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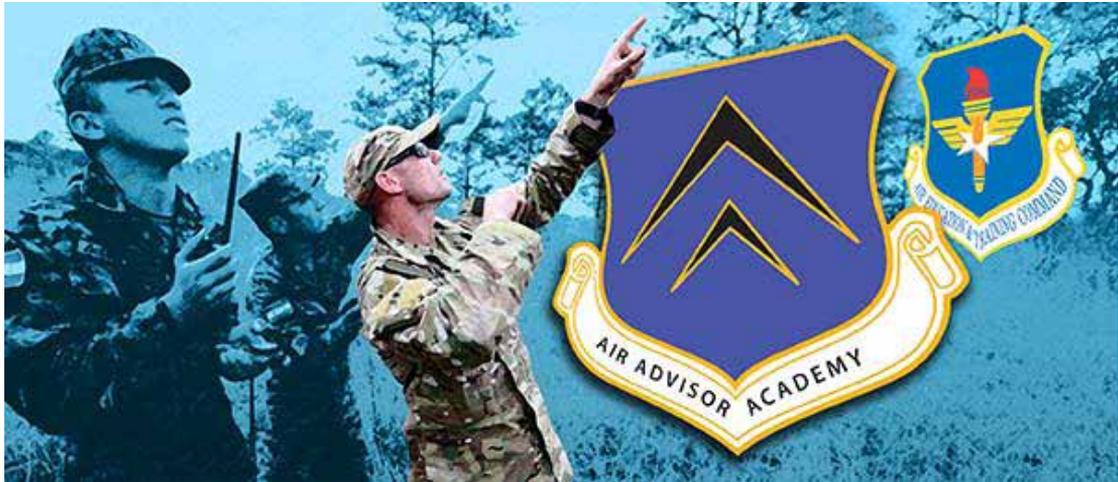
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# The Air Advisor

## The Face of US Air Force Engagement

Maj Gen Timothy M. Zadalis, USAF



Nestled in the local townships of small-town New Jersey is an Air Education and Training Command (AETC) schoolhouse with a small faculty of instructors who are packing quite a punch across the service and around the world. This school, the USAF Air Advisor Academy, educates and trains Airmen-diplomats from a wide range of Air Force career fields who will engage with counterparts in foreign security forces across the globe. More specifically, graduates of this unique institution apply their Air Force expertise to assess, train, educate, advise, assist, and equip partner-nation personnel.

Assigned to AETC's Second Air Force and 37th Training Wing, the Air Advisor Academy officially achieved full operating capability on 14 January 2013. The process began in early 2007, when substantial demand for general-purpose-force air advisors led the Air Force chief of staff to direct AETC to build a permanent predeployment training de-



tachment. Since that time, the command has trained more than 3,400 air advisors, most of the early graduates serving as air advisors in Iraq and Afghanistan. Now fully operational, the Air Advisor Academy has the capacity to train up to 1,500 Airmen annually. These individuals will advise counterparts in a multitude of nations across every region, supporting a wide array of contingency and peacetime missions around the world. As security challenges and strategic importance increase across the African Maghreb, for example, the Air Advisor Academy is poised to provide education and training to a whole host of Airmen deploying to that region as well.

The US military's responsibility to perform the advising function is steeped in policy and guidance. The US *National Security Strategy* directs a comprehensive, whole-of-government engagement strategy.<sup>1</sup> To realize this vision, the national defense strategy—outlined in the document *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense*—directs the Department of Defense (DOD) to “build the capacity and competence of U.S., allied, and partner forces for internal and external defense.”<sup>2</sup> Similarly, one of six key missions in the *Quadrennial Defense Review Report* of 2010 involves “build[ing] the security capacity of partner states.”<sup>3</sup> According to the DOD's *Defense Planning Guidance*, “The US will work closely with allies and partners to ensure collective capability and capacity for securing common interests.”<sup>4</sup> Finally, in support of this guidance, the *National Military Strategy* directs the services to “strengthen and . . . enable partner capacity to enhance security.”<sup>5</sup>

The *2011 US Air Force Global Partnership Strategy*, the service's guidance for the development of plans and programs to build global partnerships in support of national security objectives, grew out of this guidance.<sup>6</sup> AETC, with the Air Advisor Academy in the lead, is enabling implementation of this engagement plan. In his commencement speech to US Air Force Academy graduates on 23 May 2012, President Barack Obama acknowledged that “today, Air Force personnel are serving in 135 nations—partnering, training, building their capacity. This is how peace and security will be upheld in the 21st century—



more nations bearing the costs and responsibilities of leadership. And that's good for America. It's good for the world. And we're at the hub of it, making it happen."<sup>7</sup> As the president's comments indicate, Air Force engagement efforts are in line with his administration's guidance. Tireless effort at the Air Advisor Academy has enabled the service to meet those requirements—a huge return on a small, well-placed investment.

In addition to offering in-residence courses that have fueled this success, Air Advisor Academy instructors recently took their air-advising education and training on the road, teaching air advising to US Air Force Airmen in Europe and the Pacific. In mid-January 2013, a team of instructors led by Maj Alex Richburg taught an air-advising course to 23 members of the 36th Airlift Squadron at Yokota Air Base (AB), Japan, preparing these Airmen for the multiple partner-nation engagement activities planned across the Pacific region over the next year. America's strategic shift toward the Pacific makes it increasingly important for air advisors to build relationships and partner-nation capacity across US Pacific Command's area of responsibility. This mobile training team represents an important step in that direction.

At the Air Advisor Academy's next stop, Eastern Europe, another team of instructors trained 10 US Air Force personnel who comprise the newly activated US Aviation Detachment, 52nd Operations Group's Detachment 1, assigned to Lask AB, Poland. Four instructors from the Air Advisor Academy, led by MSgt Jeffrey Culver, taught five days of course material ranging from core knowledge for air advisors to communicating in a cross-cultural environment. American Airmen who receive this education and training will facilitate increased cooperation and interoperability between operations and maintenance personnel for the US Air Force's and the Siły Powietrzne's (Polish air force's) F-16 and C-130 aircraft.



**MSgt Jeffrey Culver, team lead of the Air Advisor Academy's mobile training, instructs US Aviation Detachment personnel at Lask AB, Poland, in late January 2013.**

## Air Education and Training Command's Roles and Responsibilities

The Air Force has recently codified 13 service core functions and has directed specific commanders of its major commands (MAJCOM) to lead the integration of these functions.<sup>8</sup> As one might expect, Gen Edward A. Rice Jr., the AETC commander, leads the Air Force's core function of education and training. It is important to note that General Rice is the core function lead integrator of the building partnerships core function as well. This makes perfect sense because these two core functions are indelibly linked. For example, AETC is charged with edu-



cating and training as many as 8,500 partner-nation personnel annually at just about every educational institution and training venue in the command. Through the International Military and Education Training program, foreign counterparts attend AETC's Undergraduate Pilot Training, Air Command and Staff College, Air War College, Senior Noncommissioned Officer Academy, and Air Force Academy, to name just a few. Education and training at AETC institutions quite literally build partnerships every day.

Additionally, both the Inter-American Air Forces Academy and the Defense Language Institute English Learning Center are assigned to AETC. The primary mission of these organizations is to build partnerships by educating and training partner-nation personnel. Additionally, AETC's Air Force Security Assistance Training Squadron manages the training of foreign partners in 137 countries that fly and maintain aircraft they have purchased through programs such as foreign military sales and foreign military financing. Furthermore, the Air Force Culture and Language Center, also assigned to AETC, helps Air University and other organizations, such as the Air Advisor Academy, educate and train Airmen who will engage and advise other partner-nation personnel.

In the preamble to the USAF Air Advisor Academy's charter, dated 19 April 2010, Gen Norton A. Schwartz, the Air Force chief of staff at the time, specifically discussed building partnerships in the context of AETC's Air Advisor Academy: "Our Nation's security is in substantial measure dependent upon our success in building partnerships and partner capacity, and countering irregular and asymmetric threats." Accordingly, he stated that "one of our most significant tasks that we face is helping to prepare our partners to defend sovereignty and govern effectively." AETC is leading the way toward the vision of the past and present Air Force chiefs of staff. In his recently published *Vision for the United States Air Force*, Gen Mark A. Welsh III, the new chief of staff, made reference to the two core functions assigned to AETC, submitting that "education and training are the foundation of our airpower advantage." Furthermore, he emphasized the importance of building



partnerships as the Air Force moves forward: “To strengthen our enduring contributions, the Air Force will . . . enhance relationships and interoperability with our sister Services, other government agencies, allies, and partners.”<sup>9</sup>

In addition to the roles of the core function lead integrator, AETC is also the lead MAJCOM for expeditionary skills training (EST). Accordingly, the command manages all foundational (tier 1), home-station (tier 2), and advanced (tier 3) EST across the Air Force. AETC is charged with managing and executing Combat Airman Skills Training and the Evasion and Conduct after Capture course as well. Furthermore, the command manages Air Force-wide training in countering improvised explosive devices, a critically important element of EST since these devices are the leading killer of coalition forces and a threat in many other hot spots throughout the world. Again, the tie between these AETC roles is critical. A substantial portion of the Air Advisor Academy’s course material, referred to as “fieldcraft,” is based upon EST lessons. Examples of fieldcraft skills taught at the academy include high-threat driving, active shooter / insider threats, advanced weapons, self-protection, small-team tactics, convoy operations, and training in countering improvised explosive devices. In fact, fieldcraft training is carefully interwoven throughout the Air Advisor Academy’s curriculum and fully integrated with air-advising core knowledge / skills and language, region, and culture course material.

Beyond its lead-MAJCOM role for EST, AETC also has responsibility for developing, standardizing, executing, and evaluating non-Air Force aircrew qualification and maintenance training. Currently, AETC leads training in Mi-17, Mi-35, An-32, King Air 350, Cessna 182, Cessna 208, and Pilatus PC-12 aircraft. The command has postured itself to add other important non-Air Force aircraft programs in the future. US Air Force aircrews and maintainers learn to fly and maintain these aircraft and then learn to advise partner-nation personnel in those roles. The same Airmen who receive AETC training in non-Air Force aircraft operations and maintenance also learn air advising and fieldcraft skills at



AETC's Air Advisor Academy—thus, we come full circle on the linkages between AETC roles and responsibilities.

## Air Force Engagement Space

It is important to understand building partnerships and air advising in the context of the many other related joint terms and DOD programs. Although one could view whole-of-government partner-nation engagement as the foundation of this collective effort, the emerging concept of aviation enterprise development serves as the overarching construct for the US Air Force's contribution. The community generally accepts the idea that four pillars support the Air Force's engagement effort: (1) building relationships, (2) building capability, (3) enabling interoperability, and (4) gaining access. Building partnerships and security cooperation both fully encompass these pillars, filling what one might refer to as the Air Force engagement space. Security assistance, which includes foreign military sales, foreign military financing, and the International Military and Education Training program, cuts across the first three pillars, filling a portion of the space and serving as an important subset of building partnerships and security cooperation. Building partner capacity and security force assistance are directly tied to developing the capability of a foreign military force and, for the US Air Force, developing a partner nation's aviation enterprise.

The US Air Force performs building partner capacity and security force assistance through the air-advising function. In so doing, it enables foreign counterparts to conduct irregular warfare activities—including counterinsurgency and foreign internal defense—and other foreign security force activities, such as countering external threats, in line with US national interests. As such, air advising fully encompasses the Air Force's efforts to build partner nation capability and plays a key role in building relationships and enabling interoperability. Although these disciplines include many players, the air advisor, in essence, is the face of the Air Force's engagement effort.



In many ways, the Air Advisor Academy is the service's link to many of these larger joint efforts. For example, the academy is emerging as the Air Force's answer to security cooperation training venues in the other services. In fact, the academy plans to train Airmen preparing to serve in a security cooperation capacity, such as security cooperation officers working in US embassies abroad. Similarly, AETC is working diligently with key stakeholders from Headquarters US Air Force, sister services, the joint community, and the Air Advisor Academy to fully align its course material with emerging standards for joint security force assistance training and corresponding levels of training. Additionally, lessons at the schoolhouse include education and training in security cooperation, security assistance, foreign military sales, irregular warfare, counterinsurgency, foreign internal defense, and other content directly tied to joint and DOD programs. Finally, in March 2013, the Air Advisor Academy launched a new course that trains key planning-staff members of each theater's commander, Air Force forces. These planners will develop those commanders' campaign support plans and individual country plans that support theater engagement plans of the geographic combatant command. Such plans codify theater and country-specific activities in aviation enterprise development and other partner-nation engagement efforts across the region. Planners will then implement the campaign support plans they helped to develop by serving as air advisors as they work with partner-nation personnel across the region.

## Conclusion

In his preamble to the USAF Air Advisor Academy's charter, General Schwartz said that "to achieve success, we will need trained, educated, and qualified general purpose force (GPF) Airmen to help build global air, space, and cyber partnerships in support of combatant commanders' security cooperation and irregular warfare . . . activities." He added that "a robust GPF Air Advisor capability will leverage the hard-earned expertise derived from our recent efforts in Iraq and Afghani-



stan.” All too often, the lessons of past wars are lost on the next generation. Instructors at the Air Advisor Academy are working diligently to institutionalize the progress made in air advising and expeditionary training over the last decade. Now fully operational and aggressively spreading the word, the little schoolhouse in New Jersey is punching above its weight in response to today’s threats and is poised to make an even greater impact in the future. ✪

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## Notes

1. President of the United States, *National Security Strategy* (Washington, DC: White House, May 2010), [http://www.whitehouse.gov/sites/default/files/rss\\_viewer/national\\_security\\_strategy.pdf](http://www.whitehouse.gov/sites/default/files/rss_viewer/national_security_strategy.pdf).

2. Department of Defense, *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense* (Washington, DC: Department of Defense, January 2012), 5, [http://www.defense.gov/news/Defense\\_Strategic\\_Guidance.pdf](http://www.defense.gov/news/Defense_Strategic_Guidance.pdf).

3. Department of Defense, *Quadrennial Defense Review Report* (Washington, DC: Department of Defense, February 2010), 26, [http://www.defense.gov/qdr/images/QDR\\_as\\_of\\_12Feb10\\_1000.pdf](http://www.defense.gov/qdr/images/QDR_as_of_12Feb10_1000.pdf).

4. Cited in Joint Doctrine Note 1-13, *Security Force Assistance*, 29 April 2013, I-1, [http://www.dtic.mil/doctrine/notes/jdn1\\_13.pdf](http://www.dtic.mil/doctrine/notes/jdn1_13.pdf).

5. Joint Chiefs of Staff, *The National Military Strategy of the United States of America* (Washington, DC: Joint Chiefs of Staff, February 2011), 6, [http://www.jcs.mil//content/files/2011-02/020811084800\\_2011\\_NMS\\_-\\_08\\_FEB\\_2011.pdf](http://www.jcs.mil//content/files/2011-02/020811084800_2011_NMS_-_08_FEB_2011.pdf).

6. Department of the Air Force, *2011 US Air Force Global Partnership Strategy* (Washington, DC: Department of the Air Force, 2011), <http://www.culture.af.mil/library/pdf/AFD111228013.pdf>.

7. President Barack Obama, “Remarks by the President at the Air Force Academy Commencement” (Washington, DC: White House, Office of the Press Secretary, 23 May 2012), <http://www.whitehouse.gov/the-press-office/2012/05/23/remarks-president-air-force-academy-commencement>.

8. Gen Edward A. Rice Jr., *United States Air Force Education and Training (E&T) Governance Charter*, March 2013, 2. Senior leaders who attended CORONA Fall 2012 decided to add a 13th service core function by separating education and training from agile combat support, resulting in the development and adoption of this governance charter.

9. Department of the Air Force, *The World’s Greatest Air Force, Powered by Airmen, Fueled by Innovation: A Vision for the United States Air Force* (Washington, DC: Department of the Air Force, 2013), [2], [3], <http://www.af.mil/shared/media/document/AFD-130110-114.pdf>.



### **Maj Gen Timothy M. Zadalis, USAF**

Major General Zadalis (BS, University of Alaska–Fairbanks; MA, Webster University; MAAS, Air University) is director of intelligence, operations, and nuclear integration, Headquarters Air Education and Training Command, Joint Base San Antonio–Randolph, Texas. He is responsible for developing policies and programming resources for the Air Force’s technical and aircrew training programs. This includes enlisted accessions; training in nonrated initial skills and supplemental/advanced skills; undergraduate flying training for Air Force, Navy, Marine Corps, Army, Reserve, and Guard personnel; Euro–North Atlantic Treaty Organization Joint Jet Pilot Training; and graduate flying training. Prior to his current assignment, the general was the director of air plans, International Security Assistance Force Joint Command, US Forces–Afghanistan. General Zadalis is a command pilot with more than 4,400 flying hours in the T-6, C-130, C-141, C-17, KC-10, C-5, and E-6B (airborne emergency action officer duty).

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<http://www.airpower.au.af.mil>

# The Swarm, the Cloud, and the Importance of Getting There First

## What's at Stake in the Remote Aviation Culture Debate

Maj David J. Blair, USAF\*

Capt Nick Helms, USAF

*It has been written that it is difficult to become sentimental about . . . the new type of seaman—the man of the engine and boiler rooms. This idea is born of the belief that he deals with material things and takes no part in the glorious possibilities of war or in the victories that are won from storms. This theory is absolutely false . . . for there is music as well as the embodiment of power about the mechanisms that drive the great ships of today.*

—Capt Frank Bennett, USN

*The Steam Navy of the United States, 1897*



**F**or all the ink spilled over remotely piloted aircraft (RPA) technology, knowledge of RPA culture remains in its infancy. Continuing the debate about culture, we argue first for the urgency of achieving manned-remote fusion in air warfare. Second, we maintain that the limiting factor in realizing that future is not technological

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but cultural. That is, until the RPA community finds its voice and place in the larger service, this evolution of airpower remains unlikely. The task at hand does not call for reinventing airpower but rediscovering it. Many of our Air Force greats have much to say about building a culture of technical warriors. We simply need to apply the ideas of Gen Henry “Hap” Arnold and those like him to the enterprise of remote aviation.

## The Swarm and the Cloud: A Hypothetical Vignette

Above a future battlefield, the long-range-strike bomber Saber 01 runs FENCE checks, preparing to penetrate layered defenses of the enemy’s air defense system.<sup>1</sup> A thick “swarm” of unmanned combat aerial vehicles (UCAV) guards the leading edge of friendly airspace. When friendly aircraft pass through the swarm on the way to prosecute targets, a number of UCAVs join formation with the outbound strikers as escorts. Seamlessly, as Saber 01 transits through the front lines, seven small UCAVs join on its wing and swap data-link control from theater air battle managers to the bomber’s combat systems operator.

Saber 01 serves as equal parts bomber and mothership, its stealth complementing advanced radar and data links, enabling the aircraft to command an automated squadron deep behind enemy lines. As the bomber crosses into enemy territory, the combat systems operator brings the local swarm in closer as the UCAVs begin to contend with the enemy’s jammers. The tactical formation of these platforms, combined with a fully networked electronic warfare suite, enables Saber’s crew to triangulate a precise fix on the target—an advanced theater surface-to-air-missile site. The enemy’s air defense operators had long trained to defeat single antiradar missiles, but Saber 01’s payload of hundreds of swarming micro air vehicles overwhelms their defenses with a networked mix of inexpensive warheads, sensors, and airframes.

Simultaneously, air battle managers behind friendly lines note that the surface-to-air-missile system has dropped off-line and direct the “cloud” of persistent air-to-ground RPAs to expand into the airspace it once occupied. A mix of high-end, long-endurance aircraft and large numbers of smaller aircraft fills the skies over permissive airspace. Using a variety of satellites, ground-based data links, and air-to-air network relays, this cloud provides a jam-resistant intranet covering both the air and ground battlespace, backed up by a seemingly endless reservoir of fires. High-end RPAs fly from ground or airborne links, which tap into the battlefield intranet rather than the individual aircraft itself. Doing so not only overcomes the jammer problem but also allows their crews to operate a number of aircraft at a time.

Meanwhile, a cyber warrior parries attacks from a desperate enemy who needs to disrupt the cloud’s effectiveness but shows his hand with every attempt at cyber superiority. The enemy succeeds at corrupting data, but the cloud isolates the nature of the corruption and supplies visual feedback to gray-matter operators who decide to patch the tactical picture back together with old-fashioned radio communications. Meanwhile, our cyber warrior has successfully isolated the hack and goes on the counteroffensive with an attack ensuring that the enemy will have only a negligible chance of success on the same front for the rest of the campaign. The connectivity of the cloud and the capabilities of the swarm prove essential for the effective use of traditional platforms.

The smaller RPAs of the cloud revolutionize the role of Battlefield Airmen—instead of a radio, their primary armament becomes their data link to the cloud. Using a video-integrated helmet and a control system integrated into a glove, combat controllers can reach up and “grab” small RPAs with data links. Highly automated flight controls allow the controllers to task sensors and fires directly, right alongside the ground force commander. The combination of absolute information supremacy and inexhaustible fires proves devastating—air supremacy leads quickly to ground supremacy in this truly joint fight.

The enemy commander, however, is no fool. Knowing the American reliance on electronics, he plans to use electronic and space warfare to neutralize their technological advantages asymmetrically. Unfortunately for him, when jammers close down one link, information re-routes itself through unaffected parts of the network. Similarly, he hopes to use his tremendous numerical advantage on the ground, employing air defenses to hold American airpower at bay long enough to generate a *fait accompli*. This tactic proves no more effective as he soon learns that ground does not long remain red under blue skies. Air support has gone from retail to wholesale—the entire battlespace becomes a large-scale retelling of the battle of Al-Khafji, where torrents of persistent attack aircraft decimated entire ground-maneuver units in partnership with Marines and Rangers.<sup>2</sup> As his defenses melt away and front lines crumble, like the French commander at Agincourt, he laments the unfairness of it all. “Had it not been for those robots,” he might say. But he would be wrong. Both sides had robots since missiles are as much robots as UCAVs. He simply used his less effectively.

## Getting There First and Getting There Soon: The Centrality of Culture

The future described in this fictional account waits for whoever “gets there first.” RPAs figure prominently in the spectrum of possible American security strategies. Offshore balancing, small-footprint engagement, air-land battle, and air-sea battle rely on aspects of airpower best provided by a synergistic mix of manned platforms and RPAs. We must, therefore, get RPAs right sooner rather than later.<sup>3</sup> America entrusts our Air Force to fly, fight, and win in air, space, and cyberspace—RPAs do all of the former, making use of all of the latter. They fit squarely within our service’s *raison d’être* and rightly belong with Airmen.<sup>4</sup> Thus, as Airmen it is incumbent upon us not only to get there first but also to get there soon.

“Why the rush?” one might ask. “We all know that RPAs are the wave of the future, and we’ll get there eventually.” Making the case for urgency, one of the greatest minds of our time pointed out that when elite privilege is on the line, “later” is a dangerous snooze button that can all too easily become “never.” Consider the following description by Maj Gene Bigham, a veteran fighter pilot, that appeared in an article published by *Air University Review*:

[Aircraft] controlled by men located not in the cockpits but rather in the basement of the Pentagon, each of them controlling multiple drones through the use of a satellite link. . . .

. . . As former Secretary of the Air Force John L. McLucas has written:

I believe we are entering an era when RPVs [remotely piloted vehicles] will play an increasingly important role in helping airpower to serve the nation. . . .

. . . Thus, the development of an Air Force position on drone roles and missions is not a future decision but one that must be made today.<sup>5</sup>

None of Major Bigham’s arguments are particularly surprising; indeed, they dovetail nicely with much of the recent literature on the increasing role of RPAs. But the date of publication, November–December 1977, is quite surprising. Similarly, on no less than V-J day, General Arnold commanded us to “go to work on tomorrow’s aviation,” which “may be fought by airplanes with no men in them at all.”<sup>6</sup> He made that statement in 1945, less than a year after an RPA successfully attacked anti-aircraft staging areas near Bougainville Island during the Pacific campaign. Twenty-six years later, the first RPA-launched air-to-ground missile successfully destroyed a test target in the Mojave desert.<sup>7</sup> Yet, 64 years later, accounts of the RPA suggest it is in the Wright-Flyer stage of development.<sup>8</sup> Remote aircraft and their crews have been part of the story of aviation since its early days. This is not a question of adopting a new technology into the family but of recognizing the right of a long-standing branch of aviation to bear the family name.

