly what such a strategy would engender—cannot be won and would be counterproductive to a safe, stable, and sustainable space environment. Given the fact that what any one actor (whether military, commercial, or civil) does in space has the possibility of harming all others, the only workable approach to reducing risks and preventing (or limiting) conflict is one that mixes cooperative security with defensive measures and methods of lowering military dependence on space assets. At a time when the international community, with the full support of the Obama administration, is making headway—slowly, but headway nevertheless—on confidence-building measures that could lay the foundations for cooperative security approaches, blustering about the need for unilateral US space dominance is not helpful.

Theresa Hitchens, Former Director

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The Human Factors of Fratricide by Laura A. Rafferty, Neville A. Stanton, and Guy H. Walker. Ashgate Publishing Company (<http://www.ashgate.com/>), Suite 420, 110 Cherry Street, Suite 3-1, Burlington, Vermont 05401-3818, 2012, 256 pages, \$99.95 (hardcover), ISBN 978-0-7546-7974-5.

The Human Factors of Fratricide is a scholarly work that seeks to apply a rigorously scientific and statistical methodology to the serious and growing problem of “friendly fire” within modern Western militaries. Specifically, asymmetrical warfare has adversely affected allied troops’ communication and coordination of fire, resulting in injury and death. To provide the maximum amount of analysis, the book focuses on a small number of case studies taken from the British Royal Army and Royal Air Force, examining them in great depth.

This book’s organization is straightforward, beginning with a short introduction about the problem of fratricide before moving into an explanation of the importance of teamwork and communication. It then applies the “famous five of fratricide,” the most important human factors of fratricide in the existing literature (cooperation, coordination, schema, situational awareness, and communication), to a specific case study of a tank operation. Subsequently, the coauthors discuss the Fratricide Event Analysis of Systemic Teamwork (FEAST), an approach they use to gain the deepest possible insight into the interaction of factors that leads to either success (no friendly fire incidents and the elimination of enemy targets) or failure (friendly fire incidents and the survival of enemy targets) in a given mission. Two chapters address situations in which more communication is better (a small team with a focused mission) and in which more communication can create difficulties (a large, dispersed group of teams engaged in a complicated mission). The book closes by asking whether it is always better to be connected (offering some nuanced conclusions), by making a detailed

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comparison of the models based on the case studies, and by recommending further research that would confirm the coauthors' ideas about fratricide.

The book's discussion of the importance of accurate communication and high situational awareness when dealing with close air support (a major aspect of one of the case studies) and of combined task force teams will be of considerable interest to Air Force audiences. One should note, however, that this work is extremely technical and filled with academic jargon, perhaps limiting it to readers able to grasp the systems-driven vocabulary. Fortunately, the generous number of graphs and other figures helps the audience visualize points raised by the coauthors.

Some of the study's conclusions are striking and worthy of analysis outside the narrow problem of fratricide, including the fact that in avoiding fratricide, it appears that the quality of teamwork is more important than the quantity of team activities. Similarly, the avoidance of negative factors seems more significant than the presence of positive ones within the operation of the team. Furthermore, Rafferty, Stanton, and Walker find the avoidance of nonessential communication a major and consistent element of successful operations, given the tendency of information overload in high-stress, shoot/no-shoot decision-making processes. Strikingly, they argue on the one hand that a hierarchical organization works best in small teams, which need a high degree of cohesion to produce successful missions. On the other hand, a large and disbursed team was hurt by hierarchy and substantial cohesion (which often led to the development of cliques). Greater intergroup communication and a more disbursed, egalitarian approach worked best in complicated missions with teams of teams pursuing a wide range of challenging tasks while working cooperatively. The coauthors bolster their solutions with rigorous statistical and systems analysis as well as numerous references to the literature.

Again, prospective readers should be aware of the book's technical language and use of statistical and analytical techniques neither

widely nor generally known. Despite the coauthors' attempts at statistical rigor, they depend rather heavily on the insights and views of subject-matter experts (trainers for the case study exercises chosen here). Moreover, one finds a surprising divergence between the communication of effective and ineffective teams engaging in the same training missions chosen as case studies. Readers seeking to emulate success and avoid failure will find much to ponder here. In light of the vital importance of reducing friendly fire in the modern battlefield, *The Human Factors of Fratricide* deserves careful consideration and further research.