How, then, do we get there? We assert that culture, not circuitry, represents the true issue of today—we have had the hardware for a while.<sup>9</sup> The Predator made its combat debut in 1995, two years before

initial operational capability for the B-2 Spirit and four years before the Spirit joined the Predator in combat over the former Yugoslavia.<sup>10</sup> Air Force MQ-1s and MQ-9s have logged almost 1.5 million flight hours. By accumulating more than 350,000 yearly, they will pass the F-15C's/E's current mark of 3 million hours within half a decade.<sup>11</sup> According to *Air Force Magazine's* Aaron Church, "Within two to three years, Air Force officials predict, drone pilots will outnumber F-16 pilots."<sup>12</sup> Despite top cover from key senior leaders hailing from diverse aviation backgrounds, RPA culture still needs to find itself and its place within the larger Air Force culture.<sup>13</sup> The community needs leaders who will galvanize a creative RPA culture and embed those capabilities within the spectrum of air, space, and cyber power. Since remote aviation is no longer an emerging technology, its Airmen should not still be struggling to find cultural acceptance within their own service.

Major Bigham's article rightly predicted that the Air Force's challenge with RPAs would not be the hardware but how those who employ that hardware would find a home within the service. The hardware is here: the asymmetric needs of an asymmetric war brought about the RPA enterprise as we know it, and the new National Defense Authorization Act guarantees that it will not go away anytime soon. Despite the best efforts of Air Force leadership to normalize the enterprise, however, the place of the RPA community and the validity of its contribution remain a lightning rod within the larger service culture. We must work through this cultural tension together as a service if we wish to move forward, helping steer RPA culture between the extremes of an oppositional "chip on our shoulder" identity that will hamper synergies with manned aircraft and a demoralized "head held low" identity that fails to make full use of the platforms' capabilities. RPAs have moved well beyond the "dull, dangerous, and dirty" jobs of early drone lore, and we hold that Airmen's view of technical culture will move them even farther forward while avoiding this cultural Scylla and Charybdis.<sup>14</sup>

We assert that deep streams of airpower thought can answer the central questions of the evolution of RPA culture; moreover, we can largely attribute the broken elements of the RPA construct to neglect of the traditional Airman's view of technology. Toward that end, we examine three great Air Force leaders, each of whom explains different aspects of the interplay between culture and technology. General Arnold describes how the culture of a given technology must come into its own if it is to realize its full potential; Lt Gen Elwood Quesada argues that Airmen view technology as an amplifier of integrated human agency; and Col John Boyd observes how our definitions of cultural membership shift over time. By way of these greats, we anticipate a future that fuses manned and remote platforms—one in which Airmen exert vertical dominance of the battlespace with new levels of persistence and mass.

## Technology = Humans + Hardware: General Arnold on Air-Mindedness

"It's an important capability, but it's not really what we do or who we are." This sentence seems equally apt describing the zeitgeist of RPAs in our service at present and that of aircraft in the Army of the 1920s. "What we do" and "who we are" find themselves inextricably tied to the development of a capability within larger strategic and cultural frameworks. General Arnold noted a world of difference between *aviator* and *aircraft operator* even though the two terms may encompass the same set of actions. Aircraft operators apply the tool of an aircraft to a set of tasks. For aviators, the aircraft becomes an extension of their will, enabling them to move through a new domain. Aircraft operators perform their tasks well and honorably, but aviators grasp the possibilities inherent in the technology and its domain. This air-mindedness allowed General Arnold to advance aviation from a tactical-support capability to a transcendent strategic community.

MIT professor David Mindell refers to technology as a physical component paired with a cultural component: “Technology, right down to armor plate and turret bearings, is part of culture. . . . Technical reality does not exist independent of cultural significance. Each influences the other, to the point where distinctions between them become difficult to maintain. . . . Both constitute what we call technology.”<sup>15</sup> General Arnold’s assertion was not simple service chauvinism or technophilic zealotry but an observation about the cultural embeddedness of technology.<sup>16</sup> On a bureaucratic level, a capability will flounder without advocates; on the deeper level of identity, dreams of strategic futures are most often rooted in one’s own experience.

Dr. Dale Hayden describes air-mindedness as thinking of technology in terms of domains rather than tools.<sup>17</sup> Immersed in a domain, one begins to realize the possibilities contained therein. Common sense is common only to a specific context. Air-mindedness is a common sense of the air. During our first year in the Predator, we found learning the domain a much greater obstacle than learning the aircraft. In manned aircraft, space was important—satellite communications and the Global Positioning System (GPS) served as critical mission enablers. In the Predator, though, space became part of our domain. Orbits and footprints turned into practical rather than academic concerns as we realized that losing a satellite link could cut our control cables. Further, cyberspace folded into our world; servers acted as the eyes with which we scanned for other aircraft. Simultaneously, our ability to interpret engine sounds and vibrations through a throttle quadrant atrophied. Our experience of aviation became more abstract as we adapted to our new domain—neither better nor worse but different as we gained a new common sense. For instance, in RPA common sense, it is commonsensical to “demand” effects (rather than “command” actions) from a number of aircraft at once through a multiplexer when doing so increases intelligence collection without degrading kinetic capabilities.

RPAs are far more than long-endurance flying cameras, but to realize many of these possibilities, we need a brand of air-mindedness specific

to this technology. An infantry officer of the 1930s might consider an aircraft a tool of airborne artillery, but aviators saw the potential of destroying command centers deep behind front lines. An outsider might see a Predator as an 80-knot aircraft that takes two people to fly, but an aviator steeped in RPA culture would envision the possibilities of a flying focal point where the resources of the intelligence community intersect the needs of the tactical war fighter. Even though we have the hardware, we must think about the humans from which RPA culture will grow. Gen Wilbur Creech's passion for developing leaders seems sage counsel for the base that bears his name and the service that bears his imprint.<sup>18</sup>

## Capabilities versus Cybernetics: General Quesada on Commanding Technology

As described by aviation bard Antoine de Saint-Exupéry, aviators do not stand outside their machine; rather, they step into another world in partnership with it.<sup>19</sup> Any conception of a pilot necessarily includes both human and machine. Therefore, the “human versus machine” meme in the current RPA discussion fails to capture the issues at stake. The true conversation does not deal with competition between humans and machines. Instead, it concerns the nature of cooperation between them. General Quesada offered the best response to this issue in 1959: “The day of the throttle jockey is past. He is becoming a true professional, a manager of complex weapons systems.”<sup>20</sup> We have already moved into a world where “diffuse agency” replaces “direct agency”—where we use automation as an amplifier for our own capabilities.

The folktale of John Henry retells the myth of man versus machine through a “steel-driving man” who wins a grueling race against a steam-powered hammer at the cost of his own life. Not to diminish the poignancy of this classic American story, but Mr. Henry uses a hammer—a machine—to translate the force of his muscles into blows upon

railroad spikes. One might cynically reinterpret the fable as a dispute between the adherents of established and emerging machines. A deeper interpretation seems more appropriate, however: John Henry's iconic hammer is a machine that amplifies human agency, whereas the steam-powered hammer diminishes the role of humans in the world.

This distinction transposes well into remarkably similar quandaries faced by surgeons and pilots. Trained at a great investment of time and expense in manual dexterity and encyclopedic procedural recall, these elite groups find that advances in computers and robotics diminish the value of their painstakingly developed portfolios.<sup>21</sup> An apocalyptic battle between scalpel-wielders and computer engineers, however, would hurt the cause of medicine and serve neither group. Instead of digging in their heels, enterprising surgeons are finding ways to harness these advances, perhaps expanding their services globally to the disadvantaged through data links or employing robotics to access internal organs without major incisions.<sup>22</sup> By getting out in front, surgeons transform a threat to their profession into an asset that extends their capabilities. In the same way, the fear that pilots are replaceable is best answered by using the lens of technology to amplify the things truly irreplaceable about them. Technology then ceases to be a threat, allowing us to magnify our distinctively human capacities of judgment, reasoning, and situational awareness across the battlespace.

The first truth of special operations holds that humans are more important than hardware. In other words, technology exists to enable people to fulfill the mission. This is the *capabilities* view of technology: machines are amplifiers of human will, better enabling them to make something of their world.<sup>23</sup> By exercising dominion through technology, people gain greater command over their environment. The alternative is that humans are important to operate the hardware—that people are subsystems within larger sociomechanical constructs. This view, cybernetics, encloses people within closed control loops that regulate systemic variables within set parameters.<sup>24</sup> Rather than human

versus machine, the true discussion about the future of RPAs addresses capabilities versus cybernetics.

Many of the issues faced by RPA operators arise from unintentional cybernetic views of the crew. The demands of combat-driven explosive growth produced makeshift solutions, which became processes, procedures, and, ultimately, publications. As all too few crews struggled to meet geometrically increasing demands, the easiest answers sacrificed aircrew empowerment. The safest solution, given the circumstances, was closer supervision, but this choice had consequences.<sup>25</sup> Once entrenched within a community, a sense of dependency becomes very difficult to exorcise.

A more sustainable solution calls for embracing the traditional approach based on the aircrew's capabilities—assigning crews a mission and giving them all the resources to conduct it. From a capabilities view, crew members—in partnership with a fleet of maintainers and support personnel—take “their” aircraft into the fight to hunt down threats. Conversely, a cybernetics view uses a crew to supply a set of inputs that in turn produces x number of hours of intelligence, surveillance, and reconnaissance (ISR). Traditionally, Airmen have taken a capabilities-based view of technology, yet because of the addicting (and potentially illusory) sense of “thereness” that the platform provides to higher-echelon commanders, elements of the present RPA structure reflect a cybernetics approach. The tremendous connectivity of the platform is its greatest strength, but it can also become its greatest weakness if we do not take measures to ensure aircrew empowerment.

Restoring the “command” to RPA aircraft commanders would empower them to tap the resources of the entire intelligence community to better accomplish the mission and support their comrades. This entails (1) training RPA aircraft commanders on the wealth of relevant resources and bringing all onboard sensors under their control, (2) ensuring that ground-force commanders pass history, intent, and priorities to the crew rather than attempt to direct sensors manually, and (3) guaranteeing that air command and control respects the prerogatives of

RPA aircraft commanders as they would those of a manned aircraft. Ideally, this looks to a future in which aircraft commanders and ground-force commanders brief together, jointly building operational schemes of maneuver with authorities delegated from their respective chains of command.

To put forth one rule of thumb, horizontal connectivity between peer-level commanders is almost always beneficial. Vertical connectivity up and down the chain of command can become toxic in the absence of protections to preserve the initiative of tactical operators. In other words, never let your connectivity exceed your maturity. Lt Gen David Deptula's synergistic model of indivisible ISR offers an intercept trajectory for this goal by placing aviators in conversation with analysts in nested sensor-shooter loops.<sup>26</sup> Regardless of the implementation, the RPA must come into its own as a culture of Airmen by means of a capabilities-based view of technology that guarantees crew initiative, decentralized execution, and a say in the trajectory of the platform.

### Pilot, Version 3.0: Colonel Boyd on “Destruction and Creation”

In his masterwork “Destruction and Creation,” Col John Boyd synthesizes physics, cognition, and mathematics into the analytical engine that drives his observe, orient, decide, act (OODA) loop.<sup>27</sup> Whenever we act, we change the world; in doing so, we must reframe who we are in reference to this now-altered world. We constantly destroy old frameworks and create new ones to “improv[e] our capacity for independent action.”<sup>28</sup> This is no less true for pilots. When pilots burst on the scene over the trenches of the First World War, they changed the ways of fighting wars, but they too changed as the technical horizons of aviation advanced.

We could express the core idea of a pilot as “one who fights from the air” or “one who fights in three dimensions.”<sup>29</sup> An RPA pilot be-

longs squarely within this category, yet his or her inclusion within the prestige-laden term *pilot* was at first a point of cultural contention within the service. Encouragingly, Air Force Instruction 11-401, *Aviation Management*, the regulation that governs aeronautical ratings for the Air Force, chose the term “RPA Pilots” to describe officers who command an RPA.<sup>30</sup> The incorporation of RPA sensor operators into the prestigious category of career enlisted aviators is similarly provident. As always, advances in technology force us to consider how the core principles of identity intersect with the world of the possible and adapt our definitions accordingly. Tracing the evolution of the term *pilot* may help us grasp the issue at hand.

Colonel Boyd’s OODA loop distills the nature of aerial combat. Whether a P-51 pilot pulling lead with machine guns or an F-15 optimizing a radar, the name of the game is getting inside the adversary’s sensor-shooter loop before he does so. Because sensor and weapon technology determines the derivation of this solution, our examination of the evolution of the term *pilot* touches upon the eras of cannons, missiles, and networks. With each evolution, the definition of *flying* becomes more expansive and enables greater capabilities, the OODA loop becomes more abstract, and the pilot’s “capacity for independent action” increases.

The Mark 1 pilot, a gunfighter, used his eyes as primary sensors, with some degree of off-board support from ground-based radar. This pilot’s primary weapons relied on the Newton guidance system, a mix of cannons, machine guns, and unguided bombs whose flight path intersected their intended targets only through the pilot’s aerial gunnery skill. The P-51 serves as an archetype of this era. With advances in sensors, beyond-visual-range combat grew in importance, and the critical skill set became arriving at a long-range sensor solution on a target while denying the same to an adversary. The archetypal F-15A Mark 2 pilot took control of a much wider swath of the battlespace, using electrons and an arsenal of semiautonomous unmanned aerial vehicles by the names of Sparrow and Sidewinder to wipe the skies clear. Maneu-

vering the aircraft into launch parameters for these rocket “drones” constitutes a far more efficient means of owning the OODA loop than spraying nine yards of machine gun rounds around the sky.

The war-winning pilot of the 1990s fights in three dimensions in a very different way than the war-winning pilot of the 1940s. The war-winning pilot of 2020 will fight in three dimensions in a way just as different as that of his or her predecessors—from lines of fire and arcing weapon-engagement zones to volumes of three-dimensional network space. For these pilots, the OODA loop is information supremacy: by first removing critical nodes and thus disrupting their adversary’s connectivity, the pilots of 2020 can easily destroy the remainder of the enemy network in detail.

The F-22 is an astonishingly capable aircraft precisely because it embraces the idea of this Mark 3 pilot. Although F-22 pilots spend less time chasing needles on “steam gauges,” advanced sensors and the power of two Cray supercomputers make them far deadlier than their predecessors.<sup>31</sup> Mark 3 pilots have the defining characteristic of placing their craft at the *schwerpunkt* (focal point) of the battlespace and there exert vertical dominance.<sup>32</sup> According to the chief of the Israeli air force’s (IAF) long-term planning department, “The job of a pilot is vastly different from what it was. . . . The point is to see the enemy way before he sees you, and for that you need datafighters, not dogfighters.”<sup>33</sup> It is intriguing, then, that the IAF adopted RPA technology early on. Abraham Karem, designer of what would become the Predator, formerly served as chief designer for the IAF.<sup>34</sup>

We hold that RPA pilots fit this Mark 3 definition well because they are cousins to the computer- and connectivity-enhanced C-17 and F-22 pilots.<sup>35</sup> A Predator’s day-long endurance allows crew members to place their aircraft over critical nodes of an adversary’s organizational structure, whether those nodes move or stay put. Efficient engines and a lightweight structure let the crew members outlast patient adversaries and strike targets at a time and place of their choosing. Sensor acuity and long dwell permit the aircraft to generate its own awareness of

the ground situation. The Global Information Grid connects the crew to a range of onboard and off-board resources, which they use to gain and maintain vertical dominance of the acre under their steady stare. Automated systems and data links are hardly unique to the Predator—those of the F-22 easily put it to shame. The factors that seem to estrange the RPA from the mainstream of “pilotness” are actually commonalities among our most recent redefinition of *pilot*.

Col Hernando Ortega, the Air Force ISR Agency’s chief flight surgeon and a leading expert on RPA human factors, coined the term *telewarfare* (from Greek *telos* [far] and the familiar English word) to describe the experience of fighting from afar.<sup>36</sup> One of the most crucial implications of his term is that all air warfare in the era of long-range sensors includes some degree of telewarfare. Physical distance becomes less important than cognitive distance—entering coordinates into a GPS-guided bomb is a more abstract experience of combat than directing a laser-guided bomb on a high-resolution sensor. In one of the stranger turns of technology, early low-fidelity sensors made weapons employment more abstract, but advanced sensors make the act more cognitively immediate. A B-1 with an advanced targeting pod is likely more connected to the consequences of its weapons than is a B-17 bomber. This juxtaposition of increasing physical distance with decreasing cognitive distance in sensor-mediated combat reflects another commonality of Mark 3 piloting, manned and remote alike.

Folding RPA operators into the *pilot* category, along with F-22 operators and C-17 operators, does not dilute this evolving term but updates it to reflect the ways in which one fights in three dimensions with the technology of our day. True acceptance of this idea will require a reshuffling of privilege, and some individuals who find that the current state of affairs puts them at an advantage will likely resist such a reordering. The career of Gen Curtis LeMay demonstrates a higher road above these squabbles. Although he initially served as a fighter pilot, as one of a small cadre of navigation-qualified aircrew members, he instead filled the critically needed role of navigator in the run-up to the

Second World War.<sup>37</sup> In the same way, the needs of the service are exactly what drives the continued growth of the RPA community. Definitions should serve missions rather than the other way around. *Pilot* is a term of great prestige in the Air Force. In keeping with General LeMay's example, instead of allowing that word to capture us, let us instead capture it and use its gravity to slingshot our service forward.

## Conclusion: Making Culture with All of Its Fixings

We began our discussion with the swarm and the cloud, a vision of an airpower strategy whereby Airmen gain and hold vertical dominance of the battlespace by fusing the best of manned and remote aviation. We argue that the primary challenge in achieving this future is not technological but cultural. Colonel Boyd closes the loop by describing how strategy and culture are bound together: "We must . . . *eliminate* those blemishes, flaws and contradictions that generate mistrust and discord . . . [and] that either alienate us from each other or set us against each other, thereby . . . paralyz[ing] us and mak[ing] it difficult to cope with an uncertain, ever-changing world. . . . We must *emphasize* those cultural traditions . . . that build up harmony and trust, thereby creat[ing] those implicit bonds that permit us . . . to shape as well as adapt to the course of events in the world."<sup>38</sup> To understand how one builds the cultural room for strategic evolution, we turn to history as an analogy for understanding the present.

In 1862 at the docks of the New York Navy Yard, the USS *Monitor* didn't look much like a ship at all, according to the definition of the day. Boasting no tall masts with sails blowing in the breeze, no broadside arrays of cannons, and no ornately decorated bowsprit, the squat ironclad stood no risk of being mistaken for Vice Adm Horatio Nelson's HMS *Victory*. The enlisted men who volunteered for service aboard "were made all manner of fun . . . for gooing [sic] to sea in a tank."<sup>39</sup> A year later, in the immediate aftermath of the pitched Battle of Hamp-

ton Roads, the Assistant Secretary of the Navy told the crew, “You don’t look as though you were just through one of the greatest naval conflicts on record.”<sup>40</sup> In the age of sail, battles resulted in “torn uniforms stained with blood, [and] hollow faces stunned by shellfire” while the crew of the *Monitor* emerged from victory covered only in soot and powder.<sup>41</sup>

Herman Melville weighed in on the passionless mechanical power of the ship: “Hail to victory without the gaud / Of glory. . . . / War’s made / Less grand than Peace.”<sup>42</sup> In considering the honor and glory of Appomattox Courthouse, he fails to mention the consuming, inhuman hunger and disease of the siege of Richmond that immediately preceded it.<sup>43</sup> Poets and screenwriters may favor Thermopylae, but with their friends’ lives on the line, most warriors would prefer Plataea.<sup>44</sup> The crew of the USS *Minnesota*, saved from destruction at the hands of the Confederate ironclad CSS *Virginia* by the inelegant *Monitor*, surely preferred their survival to the sustenance of Melville’s sentiments about the trappings of warfare. The greatest honor lies in what works—in what completes the mission and brings friends home alive without compromising the values for which we fight.

As described by Maj Charles Kels, the point of warfare is to win, and the way to win is to make sure that the other side bears as much of the risk as possible.<sup>45</sup> As a service, we would do well to remember that point. Admitting RPAs into the inner ring of our service culture is not a question of heroism but of simple effectiveness. An air force that perfects a fusion of manned and remotely piloted aircraft will dominate the skies (and the surface beneath those skies), but to build that force we must have people who understand both sides of that equation.

Toward that end, fostering RPA-minded aviators within the service will reveal airpower possibilities beyond those immediately apparent to traditional aviators. Ensuring some level of cross-fertilization between manned and RPA experience benefits both communities. As with any teamwork, these benefits must be built on a foundation of mutual respect. Putting this into practice, the Air Force has sent a

number of young captains who have completed their first flying tour in RPAs into follow-on tours in manned aircraft. Units receiving these pilots might learn much about how RPAs can assist their platforms if they choose to view RPA experience as legitimate. If we think structurally, replacing cybernetic processes with capability-based models empowers RPA pilots, which improves performance, effectiveness, and job satisfaction. As a service, coming to terms with the evolving nature of pilots inducts RPA aviators into the rich lore of flight and allows Airmen to tell the chapter of the Air Force story written over the last decade in the skies of Iraq and Afghanistan.

The most important aspect of martial culture, though, is pride—something we cannot transplant. It must be homegrown by the community out of a sense of shared values, accomplishments, mission, and purpose. The RPA community must take itself seriously—there is no room for being off altitude and hence becoming a hazard to other aircraft, and there is no excuse for watching a target for hours but failing to gain situational awareness of an upcoming operation on that target. The community must give no reason whatsoever to validate negative assumptions about it. This sort of seriousness comes from a passion for the mission. Thus, we return to the centrality of combat.

The rush of acceleration that accompanies an afterburning takeoff cannot motivate typical Predator or Reaper pilots—nor can the prospect of making assault landings on impossibly short dirt strips. Only one idea motivates them—that their actions help comrades in the line of fire and that their weapons help win the war and keep their countrymen safe. Combat occupies center stage for all Air Force aviators, but for RPA pilots it is the only thing on stage at all. A culture builds pride from what it does. RPA crews spend nearly the entirety of their flying time piloting aircraft in combat zones. Combat must be the deep soil from which the RPA community draws its pride. More than likely, no one will make a *Top Gun* movie about the glamour of long hours in a cargo container. There is, however, a long stream of headlines about al-Qaeda's thinning command structure. A saying from the days "when

Strategic Air Command was king” alluded to making movies and making history. RPA is making history.

Mindell describes the mechanism by which new technologies are accepted into the military mainstream—victory in battle.<sup>46</sup> This is hardly the scientific method since battles never take place in controlled conditions, and very rarely do we collect enough data points to attain statistical significance. But acceptance is as much a question of cultural narrative as of equipment optimization; thus, the retelling of a battle becomes as significant as the regression output from scientific testing. There is a certain logic to this—the crucible of uncontrolled conditions in the chaos of battle is a fitting final exam. Consequently, in the naval Battle of Hampton Roads during the Civil War, the duel of the *Monitor* and the *Merrimack* irrevocably inscribed the combination of steam power and metal-plate armor into the lore of the United States Navy. The gold standard of a military technology remains its ability to save lives. The *Monitor* saved the lives of the one remaining “wooden wall” at Hampton Roads from the Confederate ironclad that had already claimed two wooden frigates. This weighty discussion occurs in the currency of lives. The *Monitor’s* crew members were weighed and found worthy because they saved the people aboard the wooden USS *Minnesota*—despite the iron walls that gave them immunity.

The counter-improvised explosive device (IED) fight of Operation Iraqi Freedom represents the modern equivalent of the Battle of Hampton Roads. Although the RPA crews enmeshed in the struggle were not at risk, their actions radically reduced the threat to their friends on the ground by providing the ISR needed to dismember the IED network.<sup>47</sup> As the *Washington Post’s* Rick Atkinson describes in “Left of Boom,” allied commanders realized that “if you don’t go after the network, you’re never going to stop these guys. Never.”<sup>48</sup> The geometric growth of the RPA community was in the midst of this struggle to stem the killing tide. In partnership with intelligence professionals and special operations forces, the RPA’s unblinking eye proves uniquely adept at disrupting social networks.<sup>49</sup> For all the talk of risk in the controversy over RPA

culture, the threats to ground forces drove the remote-split-operations construct that allows RPA crews to fly from outside the combat zone. The steady stare of the Predator protected our comrades on the ground, and that stare remained fixed on target through countless flight hours—hours that could be generated in much greater numbers from the United States than from downrange.<sup>50</sup> In Operations Iraqi Freedom and Enduring Freedom, risk to ground forces proved far more acute than to aviators; therefore, almost all the lives saved by the Predators and Reapers were those of ground troops. This realization should restore civility and camaraderie to the discussion about RPA culture—virtues heretofore sorely lacking.

Over the course of the past decade, RPA aviators have clearly experienced victory in battle, the standard for acceptance into military culture. Our enemy's own words testify to that fact. In war, the enemy always gets a vote. In this war, his vote was clear—Osama bin Laden himself confirmed the effectiveness of RPAs. Personal papers seized from his compound reveal a man left "distraught by drone strikes [and] al-Qaeda losses."<sup>51</sup> An astute airpower thinker described the link between victory and acceptance by joking that an RPA should sink the *Ostfriesland*, the vessel destroyed in a bombing demonstration by Gen Billy Mitchell in his quest to legitimate the role of aircraft in national security.<sup>52</sup> Off the top of our heads, we'd pick about a dozen high-value al-Qaeda targets over that battleship. ✪

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## Notes

1. FENCE checks are final combat checks conducted prior to entering hostile airspace.
2. Thomas A. Keaney and Eliot A. Cohen, *Revolution in Warfare? Air Power in the Persian Gulf* (Annapolis, MD: Naval Institute Press, 1995), 94–95.
3. Specifically, we advocate a causal-constitutive view of the relationship between technology and culture. Technology shapes culture as culture shapes technology, and the evolution of this relationship depends upon initial conditions. Culture facilitates the effect of developing solutions, whether doctrine, training, or materiel. The most creative new-paradigm solutions are undoubtedly fostered by critically thinking, open-minded, interdisciplinary cultures. Thus, culture precedes capability. The other way around, where capability creates

culture, risks doubling down on an exploitable paradigm or creating an infinite loop of inertia. We do not imply that capability does not create culture—probably a historical fact. However, technology does not automatically create culture of value. Sometimes capability opens the minds of its users to foster a culture that iterates high-value solutions. In this case, the acceptance of RPAs as a group itself, responsible for generating the “right” culture, symbolizes the last 80 years of RPA/manned-aircraft synergy—or the lack thereof.

4. This is not to lessen the tremendous advances that the joint community has made on behalf of RPAs, but the nature of that relationship lies beyond the scope of this article. We argue for Air Force leadership—not exclusivity.

5. Gene Bigham, “The Future of Drones: A Force of Manned and Unmanned Systems,” *Air University Review* 29, no. 1 (November–December 1977): 51–52, 64, <http://www.airpower.au.af.mil/airchronicles/aureview/1977/nov-dec/bigham.html>.

6. Lawrence Spinetta, “The Rise of Unmanned Aircraft,” *Aviation History* 21, no. 3 (January 2011): 30.

7. Thomas P. Ehrhard, *Air Force UAV's: The Secret History* (Arlington, VA: Mitchell Institute Press, July 2010), 34–37, <http://www.dtic.mil/cgi-bin/GetTRDoc?Location=U2&doc=GetTRDoc.pdf&AD=ADA525674>.

8. Brookings Senior Fellow Peter W. Singer captures this zeitgeist well. See “Peter Singer: Drone Warfare,” YouTube video, 22:49, March 2012, <http://www.youtube.com/watch?v=gP3-TC3AMv8>.

9. One of the most common misconceptions in the pop-culture discussion of “drones” is the “fetishization of technology.” Incorrectly assigning agency to the technical construct, this error misses the nature of remote combat (as if the ubiquitous Tomahawk cruise missile were any less of a “robot killer”). Between 1990s-era computers and a network of 10 or more pilots, sensor operators, and analysts, the latter carries the weight of the causality. RPA technology is very much a human story.

10. Walter J. Boyne, “How the Predator Grew Teeth,” *Air Force Magazine* 92, no. 7 (July 2009): 42–45, <http://www.airforcemag.com/MagazineArchive/Documents/2009/July%202009/0709Predator.pdf>; “B-2 Spirit History,” Northrop Grumman, accessed 5 June 2012, [http://www.as.northropgrumman.com/america\\_bomber/history.htm](http://www.as.northropgrumman.com/america_bomber/history.htm); and “The B-2A Spirit: Kosovo and Beyond,” Northrop Grumman Analysis Center, 16 February 2000, <http://www.northropgrumman.com/AboutUs/AnalysisCenter/Documents/pdfs/B-2A-Spirit-Kosovo-and-Beyond.pdf>.

11. Boeing and General Atomics Aeronautical Systems Inc., personal correspondence with the author, 29 May 2012.

12. Aaron Church, “RPA Ramp Up,” *Air Force Magazine* 94, no. 6 (June 2011): 60, <http://www.airforcemag.com/MagazineArchive/Documents/2011/June%202011/0611RPA.pdf>.

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14. P. W. Singer, *Wired for War: The Robotics Revolution and Conflict in the 21st Century* (New York: Penguin Press, 2009), 273.

15. David A. Mindell, *Iron Coffin: War, Technology, and Experience aboard the USS Monitor*, updated ed. (Baltimore: Johns Hopkins University Press, 2012), 15.

16. Maj Gen Charles J. Dunlap Jr., "Air-Minded Considerations for Joint Counterinsurgency Doctrine," *Air and Space Power Journal* 21, no. 4 (Winter 2007): 63, 64, <http://www.airpower.maxwell.af.mil/airchronicles/apj/apj07/win07/win07.pdf>.
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18. Lt Col James C. Slife, *Creech Blue: Gen Bill Creech and the Reformation of the Tactical Air Forces, 1978–1984* (Maxwell AFB, AL: Air University Press in collaboration with the College of Aerospace Doctrine, Research and Education, 2004), <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA431075&Location=U2&doc=GetTRDoc.pdf>.
19. Antoine de Saint-Exupéry wrote that "the machine, which at first blush seems a means of isolating man from the great problems of nature, actually plunges them more deeply into them. As for the peasant, so for the pilot, dawn and twilight become events of consequence." Antoine de Saint-Exupéry, *Wind, Sand, and Stars: By Antoine de Saint Exupéry*, trans. Lewis Galantière (New York: Reynal & Hitchcock, 1940), 20.
20. Quoted in David A. Mindell, *Digital Apollo: Human and Machine in Spaceflight* (Cambridge, MA: MIT Press, 2008), 40.
21. For instance, see Herbert J. Rogove et al., "Barriers to Telemedicine: Survey of Current Users in Acute Care Units," *Telemedicine and e-Health* 18, no. 1 (January/February 2012): 48–53.
22. Pamela Whitten and Frances Mair, "Telesurgery versus Telemedicine in Surgery—an Overview," *Surgical Technology International* 12 (February 2004): 68–72.
23. Amartya Sen, *Commodities and Capabilities* (Oxford, UK: Oxford University Press, 1999).
24. David A. Mindell, *Between Human and Machine: Feedback, Control, and Computing before Cybernetics* (Baltimore: Johns Hopkins University Press, 2002). The field of cybernetics is far more expansive than described here. This article uses the term to describe a structural view of the relationship between people and mechanical constructs (in contrast to a view focused on individual agency). The Apollo program tended toward a capabilities view of technology, empowering the crew and enabling collaboration with ground-based mission directors. This proved essential in the safe recovery of the *Apollo 13* crew. The Soviet space program tended toward cybernetics, locking humans within heavily regulated parameters of behavior—witness the fact that ground crews padlocked Yuri Gagarin's spacecraft controls to prevent unauthorized manual piloting.
25. For example, see the amount of leadership and overhead for combat air patrol requirements in Col J. R. Gear, "USAF RPA Update: Looking to the Future," 3 June 2011, slides 38, 39, 43, <http://www.theresearchcorridor.com/sites/default/files/Col-JR-Gear.pdf>.
26. Lt Gen David A. Deptula, "Think Different," *Armed Forces Journal* 148, no. 4 (November 2010): 20–39, <http://www.armedforcesjournal.com/2010/11/4939123>.
27. John R. Boyd, "Destruction and Creation," 3 September 1976, [http://www.goalsys.com/books/documents/DESTRUCTION\\_AND\\_CREATION.pdf](http://www.goalsys.com/books/documents/DESTRUCTION_AND_CREATION.pdf).
28. *Ibid.*, 2.

29. One might argue that the term describes one who fights “in the air,” but doing so would exclude B-17s, P-47s, and any aircraft not intended to fight other aircraft (bombers and attack aircraft fight from the air to the ground).

30. Air Force Instruction 11-401, *Aviation Management*, 10 December 2010 (certified current 9 January 2013), 90, [http://static.e-publishing.af.mil/production/1/af\\_a3\\_5/publication/afi11-401/afi11-401.pdf](http://static.e-publishing.af.mil/production/1/af_a3_5/publication/afi11-401/afi11-401.pdf).

31. “F/A-22 Common Integrated Processor,” Raytheon Corporation, accessed 5 June 2012, [http://www.raytheon.com/capabilities/products/f22\\_cip/](http://www.raytheon.com/capabilities/products/f22_cip/).

32. Clausewitz uses *schwerpunkt* to describe critical points of battlefield effort. Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1989), 485.

33. Amir Mizroch, “Nano Drones, Ethical Algorithms: Inside Israel’s Secret Plan for Its Future Air Force,” *WIRED*, 11 May 2012, <http://www.wired.com/dangerroom/2012/05/israel-secret-air-force-plan/>.

34. Peter Finn, “Rise of the Drone: From Calif. Garage to Multibillion-Dollar Defense Industry,” *Washington Post*, 23 December 2011, [http://www.washingtonpost.com/national/national-security/rise-of-the-drone-from-calif-garage-to-multibillion-dollar-defense-industry/2011/12/22/gIQACG8UEP\\_story.html](http://www.washingtonpost.com/national/national-security/rise-of-the-drone-from-calif-garage-to-multibillion-dollar-defense-industry/2011/12/22/gIQACG8UEP_story.html).

35. The AC-130H/U and the AH-64D, with which the Predator/Reaper share a persistent air-to-ground sensor-shooter loop, are closer relations in another sense. A common sensor lineage ties these platforms together; they all maintain station-keeping profiles above their targets; and they have all have been fitted with Hellfire missiles (though only experimentally on the AC-130). However, the automation and computer-mediated control that figures strongly in the estrangement of the RPA do not play as strong a role in these platforms as they do in fifth-generation fighters. This commonality is one of mission rather than of the conception of “pilotness.” In fact, one of the reasons we reject the term *drone* is that it conflates autonomy with physical presence—by the standards of processor speed and algorithms, an F-22 is a much better “drone” than the MQ-1.

36. Col Hernando Ortega, personal correspondence with the author, February–June 2012.

37. Walter J. Boyne, “LeMay,” *Air Force Magazine* 81, no. 3 (March 1998): 63, <http://www.airforcemag.com/MagazineArchive/Documents/1998/March%201998/0398lemay.pdf>.

38. Frans P. B. Osinga, *Science, Strategy and War: The Strategic Theory of John Boyd* (London: Routledge, 2007), 216–17.

39. Mindell, *Iron Coffin*, 48.

40. *Ibid.*, 1.

41. *Ibid.*, 2.

42. “A Utilitarian View of the Monitor’s Fight,” in Herman Melville, *Battle-pieces and Aspects of the War* (Cambridge, MA: Da Capo Press, 1995), 61–62.

43. Jay Winik, *April 1865: The Month That Saved America* (New York: HarperCollins, 2001).

44. The Battle of Thermopylae (480 BC) pitted a force of several thousand Greeks against more than 100,000 Persians. During this archetypal last stand, the Greeks held for days against the Persian forces but ultimately succumbed to their overwhelming numbers. The Battle of Plataea (479 BC) saw the defending Greeks face a more manageable three-to-one numerical disadvantage against the Persian invasion force; surmounting this disparity, the

Greeks emerged victorious. Herodotus, *The Histories*, further rev. ed., trans. Aubrey de Selincourt (London: Penguin Books, 2003).

45. Maj Charles G. Kels, "Don't Deride Our Drone and Cyber Operators," *Hill's Congress Blog*, 26 April 2013, <http://thehill.com/blogs/congress-blog/homeland-security/296407-dont-deride-our-drone-and-cyber-operators>.

46. Mindell, *Iron Coffin*, 9, 18, 45.

47. That is, risks comparable to "outside-the-wire" ground forces subject to IED attacks and direct enemy fire. Deployed RPA launch-and-recovery crews experience the same risk of residual indirect fire as other "inside-the-wire" personnel (the latter risk geometrically smaller than the former). The highest risks at present for manned aircraft are likely the accumulation of small amounts of daily risks associated with normal aviation mechanics along with regional and global potshot terror attacks, both of which bear heavily on questions of valor and heroism vis-à-vis RPA pilots as RPA crews share the terror-attack risk but not the aviation-mechanics risk. The relationship between risk and lethal force is not easily captured by the increasingly irrelevant geographic heuristic of a "combat zone." One challenge of the present discussion is that heroism, driven by sacrifice and risk, is increasingly decoupled from combat—a function of direct, lethal responsibility. Therefore, a manned crew flying outside the combat zone that chooses to face these small risks day after day for years is heroic—but not in combat. An RPA crew employing lethal fires is in combat; although capable of extraordinary achievement, it is not heroic. An attack-helicopter crew in the combat zone is heroic and in combat—and ground forces even moreso. Fully exploring the evolving relationship among risk, lethal force, combat, and heroism lies beyond the scope of this article. However, for a more complete discussion of risk-due-to-enemy-fire comparisons between RPA crews and manned aircraft, see the letters to the editor from Maj Christian A. Senn and Maj Dave Blair in the July–August 2012 issue of *Air and Space Power Journal*, 149–60, <http://www.airpower.au.af.mil/digital/pdf/articles/Jul-Aug-2012/RR-Senn.pdf>.

48. Rick Atkinson, "If You Don't Go after the Network, You're Never Going to Stop These Guys. Never," *Washington Post*, 3 October 2007, <http://www.washingtonpost.com/wp-dyn/content/article/2007/10/02/AR2007100202366.html>.

49. Michael T. Flynn, Rich Juergens, and Thomas L. Cantrell, "Employing ISR SOF Best Practices," *Joint Force Quarterly* 50 (3rd Quarter 2008): 56–61, <http://www.ndu.edu/press/lib/pdf/jfq-50/JFQ-50.pdf>.

50. David A. Deptula, "Unmanned Aircraft Systems: Taking Strategy to Task," *Joint Force Quarterly* 49 (2nd Quarter 2008): 50, <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA516795>.

51. Jordy Yager, "Brennan: Bin Laden Left Distraught by Drone Strikes, al Qaeda Losses," *Hill*, 30 April 2012, <http://thehill.com/blogs/defcon-hill/policy-and-strategy/224569-brennan-bin-laden-feared-drones-sought-to-rebrand-al-qaeda>.

52. Interestingly, only 23 years later, RPAs punched holes in the hull of the *Yamazuki Maru* on 30 July 1944 with drones while manned aircraft remained no closer than seven miles to the target ship. James J. Hall, *American Kamikaze* (Titusville, FL: J. Bryant, 1984), 163–68.

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<http://www.airpower.au.af.mil>

# The Next Lightweight Fighter

## Not Your Grandfather's Combat Aircraft

Col Michael W. Pietrucha, USAF

SEC. 220. UNMANNED ADVANCED CAPABILITY COMBAT AIRCRAFT AND GROUND COMBAT VEHICLES.

(a) GOAL.—It shall be a goal of the Armed Forces to achieve the fielding of unmanned, remotely controlled technology such that—

(1) by 2010, one-third of the aircraft in the operational deep strike force aircraft fleet are unmanned; and

(2) by 2015, one-third of the operational ground combat vehicles are unmanned.

—Public Law 106-398, 30 October 2000

National Defense Authorization Act, Fiscal Year 2001



A casual survey of unmanned combat aerial vehicles (UCAV) would show that various countries have pursued a dizzying variety of such possible weapons systems, starting in World War I and continuing today. Reconnaissance variants have a long and effective history, but no autonomous UCAV is close to becoming opera-

tional. The value of these aircraft remains a subject of much debate, and although UCAVs clearly are not ready to replace manned strike aircraft, the exact role they will fulfill is less clear.<sup>1</sup> Almost any discussion of the subject treats them as aircraft *that happen to have a combat role*. Although technically correct, this view misses the larger picture. UCAVs are nothing of the sort; rather, they are *combat aircraft that happen to fly without aircrews on board*. As such, UCAVs may represent a partial solution to the increasing expense and dwindling numbers of modern fighter aircraft in service of the United States.

In 1971 the Air Force started its last lightweight fighter program, which produced the F-16 Fighting Falcon and (eventually) the F-18. With the F-16 and F-15, the service settled on a “high/low” mix of aircraft to replace Vietnam-era fighters. It procured more than 1,000 F-15s and F-15Es and more than twice that number of F-16s. The Air Force wanted the F-22 Raptor and F-35 Joint Strike Fighter to follow a similar high/low strategy, but both programs have seen their total size shrink, and the Joint Strike Fighter may suffer from defense cuts. Given spiraling costs, the time is right to consider a new program. The next lightweight fighter should be small, maneuverable, and relatively inexpensive, having a combat radius similar to that of its heavier brethren—but it need not have a crew on board. The aircraft’s different design constraints will distinguish it from a fighter, and it won’t do everything we expect of the latter. Intelligently designed, a UCAV can become a force multiplier.

## A Force Multiplier, Not a Replacement

The UCAV will not replace the manned fighter aircraft—we cannot build a control system to replicate the sensing and processing ability of trained aircrews. Nevertheless, UCAVs may play a valuable role as a supplementary system. Not remotely piloted aircraft, they will operate semiautonomously, serving as literal wingmen of limited capabilities. We can build the technology to fly an aircraft and execute preprogrammed routines. The “brains” of the operation will remain the

nearby human, who needs only to tell the UCAV what to do and (mostly) forget about it.

## Design

For this purpose, the generic UCAV is designed in response to a set of requirements. Since it will not do the same thing as a manned fighter, it need not have identical capabilities. Gold-plating the system will raise the cost of the aircraft and likely destroy any reasonable argument for incorporating it into service. Thus, the Air Force must limit requirements to the following:

- Autonomous flight; navigation (including instrument approach and terrain following); identification, friend or foe; and communications.
- Small size.
- High maneuverability (up to 7 g's).
- F-16-like combat radius.
- High subsonic speed, service ceiling of at least 30,000 feet.
- Internal and external payload.
- Reduced radar and infrared signature (not necessarily “low observable”).
- Modular avionics fit.
- Short takeoff and landing (STOL).
- Capability of interfacing with tactical networks.

The need to take off, fly, navigate, land, and communicate provides the backbone for an aircraft that can function without having to constantly tie up a human operator. If the airframe stays small, we can place a number of them in confined spaces, especially on board a variety of sea-basing options. Furthermore, smaller airframes lend themselves to relatively easy transport in significant numbers via airlift,

thereby shortening deployment time. Finally, adversaries will find such aircraft more difficult to detect and successfully engage. High maneuverability directly correlates to survivability against a variety of threats. If we assume that this UCAV will operate extensively (possibly primarily) with manned aircraft, then it must have range similar to the F-16's, possibly calling for an air-refueling capability. To keep up with strike aircraft, the UCAV must operate at high subsonic speed.<sup>2</sup>

We can partially attain signature reduction in a variety of spectra with small size, airframe shaping, and design. Since a number of UCAV missions will not demand stealth, most production airframes need not utilize expensive radar-absorbent coatings. Similarly, the aircraft must carry some payload internally to minimize drag and signature; it must also carry external ordnance and fuel.

The modular avionics fit is essential to maximize flexibility and control cost. Some UCAVs will carry advanced (and expensive) sensors and communications, but not all missions call for a full kit. In light of the historically high loss rates for remotely piloted platforms, the “basic” airframe design will permit the deletion or addition of capabilities, minimizing the cost of losing an airframe. For example, it might include space for a system (black box and antenna array) carried only as necessary.

STOL capability will assist operations from small airfields or the deck of a ship (not only carriers but perhaps also specially fitted amphibious ships) and allow recovery on damaged runways. Finally, since the UCAV primarily operates in conjunction with manned combat assets, it must “plug and play” into any tactical data links available.

Expanding further into conjecture, this article discusses what the UCAV might bring to the fight if the Air Force could launch the program in a short time frame. Accordingly, it incorporates a notional paper written at Air Command and Staff College in the year 2020:

## Development and Employment of the F-40 Warhawk II: Looking Back from 2020

Given the need for a lightweight fighter, the Defense Advanced Research Projects Agency developed a prototype UCAV for use by both the Air Force and Navy, producing a small fighter aircraft available in three configurations. The F-40A, the basic airframe, does not utilize radar-absorbent materials (a cost-reduction measure), gaining its small signature by means of shaping and composite materials.<sup>3</sup> Many of the F-40A's design features were intended to support a flexible, modular configuration. The basic aircraft is equipped with antenna mounts and space for radar-warning gear, a self-protection system with expendables, satellite communications, optical communications, and a tactical data-link package. Internal payload is located in two internal bays, each sized to carry a GBU-32 (v) 1/B 1,000-pound Joint Direct Attack Munition (JDAM) or a four-pack of GBU-39/B.<sup>4</sup> There are two external, fuselage-mounted, removable hardpoints capable of holding AGM-84s, AGM-88s, or equivalent weapons or external fuel tanks.<sup>5</sup> Combat payload, exclusive of mounted sensors and internal fuel, weighs 3,400 pounds.

Identical in most respects to the A model, the F-40B does use radar-absorbent materials, further reducing its radar cross section. The B model has no external hardpoints. The F-40C—an F-40B with a more powerful engine—features higher performance, making it suitable for use with the F-22. The fact that the B and C models cannot carry external fuel limits their range, but all variants can permit air refueling via the boom on KC-135, KC-46, and KC-10 tankers; the A model also has a probe for probe-and-drogue refueling, the first aircraft since the F-100 equipped with both.<sup>6</sup>

The basic airframe allows the platform to function as a reusable cruise missile, weapon caddy, or reconnaissance package roughly equivalent to the early Model 147 Firebee drones employed over Vietnam (although enjoying much more precise navigation). Shorn of much equipment, it lacks even a camera to assist with recovering the

aircraft by remote control (although it can accommodate one); moreover, even though it has space for self-protection and radar-warning gear, none is permanently installed. As a result, the most expensive parts of the system are the engine and the navigation/control package, making the cost of a usable (although limited) aircraft as low as possible. Additional combat capabilities can be added to the airframe in modular fashion, including any or all of the following: a basic direction-only radar-warning receiver *or* an advanced radar-warning/electronic-support-measures package, chaff and flares, forward-looking day/night television for landing under manual control, a forward-looking-infrared camera, and advanced ground-mapping radar.<sup>7</sup>

The payload bays remain available for sensors, fuel, or weapons. The UCAV could carry additional weapons on external hardpoints, but external weapons compromise stealthiness and reduce the combat radius. Internal payloads include

- air-to-ground munitions, such as GBU-32s, GBU-39s/-40s, SUU-64/B canisters,<sup>8</sup>
- air-to-air munitions, currently AIM-120Ds;
- air-droppable sensors, including sonobuoys;
- a 1,600-pound fuel tank;
- decoys (ADM-160 miniature air-launched decoy [MALD]) or expendable jamming packages (MALD-J);
- standoff/escort jamming or other electronic warfare packages;
- special sensor packages, including a laser radar, radar, hyperspectral sensors, or photoreconnaissance;
- collection packages, including air-sampling tools;
- resupply pallets (aided by the Global Positioning System and parachute retarded);
- specialized signals-intelligence avionics;
- a communications relay package;

- advanced self-protection, including towed decoys and additional expendables (chaff/flares); and
- a directed-energy pallet (in development).

Some weapons are too large to fit inside, so the platform must carry them externally. It can accommodate both the AGM-88 high-speed anti-radiation missile and AGM-84L Harpoon II in pairs although the weight of the AGM-84L requires empty payload bays, at least at take-off.<sup>9</sup> The aircraft cannot carry especially heavy weapons.

Mixing payloads permits tailoring of the UCAVs for the mission in question. That is, a long-range mission might carry a single GBU-32 and fuel; a poststrike reconnaissance pass in a high-threat area might carry a photo pallet as well as an advanced self-protection package. Two identical bays offer more utility than one larger bay. A modular system design allows the services to minimize the expense of losing an airframe yet provide for multirole capability.

### *Lightweight Fighter Missions*

Unlike the lightweight fighter of 1971, the F-40 has a very limited air-to-air role. No variant of the F-40 possesses an air-to-air radar. All variants can carry the AIM-120D advanced medium-range air-to-air missile, but they are simply missile caddies. Pairing a single F-40C with an F-22 increases the total missile loadout from eight to 12; the Raptor performs all target-detection and missile-guidance functions. This limitation is not as severe as it seems and may (in the future) provide a highly valued capability to other platforms. Block 20 aircraft will be able to interface with Aegis ships, as will follow-on blocks with E-2D aircraft, thus extending the outer boundary against air-breathing threats.<sup>10</sup>

The interchangeability of the F-40A proved quite valuable—particularly during the initial production run, which did not supply enough aircraft to go around. On several occasions, land-based F-40As launched, completed their mission, and recovered aboard a US aircraft carrier; thus, they could replace lost F-40s without “wasting” a sortie

on a ferry flight.<sup>11</sup> Ferry reconnaissance missions became commonplace during the Hamadan crisis, when aircraft that launched from eastern Turkey overflew Iran and recovered on board the carrier in the Persian Gulf (and the reverse).