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Digital Apollo: Human and Machine in Spaceflight by David A. Mindell. MIT Press (<http://mitpress.mit.edu/>), 55 Hayward Street, Cambridge, Massachusetts 02142-1315, 2008, 384 pages, \$30.00 (hardcover), ISBN 9780262134972; 2011, 384 pages, \$24.95 (softcover), ISBN 9780262516105.

With the National Aeronautics and Space Administration's (NASA) curtailment of domestically operated manned missions via the space shuttle and the current reliance on Russian spacecraft for transport to the International Space Station, human spaceflight is as relevant today as ever. David Mindell's *Digital Apollo: Human and Machine in Spaceflight* explores human spaceflight through the lens of the interaction between humans, both in the spacecraft and on the ground, and technology within the context of the Apollo program. Mindell acknowledges the existence of many books about Apollo but says that a number of them are simply chronologies and lack discussion about the significance and relevance of the mission series within space history. When they do put the program into context, conventional books approach the subject from a political or cultural paradigm. The author says that the value of *Digital Apollo* lies in the discussion of technology, humans, and the applicability of the two in space development (p. 9).

The book includes four sections: the early perspective of pilots regarding human spaceflight, precursors to the Apollo spacecraft, the iterative development of Apollo's subsystems, and human-machine interactions within the missions. Pilots viewed the expansion of flight into space with hesitancy because heretofore their identity depended upon the balance between stability and controllability within aircraft (p. 20). During the creation of spacecraft leading up to and throughout the Apollo program, pilots often differed with developers about whether they should be "chauffeurs" (disconnected drivers serving as guides) or "Airmen" (controllers involved in the experience of flight) (p. 21). Mindell finds the appropriate point along the chauffeur-Airmen spectrum by examining the level of human-controller involvement in projects preceding Apollo: the X-15 as well as the Mercury and Gemini programs. Those involved with the North American X-15 supported the position that astronauts should be pilots, not passengers, asserting that the aircraft's high success rates stemmed from the fliers' contributions (p. 61). In the Mercury program, humans served as backups to computers. However, in Gemini, the crew gained control of the spacecraft once it reached orbit and assisted in mission completion. In the development of Apollo's systems, the main interaction between humans and technology resided not between controller and machine but between developers of various components of the spacecraft. One sees this dynamic in creation of the hardware and software for the Apollo program's lunar module as well as the navigation and guidance systems. *Digital Apollo* recounts the execution of the *Apollo 11* mission in considerable detail, emphasizing the advantages of including both human operators and automated technology in the spacecraft in order to complete a successful lunar landing. Subsequent missions are examined in relation to each one's principal objective.

This readable book presents a well-crafted narrative, balancing the role of humans throughout the Apollo project and technical facts. Much of it relates the interactions between Apollo developers and operators regarding the amount of human involvement designed into the systems. The narrative is detailed and technically smart without being

esoteric. Given the author's credentials, such a pitfall could easily have occurred. Mindell is a professor of a variety of engineering, science, and space-related subjects at the Massachusetts Institute of Technology. He has written two books similar to *Digital Apollo* about the interaction of humans and technology and has served on NASA's Historical Advisory Committee. In addition to crafting a well-presented narrative, the author successfully introduces technology by educating without belittling the intelligence of his audience. Mindell incorporates technical pictorials that are both informative and relevant, effectively using the plethora of primary sources about the Apollo mission.

Given the vast, rich history of space exploration, its study is limitless and everlasting. Readers who desire a thorough yet concise knowledge base on the Apollo mission should pick up *Digital Apollo*. In addition to its scholarly worth, Airmen will find that it has professional value. First, to understand the Air Force's cornerstone mission in space, one must have a background in the various facets of the US space program, including both the civil component, which encompasses the Apollo program, and the commercial component. Second, as automation becomes more prevalent in military systems, the interaction between humans and technology and their appropriate roles allows for the effective development of combat systems. As technology becomes more automated, human involvement provides a level of discrimination and error management not possible through machines. More holistically, in the financial environment that the military currently faces, the Air Force needs to think carefully about new technologies in terms of their ability to fulfill the desired objective. Mindell says that the purpose of his book is not to take sides in the human-machine debate but to offer more effective discussion (p. 271). *Digital Apollo* delivers, proving itself an invaluable account of the timeless interaction between humans and technology.

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Lessons from the Hanoi Hilton: Six Characteristics of High-

Performance Teams by Peter Fretwell and Taylor Baldwin Kiland. Naval Institute Press (<http://www.usni.org/naulinstitutepress>), 291 Wood Road, Annapolis, Maryland 21402, 2013, 184 pages, \$27.95 (hardcover), ISBN 978-1-61251-217-4.

Peter Fretwell and Taylor Baldwin Kiland have written a compelling book that connects lessons learned from the organizational structure and persistence of Vietnam prisoners of war (POW) to modern team building. The authors begin by placing readers in the middle of the Hanoi Hilton, the Hoa Lo Prison used by North Vietnam for POWs, introducing them to key leaders, their command structure, and the internal and external threats facing that structure. Fretwell and Kiland then attempt to connect the POWs' situation and their management of it to the leadership of today's corporations and government agencies and their team-building strategies.

The book includes 10 chapters with interwoven themes. The chapters are included in six characteristics of high-performance cultures: "The Mission Leads," "You Are Your Brother's Keeper," "Think Big and Basically," "Don't Piss Off the Turnkey," "Keeping the Faith," and "The Power of We." Each chapter ends with a graphic of these titles enclosed in a ring, with lines connecting the chapter's main points with the relevant characteristics. This device aids the reader in connecting the dots in the authors' thinking and, in some cases, elucidates the theme more effectively.

Chapter 4, "You Are Your Brother's Keeper: The Catalyst for Virtual Leadership," illustrates how the authors relate lessons learned from the Hanoi Hilton to today's leadership. Fretwell and Kiland walk the reader through some of the most intense days in 1972 when, after peace talks with the North Vietnamese broke down and the bombings resumed, many of the POWs thought they would never see home again. Adm James Stockdale, one of the POWs, recalls the importance of keeping the team together because of their responsibility to each other—they were in effect their brother's keeper. Stockdale communi-

cated these thoughts by using a tap code, motivating his men to continue to resist. The authors then connect Stockdale's use of this code to the modern communication environment, much of which occurs through e-mail.

I found the illustrations and stories of the POWs' experiences at the Hanoi Hilton and their lives after release extremely interesting and at times quite engaging. The authors do an excellent job of gathering data and honoring the memory of these men. However, at times some of their points are disjointed. Indeed, readers looking for a book that speaks directly to a corporate organization or squadron may have a difficult time with some of the chapters' figures, whose representation of key points and their relationship to the rings mentioned above is confusing. Nevertheless, I found the book enjoyable. It is a short, easy read, and the stories are intriguing. Most of the latter are not well known and would serve as excellent illustrations at a commander's call and training events on teamwork and crew resource management.

1st Lt Matthew Chapman, USAF

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Give Me Tomorrow: The Korean War's Greatest Untold Story – The Epic Stand of the Marines of George Company by Patrick K. O'Donnell. Da Capo Press (<http://dacapopress.com/perseus/home.jsp>), 44 Farnsworth Street, 3rd Floor, Boston, Massachusetts 02210, 2010, 288 pages, \$26.00 (hardcover), ISBN 978-0-306-81801-1; 2011, 288 pages, \$16.00 (softcover), ISBN 978-0-306-82044-1.

In the early morning hours of 25 June 1950, the North Korean People's Army (NKPA) struck across North Korea's border with South Korea, rapidly destroying organized resistance in its path. President Harry S. Truman viewed this act as the opening salvo of a broader Soviet-led offensive and so ordered immediate American intervention. Gen Douglas MacArthur directed the US Eighth Army to Korea from occupation duties in Japan to stop the NKPA's momentum, envisioning it as a fixing force

coupled with an amphibious envelopment to turn the NKPA flank at Inchon. Patrick K. O'Donnell's *Give Me Tomorrow* is the story of George Company, 3rd Battalion, 1st Marines, from the envelopment at Inchon to disaster at the Chosin Reservoir.