The F-40 found its key niche in counterland or antisurface operations. As a combat aircraft, it acts either as an autonomous asset or as a force multiplier and is commonly assigned to manned aircraft, referred to as “consorts.” Control methods vary with the complexity of the mission, but no control mode in the UCAV allows remote pilotage (except for takeoff and landing). All variants have three control modes.

**Mode A (autonomous control).** The simplest form of control for the F-40 is autonomous control, enhanced with an in-flight report and retasking ability, similar to that of a tactical Tomahawk. As in any mode—except for emergency landing—the vehicle itself handles basic flight operations, including terrain and threat avoidance. Useful for servicing fixed targets, this system can be retasked if the target moves. The Warhawk has two control loops—one for threat avoidance and one for fuel management. Autonomous operations have the advantage of very tight emissions control, immunity to communications interruption, and ease of planning, but their flexibility remains limited. Interdiction, critical resupply, and various reconnaissance missions use mode A; F-40s fly most of the high-speed tactical-reconnaissance missions on the air tasking order.

**Mode B (cooperative).** A simpler version of the semiautonomous operations mode (mode C), this mode allows the F-40 to perform simple cooperative operations whereby one of a number of UCAVs tied together via data link will react to conditions encountered by the others. One autonomous F-40 dropping bombs might be followed by another dropping unattended sensors. If the first UCAV becomes engaged, the second will replot the route to avoid the threat. If the first UCAV is destroyed, the second one may abort the mission, returning with key information about the loss. Cooperative mode also includes automatic collision avoidance—not a feature of autonomous mode.

Similarly, when paired with a manned aircraft, the F-40 can take action based on what its consorts or the other UCAVs are doing. In most cases, cooperative actions are merely the result of simple if/then statements: *if* threat radar illuminates the parent aircraft, *then* the F-40 will perform Y action (anything from launching decoys to attacking the radar directly). This simple scheme mimics the actions of intelligent machines but involves no direct human control, simply actions from a preplanned menu.

**Mode C (semiautonomous control).** The versatile semiautonomous control permits easier integration with the remainder of the joint force. Without it the Air Force might not have procured the aircraft. In semiautonomous mode (also referred to as the “wingman” mode), the F-40 is electronically tethered to a combat unit, which serves as the critical “man in the loop” for targeting and weapons employment—typically an aircraft, vessel, or ground unit. The manned unit supplies target identification, prioritization, assignment, and weapons allocation, thus clearing the “autonomous weapon” hurdle that has bedeviled weapons developers for decades.

The F-40 may receive updates and commands frequently or infrequently, and control can switch from one asset to another. No more than one unit may control any given UCAV although a single unit can control multiple F-40s. In short, under mode C the F-40 frequently acts as a literal wingman with no judgment, capable of following limited instructions.

Because the F-40 is not remotely piloted, mission commands are simple and easily integrated. It receives assignments of hostile air or surface “tracks” for attack, along with data on other UCAVs working in the same area. Other tasks may be assigned via simple commands, and the F-40 takes action based on its programming and the current “picture” provided via data link (see the figure below for primary commands used by the FB-22). Sensors on the F-40 usually integrate with those of the consort via data link

**TO 1FB-22-34-1-1**
**F-40 INTERFACE AND CONTROL (REAR COCKPIT)**

All variants of the F-40 may be controlled from the FB-22 rear cockpit, and additional commands are available that cannot be commanded from the front seat.

All normal F-40 commands require that the UCAV control page be selected on the MFD and that the RCP be in control of the display.

**Attack (ATK)** mode can be selected using either button 1 or by right input on the castle switch. Successful transfer of targeting data is indicated by a box around the **ATK** at button 1 and a green **RDY** indication at button 16. Full action on the RHC trigger is required to command the F-40 to execute. The F-40 will attempt to employ previously selected weapons (or jamming package) against the current ground track designated in the Tactical Situation Display. Weapon selection can be changed in the armament menu under button 15 (see SPECIAL FEATURES below).

**NOTE**

If no track is currently designated on the TSD, the **ATK** display will remain unboxed, **STBY** will remain at button 16, and "NO TRACK" will appear for two seconds in the center of the display.

**NOTE**

Friendly tracks cannot be designated and will be treated as a "no track" condition. "FRIENDLY" will appear for two seconds in the center of the display.

**WARNING**

If a neutral track is designated, the **ATK** display will remain unboxed, **ATK** will remain at button 16, "NEUTRAL" will appear for four seconds in the center of the display, and the voice warning "NEUTRAL, NEUTRAL" will play in both cockpits. Attack on a neutral target may still be commanded using the shift feature (coolie switch up + trigger full action). The **RDY** indication will return to **STBY** after 4 seconds.

**Escort (ESC) Attack (ATK)** mode can be selected using either button 2 or by down input on the castle switch. Successful receipt is indicated by a box around the **ESC** at button 2 and a yellow **RDY** indication at button 16. Full action on the RHC trigger is required to command the F-40 to execute. The F-40 will

attempt to employ previously selected weapons (or jamming package) against the highest priority target on the escort menu. The default entry on the escort menu is the highest priority "in range" target on the parent's threat warning display. **ESC** mode is automatically commanded if the consort is within 5 nm of parent aircraft that has sent a "Defensive" message on datalink.

**WARNING**

Once the escort mode is enabled, the F-40 will attack the first target that meets the specified conditions. If a subsequent, higher priority threat emerges, the F-40 priority must be changed using the **ATK** function or by commanding **ESC** again.

Weapon selection can be changed in the armament menu under button 15 (see SPECIAL FEATURES below).

**Decoy (DCY)** mode can be selected using either button 3 or by left input on the castle switch. Successful acceptance is indicated by a box around the **DCY** at button 3 and a green **RDY** indication at button 16. Full action on the RHC trigger is required to command the F-40 to execute. The F-40 will augment its signature and attempt to employ ADM-160 (if loaded) against the highest priority "in range" target on the parent's threat warning display. Automatic use of this function is selected using the shift-designate feature.

**CAUTION**

Use of the automatic feature may result in unintentional release of decoys or mission compromise.

**Loiter (LTR)** mode can be selected using either button 4 or by up input on the castle switch. Successful acceptance is indicated by a box around the **LTR** at button 4 and a green **RDY** indication at button 16. Full action on the RHC trigger is required to command the F-40 to execute. The F-40 will begin a random offset orbit 10 to 20 nm (5 to 10 nm if low) from the spot designated on the TSD. The structure of the orbit can be changed in the flightpath menu under button 11 (see SPECIAL FEATURES below).

**CAUTION**

Loitering F-40 will automatically return to base once **JOKER** fuel is reached.

**Change 3 2.51**

**Figure. Extract from notional Technical Order 1FB-22-34-1-1, Weapons Employment Manual, FB-22 Aircraft**

### ***Combat Employment: Close Air Support***

The first combat employment of the X-45A occurred after the devastating Arabian quake in Somalia, which has almost no infrastructure and suffers from ongoing clan warfare. The United States deployed forces to assist in security and logistics support to United Nations relief efforts in that country, particularly around the regional capital of Bendir Kassim, which the quake had virtually leveled. A joint task force based in Djibouti stood up to direct the relief effort, exercising airborne command and control via E-8C aircraft.

The US Air Force lifted elements of an Army Stryker brigade combat team (SBCT) into Djibouti, from which they drove 300 miles along the coast road to what was left of the regional capital. Shorn of organic artillery so it could deploy rapidly, the SBCT relied instead on a squadron of 24 F-40As airlifted into Djibouti from war-reserve storage at the US air base at Incirlik, Turkey. Interference from warlords became routine, and the F-40s rotated to serve as on-orbit assets for responsive joint fires.

The initial use of UCAVs occurred on the second day after arrival of leading elements of the SBCT in Bendir Kassim. Uploaded with a mix of general-purpose (GBU-32 JDAMs) and antiarmor (CBU-97) munitions, the F-40s orbited in unthreatened airspace 10 miles off the coast. At 0900 hours, the brigade staff called the orbiting E-8 aircraft and requested retaskable close air support against a fortified building providing cover for militiamen firing on relief personnel.<sup>12</sup> The E-8 released a pair of F-40s to a close-air-support orbit. After they arrived over the city, a terminal attack controller established communications, designated the target, selected munitions, and keyed “attack” into the handset. Shortly thereafter two JDAMs hit the building, which collapsed in a cloud of powdered concrete and dust. The F-40s, still with half of their ordnance on board, then returned to their orbit.

Fifteen minutes later, the E-8C detected a column of vehicles heading towards the city from a suspect area. Using a Navy Fire Scout already in the area, the E-8C crew identified the vehicles as the ubiqui-

tous African “technicals”—light trucks armed with heavy weapons—and declared the convoy hostile in accordance with the rules of engagement. This time, the E-8C crew pulled all four F-40As out of orbit and tasked them to attack the column. The E-8 continuously updated the position of the individual vehicles, and the Warhawks executed a near-simultaneous attack against the entire length of the convoy. Despite a hail of small-arms fire, the UCAVs remained largely undamaged, each one dropping a single CBU-103 canister. Each of the canisters dispensed 40 independently targeted “skeets” that tracked the hot metal of the vehicle engines and fired explosively forged slugs. A scant 10 seconds later, the entire column consisted of immobile wrecks, some vehicles hit by as many as three slugs. Two empty UCAVs returned home automatically; the two with JDAMs returned to orbit for their remaining on-station time, which proved uneventful. This early demonstration of firepower limited the exposure of US troops to hostile fire and significantly augmented the firepower available to the brigade commander. Arrival of the USS *Abraham Lincoln* a week later added another squadron of F-40As to the stock of aircraft, along with F-18E/F aircraft and a number of helicopters. In this operation, multiple units employed the UCAVs—initially a tactical air control party, then a tactical command and control element, and much later an F-18 from the *Abraham Lincoln*. In most cases, these units provided only target identification, designation, and weapons selection—the F-40 handled course corrections, attack profile, and weapons employment.

### **“Small Wingmen”**

In combat, F-40s have served primarily as “small wingmen.” The drastic reduction in the size of both Air Force and Navy combat aviation drove development of the F-40 to “stretch” the capabilities of the more advanced fighters by “tethering” the UCAV to manned aircraft. Efforts to lighten Army brigades spurred additional momentum within the Department of Defense; specifically, the loss of organic artillery support drove an airborne solution to provide fires for light ground forces. The F-40’s design made it compatible with a wide array of platforms

that give it instructions with a minimal increase in the crew's workload. F-40s employed in this manner retain the man in the loop for critical decisions.

Counterland and countersurface operations became the logical mission of choice for tethered F-40s. Typically, four to six F-40s accompany a flight of four manned fighters, the UCAVs offering extra weapons, an expanded sensor array, and capability to attack geographically distributed aiming points simultaneously. F-40s also supply both lethal and nonlethal suppression of enemy air defenses and are the weapon of choice for attacking located surface-to-air-missile batteries. Warhawks typically assume the dangerous poststrike reconnaissance mission.

Platforms other than fighter aircraft have made good use of the F-40. Realizing the potential of having a survivable, fast-moving jet under direction, users drastically increased in number. The Longbow Apache (AH-64E), originally built to designate targets for other aircraft using the Longbow radar, became the airborne forward air controller of choice for Army aviation brigades. The Apache/Warhawk combination offered unmatched capability for all-weather close air support. B-1 and B-52 bombers also use the F-40 as escort; however, because of the latter's limited range, the bombers join up with their Warhawks en route.

Some aircraft innovatively employ the F-40 as an airborne "scout." Terrain blockage and curvature of the earth prevent low-altitude or distant aircraft from looking into "the next valley" directly. Consequently, many a reconnaissance mission or package commander let the F-40 take a peek in advance. RC-135s effectively and regularly allow it to serve as an extension of their sensor arrays. EA-18G crews adopted this same concept by utilizing F-40s for lethal suppression of enemy air defenses but find them invaluable for providing "look-through" for their own jamming.<sup>13</sup> Strike aircraft operating at low altitude often direct an F-40 to "pop up" for a look around. Similarly, platforms flying over a weather deck have used this UCAV to investigate below the weather.

Surface combatants, particularly those operating close in the littorals, have turned to F-40s as surrogate sensors, allowing those vessels

to remain under strict emissions control and look beyond the horizon. Using the F-40 for weapons employment allows the location of the parent ship to remain uncompromised.

Air-to-air squadrons, though, did not readily accept the F-40. Despite the promise of extra missiles, the crews pointed out (correctly) that because Warhawks cannot fly either extremely high or supersonically, the advanced medium-range air-to-air missiles launched from those platforms lacked a running start and could not match the range of fighter-launched weapons. Defensive counterair missions partially alleviated this problem by placing the F-40 combat air patrol much closer to the threat although this tactic was of little use offensively. Any remaining objections vanished when a young F-22 weapons officer realized that the F-40's AIM-120, although shorter ranged for the typical nose-to-nose engagement, was longer ranged for any action in which the consort had to shoot off-boresight because of its defensive or neutral posture. The F-40 could afford to point at the enemy when its consort could not; AIM-120s shot from "hot" Warhawks wasted no energy making a turn to line up on target.

### ***Black Operations***

Granted, regular forces employed the UCAV in roles formerly filled by manned fighters, but the special operations community took to the F-40B like ducks to water. The F-40s gave this community two capabilities it had lacked entirely: a means of covert resupply and a pathfinder aircraft. Equipped with parachute-retarded supply pallets, Warhawks can resupply special operations forces yet minimize the chance of detection. A single UCAV can deliver 1,600 pounds of cargo in two pallets although long-range missions cut this figure in half because of the need to carry extra fuel.<sup>14</sup> Normally conducted with MC-130s and MV-22s, Pathfinder missions send F-40Bs along a planned flight route to survey the radar environment and help ingressing aircraft avoid detection.<sup>15</sup> UCAVs flying such a mission often carry a four-pack of

GBU-39 bombs for reactive suppression. Additionally, F-40s can pre-survey designated landing zones in advance.

The Department of Defense is not the sole user of the F-40B, but exact numbers and operators remain unconfirmed. Supposedly, the Central Intelligence Agency operates these aircraft, and both the Drug Enforcement Administration and Immigration and Customs Enforcement have been known to “borrow” Warhawks for surveillance. One of the rare payloads is a sampling pallet, used to take air samples along a specified route of flight. Unconfirmed rumor has it that such a payload has played a role in monitoring chemical weapons production and the Iranian nuclear-enrichment program.

### *Rapid Deployment and Sea Basing*

The Air Force, Navy, and Marine Corps—the F-40’s primary operators—can use the A and B models interchangeably although each service has its “own” appropriately marked jets.<sup>16</sup> Since all F-40s can fly from an aircraft carrier, it is not unusual to see a “USAF” aircraft doing so. Even F-40Cs have operated from flattops—a rare occurrence that involves a small Air Force maintenance detachment on board the carrier. Block 20 aircraft will be able to operate off *Wasp*-class amphibious carriers, effectively doubling the number of hulls that can accommodate UCAVs. Successful tests have taken place on the USS *Essex* (LHD-2) using a portable “ski ramp” for launch rather than the fleet carrier’s catapults. Arrested landings remain the only means for recovery, utilizing a bolt-on three-wire arresting kit derived from the Air Force’s mobile aircraft arresting systems. These systems permit smaller flattops to operate fast jets, but the launch and recovery of UCAVs interrupt normal helicopter and vertical and/or short takeoff landing and operations.

Current Navy and Marine Corps concepts call for a number of employment options since the Navy prefers to use tactical Tomahawk missiles rather than autonomous F-40s during high-intensity operations. Typically, F-40s fly a preplanned route to a pickup point where another aircraft (often from the same carrier), a nearby ship (includ-

ing submarines and littoral combat ships), or a forward air controller directs semiautonomous operations.<sup>17</sup> Operations from amphibious carriers allow the “delivery” of F-40s into holding orbits where they remain until called upon by Marine forces ashore.

The F-40A remains rapidly deployable: a single C-17 sortie can carry four crated UCAVs, and the C-5M can carry six. F-40s at lighter launch weights can take off from airfields as short as 3,000 feet. Clearly, short fields and sea basing significantly increase the basing opportunities. F-40s are stored in transportable configurations at a number of locations worldwide, more than half of the Air Force’s UCAVs remaining in their crates, stored with support equipment and munitions stocks ashore and on maritime pre-positioning ships. Many of the overseas “crate-hawks” reside at Air Force bases that also operate combat aircraft.

### *Training and Maintenance*

Flight training for the F-40 occurs almost entirely by simulation—a first among major weapons systems. Since there is no pilot to train, the presence of the actual aircraft remains largely unnecessary. Most units have built-in software that allows them to train on simulated weapons that have the “look and feel” of Warhawk employment, obviating the need for the real platform.<sup>18</sup> Units capable of employing F-40s regularly practice with the simulations; some never conduct a tactical training mission without them. Normally, large numbers of the UCAVs appear only in large force exercises at Nellis AFB or Naval Air Station Fallon, Nevada.

Simulation allows most of the Air Force’s F-40s to remain in storage (hence, the term “cratehawks”).<sup>19</sup> When these aircraft first reached the field, everyone expected that all of them would stay in storage until needed—a notion that proved unsatisfactory for two reasons. First, because their maintenance crews received insufficient experience with real-world flight operations, the Warhawks’ reliability rates were lower than expected. Second, joint terminal attack controllers felt uncomfortable with pure simulation because the F-40s never showed up in

training. Consequently, they rarely employed the UCAVs—even in simulation.

The Air Force corrected both problems rapidly and did so in a fashion that permitted it to kill two birds with one stone. At every base that has a squadron capable of employing F-40s, at least three fly daily operations.<sup>20</sup> Because these aircraft see heavy use when they exercise with ground forces, joint terminal attack controllers become accustomed to their air support. Most training still makes use of simulated weapons; thus, F-40s are often “reloaded” in flight, giving the appearance of a larger number than are actually flying.<sup>21</sup> These UCAVs routinely participate in live munitions drops at Nellis and Fallon, and both Combat Archer (an air-to-air weapons system evaluation program) at Tyndall AFB, Florida, and Combat Hammer (an air-to-ground weapons system evaluation program) at Hill AFB, Utah, routinely drop (or shoot) live weapons from F-40s under semiautonomous control.

By any standard, the F-40 program has been a resounding success, giving the United States a flexible, lightweight fighter at relatively low cost, and adding to the joint force a number of capabilities that did not exist prior to the Warhawk’s initial operational capability. One can gauge the program’s success by examining the proliferation of imitators: Russian, Chinese, and French manufacturers are all pursuing similar programs.<sup>22</sup>

## The View in 2013

No one can realistically assume that UCAVs will replace manned combat aircraft anytime soon, public law notwithstanding. The flexibility inherent in having a pilot in the environment remains the single most important aspect of combat aviation writ large, and replacement of human aircrews is not in sight. Similarly, the remote-pilotage model used by the MQ-1 and MQ-9 is suitable only for uncontested airspace. Nevertheless, we could expand the capabilities of manned aircraft—even to the extent of replacing them on the air tasking order when ap-

appropriate and reserving manned combat aircraft for those times when we need them. The United States has done so for more than 40 years, first with the Firebee drones in Vietnam and much later with Tomahawks and air-launched cruise missiles. Like the Firebee, the UCAV is designed to come back and do it again, and its assigned tasks are relatively simple—despite their importance. Given our fiscal challenges, the future threat environment, and the possibilities inherent in missionized UCAVs, they seem an obvious candidate for a major weapons program. ★

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## Notes

1. Notably, arguments that favored purchasing the Predator and Reaper because they would reduce the risk to pilots have turned out to be nonsense because the aircraft can operate effectively only in environments without air defense.
2. This fact poses a design problem for operations with the F-22, which can “super-cruise”—that is, cruise in excess of Mach 1 without using afterburners. Given the small size of the Raptor buy, most UCAVs will be employed with and by platforms that cannot (and need not) match the Raptor’s performance.
3. The F-40 is an entirely notional system, discussed here solely to allow a usable reference point.
4. The weapons bay size (about 20 inches wide, 20 inches deep, and 150 inches long) also accommodates a number of other weapons, from the AIM-120D to the CBU-87/-89/-103. A four-pack of small-diameter bombs on a BRU-61 is 143 x 16 x 16 inches.
5. Because of the F-40’s limited takeoff weight, the external hardpoints serve primarily to carry weapons too large to fit in the internal bay and, consequently, are rarely installed.
6. The tankers are equipped with a short-range communications link that provides flight-control data to the F-40 for refueling.
7. These packages count against the maximum gross takeoff weight but do not take up space in the payload bays. Thus, a “full-up” (but empty) UCAV would have all of the add-on combat capabilities.
8. The SUU-64/B canister allows for dispensing a variety of munitions—from leaflets to gator mines, sensor-fuzed weapons, or combined-effects submunitions.
9. The Navy has experimented with carrying two AGM-84s externally, with two empty fuel tanks in the payload bays. This configuration does not exceed the maximum takeoff weight and can then be refueled when airborne, effectively doubling the combat radius with a single refueling. Minor software adjustments allowed flight under very heavyweight conditions, which adversely affected handling characteristics. In the words of a flight-test engineer, the aircraft “flies like a drunken pig” when heavily loaded; therefore, naval air training and operating procedures as well as Air Force instructions prohibit operations below 500 feet.

10. The present F-40 series operates under the initial Block 10 production configuration. Block 20 aircraft will have an additional control module allowing interface with other air defense assets (the Patriot, Medium Extended Air Defense System, and Aegis especially). All Block 10 aircraft will be retrofitted.

11. The landing mode, ironically referred to as the “emergency landing mode” by the Air Force and the “trap mode” by the Navy, lets the carrier fly the UCAV on final approach, resulting in near-perfect recoveries in most weather conditions.

12. Retaskable close air support missions are issued as fragmentary orders in the air tasking order with no preplanned recipient and tasked as necessary on the fly, based on the need for joint fires.

13. Smart jamming platforms must be able to “look through” their own jamming to determine their effect on the victim signal—or determine if that signal exists at all. This often requires turning off the jammer for very short periods. EA-18G crews use a distant F-40 to determine the status of both the victim radar and the jamming technique as well as receive satellite communications data.

14. The cargo pallet itself weighs 100 pounds empty, including frame, parachute, and air bags. The maximum deliverable cargo weight amounts to 800 pounds on land and 1,000 pounds on water, all of which must fit within the fairly restricted canister dimensions.

15. B-2 Spirit bombers are also known to join up with F-40s launched in-theater, using them as both armed pathfinders and bomb caddies. The Air Force would have incorporated similar capability into the F-117 had the service not retired it.

16. Because of the different engine and the no-service requirement for supercruise, the Navy and Marine Corps did not purchase any F-40Cs although these aircraft remain capable of carrier operations.

17. Primarily, the E-2D and the two-seat F-18F and EA-18G serve as airborne controllers for multiple UCAVs (the P-3 and P-8 [multimission maritime aircraft] do so as well). F-18Es rarely control more than a single Warhawk.

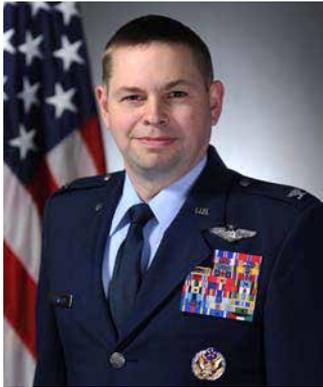
18. For platforms (such as the RC-135) that did not have such software, Lyton Industries developed a retrofit kit to allow in-flight F-40 simulation.

19. This problem never manifested itself in the Navy and Marine Corps because all F-40s assigned to at-sea ships were fully assembled and ready to go.

20. Aircraft on flight status are rotated among the stock on hand so that all F-40 airframes fly for several periods each year and crews maintain proficiency in assembly, disassembly, and maintenance.

21. Because the Federal Aviation Administration remains skeptical about UCAV operations in controlled airspace, most F-40 activity outside the western test ranges occurs while they are tethered to a manned aircraft.

22. To be fair, the French Dassault “Gran Duc” program actually predates the F-40, having been a counterpart of the Defense Advanced Research Projects Agency’s original UCAV program—the grandfather of the F-40.