Despite a dearth of Korean War literature relative to World War II and the Vietnam War, the body of work on this often overlooked but extremely important conflict continues to grow. *Give Me Tomorrow* is a popular history book that reads quickly and entertains, eschewing deep analysis and broad context. O'Donnell ties together interviews and familiar secondary sources to construct his narrative in a similar fashion to Donald Knox's two-volume set *The Korean War: An Oral History* (Harcourt Brace, 1985, 1988) but with much less contextual research and discussion than that classic example of oral combat history. *Give Me Tomorrow* is closer to Bill Sloan's recent book *The Darkest Summer* (Simon & Schuster, 2009), reflecting the bias against US Army leadership in the Korean War inherent in the secondary sources used by both authors but without Sloan's polemics. O'Donnell displays his writing background with generous amounts of foreshadowing to bridge his chapters within a decidedly teleological work, but he very effectively brings to life the memories and experiences of a heroic group of veterans.

Give Me Tomorrow briefly introduces the Korean War, George Company's origins, and the movement to Inchon in three short chapters. Veterans and readers of popular war history will find George Company's bonding and team formation a familiar story. The men came from across the United States and, under the hard leadership of 1st Sgt Rocco Zullo, had their disparate backgrounds and experiences forged into a common purpose. Over the next six chapters, O'Donnell describes the Inchon landing and liberation of Seoul, narrating these momentous events in just 75 pages, a feat that reflects engaging storytelling in favor of broader context. These chapters do not provide enough of the operational and strategic contexts to overcome the understandably myopic viewpoints of individual veterans. A better sense of how

the sacrifices, experiences, and even deaths of these Marines connected to the bigger picture would make the book that much more poignant.

The Inchon landing and subsequent liberation of Seoul cut NKPA supply lines, helping Eighth Army break out from the Pusan perimeter. George Company assisted in mopping up resistance in Seoul as Eighth Army rapidly advanced to the 38th parallel. President Truman authorized MacArthur to cross the parallel, an act that brought China into the war. MacArthur planned a two-pronged attack with Eighth Army on the west side of the north-south-running Taebaek Mountains and the US X Corps on the east. X Corps, to which George Company belonged, reloaded its transports and prepared for a second amphibious assault at Wonsan on North Korea's east coast. MacArthur demanded speed of action, but the terrain of North Korea slowed movement, strung units out, and ultimately left many of them isolated beyond the range of mutual support.

The great bulk of *Give Me Tomorrow* concentrates on George Company at the Chosin Reservoir, a part of X Corps's attack towards the Yalu River. Chinese Communist forces infiltrated large numbers of troops into North Korea and lured Eighth Army and X Corps into extending their supply lines to the point where the Chinese technique of double envelopment and encirclement was favorable, given a superior number of troops. After a bitter fight against the Chinese, the terrain, and the harsh winter weather, the 1st Marines successfully broke out of Chinese encirclement to reach Hungnam where they and the other remnants of X Corps evacuated North Korea. The description of Chosin in *Give Me Tomorrow* reflects the official Marine Corps history's narrative of the Marines fighting in isolation because Army units disintegrated under pressure from the Chinese Communist forces. This illustrates one of the limitations of oral history and the responsibility of the historian. Official reports, award citations, and unit histories shape how a veteran remembers battlefield events. Historians must treat recollections as truth for the participant while carefully balancing them with contextual research. In this case, the US Army's 7th and 3rd Infan-

try Divisions and the US Air Force played key roles in allowing the Marines to evacuate—an important aspect of the fight that George Company veterans would not necessarily know from their vantage points.

The greatest strength of the book lies in describing combat from the veteran's point of view. Seeing friends die, living the chaos and confusion of combat, and struggling to make sense of it all—even years after these events took place—are important aspects in understanding any war from a participant's perspective. O'Donnell is at his best weaving together past and present and helping the reader understand that a combat veteran never really leaves that experience behind; it lives with him or her forever, for better or worse. This lesson is particularly timely as thousands of Iraq and Afghanistan veterans attempt to reintegrate into a society that increasingly does not understand war.

On the whole, *Give Me Tomorrow* is a well-told story of one company of men at war. O'Donnell is a gifted writer and storyteller, engaging his readers with a fast-paced narrative that threads together the tragic yet heroic experiences of men who shared the boredom, excitement, and consequences of war. Scholars will find little that is new here except the previously unrecorded experiences of George Company veterans, but O'Donnell's intended audience of general readers and military history enthusiasts will undoubtedly enjoy this addition to Korean War literature.