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# Building Partnership Capacity by Using MQ-9s in the Asia-Pacific

Col Andrew A. Torelli, USAF\*



In 2011 the US Air Force conducted a comprehensive review of its intelligence, surveillance, and reconnaissance (ISR) capabilities.<sup>1</sup> The secretary of the Air Force directed a study of where those capabilities are today, where they should be in 2030, and how they might balance against future requirements. The study provided key insights, recommendations, and tasks for shaping ISR priorities, planning, and programming to realize the Air Force's vision for 2030 (see graphic below).<sup>2</sup>

The secretary directed seven tasks (see list below). Although they do not represent all of the study's recommendations, these tasks reflect top-priority problems that the service must address if it wishes to conduct "current operations successfully, navigate resource limitations, embrace shifts in national strategy, and progress towards a new vision."<sup>3</sup>

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This article is adapted from a strategic policy paper written in 2012 at the Australian Defence College, Centre for Defence and Strategic Studies, Canberra, Australia.

### **A View of the Future: The 2030 Air Force ISR Enterprise**

- Offers a seamless, open-architecture, all-domain, sensor-agnostic, “go-to” information source integrated with Air Force command and control architectures
  - Characterizes any target set (air, space, cyber, or terrestrial) as a “network” to enable effects-based targeting and assessment
    - Persistently accesses target sets by necessary means
    - Collaboratively plans all-domain ISR operations as a single entity
  - Demands trained/equipped analysts with critical-thinking skills
  - Needs secure, reliable, and sufficient information pathways
- Provides fully integrated operations in a networked world
  - Includes operators and intelligence professionals working as a fused team in all domains
  - Requires improving the way we think, train, and operate

*Success in war depends on superior information. ISR underpins every mission that the DOD executes.*

(Adapted from US Air Force / A2, briefing, subject: Secretary of the Air Force’s ISR Review Road Show [unclassified version], slide 4, December 2011.)

### **Tasks Directed by the Secretary of the Air Force**

1. *Conduct an Analysis of the Information Architecture to Frame Air Force Discussions on the Architecture of the Future*
2. *Acquire and Develop Framework Tools to Enable Capability-Based Planning and Analysis of the Air Force ISR Enterprise’s Platform, Sensor, and PED [processing, exploitation, and dissemination of intelligence] Requirements to Feed Core Function Master Plans*
3. *Develop a Road Map for ISR Automated Tools and Analyst Visualization Tools*
4. *Develop a Distributed Common Ground System Road Map with Specific Measures to Implement Service-Oriented Architecture and the Ability to Synergize PED for All Air, Space, and Cyber Platforms and Sensors*
5. *Develop an Air Force Targeting Road Map to Outline Requirements That Satisfy Target-Folder-Development Support to War Fighters, Including Space and Cyberspace Target Sets*
6. *Develop a Nontraditional ISR Road Map to Include Platform and Sensor Mix, Requirements for Communication Pathways, Development of Concepts of Operations, and Demands for Personnel Training*
7. *Develop a PED Apportionment Model and Associated Road Map That Models Manpower Based on Air-, Space-, and Cyberspace-Fused Information Requirements—Not Apportioned Platforms*

(From Hon. Michael B. Donley to key Headquarters Air Force deputy chiefs of staff, deputy undersecretaries, and commanders of major commands, memorandum, 28 December 2011.)

Note that this list does not include a task to build ISR partnerships—critical enablers for supporting the secretary's finding that the Air Force must posture itself to conduct ISR across the spectrum of operations, from humanitarian assistance and disaster relief through major conflict. The United States rarely carries out unilateral operations, relying on bilateral and multilateral partnerships to attain its national security objectives. Therefore, this article urges that the Air Force either elevate or add the building of ISR partnerships as another top-priority task to the secretary of the Air Force's ISR review and approve this article's recommendations. The secretary's findings and endorsements in that review should address the role of building ISR partnerships in the Air Force of 2030.

The article calls for adoption of a policy to develop bilateral ISR studies with partner nations in the Asia-Pacific region; those studies should address unique issues of conducting ISR operations to support common security concerns. It uses the MQ-9 Reaper remotely piloted aircraft (RPA) as an example to highlight key problems associated with deploying this weapon system to the Asia-Pacific and to demonstrate how the service should utilize bilateral studies to address them. It focuses on the MQ-9 because that platform provides the preponderance of airborne ISR and strike capabilities rolled into one package in Afghanistan. Three converging drivers prime the conditions for using the MQ-9 in the Asia-Pacific to confront that complex and dynamic security environment. First, responsibility for conducting the war in Afghanistan is transitioning to the Afghans; second, the Department of Defense (DOD) is emphasizing the need to build partnerships through military sales, training, advising, and working with foreign military and security forces; and third, the United States seeks to rebalance its national security interests within the Asia-Pacific. The MQ-9 could become a fulcrum for enabling sustainable partnerships and furthering US national interests in the region. The article makes the key assumption that the move to Afghan-led operations will reduce the need for MQ-9s, freeing them for use in the Asia-Pacific. However, it does not address the importance of this area to the United States and the role

that ISR plays in security because “US Intelligence, Surveillance, and Reconnaissance (ISR) Challenges in the Asia-Pacific,” a strategic assessment paper, has already done so.<sup>4</sup> Nevertheless, the bilateral studies recommended in this article could help overcome these challenges.

The article begins by examining the necessity of ISR in US Pacific Command (USPACOM) and underscores the importance of building ISR relationships in the Asia-Pacific. It then contends that MQ-9s could serve as an important catalyst in this effort and emphasizes the need for bilateral ISR studies to address several anticipated issues involved with operating these aircraft there. The article describes key elements of such studies as well as potential costs and risks. It concludes with a recommendation that encourages the Air Force to develop bilateral studies as part of the secretary of the Air Force’s ISR review.

Conducting ISR studies gives the service’s strategists and planners a tool to design an operational ISR framework with foreign partners that will inform and guide the development of broader strategies and plans. In turn, those studies will build a foundation for better visualizing and actively framing security problems, reassessing the situation, and reframing the issue in a volatile, uncertain, complex, and ambiguous environment. No design process will overcome the unknowns or uncertainty, but ISR studies will help the Air Force’s decision makers, strategists, and planners apply critical thinking and gain better understanding of the types of environment in which they may operate and the difficulties they present for ISR operations.<sup>5</sup> Without such studies, the Air Force risks becoming reactive and worsening a security situation.

Together, these bilateral ISR studies will broaden USPACOM’s ISR strategy for the theatre and enable bilateral and multilateral security operations. They will also support US national security interests and the rebalancing of America’s defense posture in the Asia-Pacific by shifting additional ISR capability and capacity to the region. These studies give the Air Force a viable option for answering such questions

as how, where, when, and with whom it can collaborate on ISR operations in a diverse, complex region.

## US Pacific Command's ISR Imperatives

For more than 10 years, USPACOM relied on ISR to satisfy US defense and national requirements in a vast area of operations (in excess of 100 million square miles) that covers over 50 percent of the earth's surface and contains 60 percent of its population—approximately 3.5 billion people.<sup>6</sup> It includes 36 countries divided into four subregions: Northeast Asia, South Asia, Southeast Asia, and Oceania.<sup>7</sup> Each of the US combatant commands has great operational need for airborne ISR, referred to as a critical low density / high demand asset because requirements exceed the available resources to satisfy them.<sup>8</sup> All of those commands, except US Central Command, have limited airborne ISR capability and capacity because the preponderance of these assets have supported operations in Iraq and Afghanistan, forcing other commands to accept additional risk to their operations.<sup>9</sup> Emphasis on those two wars resulted in significant collection gaps within USPACOM and reduced the situational awareness necessary to support decision makers. Given the military drawdown in Afghanistan over the next few years, excess MQ-9s should be reallocated to the Asia-Pacific to improve USPACOM's overall airborne ISR capability and capacity. Furthermore, the Air Force could leverage these aircraft to build ISR partnerships with many Asia-Pacific countries in accordance with the DOD's strategic-partnership guidance.

To improve vigilance across the spectrum of conflict and operations varying from humanitarian relief to conventional war, the United States is initiating defense-rebalancing efforts from the Middle East to the Asia-Pacific theatre of operations. This policy demonstrates to its allies, partners, and adversaries that the United States does not simply “talk the talk” but “walks the walk” to improve and sustain a safe, secure, and prosperous region. US national and defense strategic guidance codifies and articulates the need for maintaining and building

partnerships with other countries to support America's national security interests.<sup>10</sup> That guidance also emphasizes the uncertainty of the future operating environment and the criticality of ISR to minimize surprise and counter the adversary's denial and deception in all domains. US policy promotes the establishment of robust intelligence relationships with Asia-Pacific allies and partners to ensure cooperation, collective security, and future stability.<sup>11</sup>

For example, in 2012 the Office of the Secretary of Defense highlighted its desire to enhance and deepen cooperation in the theatre through joint ISR operations, which would include RPAs.<sup>12</sup> Because Congress's Budget Control Act cut \$487 billion from the defense budget for the next 10 years, the secretary of defense has emphasized the fact that the United States cannot shoulder global security burdens and costs alone but must build the security capabilities of allies, partners, and multinational organizations.<sup>13</sup> ISR assets already released by the drawdown in Afghanistan include EP-3 signals reconnaissance aircraft, Firescout RPAs, and P-3 maritime surveillance aircraft.<sup>14</sup> Furthermore, the Office of the Secretary of Defense has indicated that the Air Force's distributed common ground/surface system, MQ-9s, U-2s, and Global Hawk ISR capabilities should also shift to the Asia-Pacific.<sup>15</sup>

## Building ISR Partnerships

The traditional approach to building partnerships in the airborne ISR realm generally has been limited to intelligence, the product of surveillance and reconnaissance. Currently the United States has intelligence-sharing agreements—each with unique foreign disclosure and release policies—with approximately 28 North Atlantic Treaty Organization countries, four commonwealth countries, 42 International Security Assistance Force countries, and 85 global counterterrorism-force countries. However, America should expand these partnerships to encompass ISR, not just intelligence, and look to build partners' overall airborne ISR capabilities with developed and interoperable systems. Consequently, the Air Force should champion a broader approach to

building ISR partnerships as a means of sharing burdens and improving the integration of intelligence and operations with allies and partners.

Because the United States does not have the means to unilaterally confront all of the threats it faces (e.g., proliferation of weapons of mass destruction, ballistic missiles, terrorism, piracy, and air/space/cyberspace threats), the Air Force should continue cooperation with other nations and expand it with new partners to address common security issues. Building partnerships with foreign nations strengthens the Air Force's lines of communication and its ability to wage war, enhances its political-military influence, distributes the burden of security across nations, and reinforces stability before, during, and after a crisis.

Direct benefits of building ISR partnerships include the following:

- Promoting streamlined ISR support for combined air operations.
- Building and/or preserving ISR information and communication channels with partner nations.
- Exchanging ISR assessments and analyses with them.
- Sharing ISR tactics, techniques, and procedures (TTP) to promote interoperability and synergize concepts of operations.
- Building a common understanding of comprehensive air policy and doctrine with partner nations.
- Enabling multinational exploitation of foreign material.
- Enhancing the interoperability of information systems and databases.
- Streamlining ISR planning and direction, collection, processing and exploitation, analysis and reporting, and dissemination across coalition partners.
- Optimizing allocation of limited ISR resources in the combined operational environment.
- Enabling freedom of operation across all war-fighting domains.

The lack of a broader ISR engagement exacerbates the knowledge deficit and can result in strategic surprise, slow decision-making processes, and delayed reaction times and countermeasures to a full spectrum of threats. Although the Air Force is heavily engaged in global partnership building, it could enhance ISR partnership activities beyond intelligence sharing, engagements of key leaders, training, and education by using MQ-9s as a fulcrum for improving these relationships in the Asia-Pacific.

## The Need for Bilateral ISR Studies

The Air Force should synchronize USPACOM's ISR imperatives, US partnership-building objectives, and the operational advantages of MQ-9s described above by using bilateral studies advocated in this article. These studies would improve the service's and other US government organizations' understanding of the opportunities and challenges of operating the MQ-9 with other partner nations in the numerous bilateral and multilateral security arrangements (i.e., counterterrorism, counterpiracy, and counterdrugs) in the Asia-Pacific. Areas that the Air Force could explore with partner nations include assessing and improving interoperability, synchronizing and deconflicting operations, exchanging doctrine and TTPs, determining suitable operating areas and bases, and sharing resources. It should conduct combined ISR studies with selected countries to improve ISR partnerships.

The formation of bilateral studies represents an initial step in institutionalizing, prioritizing, and deliberately planning ISR partnerships in the Asia-Pacific. These studies will complement the Air Force's establishment of connections with other countries, allowing it to take a bite-sized, regional approach to a very complex global core function. Further, they would provide strategic guidance for willing parties (the Air Force, USPACOM, partner nations, and other interested actors), permitting better understanding of each other's ISR roles, responsibilities, focus, capabilities, and commitment. These studies would also of-

fer a framework to support Air Force ISR planning, programming, and resourcing efforts.

Moreover, bilateral studies will enhance cooperation and understanding between the United States and partner nations, facilitating the advocacy of common security interests. Such studies could then undergird USPACOM's ISR strategy and, possibly, future binding agreements between the United States and other countries. They should have as their desired end state an increase in ISR cooperation between the US Air Force and partner air forces—but tailored to individual countries. Additionally, they should provide for integrated ISR activities with other US government agencies, allies, and partners, enabling operations against regional threats to those entities. Furthermore, bilateral studies should strengthen relationships and trust through closer collaboration with allies and partners. Lastly, they would inform and shape war-fighter-integration discussions between the US Air Force and its partner air forces, enabling national and defense strategic guidance.

### *Structuring an ISR Bilateral Study*

Because many actors have equities in ISR, international affairs, and operations, the studies will need coordination with a number of organizations, including Air Force ISR and international affairs organizations, USPACOM, US Pacific Air Forces, the Joint Staff, DOD, national intelligence agencies, and the State Department. Proper and robust whole-of-government coordination and synchronization will help ensure that ISR partnerships remain within the context of international partnership frameworks already in place and stay in lockstep with broader national and defense intelligence policy. Doing so will also ensure that the sharing of data and TTPs with partner nations is consistent with US law.

The Air Force must also collaborate regularly and conduct reciprocal visits with allies and partner nations to gather facts, understand implementation options, and share perspectives. It should base the studies on a prioritized list of countries, beginning with allies, and detail rec-

ommendations for consideration by partner nations and the service's senior leaders at war-fighter-integration forums such as the Air Force-hosted operator engagement talks with other services. Further, this effort should incorporate activities such as conference programs on the sharing of intelligence; officer-exchange programs; Air Force security-assistance programs; reciprocation of ISR information in accordance with international agreements; exchanges of the acquisition and exploitation of foreign material; and the development of programs to enhance MQ-9 systems and database interoperability with international partners.

At a minimum, the structure of a bilateral ISR study should include a statement of principles, such as an operational focus and the support of service and joint requirements; key assumptions, such as the sharing of information among countries under existing policy agreements; a vision to guide the study; and desired outcomes, including the identification of operational concepts and broad timelines. The study should also assess ISR cooperation among current partners and the Air Force, including investment and participating organizations. Additionally, it should identify key common gaps, needs, and possible solution options that could shape MQ-9 capabilities, the planning and analysis process, and the partner nation's equivalent. Based on these findings, the study would make recommendations with proposed courses of action that include timelines, costs, implications, and measures of effectiveness. It would also need to develop coordination and collaboration frameworks to monitor, manage, and direct the progress of results.

Furthermore, such studies would explore initiatives to increase the sharing of ISR information as well as collaborative ISR planning and direction, collection, processing and exploitation, analysis and reporting, and dissemination. They would also determine the level of cooperative backing of ISR operations by each participant, including training and education initiatives. This could support the provision of educational, training, and experience opportunities for Airmen in the intelligence career fields, allowing them to master the knowledge, skills, and cul-

tural familiarity necessary to influence the outcomes of US and coalition operations and to maximize the MQ-9's operational capabilities.

The Air Force would benefit by understanding the strategic objectives of our partners from the inside out, enabling it to influence operations and build coalitions. Furthermore, the service could identify areas for expansion with partner nations, perhaps including foreign military sales and direct commercial sales of MQ-9 systems. It could also ensure their interoperability with US systems to enhance coalition operations and expand defense cooperation activities, including personnel-exchange programs, mobile training teams, and ISR training programs and exercises.

### *Potential Focus Areas for Bilateral ISR Studies*

Integration of the MQ-9 into USPACOM's operational plans and strategies would entail a concerted effort to increase these activities with partner nations and allies. Otherwise, a lack of joint and combined integration and interoperability would prevent the MQ-9 from serving as a force multiplier, would hinder understanding of the operational advantages and disadvantages in the Asia-Pacific environments under various combat conditions, and would fail to reduce the trust-deficit gap. The following sections offer examples of some potential focus areas for airborne ISR that could benefit from a bilateral study prior to introducing MQ-9s into the theatre.

**Interoperability and collaboration.** Having concentrated on the Middle East for more than a decade, the United States probably lacks sufficient personnel with critical cultural, linguistic, and analytical experience to conduct long-term MQ-9 operations in the Asia-Pacific. To bolster the current force structure, it will need to shift the focus of substantial numbers of individuals from the Middle East to the Asia-Pacific and train them in the appropriate language and cultural awareness.<sup>16</sup> Such high-proficiency training, however, will take years, and the situation could be further compounded by an absence of integration with partner nations that could fill this gap in the cultural, linguistic, and

analytical experience necessary to support future MQ-9 operations as required. Further, one must also consider differences in the operating procedures of military, intelligence, and law enforcement organizations within a country and between countries.

ISR relationships provide a means of unique access to ISR information and capabilities that the United States might not otherwise obtain.<sup>17</sup> For example, intelligence production and information sharing have yet to become a reality in US European Command, and collection requirements remain unfulfilled due to limited ISR capabilities and capacity.<sup>18</sup> In addition, the Empire Challenge 2006 exercise identified common problems facing coalition ISR operations, including the production, exploitation, and dissemination of ISR information from gathering platforms, such as the MQ-9, to decision makers and other war fighters.<sup>19</sup> If close US allies like Australia, the United Kingdom, and Canada experience such difficulties, then the issue will be compounded with other allies and partners.

Additionally, over the last decade, only a few war games and exercises have included the synchronization and integration of MQ-9 command and control and other military capabilities in multiple simulated combat environments to truly gauge their interoperability.<sup>20</sup> These activities are designed to train and educate participants as well as test TTPs on the employment of weapon systems, capabilities, and concepts of operations. For example, during Empire Challenge 2006, coalition forces gained valuable ISR experience in sensor analysis.<sup>21</sup> Objectives usually include understanding better ways to employ and integrate capabilities by enhancing comprehension of various doctrines, strategies, plans, capabilities, and performances to determine limitations and strengths of a number of military services and countries. Participants also strengthen their skills and relationships with other partners and improve collaboration.

**Political constraints.** Policies that deal with allowing US MQ-9 activities in sovereign territory will vary from country to country in the Asia-Pacific and will be influenced by interrelationships between a

country's government, military, and public.<sup>22</sup> In the absence of a major terrorist movement that threatens a nation's survival or causes major devastation, legislation or interpretation of that legislation will probably limit US employment of the MQ-9 because many Asia-Pacific countries generally distrust other nations, especially former colonialists.

At a minimum, a divergence in perception will likely exist among a state's political and military leaders and members of the general populace regarding the value of US-operated MQ-9s over their territory. Political leaders would probably hedge over whether these aircraft would benefit their political interests and could harbor suspicions about US self-interest. For example, a partner nation might view the MQ-9 as a threat because the platform could collect intelligence that the United States might use against it. Although the forward operational footprint that supports one MQ-9 combat air patrol is relatively small by US standards (four aircraft, 59 personnel, and a ground station), a host nation might consider it intrusive.<sup>23</sup> This footprint grows with additional combat air patrols and other support, such as force-protection assets. To complicate matters even more, if a host nation permits the United States to establish a base, a bordering partner country will not necessarily permit the operation of MQ-9s across its borders.

Besides possibly disrupting the internal politics of a host country, introduction of these aircraft could also affect the fragile, intertwined, complex, and complicated political dynamics in the region.<sup>24</sup> Some nations might believe that by hosting MQ-9s, another country could gain an undue advantage and shift regional politics in its favor, causing friction among them. Further, such a situation might prompt an RPA arms race or defenses against those aircraft. Although the United States enjoys strong bilateral relationships, its multinational approach is still evolving, and key issues—such as the future security environment and the regional security architecture—demand discussion and agreement.<sup>25</sup> In light of the strong, independent nature of each of the Southeast Asian countries, such consensus will not likely occur in the near

future, so any deployment of MQ-9s might prove troublesome without giving careful consideration to the region's dynamics.

**Nexus of politics and public opinion.** The United States' MQ-9 operations in Afghanistan and Pakistan might also have a ripple effect on the Asia-Pacific region in terms of the issue of sovereignty. Both international and domestic opinions, perceptions, and actions could adversely influence a country's decision to host MQ-9s. Although the United States likely views the use of these platforms favorably, the international community remains split in its assessment. In countries where America actually employs MQ-9s (e.g., Yemen, Pakistan, and Afghanistan), a substantial portion of the populace opposes their presence.

On 5 May 2012, for example, Pakistan's Ministry of Foreign Affairs declared that "the Government of Pakistan condemns in the strongest terms the US drone attacks in North Waziristan. . . . Pakistan has consistently maintained that these illegal attacks are a violation of its sovereignty and territorial integrity, and are in contravention of international law. It is our considered view that the strategic disadvantages of such attacks far outweigh their tactical advantages, and are therefore, totally counterproductive."<sup>26</sup> Statements such as these, reinforced by negative media coverage, will probably hinder the United States' ability to introduce the MQ-9 and other military capabilities into the Asia-Pacific.

Questions that a host nation might ask before deciding on whether to commit to supporting US MQ-9 activities include the following:

- Will the MQ-9 be an effective tool to support our national interests?
- Will it provoke negative reactions from the domestic and international community?
- Will it decrease our bargaining power or cause us to lose legitimacy?
- Will it compete with or undermine other efforts such as soft power?

- What degree of support should we provide to the United States?
- Should activities be covert or overt?
- Will psychological, economic, and political costs of MQ-9 activities exceed the anticipated benefits?
- Is the United States trustworthy, and will it make a sustained commitment?

America should also examine these questions and incorporate this calculus into an ISR strategy.

Implications for the United States could include the rejection or limitation of any offer to deploy MQ-9s to a country for fear of human rights abuses and excessive collateral damage against the domestic populace. A host-nation government could anticipate increased political and domestic opposition to its support. Furthermore, it might suspect that the United States would usurp its role in controlling military operations and conduct unilateral operations without permission or coordination. Rejection could cost America an opportunity to gain both mutually beneficial objectives and an advantage over common adversaries. The host might place limitations on the times when the Air Force could fly its MQ-9s, the number of personnel and amount of equipment it could employ, and its methods of employing the capability. Furthermore, the host nation might require the United States to share information that could expose sensitive sources and methods. Additionally, elements within that country could leak sensitive data to the media or an adversary. The United States must consider all of these factors in its MQ-9 planning and in a broader ISR strategy. Moreover, US decision makers should remain cognizant that allies and partner nations may wish to pull American ISR resources, such as the MQ-9, into their operations, thus drawing the United States into domestic or border matters in which it does not wish to be involved.

## Conclusion

This article has called for immediate adoption of a policy to develop bilateral ISR studies with partner nations in the Asia-Pacific region for the purpose of addressing unique aspects of conducting ISR operations to support common security issues. These studies would give Air Force strategists and planners a tool to design an operational ISR framework with foreign partners to inform and guide the development of broader strategies and plans. This foundation would allow the service and its partners to better visualize and actively frame security problems, reassess the situation, and reframe problems to bolster security operations. Such ISR studies are not meant to answer all of the unknowns or eliminate all uncertainty; rather, they will help decision makers, strategists, and planners apply critical thinking and gain better understanding of the types of operating environments and the problems they present for ISR operations. Without these studies, the Air Force risks becoming reactive in a volatile, uncertain, complex, and ambiguous environment.

Moreover, this article has examined the need for ISR in USPACOM and has stressed the importance of building ISR relationships in the Asia-Pacific. It contends that MQ-9s could serve as a significant catalyst in this effort, noting their role and value and emphasizing the need for bilateral ISR studies to address several anticipated challenges of operating them in the region. The article also described key elements of these studies, using the MQ-9 as an example to point out issues that emerge in deploying this weapon system to the Asia-Pacific and suggesting how to use the studies to address them. Although the article has concentrated on one particular aircraft, the Air Force could broaden the scope of these studies to encompass a wider set of ISR capabilities.

The bilateral ISR study construct outlined here would contribute to the secretary of the Air Force's efforts to balance current capabilities against future requirements, enable successful operations, and shape the Air Force's ISR priorities, planning, and programming to realize its vision for 2030. These studies represent a viable option for filling knowledge gaps related to working with partner nations and for an-

swering questions such as how, where, when, and with whom the service can collaborate on ISR operations in a diverse, complex region. Without such studies, the Air Force and other US government organizations will not fully understand the opportunities and challenges of operating the MQ-9 with other partner nations in numerous bilateral and multilateral security arrangements. Taken together, these ISR studies could broaden USPACOM's theatre ISR strategy, enable bilateral and multilateral security operations, and support the United States' national security interests.

Lastly, such studies would help the Air Force institutionalize, prioritize, and deliberately plan ISR partnerships in the Asia-Pacific. They would also allow it to take a bite-sized, regional approach to the complexity of operating the MQ-9 there by supplying willing parties with strategic guidance to better understand each other's ISR roles, responsibilities, focus, capabilities, and commitment. This article, therefore, recommends that the Air Force either elevate or add the building of ISR partnerships as another top-priority task to the secretary of the Air Force's ISR review and adopt the deliberate approach to bilateral study advocated here. ★

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## Notes

1. See Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms*, 8 November 2010, [http://www.dtic.mil/doctrine/new\\_pubs/jp1\\_02.pdf](http://www.dtic.mil/doctrine/new_pubs/jp1_02.pdf), for the following definitions. ISR: "an activity that synchronizes and integrates the planning and operation of sensors, assets, and processing, exploitation, and dissemination systems in direct support of current and future operations. This is an integrated intelligence and operations function" (143). Intelligence: "the product resulting from the collection, processing, integration, evaluation, analysis, and interpretation of available information concerning foreign nations, hostile or potentially hostile forces or elements, or areas of actual or potential operations. The term is also applied to the activity which results in the product and to the organizations engaged in such activity" (141). Surveillance: "the systematic observation of aerospace, surface, or subsurface areas, places, persons, or things, by visual, aural, electronic, photographic, or other means" (279). Reconnaissance: "a mission undertaken to obtain, by visual observation or other detection methods, information about the activities and resources of an enemy or adversary, or to secure data concerning the meteorological, hydrographic, or geographic characteristics of a particular area" (240). As a critical war-fighting

function for US military operations, global integrated ISR involves “cross-domain synchronization and integration of the planning and operation of ISR assets; sensors; processing, exploitation and dissemination systems; and, analysis and production capabilities across the globe to enable current and future operations.” Air Force Doctrine Document 2-0, *Global Integrated Intelligence, Surveillance, & Reconnaissance Operations*, 6 January 2012, 1, [http://static.e-publishing.af.mil/production/1/af\\_cv/publication/afdd2-0/afdd2-0.pdf](http://static.e-publishing.af.mil/production/1/af_cv/publication/afdd2-0/afdd2-0.pdf).

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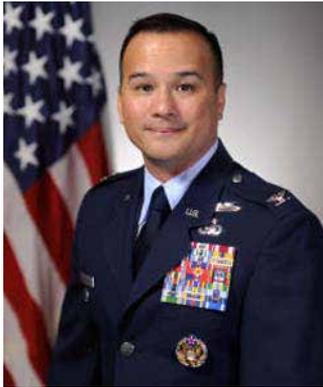
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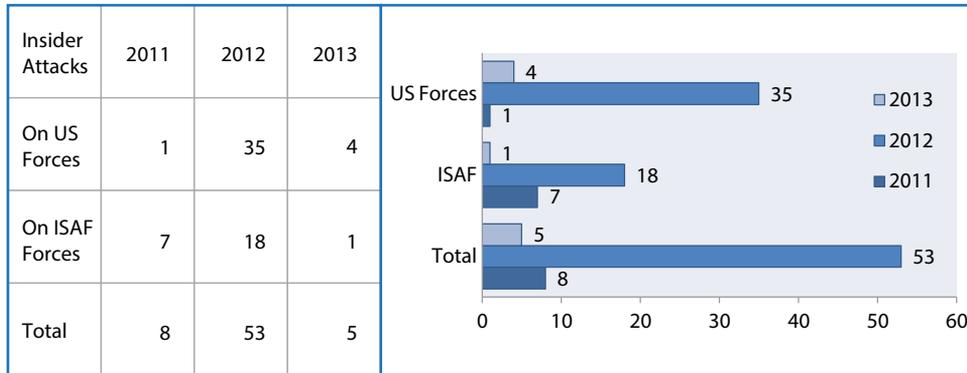
# Personnel Security during Joint Operations with Foreign Military Forces

David C. Aykens



The drawdown of the US presence in Afghanistan in 2014 does not call for complete removal of our forces. In particular, air assets will remain to support the infant Afghan national government. The job description of Air Force security forces, the primary line of defense for US airpower, puts them specifically at risk of insider attacks. US and coalition Airmen as well as US airpower assets present tantalizing targets for an insurgent enemy force, as witnessed in the strikes on Camp Bastion on 14 September 2012. Insurgents wearing American uniforms penetrated air base defenses and managed to destroy six US Marine Corps Harriers and kill two Marines before being killed.<sup>1</sup> This attack illustrates the significant challenges of force protection in an unstable forward environment. Figure 1 shows the tremendous increase in the number of insider attacks from 2011 to 2012, the

totals for 2013 indicating reported casualties only through 16 May 2013. However, these numbers do not reflect reports from the 2013 spring offensive, which usually begins in late April or early May. Taliban leaders, cognizant of their successes, issued a statement on 27 April 2013 promising to continue the use of insider attacks during that time.<sup>2</sup>



ISAF - International Security Assistance Force

**Figure 1. Reported number of insider attacks, 2011–16 May 2013.** (Data from “U.S. Military Casualties—Operation Enduring Freedom [OEF] Casualty Summary by Casualty Category,” Casualty Analysis System, Department of Defense, 6 June 2013, [https://www.dmdc.osd.mil/dcas/pages/report\\_oef\\_type.xhtml](https://www.dmdc.osd.mil/dcas/pages/report_oef_type.xhtml); and “Operation Enduring Freedom,” iCasualties.org, 25, 28 October 2012 and 24 May 2013, <http://icasualties.org/oef/Fatalities.aspx>.)

Any attempt to integrate a nineteenth-century society into the twenty-first century encounters a number of obstacles. Illiteracy and innumeracy rates are high, and repressive social values are embedded in the culture. The situation is complicated by the lack of basic utilities or commercial infrastructure to support growth. Under these conditions, it is not reasonable to expect the Afghan security forces to advance quickly enough to incorporate a first-world internal security and defense program into a third-world nation. Therefore, we must reconsider the way we think about our training objectives and factor these points into our force-protection training for future deployments in other conflicts as well. Elements of the Air Advisor Academy program

(Special Order G-12-13)—namely, portions of the fieldcraft-skills section—could easily be taught to all deploying Airmen.<sup>3</sup> This article explores options to modify existing predeployment training curricula to focus more on the safety and security of the individual Airman in any battlespace. If we protect the Airman, we protect the asset.

## Background: How Did We Get Here?

The history of Afghanistan is long and storied, but this article examines the most recent events that contributed to the unstable situation our forces found in 2001. Afghanistan was born in the forge of a proxy war between Russia and Britain in the region—one that led to a disastrous engagement in the First Anglo-Afghan War in 1839. A coalition of warlords and tribal leaders decimated the entire force of more than 4,500 British soldiers dispatched by the governor of India. Shortly thereafter, British imperialism prompted two more Anglo-Afghan wars in the nineteenth and early twentieth centuries.

The “graveyard of empires” forced the British home, ending with the Treaty of Rawalpindi in 1919 and leaving the British Empire on a long, slow road to obscurity. The middle of the twentieth century was a relatively stable time for Afghanistan. Under the leadership of Zahir Shah, the last king of Afghanistan, the country saw a move towards real modernization. Although never fully implemented, the country’s democratic constitution—established in 1964—provided for universal suffrage, civil rights, and the free election of parliament.

According to Kenneth Katzman,

Afghanistan’s slide into instability began in the 1970s, during the Nixon Administration, when the diametrically opposed Communist Party and Islamic movements grew in strength. While receiving medical treatment in Italy, Zahir Shah was overthrown by his cousin, Mohammad Daoud, a military leader who established a dictatorship with strong state involvement in the economy. Daoud was overthrown and killed in April 1978, during the Carter Administration, by People’s Democratic Party of Afghanistan (PDPA, Communist party) military officers under the direction

of two PDPA (Khalq, or “Masses” faction) leaders, Hafizullah Amin and Nur Mohammad Taraki, in what is called the *Saur* (April) Revolution. Taraki became president, but he was displaced in September 1979 by Amin. Both leaders drew their strength from rural ethnic Pashtuns and tried to impose radical socialist change on a traditional society, in part by redistributing land and bringing more women into government. The attempt at rapid modernization sparked rebellion by Islamic parties opposed to such moves.<sup>4</sup>

After the overthrow of Zahir Shah in 1973, Afghanistan fell into a cycle of endless warfare. In 1978 the communist-backed PDPA assassinated Mohammad Daoud and implemented sweeping but ill-conceived social reforms. Afghan civilians were introduced to land reforms and gender politics virtually overnight. Land-redistribution projects effectively carved up traditional tribal areas, sowing resentment among the population. These events, combined with the sudden inclusion of females in the political and bureaucratic machine, led Afghans to believe that their traditional values were under attack. This situation presented a moral dilemma for the United States, ultimately forcing it to side with Islamist groups against the communists.

We are still dealing with the repercussions of this alliance. The situation exploded in February 1979 when the Soviet Union deployed 100,000 troops to support the PDPA regime, starting yet another proxy conflict in the Cold War. The United States established a policy of indirect support of the mujahideen rebels through the Pakistani Intelligence Service (ISI). Despite warnings from within the State Department and other agencies that we should direct our support to groups like those of Ahmed Shah Massoud, the United States ceded operational control to the ISI. The Pakistani government, led by Benazir Bhutto, aligned itself with factions that were less than America’s ideal choices—namely, Gulbuddin Hekmatyar, Sirajuddin Haqqani, and Osama bin Laden.

In hindsight, these decisions proved disastrous, mostly because of internal conflicts and bloody retributions between the Pakistani-supported militias and various factions in Afghanistan—such as Massoud’s—that re-

sisted ISI influence. Abdul Haq, an ally of Massoud, famously said, “How is [it] that we Afghans, who never lost a war, must take military instructions from the Pakistanis, who never won one?”<sup>5</sup> Infighting among the various militias precluded any chance of a unified opposition to the PDPA regime, which remained in power after the Soviet withdrawal in 1989. This created difficulties for the Afghan opposition when it tried to make tangible progress against the Soviet-supported regime, especially considering the sheer volume of arms left to the PDPA by the withdrawing Soviets. With Soviet technical support for the thousands of tanks, planes, helicopters, and artillery pieces in its control, the PDPA maintained power until 1992.

Pakistan’s intention to install Hekmatyar as dictator forced Massoud’s Northern Alliance fighters to defend themselves from both the PDPA forces and those of the ISI-backed Hekmatyar. The personal war between these two factions allowed the PDPA to survive, although not for long. However, the communists had begun to experience internal strife of their own as the Soviet Union collapsed, weakening their position among the PDPA-allied tribes. Two decades of war had eviscerated the economy in Afghanistan, and the Soviets had to provide everything, from fuel to food. Unfortunately, for the PDPA, Boris Yeltsin pulled support after the collapse of the USSR and set the stage for yet another civil war to follow the fall of Kabul in 1992. Amin Saikal writes that “Islamabad could not possibly expect the new Islamic government leaders . . . to subordinate their own nationalist objectives in order to help Pakistan realise its regional ambitions. . . . Had it not been for the ISI’s logistic support and supply of a large number of rockets, Hekmatyar’s forces would not have been able to target and destroy half of Kabul.”<sup>6</sup>

Pakistan was not the only player in Afghanistan after the Soviets left. Iran, Saudi Arabia, and even India engaged in a campaign of influence to fill the vacuum left by the PDPA. Unfortunately, this regional proxy war created the Taliban when the various factions of Islam, such as the Wahabbis, Sunnis, and Shia, began to compete for the loyalty of the people. Each group tried to “outdevout” the other, a situation that

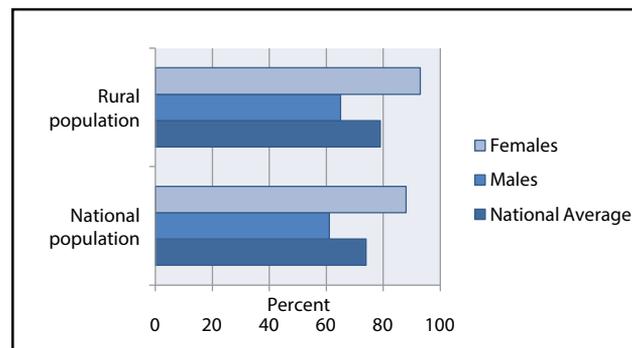
quickly degraded into executions for social infractions like blasphemy. Repression soon followed, and the best chance for the success of future American foreign policy in Afghanistan died with Ahmed Shah Masoud on 9 September 2001. Breaking this 40-year cycle of constant regional and civil war—the unenviable task of our policy makers—lies beyond the scope of this article. However, the study does allow us a glimpse at the various factors that must be included in our force-protection planning if we wish to avoid the same endless caregiving that the Soviets inherited.

### Objective: Why Do They Hate Us?

This article addresses the primary issue of the dramatic increase in the number of insider attacks on coalition forces in 2012. Most logically, one should begin by examining the existing technological gap between Western society and the Afghan population. Arming and equipping forces of the Afghan National Army (ANA) and Afghan National Police (ANP) with high-maintenance weapons and equipment only add to the time and effort necessary to train the individual soldier.<sup>7</sup> Considering the fact that more than 70 percent of the population is functionally illiterate, how do we expect to close this gap without a massive education program to support it? Miscommunication is the breeding ground for a targeted killing when US instructor personnel are asked to bring ANA soldiers up to speed. Frustration builds when students are unable to perform the most basic tasks, such as loading a magazine to specified capacity, because they cannot count: “When [Lt Gen William Caldwell IV] visited a firing range and discovered that most recruits were not just illiterate but innumerate—if the instructor wanted them to load 10 bullets in their rifles, he told them to count by placing one bullet next to each of their fingers—Caldwell expanded boot camp by two weeks to include basic education.”<sup>8</sup> Abdul Samad Haidari notes the following:

Perhaps, literacy, peace, security, and democracy are the foundations for the development of a country; all areas that are strengthened by the existence of a self-sustaining critical mass of literate and productive citizens.

However, more than three decades of conflict in Afghanistan have created generations of people who have lost out educational opportunity. As a result, Afghanistan has one of the highest illiteracy rates in the world today, and according to the National Risk and Vulnerability Assessment (NRVA) the estimated national adult literacy rate (aged 15 and above) is 26 percent, with 12 percent for women and 39 percent for men. In rural areas, where approximately 74 percent of all Afghans reside, the situation is more acute, with an estimated 93 percent of women and 65 percent of men lacking basic reading and writing skills [fig. 2].<sup>9</sup>



**Figure 2. Illiteracy rates in Afghanistan.** (Data from “Afghanistan,” Central Intelligence Agency, *CIA World Factbook*, 5 October 2012, <https://www.cia.gov/library/publications/the-world-factbook/geos/af.html>; and “Afghanistan: Statistics,” UNICEF, 12 February 2003, [http://www.unicef.org/infobycountry/afghanistan\\_statistics.html](http://www.unicef.org/infobycountry/afghanistan_statistics.html).)

Although school attendance rates have improved slightly since US intervention in 2001, one must meet the basic security needs of the civilian population before aggressively addressing the literacy problem. This requirement, coupled with the cultural void that exists between the Airman and the civilian, presents a quandary. Every member of the US military knows the phrase *attention to detail* as a unifying concept—a manifestation of the Airman’s sense of duty to country. It is the basic rule that governs every job we do, from flying advanced aircraft to polishing brass. Successfully applying it to a military command structure requires a shared national identity, but how can we possibly hope to build a sophisticated organizational relationship with Afghani-

stan based on a Western model? We must build one that promotes communication and trust on an individual scale—at best, a difficult endeavor when one side is literally starting from scratch. The answer, perhaps, is to allow tribal leaders to create the shared concept of exceptionalism necessary to build esprit de corps inside the ANA: “A community defense initiative should begin from the bottom up, not from top-down efforts by the Afghan government or coalition forces. This development is critical; a local defense force will only be effective where locals view it as in *their* interest” (emphasis in original).<sup>10</sup>

Additionally, a cultural gulf exists among the Afghan national forces that further complicates any partnering efforts. The languages of Afghanistan include Pashto from the south and Dari from the north, all with a sprinkling of Punjabi, Urdu, and a host of others thrown in. The complex nature of that subject prevents this article from even attempting to address the various religious sects vying for power. This rich mixture presents its own problems when one seeks to develop a standardized curriculum for technical-skills training in a military environment, especially when the primary International Security Assistance Force (ISAF) instructors speak none of these languages.

## If It Ain't Broke, Don't Fix It

How can we expect the new recruit from the provinces to succeed when faced with such an unreasonable learning curve? ISAF commanders have responded by instituting remedial classroom instruction, including reading, writing, and arithmetic. Though necessary in a twenty-first-century military force, these skills increase the time necessary to make the new recruit field-ready. Generally, US forces deployed to support the ANA training program are assigned to mixed units that lack the essential team element required to present students with a unified instructor staff. Team spirit allows staff to become comfortable enough to say something when a teammate is culturally insensitive to the host nation's students. Instructors also bring a wide range of expertise from local, state, and federal law enforcement—not just

the military—and disagreements often arise as they prepare a curriculum. When aired in public, these differences give the appearance of disunity, which will undermine students' faith in the staff and the lesson. This volatile combination of frustration within the ANA ranks, language barriers, and social faux pas creates situations that lead to insider attacks.

Moreover, Rajiv Chandrasekaran asserts that “the U.S. military has imposed unnecessary methods and impractical equipment on the Afghans. American commanders funded large, U.S.-style division headquarters with command centers that feature wall-mounted plasma screens and staff officers schooled in making PowerPoint slides, even though many of those facilities lack reliable electricity. Critics within the U.S. ranks contend that dry-erase boards and paper maps would have been sufficient.”<sup>11</sup>

The average Afghan male has spent his entire life using, maintaining, and fighting with the venerable AK-47 and other Soviet-era weaponry that has been a part of Afghan culture since Zahir Shah began importing them in the 1950s. Even after the Soviet invasion in 1979, the United States did not attempt to convert the population to the M-16—a fine weapon but one that demands significant maintenance and care while Afghans make AKs by hand in the local markets. Attempting to instruct a soldier on an unfamiliar weapon system when he could not read the manual if he wanted to is counterproductive:

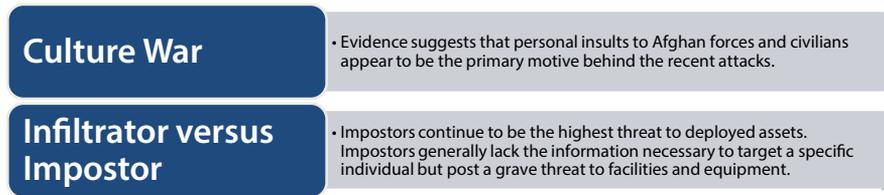
Instead of equipping Afghan soldiers with AK-47 rifles, which Afghans are well versed in firing, the U.S. military gave them M-16s, which are far more complicated to maintain and tend to jam when not cleaned properly. The decision was the result of pressure from former defense minister Abdul Rahim Wardak, who argued to Pentagon officials and members of Congress that American weapons would make his army appear more professional, despite concerns from U.S. commanders in Afghanistan that the soldiers would be unable to care for the guns.<sup>12</sup>

This does not mean that technology is useless in the Afghan theatre. In fact, when we look at methods employed in the targeted attacks, we find that the opposite is true. The various tactics used to commit a tar-

geted killing depend heavily on the personal motives of the attacker. Did an ISAF member slight the attacker in some way? Many people have identified the culture clash as the single most significant factor in the recent rise in insider attacks. Extortion and kidnapping follow close behind when the local Taliban threaten the family of a recruit far from home. Motivation plays a central role when they determine a plan of attack.<sup>13</sup> The Asymmetric Warfare Group at Fort Meade, Maryland, created “Insider Threats in Partnering Environments: A Guide for Military Leaders,” an extremely thorough, graphic representation of the decision matrix and course-of-action guidelines useful in the senior staff-assessment and decision-making process.<sup>14</sup> However, it is not a practical quick reference for the Airman at the gate.

## The Culture War

Western society is rightfully proud of its social contract and first-world status. We enjoy liberties alien to populations in many parts of the globe. Yet, when we exercise these rights, which are as natural to us as breathing, we open ourselves to the unintentional insult (fig. 3). Personal space, gender politics, and even casual body language can be misinterpreted as a direct, personal insult by our Afghan allies. Something as simple as a pat on the back after a job well done or putting one’s feet up after a long day could be interpreted as a personal offense. Some of the slang terms we use—*hajji*—for example, is actually an honorific title given to elders or those who have completed the pilgrimage to Mecca (the hajj). Using *hajji* to address a local who feels undeserving of the title could be taken as a personal slight.



**Figure 3. Culture war, infiltrators, and impostors**

Oliver Wendell Holmes Jr. wrote that “the most stringent protection of free speech would not protect a man falsely shouting fire in a theatre and causing a panic. . . . The question in every case is whether the words used are used in such circumstances and are of such a nature as to create a clear and present danger that they will bring about the substantive evils that Congress has a right to prevent.”<sup>15</sup> In writing for the unanimous majority, Justice Holmes described the point at which we smack headlong into our own rights regarding freedom of speech. American citizens have the right to say nearly any foolish thing that comes to mind, but we still cannot shout “fire” in a crowded theatre. The same principle applies here. When speech presents a “clear and present danger,” commanders must take the initiative when explaining this to their troops. Casual comments and good-natured ribbing aside, why risk exacerbating an already-tense relationship just for a laugh? Trainers must take steps to address this issue during pre-deployment training cycles by clearly explaining that Airmen are diplomats as well as combatants. Leaders who choose to ignore this point do so at the peril of those under their command.

Perhaps the darkest epoch in Afghan society is its reliance on the drug trade. One should never assume that a poor village in the provinces would ignore the income potential from drug operations run by the local warlords (and sometimes by the local Afghan police). Although no central Afghan authority supervises and executes interdiction operations in the borderlands, one could make real progress in this area—specifically, by initiating locally supported agricultural initiatives and community-infrastructure projects.<sup>16</sup> Without stable utili-

ties, illicit cash crops like poppies and hashish will continue to dominate farming:

The southern and southwestern provinces of Afghanistan account for 92 percent of that country's illicit poppy cultivation. Taliban insurgents are also active in this area. Narcotics traffickers provide revenue and material support to insurgents in exchange for protection to the growers and traffickers. Insecurity continues to be a problem, but improvements in Afghanistan's infrastructure have helped to create some viable economic alternatives to poppy cultivation. While Helmand continues to be the largest poppy cultivating province, according to both UNODC [United Nations Office for Drug Control and Crime] and USG [US government] estimates, cultivation there was down between 3 and 19 percent this year [2012], respectively. These reductions were the result of improved security, a significant alternative livelihood program supported by the international community, and strong political will on the part of the governor.<sup>17</sup>

A corrupt government in Tajikistan, providing safe smuggling routes for heroin and other illicit narcotics, exacerbates the problem. ISAF decision makers for the Afghan conflict are obviously wary of neighboring regimes and their attempts to influence events there, but they are limited in their response options. The illicit drug trade in Afghanistan is also a clear example of the hypocrisy displayed by the Taliban philosophy. During their rule, poppy cultivation and heroin production were “officially” prohibited and punishable by death. However, these executions were usually just a method of territory control in the drug trade.

## Who Are These Guys?

Many families have only one male breadwinner and are reluctant to risk their lives by engaging the local warlord. This behavior is familiar to our troops during joint operations and civil-affairs patrols with ANA forces. Animosity grows when our troops witness a reluctance to engage the enemy and turns to pure anger when they sustain casualties.<sup>18</sup> We must also consider the emotional health of the Afghan soldier—usually the sole provider, far from his home province. Will that

soldier risk the livelihood of his entire family simply because we say he must?