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Stalin's Eagles: An Illustrated Study of the Soviet Aces of World

War II and Korea by Hans D. Seidl. Schiffer Publishing (<http://www.schifferbooks.com>), 4880 Lower Valley Road, Atglen, Pennsylvania 19310, 1998, 368 pages, \$59.95 (hardcover), ISBN 9780764304767.

Studies of the development of airpower in the United States tend to focus exclusively on American and Allied experiences of aerial combat in the two world wars. This is understandable since the US Air Force

emerged from those conflicts. However, for the past 70 years, most adversaries of the United States have founded their tactics and training on Soviet doctrine. Just as American Airmen study their history to understand our present so should they examine Soviet and derivative air forces to grasp their development. *Stalin's Eagles* provides the opportunity to do so by telling the story of Soviet air combat on the eastern front from 1941 to 1945 and again in Korea from 1950 to 1953.

This well-illustrated, comprehensive reference of all Soviet aces from World War II and the Korean War consists of brief narratives that introduce encyclopedic listings of aces, units, and aircraft. It includes five chapters, four appendices, a glossary, bibliography, and 16 full-color plates of Soviet aircraft. Mr. Seidl also offers copies of a US Army Air Forces report detailing a friendly-fire incident by Soviet aircraft against American P-38 Lightnings in 1944.

The author derived this work from personal research in American, Russian, and German archives; extensive interviews with combatants; and some secondary sources. The bibliography lists exclusively Russian sources although Mr. Seidl credits other archives in his introduction. Many of the photographs come from his personal collection.

The bulk of *Stalin's Eagles* is found in two chapters with alphabetic listings of Soviet aces (chap. 2) and air units (chap. 3). Only chapters 1, "The Eastern Front Air War"; 4, "The Tankbusters"; and 5, "Soviet Fighter Aces in Korea" are narratives. Together these three chapters comprise 28 pages of the book's 368 total—sufficient to give readers an idea of how air forces operated and developed in the Soviet Union. Mr. Seidl does not cover the history of both wars in great detail; instead, he spends more space describing how Soviet aircrews adapted to their circumstances, especially in World War II. Soviet air forces fought under conditions of great austerity: at the beginning of the war, they fielded fewer than 1,000 modern fighter aircraft. Within the first two days of combat, the Western Military District, nearest to the front, had lost 47 percent of its combat strength (p. 13). Combined with restrictive military regulations, these conditions made Soviet successes all the more remarkable.

Of particular interest are the book's two forewords, one by retired lieutenant general Vitaliy Popkov of the Russian air force and the other by retired lieutenant general Günther Rall of the German air force, which set the tone for the rest of the book. Rall emphasizes relationships developed between the erstwhile enemies while Popkov concentrates on the Soviet Union's sacrifices.

The latter theme permeates *Stalin's Eagles*. Western airpower promotes efficiency and technology, but the Soviet experience touted the expendability of each individual for the sake of the whole. Take, for example, the unique Soviet practice of aerial ramming. Soviet pilots used this tactic, which frequently destroyed both aircraft, more than 600 times on the eastern front. Some pilots successfully completed as many as four rams in their career. The author takes pains to contrast this kind of self-sacrifice against Western airmanship.

One notable flaw is the book's consistently unclear or distracting use of acronyms. Although the glossary includes all of them, Mr. Seidl usually does not explain them on first use—a tendency that can confuse the reader. In general, though, *Stalin's Eagles* is thorough, providing extensive details about individuals and units that had the greatest impact on the air wars of World War II and Korea. The numerous photographs and color plates make the book easy to peruse or find information about a specific person. Students of air combat and World War II or anyone interested in fighter aircraft and the people who fly them will find it useful.

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Lost Eagles: One Man's Mission to Find Missing Airmen in Two**World Wars** by Blaine Pardoe. University of Michigan Press

(https://press.umich.edu), 839 Greene Street, Ann Arbor, Michigan

48104-3209, 2010, 264 pages, \$32.50 (hardcover), ISBN 978-0-472-11752-9.

One of the finest traits of our Air Force is the degree to which we attempt to locate and retrieve our missing Airmen whether they are alive or dead. Blaine Pardoe's book *Lost Eagles: One Man's Mission to Find Missing Airmen in Two World Wars* reminds of a time when this principle was not so ingrained. Pardoe, a frequent writer on World War I aviation topics, presents a biography of Frederick W. Zinn, an early American aviator who took an abiding interest in locating the remains of missing aircrews from that war and continued to do so through World War II until his death in 1960. The work is interesting and often intriguing but falls somewhat short of its promise.

Pardoe traces Zinn's life story from his childhood in Battle Creek, Michigan, through engineering studies at the University of Michigan and his 1914 voyage to Europe on a postgraduation lark, arriving as the war began. In Paris, Zinn gets caught up in the "short war" frenzy and becomes part of the initial group of Americans to enlist in the French Foreign Legion, looking for a little adventure. Finding life in the trenches a bit less glamorous—and much longer—than expected, he transferred to the newly created Lafayette Flying Corps in 1916 and then to the American Air Service in 1917 where he was Billy Mitchell's chief of personnel. In this last capacity, Zinn found what would become his life's work—finding missing Airmen. Pardoe's narrative shows Zinn's concerns for accounting for the missing even before the war ended and his efforts to find about 200 Airmen after the armistice, many of them successfully. Returning to civilian life in 1919, he remained interested in the topic—an interest that he rekindled at the outset of World War II when he urged the Army Air Corps to learn from his experiences. Pardoe shows how Zinn, though only in a civilian capacity, managed to secure approval for and design the first Missing Air Crew Report (MACR) and become a member of the Office of Strategic

Services (OSS) in Europe to further his agenda of finding crews. The author takes great care to use a balanced approach in portraying Zinn's rise from French private to American major to civilian OSS operative, including the less flattering sides of his subject's often prickly personality. This objectivity makes the narrative much more compelling and believable.

Rather than utilize a straight narrative, Pardoe presents Zinn's life and efforts interspersed with thumbnail sketches of the missing for whom he searched in both European conflicts. These vignettes are the most intriguing parts of the book. Instead of dwelling on luminaries such as Frank Luke or even David Putnam (who, at his death, was the leading American "ace"), Pardoe uses Zinn's efforts to illustrate the more typical American aviator. Moreover, these vignettes contain many of the same issues that vex casualty efforts today: misinformation, false hope among family members, the dignified handling of remains, and the disposition of personal effects. Additionally, each episode has the kernel of a minimystery which Zinn attempted—often with success—to solve. The author would have been better served by expanding this portion of his story, thus illuminating Zinn's challenges and the tragedy of those lost in our first air war.

However, for all its merits, *Lost Eagles* does not convincingly prove the author's thesis—that Fred Zinn pioneered and influenced the techniques and procedures for finding missing aircrews. The author cannot draw a straight line between a so-called Zinn System and the systematic efforts later used by the military. Perhaps the example of a methodical process for collecting information and searching when territory is accessible was a sufficient start for what followed. However, as is clear from Pardoe's narrative, the Army Air Corps had completely forgotten any lessons from World War I by the time World War II had engulfed Europe. That the MACRs he designed in a Washington hotel are important documents to the process is inescapable, but beyond that contribution, Zinn's true impact remains uncertain. Although Zinn advocated for a central clearinghouse of all aircrew information

(regardless of service), Pardoe presents no evidence that his recommendations or advocacy led to the creation of either the Central Identification Lab or the Joint Prisoner of War / Missing in Action Accounting Command.

Lost Eagles is well written, well researched, and intriguing in its presentation of both Zinn and the objects of his searches. For readers deeply interested in early aviation (especially in World War I) or casualty/mortuary affairs, *Lost Eagles* is a compelling—if slightly flawed—bookshelf addition.

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Internet Architecture and Innovation by Barbara van Schewick. MIT Press (<http://mitpress.mit.edu>), 55 Hayward Street, Cambridge, Massachusetts 02142-1493, 2010, 592 pages, \$47.00 (hardcover), ISBN 978-0-262-01397-0; 2012, 592 pages, \$28.00 (softcover), ISBN 978-0-262-51804-8.

Each Airman is charged with understanding and anticipating changes in the Air Force's operating environment. Perhaps no environment is currently more challenging than cyberspace. Thankfully, Barbara van Schewick's *Internet Architecture and Innovation* provides a comprehensive evaluation of the Internet, skillfully examining its critical components and delving into why much of our interaction with cyberspace is shaped the way it is. This informative text educates both the informed and lay reader and serves as an authoritative resource for examining current and future cyber issues.