According to Gareth Porter, “The truth of course is that these two explanations of personal grudges and infiltrations are not mutually exclusive at all. And the reality is that these attacks are motivated by grudges, by people who are unhappy with the people that are coming in contact with in the US and NATO [North Atlantic Treaty Organization] military forces. But also by the broader context of what they hear and see these forces are doing in Afghanistan. Specifically, for example, breaking into people’s homes and taking away the males in these homes and detaining them.”<sup>19</sup>

In the United States, one leading factor paved the way for the civil rights movement of the 1960s. On 26 July 1948, President Truman signed Executive Order 9981, fully desegregating the military.<sup>20</sup> World War II had created an internal migration in America that brought the rich variety of cultures together as never before. This mingling, coupled with new forms of mass communication, set the stage for integration of the armed forces. Virtually overnight, whole families went to new postings coast to coast. Integration created an atmosphere, albeit a rocky one at first, that fostered the understanding necessary to integrate the nation. Integration allowed base housing to become a safe place for minority families to make a home. So why not reverse the process in Afghanistan by using base facilities that remain after the American drawdown for ANA/ANP family housing? This program would address at least three problems with one solution. First, it could effectively integrate the country while providing a modicum of security for the individual Afghan soldier and his family. Second, having families in base housing ameliorates separation anxiety and improves the mind-set of the ANA soldier, making him more effective on joint operations with the ISAF. Third, opportunities for family members to use base medical and educational resources will begin to lower the illiteracy and innumeracy rates and improve the general health of the Afghan citizen. As Dr. Seth Jones points out,

Establishing security in Afghanistan has generally been a combination of top-down efforts by the central government, whose forces have established security in major cities and along key roads, crushed revolts and rebellions, and mediated intratribal disputes, and bottom-up efforts from local tribes and other communities, whose forces have established security at the village level in rural areas. . . .

. . . Local forces have often been most effective when they are viewed as supporting nearby interests, especially defending villages for the sake of the village rather than the central government or foreigners.<sup>21</sup>

Local politics rule in Afghanistan, optimistically making the development of a national identity a long-term project.<sup>22</sup> Average ANA/ANP recruit candidates come from these rural villages to build a better life for themselves. Most are young, male, functionally illiterate, and desperately poor. If they have immediate family, then they are likely the breadwinners. Unfortunately, the same qualities that make them attractive recruits for the Afghan national forces are also attractive to the Taliban and foreign intelligence agencies. Luckily, the United States is in the best position to make a difference in this area because we can effect real change in the lives of the average Afghan recruit by providing the tangible benefits of American friendship. It is possible to implement a number of simple measures immediately. Current pay rates—for new recruits, about \$200 a month—are not competitive in a market that offers 10 times that amount to produce heroin or kill Americans. The inclusion of family-benefit packages could address a number of the deficiencies identified previously in this article. Principally among these is the desire to keep one's family together in a safe, stable home. A closer look at the perpetrators of previous attacks reveals three distinct personality types likely to initiate a green-on-blue attack (fig. 4).



**Figure 4. Defectors, infiltrators, and impostors**

## Conclusions: Where Do We Go from Here?

Now we arrive at the crux of the issue. Regardless of how the enemy attempts to access our facilities, the primary target remains the same: the Airman. The insurgency seeks to disrupt the mission of coalition forces by any means necessary, and its strategy hopes to do so by driving a wedge of suspicion between the ISAF and the fragile Afghan central government. If successful, insurgents would destabilize Afghanistan and force NATO to extricate itself with little to show for its considerable efforts. Whether by deity or design, enemy tactics are working to a degree:

During 2011 and thus far in 2012, insurgents appear to be making increasing use of infiltrators within the Afghan security forces, persons impersonating Afghan security personnel, or recruits to their ranks from among the security forces. Afghan security force attacks on U.S. and other coalition personnel in 2012 have killed 43 coalition soldiers during January–August 2012, of which 25 were American. There is debate as to whether these attacks are a result of infiltration, or were self-inspired by disgruntled members of the Afghan forces—perhaps reacting to perceived slights such as the mistaken burning of Qurans by American soldiers in 2011.

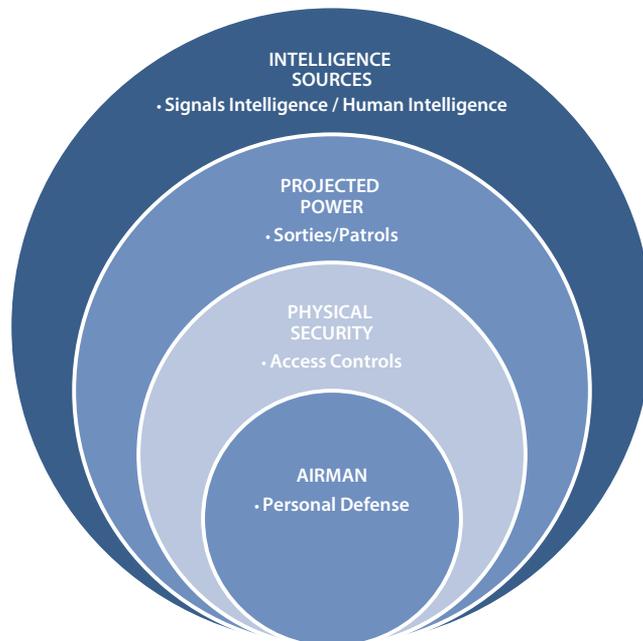
U.S. commanders say about 25% of the attacks were the result of militant infiltration. Afghan officials have tried to increase monitoring over the sale of military-style clothing that might be used for such attacks, and U.S. commanders have altered some of the procedures governing how U.S. forces interact with their Afghan counterparts.<sup>23</sup>

The rise in insider attacks has negatively affected the mission in Afghanistan by forcing ISAF commanders to implement stopgap measures to protect their troops. As a result, ISAF commander Gen John Allen designated certain troops as “guardian angels.”<sup>24</sup> These over-watch troops are selected members of ISAF combat units working alongside or interacting with ANA/ANP forces. Specifically tasked with personal-protection duties, guardian angels watch their team and limit interpersonal contact (which serves only to convey mistrust.) The guardians also apply deadly force when required. Despite its effectiveness, this strategy has considerable downsides, including the depletion of ISAF manpower because Airmen must perform more tasks on a given assignment. The added stress from the mistrust of ANA/ANP personnel serves only to reduce the long-term combat effectiveness of the Airman. The most tangible victory the enemy has reaped from this strategy is the forced suspension of missions. The cancellation of operations creates an opening for the enemy to make advances, leaving the ISAF in a continuously defensive position in this regard.

The ISAF’s force-protection planners seek immediate elimination of green-on-blue attacks in future joint operations. At its most basic, force protection is designed to protect the individual Airman, the Air Force’s most valuable asset—not aircraft, bases, or equipment. Hardware is replaceable; an Airman is not. Consequently, force-protection training must concentrate on enhancing the combat skill sets of the individual Airman.

Figure 5 presents force protection in concentric rings of security, each complementary to and dependent upon the adjacent rings. The outermost ring is information gathered by projected means, including signals intelligence, human intelligence, various media reports, after-action reports, and mission debriefs. They all combine to paint an in-

complete picture of the situation outside the fence. Next, the expeditionary force projects power beyond the perimeter, forcing the enemy to respond before he can regroup and launch an attack on our facilities. This brings us to the perimeter fence itself—the most visible of the rings and the most vulnerable. The Airman is most likely to encounter the enemy face-to-face at the access control point. A fixed structure has serious drawbacks, as the French discovered on the Maginot Line. In particular, an airfield is a massive facility, and security forces must protect a large, open area filled with state-of-the-art aircraft. Although technological solutions remain the best option for the long stretches of desolate fencing, the attack on Camp Bastion proves that fresh eyes on the fence line work best.



**Figure 5. Rings of force protection**

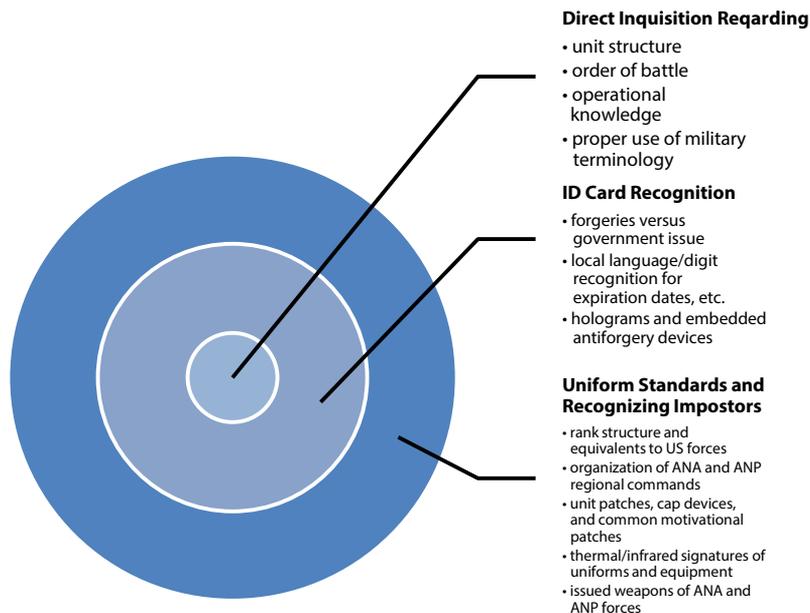
*A man can seldom—very, very, seldom—fight a winning fight against his training; the odds are too heavy.*

—Mark Twain

Because of their regular contact with non-US military personnel overseas, the US Air Force's security forces are well suited to aid in developing an advanced training module (fig. 6).<sup>25</sup> Those forces' unit-level training instructors conceived the Green Force Identification Training (G-FIT) module as a response to the increased number of green-on-blue attacks launched by insurgent forces in Afghanistan in 2012 (fig. 7). The G-FIT module directly addresses threats to our forces from insider attacks by adapting Air Force small-arms and defensive-tactics courses for the Airman. This training seeks to increase personal survivability by amending current predeployment training courses to focus on critical thinking and situational awareness. Here, the goal is to improve the ability of the Airman to identify enemy personnel and impostors quickly and correctly in an evolving battlespace. Airmen with these skills greatly increase the commander's odds of mission success.



**Figure 6. Specific recommendations for training**



**Figure 7. G-FIT components (preliminary)**

G-FIT was developed to teach Airmen a combination of weapons handling, personal defense, and psychological skill sets necessary downrange to identify and neutralize threats in real time and under battlefield conditions. The technical research emphasizes field-ready options for personnel identification, such as radio frequency identification as well as integrated technology solutions for access control during expeditionary operations. Developing a visual identification process that incorporates both technical and observational methods allows the soldier to quickly and positively identify personnel from allied forces in the ANA and the Afghan national/local police. The G-FIT technical components are a low-maintenance, high-reliability solution for combatant personnel, specifically designed to integrate seamlessly when applied to existing force-protection tactics, techniques, and procedures. The module is intended to supplement and seamlessly integrate with existing predeployment training modules currently in use (e.g., Shoot, Move, and Communicate). G-FIT offers a unit-level solution to guide the modification of tactics, techniques, and procedures

used by the US joint forces community and assist in establishing a cross-service standard for identification-friend-or-foe processes on the battlefield. A number of technologically based solutions will address specific weaknesses in our defenses against insider attacks. Research encompasses many scientific disciplines to meet mission requirements, including robotics, electromagnetic waves (communications), visual-spectrum physics, nuclear medicine, microelectronics, materials science, and chemistry. Currently, some off-the-shelf examples are available to support a positive-identification and access-control program. With a few improvements and some systems integration, we can make new, technologically advanced tools available to the war fighter. Of course, a myriad of variables affects the outcome of an insider attack, and technology is never the only solution. That said, the scientific and technological advantage that our forces maintain over the enemy is a significant force multiplier. When incorporated into the force-protection mission, these systems greatly increase the likelihood of success.

As we anticipate the planned drawdown of NATO forces in 2014, the path forward for coalition commanders to protect remaining combat assets is unclear. A number of obstacles impede successful extraction of our combat force in Afghanistan—primarily the internal Afghan rivalries, which are complicated by interference from external parties in the region (i.e., Pakistan, Saudi Arabia, and Iran). The intelligence services of these nations are very active in Afghanistan because their proximity to each other places the future stability of the region in their interest. A concentrated, budget-responsible solution such as giving Airmen the skills to defend themselves is a force multiplier. As the force drawdown in 2014 approaches, our remaining forces will find themselves at increased risk unless we implement sustainable countermeasures such as G-FIT. US commanders will have to defend fixed assets like air bases with smaller numbers, but they must remain vigilant, knowing that the enemy will continue to use insider attacks to great effect.<sup>26</sup> 🌐

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24. Brig Gen Roger Noble, deputy chief of staff for operations, ISAF, press conference, 31 October 2012, [http://www.nato.int/cps/en/SID-03025401-5991DBB1/natolive/opinions\\_91118.htm](http://www.nato.int/cps/en/SID-03025401-5991DBB1/natolive/opinions_91118.htm); and John Reed, "Guardian Angels in Afghanistan," *Foreign Policy*, 14 August 2012, [http://www.foreignpolicy.com/articles/2012/08/14/pentagon\\_looks\\_to\\_guardian\\_angels\\_in\\_afghanistan](http://www.foreignpolicy.com/articles/2012/08/14/pentagon_looks_to_guardian_angels_in_afghanistan).

25. Air Force Manual 16-101, *International Affairs and Security Assistance Management*, 15 February 2011, 38, sec. 3.1, [http://static.e-publishing.af.mil/production/1/af\\_a3\\_5/publication/afman16-101/afman16-101.pdf](http://static.e-publishing.af.mil/production/1/af_a3_5/publication/afman16-101/afman16-101.pdf).

26. Associated Press, "Taliban Promises More Insider Attacks."



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# The Glass Ceiling for Remotely Piloted Aircraft

Lt Col Lawrence Spinetta, PhD, USAF

*Those who by valorous ways become princes, like these men, acquire a principality with difficulty, but they keep it with ease.*

—Niccolò Machiavelli, 1513

Though written 500 years ago, Machiavelli's *The Prince* remains a seminal treatise on the art of acquiring and maintaining political power. The book contains many aphorisms, but the observation that acquiring power is more difficult than losing it reflects the organizational politics of the US Air Force. The service gained its independence in 1947 due in no small part to the valor of pilots during World War II. Since then, aviators have dominated Air Force leadership. Indeed, a nonpilot has never led the service.

The selection of the individual who runs the Air Force is important because the development of new ways of fighting depends on the support of senior leaders. It is human nature to pursue initiatives that reinforce vested interests rather than adopt disruptive new weapons and doctrine. Given that tendency, Stephen Rosen, a leading scholar on military innovation, observes that military organizations rarely embrace new ways of fighting without the creation of new promotion paths to senior ranks. In fact, Rosen says that innovation within the armed forces normally proceeds “only as fast as the rate at which young officers rise to the top.”<sup>1</sup> Advocates of change find protectors and patrons, experiment doctrinally, and slowly climb the promotional ladder, contending with rivals for control over the direction of a military service.

In line with Rosen's theory, Gen Norton Schwartz, Air Force chief of staff from 2008 to 2012, championed personnel policies that sought to build a remotely piloted aircraft (RPA) constituency. In October 2010, he directed the creation of a new career field—18X, RPA Pilot.<sup>2</sup> However, the initiative to establish a viable promotion path for this new way of fighting appears to be faltering.

In June 2011, Secretary of Defense Robert Gates, citing low promotion rates for RPA operators, directed the Air Force to “increase opportunities for highly skilled members of the UAS [unmanned aircraft systems] military community to reach senior leadership positions,” emphasizing that “General Officers originating from this community are critical to our institutional goals.”<sup>3</sup> In September 2012, Senate Majority Leader Harry Reid and Carl Levin, chairman of the Senate Armed Services Committee, sent a letter chronicling persistently lower and declining promotion rates for officers in the RPA career field to the Government Accountability Office, calling for an investigation of Air Force personnel policies. The lawmakers noted that during the last five years, promotion percentages for RPA personnel to the rank of major dropped from 96 to 78 percent, compared with a range of 91 to 96 percent for Airmen in other career fields. Reid and Levin implored, “Given the extent to which we increasingly depend upon RPA personnel to conduct military missions of strategic importance to our nation, we believe that we must take rapid and proactive steps to ensure that these personnel are rewarded, rather than disadvantaged for their choice in career path.”<sup>4</sup>

Responding to Reid and Levin's call for an investigation, an Air Force spokesman acknowledged institutional “challenges” and noted that promotion rates for new career fields often take time to stabilize.<sup>5</sup> Certainly, low promotion rates are not surprising in light of the Air Force's initial decision to staff its RPA force in an ad hoc fashion with medically disqualified pilots and nonvolunteers, many of whom were not necessarily stellar performers from other aviation communities. One Predator commander lamented that his team consisted of the “sick,

lame, or lazy.”<sup>6</sup> In a 2008 speech, General Schwartz admitted that Air Force personnel policies had turned the RPA community into a “leper colony,” acknowledging the institutional “stigma” associated with RPA assignments.<sup>7</sup> Ultimately, his vow to address the issue led him to create the 18X career field. Moreover, the lack of career-broadening and professional military education opportunities—the result of personnel policies that for years prevented permanent changes of station—may also be to blame.<sup>8</sup>

One may reasonably believe, as the Air Force spokesman suggested, that promotion rates to field grade ranks may bottom out and improve. The 18X career field will develop Airmen with more competitive records. However, the situation is quite different for promotion to flag rank. By design or effect, a bottleneck exists that guarantees a glass ceiling (i.e., a barrier to advancement) for RPA officers. This article describes that bottleneck and suggests that the Air Force take action to break the glass ceiling to flag rank.

Specifically, it seeks (1) to help the Air Force identify and remove a key obstacle to institutionalizing RPAs, a new way of fighting that has proven indispensable over the last decade of war, and (2) to inform service efforts to meet a provision of the National Defense Authorization Act for Fiscal Year 2013. Not satisfied with the Air Force’s response to Reid and Levin’s letter to the Government Accountability Office, Congress enacted a legislative requirement for the service to submit a report no later than June 2013. It must include detailed analysis of the reasons for persistently lower average promotion rates for RPA pilots, a plan to raise such rates, and a description of the near-term and longer-term actions that the service intends to undertake to implement the plan.<sup>9</sup> From an institutional perspective, sections of this article may make for uncomfortable reading. However, like a fighter pilot’s post-mission debriefing, this frank discussion wishes to help build a stronger Air Force.

Undoubtedly, building a constituency for disruptive innovation is difficult—just look at the birth of our own service. Institutionally, the

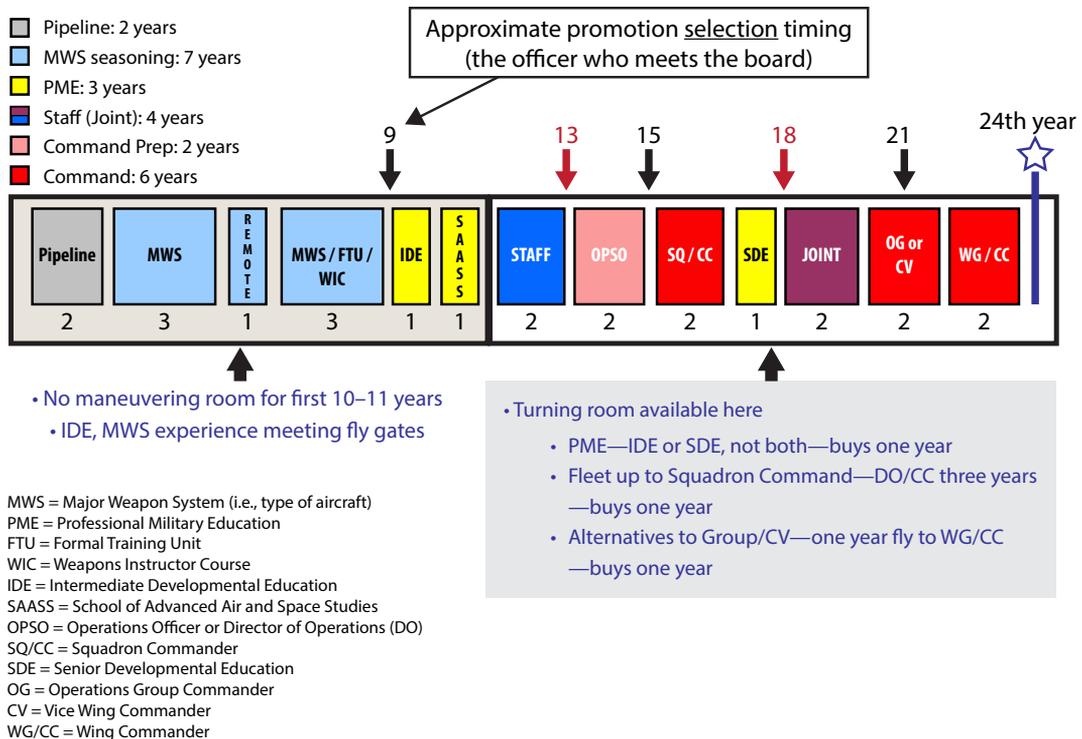
Army did not like Billy Mitchell's tone or his message about the airplane, a new technology that revolutionized warfare. But the Air Force has the enviable quality of inspiring leaders who embrace technological change and do not shy away from tackling institutional challenges. As Gen Mark Welsh, the Air Force chief of staff, observed, our service remains "fueled by innovation."<sup>10</sup>

To emphasize the point, disruptive innovation is nothing new for the Air Force. The service faced a remarkably similar issue in the 1950s regarding adoption of the intercontinental ballistic missile (ICBM), the first unmanned revolution in airpower. At the time, some officers considered the ICBM a threat to the Air Force's "essence."<sup>11</sup> Yet, inspired leadership prevailed. The second half of this article tells that story, describing how Gen Thomas D. White, vice-chief (1953–57) and fourth chief of staff of the Air Force (1957–61), shepherded the ICBM into the service's inventory. If history is any predictor, the Air Force will build a strong and healthy RPA community.

## The Path to Flag Rank

For pilots, the path to general officer goes through command. The Air Force's official career path suggests that pilots must command an operations group and a wing (or serve as a wing vice-commander) to become competitive for flag rank (see figure below). A perusal of the biographies of active duty generals available on the Air Force's official website reveals that wing command is not only highly desired but also evidently required for promotion of a pilot to brigadier general.<sup>12</sup> All of the generals served as wing commanders, with the exception of a physician/pilot who headed a medical group and then became a command surgeon.

## Careers Already Are Packed Rated Example



**Figure. Rated-officer career path to selection board for brigadier general.** (From Greg Lowrimore, Air Force Colonel Management Office, *Wing/Group Command PCT* [Washington, DC: Headquarters Air Force, 8 April 2013], 33.)

An examination of the lineage of Air Force chiefs of staff and Air Combat Command (ACC) commanders offers further evidence of wing command as an indispensable prerequisite to rise to the top levels of the service. *Every* chief of staff during the last 50 years commanded a wing during his rise. So too did *every* ACC commander—10 since the command's creation in 1992. One should note that selection of the individual who leads ACC is especially important because of the command's size—the largest in the Air Force. Additionally, ACC serves as the core function lead integrator for five of the Air Force's 12 core

functions.<sup>13</sup> In that capacity, ACC acts as the primary steward for the development and acquisition of combat aircraft, including RPAs.

## The Wing Command Bottleneck

The way that the Air Force chooses to field its RPA force limits wing-command opportunities for RPA Airmen, thus creating a career-path bottleneck. Despite fast-paced growth over the last decade that led the RPA community to balloon into the second-largest group of aviators in the Air Force, RPA pilots have the fewest opportunities for wing command.<sup>14</sup> To facilitate the rapid expansion of the RPA force to support Operation Iraqi Freedom as well as Operation Enduring Freedom, the Air Force centralized RPA management, establishing one massive RPA wing at Creech AFB, Nevada. The 432nd Wing commander has responsibility for two operations groups and eight squadrons. That individual also serves as commander of the 432nd Air Expeditionary Wing, a position that extends his or her span of control to operations on four continents, including a half dozen deployed landing and recovery units. In contrast, fighter wings normally consist of two or three squadrons.<sup>15</sup>

With the 432nd Wing commander's span of control stretched to the maximum, the Air Force started tucking isolated RPA units under wings dominated by other aircraft. In 2008 the Air Force stood up two RPA squadrons under the 27th Special Operations Wing at Cannon AFB, New Mexico. In 2009 the service placed two RPA training squadrons under the 49th Fighter Wing (an F-22 wing) at Holloman AFB, New Mexico.<sup>16</sup> The year 2010 saw the Air Force assign an MQ-9 Reaper squadron to the 28th Bomb Wing at Ellsworth AFB, South Dakota, and another to the 509th Bomb Wing at Whiteman AFB, Missouri.

As a rule, wing commanders of mixed wings come from the community that supplies the preponderance of forces. Officers from the minority are relegated to vice wing command and operations group command. Cases in point include a special operator who commands

Cannon AFB, a fighter pilot in charge of Holloman AFB, and bomber pilots who head Ellsworth AFB and Whiteman AFB.<sup>17</sup>

The Air Force plans to stand up future RPA squadrons almost entirely under the National Guard. Although this makes sense in terms of preserving talent as the Guard's fighter squadrons close, the plan contributes to a systematic disenfranchisement of RPA personnel from the senior ranks of the active force.<sup>18</sup> Indeed, the Air Force's approach to RPA basing—standing up isolated RPA units dominated by other communities and disproportionately sending RPA units to the Guard—amounts to the organizational equivalent of political gerrymandering. This process results in malapportionment of institutional power that overwhelmingly favors fighter pilots. RPA personnel enjoy one wing command: Creech AFB.<sup>19</sup> Fighter pilots, though, control 26.<sup>20</sup> In other words, the ratio of wing-command opportunities for RPA pilots versus those who fly manned combat aircraft is a staggering 1-to-26! To put that ratio into perspective, consider the fact that the Air Force has nearly twice as many RPAs than bombers in the active inventory, yet bomber pilots enjoy three times as many chances for wing command.