Van Schewick's unique expertise as an associate professor of both law and electrical engineering at Stanford University allows her to expertly weave technical, legal, and economic decomposition and synthesis of the Internet's architecture and highlight its impact as a driver of global development and innovation. One of the most valuable and critical elements of the book is the time and detail she dedicates to developing a baseline understanding of the origin of this architecture and the basis of its design. Most critically, the author educates readers on

Internet design principles, modularity, layering, and both narrow and broad versions of the end-to-end arguments. Understanding such arguments or how functions are divided between the source and destination of a network is especially critical because the placement of functions has significant impact on innovation. Van Schewick argues that deviation from the broad version of the end-to-end argument is one of the most significant factors affecting economic incentive for innovation over the Internet. Additionally, because of her focus on design principles, several aspects of her analysis transcend the immediate subject of the effect of Internet architecture on innovation and offer universal lessons for leaders to improve innovation within their own organizations.

Reading *Internet Architecture and Innovation* is an investment that both technical and nontechnical readers should make to better understand the principles and debates that form the way information, money, and ideas are shared today and in the future. Readers with only casual familiarity with the Internet and its design concepts will likely find this study initially challenging and will have to reread several passages. However, van Schewick's meticulous and clear building-block approach permits readers with a limited technical background to understand the rules and debates about one of the most critical elements of global interaction. As the Air Force continues to seek ways to create operations within the cyber domain, *Internet Architecture and Innovation* provides an invaluable resource for understanding the design principles that shape the domain.

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MiG Killers: A Chronology of U.S. Air Victories in Vietnam, 1965–1973 by Donald J. McCarthy Jr. Specialty Press (<http://www.specialtypress.com>), 39966 Grand Avenue, North Branch, Minnesota 55056, 2009, 160 pages, \$32.95 (hardcover), ISBN 978-1-58007-136-9.

In *MiG Killers*, Donald McCarthy describes US aerial victories in Vietnam, including those by Air Force, Navy, and Marine Corps pilots. Several chapters of chronological narratives that describe each encounter make up the bulk of the book. One appendix offers a summary of those kills, and another discusses the MiG aircraft in some detail. Early chapters address the nature of air-to-air combat in Vietnam, the armament available and its use, and the process by which the services analyzed reported MiG kills and gave official credit. McCarthy has also included aircraft tail numbers when known as well as photos of nearly every kill aircraft. The author makes use of a variety of official sources together with input from numerous historians, enthusiasts, and pilots. Although the book has no footnotes, the introduction does list many of the documents and people who contributed to this effort.

Readers should use care when citing numbers from this book. Specifically, McCarthy includes kills widely presumed valid by historians but either not included on official military credit lists or later withdrawn for various reasons. Furthermore, discrepancies exist between the chronological narratives in chapters 4 through 11 and the kill list in appendix B. For example, the first entry in chapter 4, “MiG Kills of 1965” (p. 23) is not listed in the appendix (p. 148)—the only such omission. Although chapters 4–11 are described as chronological, that is so only in terms of the date of the first kill by specific aircraft tail number. For example, readers wanting more information about the 11 May 1972 kill in appendix B (p. 155) would naturally look in chapter 9, “MiG Kills of 1972 (January–June)” —but they won’t find it there. Instead, it is listed in chapter 8, “MiG Kills of 1968/1970” (p. 97). On dates with multiple MiG kills, the sequence in the narratives does not always match the one in the appendix—a minor annoyance but one that should have been caught during editing. In one case, a kill date of 12

April 1967 in the appendix (p. 150) does not match the date in the narrative (p. 57). In the “Armament” chapter, the .50 caliber machine gun used on the B-52 is correctly called the M3 (p. 19), but in appendix B it is listed as the M60 (p. 157). Another small glitch is the author’s placement of the Tolicha Peak Electronic Combat Range in “upstate New York” rather than Nevada (p. 47). These discrepancies suggest that readers should take a cautious approach to using this book as an authoritative reference.

MiG Killers will serve any reader—historian, aviation enthusiast, or fighter pilot—who wants a comprehensive summary of American MiG kills during the Vietnam War. The research is thorough, the individual accounts are detailed, and the descriptions and discussions of 1960s-era air-to-air combat weapons and tactics are educational. Although the inclusive coverage of Air Force, Navy, and Marine Corps action under one cover is welcome, poor editing—primarily the lack of consistency between the narrative chapters and appendix B—remains a drawback.

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