An analysis of the ratio of fighter-wing commands to squadrons over time underscores how fighter pilots have retained control of the pathway to senior ranks despite the declining structure of the fighter force. In 1964 the Air Force fielded 79 tactical fighter squadrons and 21 tactical fighter wings—a ratio of 3.76 to 1. Today, the service operates 54 fighter squadrons, significantly fewer than in 1964, yet, as mentioned above, it has 26 fighter wing commands—a ratio of 2.06 to 1.<sup>21</sup>

A study conducted in 2001 noted that fighter pilots held 67 percent of the four-star general officer positions and commanded 63 percent of all major commands, yet they comprise only 5.3 percent of the force. Furthermore, it observed that “our last eight USAF Chiefs of Staff have been fighter pilots [nine, if one counts Gen John Loh, an interim chief]. They constitute an elite group which influences, if not outright controls, every aspect of the Air Force institution.”<sup>22</sup>

Since 2001 fighter pilots have largely consolidated their institutional hold on power.<sup>23</sup> Three more fighter chiefs have followed although the dynasty was temporarily interrupted when Secretary of Defense Gates fired Gen T. Michael Moseley and installed General Schwartz, the first person without fighter-/bomber-pilot credentials to become chief. In summary, fighter pilots disproportionately influence the vision, doctrine, budgeting, program priorities, and direction of the Air Force.

## RPA Airmen: Ineligible to Command Their Own Wings

Perhaps reflecting the odds of an RPA Airman being selected for wing command, the Air Force's latest Command Screening Board, which met in October 2012, included categories for fighters, bombers, mobility aircraft, and even Airborne Warning and Control System aircraft but did not include a category for RPAs. Curiously, only officers who transferred from fighters to RPAs late in their careers made this year's command list. In other words, they competed for a command slot within the fighter category. The problem with that policy is that under current eligibility rules, 18X Airmen who spend their careers flying RPAs are not eligible for consideration. The board's announcement letter established the following recency-of-experience criterion for command eligibility: "Flying: Minimum of 50 hours within the last 7 years in category as of 1 Aug 2012. For example, in order to command a fighter group/wing, the member must have flown 50 hours minimum in a fighter aircraft within the past 7 years. Exception, officers who have been flying only training aircraft within the last 7 years may compete in the category they had previously flown in."<sup>24</sup> RPA flight time did not satisfy the recency-of-experience requirement.<sup>25</sup> The Air Force makes an exception for officers who fly training aircraft but not for RPA flight time.

Even officers who transferred to RPAs from fighters late in their careers find themselves hard pressed to satisfy the recency-of-experience criterion. Only those who go directly from fighters to command an RPA squadron are eligible to compete for wing command, and they can

compete on just one board because their recency of fighter experience expires. The lack of an RPA command category and the enforcement of a manned-flight requirement for command serve to further restrict the promotion bottleneck put in place by the Air Force's approach to RPA basing, thus effectively creating a glass ceiling.

## “Too Big to Fail” Corporate Strategy

As Rosen's theory predicts, fighter pilots have prioritized the pursuit of manned fighters ever since they wrested the institutional helm of the Air Force away from bomber pilots in the early 1980s.<sup>26</sup> Flush with cash from the Reagan administration's 213 percent increase in defense spending, they went on a fourth-generation-fighter spending spree, adding over 1,000 platforms to the service's inventory.<sup>27</sup> The fighter-pilot-dominated leadership announced that the service would henceforth measure and express force capability in terms of “fighter wing equivalents.”<sup>28</sup>

Subsequently, the Air Force declared the acquisition of fifth-generation fighters—namely, the F-22 and the F-35—its highest priority. ACC's *Strategic Plan: Securing the High Ground*, released in March 2012, not only reaffirms the Air Force's commitment to acquiring the F-35 but also declares the development of a sixth-generation fighter a “must.”<sup>29</sup> Tellingly, the plan makes no mention of RPAs despite the promising record they have amassed over the last decade.<sup>30</sup>

Despite congressional concern over RPA integration, the Air Force has taken five actions that suggest a reversal of remotely piloted inroads into its predominantly manned aircraft force.<sup>31</sup> First, in January 2012, the service announced that it would discontinue procurement of the Global Hawk Block 30 and mothball its existing fleet. Remarkably, the plan included a provision to roll several Global Hawks currently in production directly off the assembly line into storage.<sup>32</sup> Second, in February 2012, the Air Force ended the MQ-X program, the linchpin of the medium-sized RPA development under the *Unmanned Aircraft Systems*

*Flight Plan*.<sup>33</sup> Third, the Air Force halved its planned end acquisition of MQ-9 Reapers. Instead of 48 in each of the years from 2012 to 2017, the service will purchase just 24. Fourth, in February 2013, the Air Force revealed plans to cancel its Global Hawk Block 40 program. Fifth, the Air Force recently announced plans to “[divest] the UAV (unmanned aerial vehicle) Battlelab in [fiscal year 2014].”<sup>34</sup> Additionally, it is exploring ways to “revisit” (i.e., reduce) the Joint Requirements Oversight Council’s directive for the service to field 65 remotely piloted combat air patrols.<sup>35</sup>

These efforts are part of what one can call a “Too Big to Fail” corporate strategy.<sup>36</sup> The service has essentially linked its future to one manned combat platform—the F-35—while slowing the development of RPAs, a potential alternative. Unfortunately, F-35 costs continue to spiral upwards, making the jet increasingly unaffordable. Moreover, attempting to make the fighter too big to fail has ironically rendered the program a bigger target for cuts, given the impending fiscal austerity. Few people believe that the F-35 program will escape substantial reductions. In fact, if the Joint Strike Fighter suffers the same fate as the F-22 and the B-2, then the Air Force will receive less than one-fourth of its planned purchase.<sup>37</sup>

## Learning from the 1950s

During a speech in 2009, General Schwartz insightfully observed that the Air Force is at a point of inflection: “Now, it is clear that we must reconsider the relationship between people, machines, and the air. The technology that initially allowed us to slip ‘the surly bonds of Earth’ has progressed to the point where pilots on the ground can now remotely operate highly capable, highly maneuverable, and highly versatile unmanned vehicles.”<sup>38</sup> The general noted that the Air Force faced a similar choice 50 years ago: “There was a time when some in our Air Force thought that missiles and other unmanned vehicles were

not a good fit into our core mission, and thus had no place in our Service,” Schwartz said. “We seek to learn from our shortcomings, and to avoid them in the future; but, the storied history of the United States Air Force suggests that much of what we have done are things that we *do* want to repeat” (emphasis in original).<sup>39</sup>

In the 1950s, the “bomber mafia,” led by Gen Curtis E. LeMay, commander of Strategic Air Command (SAC), dominated the service. The bomber was more than a weapon to LeMay. In the words of one historian, it represented “a fighting machine to which he was deeply wedded emotionally, an arm in which he had unshakable faith.”<sup>40</sup> The general predicted that the Atlas, America’s first ICBM, would be an extravagant boondoggle and not perform as anticipated: “Missiles, he argued, would gain only a ‘satisfactory state of reliability’ after ‘long and bitter experience in the field.’”<sup>41</sup> The catch-22, of course, was that LeMay consistently put ballistic missiles last among SAC’s funding priorities; consequently, the Atlas wouldn’t get a chance to gain the “long and bitter experience in the field” that he demanded. The general fanned the embers of resistance among the bomber coterie, who occupied virtually all of the service’s leadership spots.

Fortunately, a visionary leader—Gen Thomas D. White—recognized the ICBM’s promise and in May 1954, over LeMay’s heated objection, hoisted the missile to the top of the service’s priority list for research and development.<sup>42</sup> Six months later, he declared that the Atlas program should have as its immediate objective the achievement of an initial ICBM operational capability, thus making production as well as research and development the Air Force’s top priority.<sup>43</sup>

Interestingly, White was not a bomber pilot. He spent much of his career as an attaché, a specialty that considers flying secondary duty. His nontraditional background made him more willing to discount organizational costs associated with adopting the ICBM. General White made the tough, unpopular decision to prioritize the ICBM—even though it irritated the pilot-dominated establishment—because he was convinced that doing so would benefit the United States. He remem-

bered “telling the Air Staff on many occasions that the build-up in strategic missiles . . . was not good for the traditional Air Force but it was vital for the nation.”<sup>44</sup>

Lemay, however, remained resolutely opposed to diverting money from his bombers to missiles, outlining his position in a 1955 letter: “It is my firm belief that the manned bomber must be the backbone of our offense for some time to come. . . . Various missile programs should be re-examined to eliminate as many as is necessary to provide the funds for extension of our bomber capability.”<sup>45</sup> In June 1956, he told Congress, “We believe that in the future the situation will remain the same as it has in the past, and that is a bomber force well-equipped, determined, well-trained, will penetrate any defense system that can be devised.”<sup>46</sup> LeMay later proclaimed, “I think any force that has manned weapons systems at its disposal will certainly have the advantage over one that chose to go to an unmanned system.”<sup>47</sup>

White remained steadfast, lecturing the Air Staff: “Ballistic missiles are here to stay—you need to realize that and get on with it.”<sup>48</sup> He told the Air War College that “we see too few examples of really creative, logical, far-sighted thinking in the Air Force these days. It seems to me that our people are merely trying to find new ways of saying the same old things about air power without considering whether they need changing to meet new situations and without considering the need for new approaches to new problems.”<sup>49</sup>

In June 1957, General White convened a board of senior officers chaired by Lt Gen Donald Putt, the deputy chief of staff for development, to review and assess the prospects for integrating missiles into the service. Putt reported a “lack of Air Force interest and understanding by most top-level officers” when it came to missiles.<sup>50</sup> White called a “come-to-Jesus meeting” with his top generals on 30 September 1957 and scolded them for their negative attitude towards missiles: “The senior Air Force officer’s dedication to the airplane is deeply ingrained, and rightly so but we must never permit this to result in a battleship attitude. We cannot afford to ignore the basic precept that all truths

change with time.”<sup>51</sup> General White declared that the Air Force should remain flexible and ready to adopt superior technologies, noting that money limitations would not permit both the acquisition of ICBMs and indefinite funding to maintain the current inventory of manned nuclear bombers. Additionally, White warned that ever-improving Soviet anti-aircraft missile capability would continue to reduce the effectiveness of the manned nuclear bomber: “With the advent of the guided missile, the US Air Force is in a critical era of its existence. It is essential that we all pull together in the effort to properly utilize this family of new weapon systems for the defense of our Nation.”<sup>52</sup>

The general recognized the difficulty of convincing the old guard to change; thus, in April 1958, anticipating that the Atlas would shortly attain initial operational capability, he ordered the creation of a new career field for missilemen. He issued strict instructions that the new guided-missile insignia not include pilot wings of any kind.<sup>53</sup> Next, after seeing a disproportionate number of bomber pilots on the promotion list for brigadier general, White returned the list to LeMay, who had moved from SAC to vice-chief, with directions that the Air Staff produce a more equitable distribution.<sup>54</sup> General White intended to prevent a stacked deck against the fledgling weapon system.

His inspired leadership helped avert a glass ceiling for missilemen. Although excess pilots initially staffed the missiles, by 1964—four years after the first ICBM squadrons became operational—the Air Force had stood up six missile wings, ensuring operators of the new weapon system a viable path for promotion to senior ranks.<sup>55</sup>

## Conclusion

The establishment of new promotion paths to senior ranks constitutes an important, if not indispensable, prerequisite for shepherding innovative technology and new ways of fighting. Accordingly, the Air Force should break the RPA glass ceiling by (1) creating an RPA category for Command Screening Boards, (2) eliminating the recent

manned-flight requirement for command selection, and (3) rebalancing the distribution of wing-command opportunities to break the power of vested interests.

National security demands that we break this glass ceiling. As General Schwartz observed, “Those who are able to capture and embrace technology have a significant advantage over those who have not.”<sup>56</sup> If the Air Force fails to lead the future of remotely piloted airpower, then the other services and/or our adversaries will assume that responsibility.<sup>57</sup> ★

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## Notes

1. Stephen Peter Rosen, *Winning the Next War: Innovation and the Modern Military* (Ithaca, NY: Cornell University Press, 1991), 105.

2. Pilots who transition to the RPA from manned aircraft receive an Air Force Specialty Code of 11U.

3. Secretary of Defense Robert M. Gates, to Gen Norton Schwartz, memorandum, subject: Continued Growth of Unmanned Aircraft Systems, 29 June 2011.

4. “Lawmakers Ask Review of Unmanned Promotion Rate,” *Air Force Times*, 3 October 2012, <http://www.airforcetimes.com/news/2012/10/air-force-ask-gao-review-uav-pilots-promotion-rate-100312/>.

5. Ibid.

6. Houston Cantwell, “RADM Thomas J. Cassidy's MQ-1 Predator: The USAF's First UAV Success Story” (thesis, Air Command and Staff College, Maxwell AFB, AL, April 2006), 25.

7. Michael Hoffman, “Hundreds of Reaper, Predator Pilots Needed,” *Air Force Times*, 29 September 2008, [http://www.airforcetimes.com/news/2008/09/airforce\\_uav\\_pilots\\_092908w/](http://www.airforcetimes.com/news/2008/09/airforce_uav_pilots_092908w/).

8. Although the Air Force now allows permanent changes of station for RPA personnel, the selection rate for professional military education remains low. Indeed, the MQ-1/9 community has the lowest selection rate for both intermediate and senior developmental education among all major weapon systems (MQ-1/9: 4 percent, F-16: 12 percent, F-15: 17 percent). Air Combat Command to Headquarters Air Force, PowerPoint presentation, subject: Reconstitution Assessment, 1 December 2012, slide 1.

9. *National Defense Authorization Act for Fiscal Year 2013: Conference Report to Accompany H.R. 4310*, 112th Cong., 2nd sess., 18 December 2012, 94–95, [http://www.airforce-magazine.com/SiteCollectionDocuments/Reports/2013/January%202013/Day04/HR4310\\_Conference\\_Report.pdf](http://www.airforce-magazine.com/SiteCollectionDocuments/Reports/2013/January%202013/Day04/HR4310_Conference_Report.pdf).

10. Mark A. Welsh III, "The World's Greatest Air Force: Powered by Airmen, Fueled by Innovation; A Vision for the United States Air Force," 10 January 2013, <http://www.af.mil/shared/media/document/AFD-130110-114.pdf>.

11. Thomas P. Ehrhard, "Unmanned Aerial Vehicles in the United States Armed Services: A Comparative Study of Weapon System Innovation" (Phd diss., Johns Hopkins University, June 2000), 492.

12. "Biographies," US Air Force, accessed 26 March 2013, <http://www.af.mil/information/bios>.

13. ACC is the core function lead integrator (CFLI) for air superiority; global precision attack; global integrated intelligence, surveillance, and reconnaissance; personnel recovery; and command and control.

14. Lawrence Spinetta, "The Rise of Unmanned Aircraft," *Aviation History*, 10 November 2010, <http://www.historynet.com/the-rise-of-unmanned-aircraft.htm>.

15. Squadrons with single-seat fighters typically have 30–40 assigned pilots. In contrast, the smallest squadron at Creech AFB has more than 100 personnel.

16. The Air Force plans to transfer F-22s at Holloman to Tyndall AFB, FL, the product of Secretary Gates's decision in 2009 to discontinue Raptor procurement and consolidate F-22s. "Holloman AFB to Lose 250 Jobs When F-22 Leaves," Associated Press, 28 September 2012. Scheduled to occur in 2012, the F-22 transfer was subsequently delayed to 2014 to coincide with the transfer of F-16s from Luke AFB, AZ, to Holloman. Brian Everstine, "Holloman F-22 Squadron Staying Put till 2014," *Air Force Times*, 10 January 2013, <http://www.airforcetimes.com/news/2013/01/air-force-f22-tyndall-011013w>. Note that the Air Force dropped the word *fighter* from the Holloman wing's official designation on 25 June 2010, concurrent with the change of command ceremony for Col David Krumm, an F-15 pilot turned Raptor pilot. Colonel Krumm was replaced by another fighter pilot in June 2012.

17. Only one of the four aforementioned wing commanders—the Ellsworth commander—lists RPA-familiarization flight time in his biography.

18. Again, ACC—not the National Guard—serves as the CFLI for combat aircraft.

19. Although no one other than a fighter pilot has ever commanded the 432nd Wing, everyone considers it an RPA wing.

20. Fighter-pilot wing commands include the following: (1) 1st Fighter Wing, Joint Base Langley-Eustis, VA; (2) 4th Fighter Wing, Seymour Johnson AFB, NC; (3) 20th Fighter Wing, Shaw AFB, SC; (4) 49th Wing, Holloman AFB, NM; (5) 355th Fighter Wing, Davis-Monthan AFB, AZ; (6) 366th Fighter Wing, Mountain Home AFB, ID; (7) 388th Fighter Wing, Hill AFB, UT; (8) 33rd Fighter Wing, Eglin AFB, FL; (9) 56th Fighter Wing, Luke AFB, TX; (10) 325th Fighter Wing, Tyndall AFB, FL; (11) 31st Fighter Wing, Aviano AB, Italy; (12) 39th Air Base Wing, Incirlik AB, Turkey; (13) 52nd Fighter Wing, Spangdahlem AB, Germany; (14) 46th Test Wing, Eglin AFB, FL; (15) 412th Test Wing, Edwards AFB, CA; (16) 8th Fighter Wing, Kunsan AB, South Korea; (17) 15th Wing, Joint Base Pearl Harbor, Hickam, HI; (18) 35th Fighter Wing, Misawa AB, Japan; (19) 36th Wing, Andersen AFB, Guam; (20) 51st Fighter Wing, Osan AB, South Korea; (21) 354th Fighter Wing, Eielson AFB, AK; (22) 57th Wing, Nellis AFB, NV ("Home of the Fighter Pilot"); (23) 53rd Wing, Eglin AFB, FL; (24) 3rd Wing, Joint Base Elmendorf-Richardson, AK; (25) 48th Fighter Wing, RAF Lakenheath, United Kingdom; and (26) 18th Wing, Kadena AB, Japan. The number of wing-command opportunities for fighter pilots increases if one includes pilot-training wings.

21. US Air Force, Office of the Deputy for Cost and Economics, *United States Air Force Statistical Digest: Fiscal Year 2010* (Washington, DC: US Air Force, Office of the Deputy for Cost and Economics, 2010), 93, table E-4.

22. Maj Wm. Bruce Danskine, "Fall of the Fighter Generals: The Future of USAF Leadership" (thesis, School of Advanced Air and Space Studies, Maxwell AFB, AL, June 2001), viii, [http://dtlweb.au.af.mil///exlibris/dtl/d3\\_1/apache\\_media/L2V4bGlicmlzL2R0bC9kM18xL2FwYWNoZV9tZWRpYS80OTQ0OA==.pdf](http://dtlweb.au.af.mil///exlibris/dtl/d3_1/apache_media/L2V4bGlicmlzL2R0bC9kM18xL2FwYWNoZV9tZWRpYS80OTQ0OA==.pdf).

23. The current vice-chief, Gen Larry Spencer, is nonrated. Including Spencer, four of the 37 vice-chiefs since the Air Force's birth in 1947 have been nonaviators.

24. Headquarters Air Force, memorandum, subject: 2012 CSB Eligibility Criteria, 15 July 2012.

25. The Air Force Colonel Management Office (AFCMO) confirmed that it has no plans to create an RPA command category for future boards. Moreover, the policy that mandates recency of fighter flight time is not under review and will remain in place. Ryan Richardson, AFCMO, Washington, DC, discussion with the author, 30 November 2012.

26. Gen Charles Gabriel, appointed in 1982, was the first fighter pilot who served as chief of staff in the long succession noted earlier.

27. Lt Col Lawrence Spinetta and M. L. Cummings, "Unloved Aerial Vehicles," *Armed Forces Journal* 150, no. 4 (12 November 2012): 32.

28. This practice continued for decades before ending in 2006. See Adam J. Hebert, "Eighty-Six Combat Wings," *Air Force Magazine* 88, no. 12 (December 2006): 25–29, <http://www.airforce-magazine.com/MagazineArchive/Documents/2006/December%202006/1206wings.pdf>.

29. Air Combat Command, *2012 Air Combat Command Strategic Plan: Securing the High Ground* (Joint Base Langley-Eustis, VA: Air Combat Command, 2012), 6, <http://www.acc.af.mil/shared/media/document/AFD-120319-025.pdf>. The Air Force has consistently taken the position that RPAs are not substitutes for manned fighters. Government Accountability Office, *Tactical Aircraft: DOD's Ability to Meet Future Requirements Is Uncertain, with Key Analyses Needed to Inform Upcoming Investment Decisions* (Washington, DC: Government Accountability Office, July 2010), 8, <http://www.gao.gov/assets/310/308236.pdf>.

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31. Spinetta and Cummings, "Unloved Aerial Vehicles," 9. Note that manned aircraft receive 92 percent of the Pentagon's aircraft procurement money. Spencer Ackerman and Noah Shactman, "Almost 1 in 3 U.S. Warplanes Is a Robot," *Wired*, 9 January 2012, <http://www.wired.com/dangerroom/2012/01/drone-report>.

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34. House, *Department of the Air Force, Presentation to the House Appropriations Subcommittee on Defense, Fiscal Year 2014 Air Force Posture Statement, Statement of the Honorable Michael B. Donley, Secretary of the Air Force, and General Mark A. Welsh III, Chief of Staff, United States Air Force*, 113th Cong., 1st sess., 9 May 2013, 21, <http://appropriations.house.gov/uploadedfiles/hhrg-113-ap02-wstate-donleym-20130509.pdf>.

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39. *Ibid.*, 3, [1].

40. Neil Sheehan, *A Fiery Peace in a Cold War: Bernard Schriever and the Ultimate Weapon* (New York: Random House, 2009), 132.

41. Quoted in Matthew Brzezinski, *Red Moon Rising: Sputnik and the Hidden Rivalries That Ignited the Space Age* (New York: Henry Holt and Company, 2007), 81.

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43. Jacob Neufeld, *The Development of Ballistic Missiles in the United States Air Force, 1945–1960* (Washington, DC: Office of Air Force History, 1990), 121.

44. Warren A. Trest, *Air Force Roles and Missions: A History* (Washington, DC: Air Force History and Museums Program, 1998), 190, <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA476454&Location=U2&doc=GetTRDoc.pdf>.

45. Gen Curtis E. Lemay, to the chief of staff, US Air Force, letter, subject: SAC Position on Missiles, 25 November 1955.

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50. *Ibid.*, 99n132.

51. Robert Frank Futrell, *Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force*, vol. 1, 1907–1967 (Maxwell AFB, AL: Air University Press, 1989), 514, [http://aupress.au.af.mil/digital/pdf/book/b\\_0031\\_futrell\\_ideas\\_concepts\\_doctrine.pdf](http://aupress.au.af.mil/digital/pdf/book/b_0031_futrell_ideas_concepts_doctrine.pdf).

52. *Ibid.*, 515.

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# Funding Cyberspace

## The Case for an Air Force Venture Capital Initiative

Maj Chadwick M. Steipp, USAF

*I think frugality drives innovation, just like other constraints do. One of the only ways to get out of a tight box is to invent your way out.*

—Jeff Bezos

The Air Force needs a cyberspace investment strategy. Facing a 20 percent decrease in research and development (R&D) funding from fiscal year 2012, the service remains responsible for innovating with effect amid the hyperdynamic, commercially intertwined, entrepreneurially driven cyberspace business environment.<sup>1</sup> Though daunting, the situation presents an opportunity to explore the use of creative solutions. The government already makes limited use of one such mechanism—the venture capital initiative (VCI). Privately owned and guided by government-specific direction, In-Q-Tel and On-Point Technologies give the Central Intelligence Agency (CIA) and Army, respectively, access to emerging technologies through investment tools common to the venture capital (VC) community. Though uncommon in the defense acquisition community and fraught with challenges, VCIs are relevant funding mechanisms in the entrepreneurial world of cyber innovation. By producing the following effects, an Air Force–specific VCI would keep the service in the forefront of cyber creativity:

- Maximizing funding. Modest investments in start-up companies can yield tangible results. Additionally, an Air Force–branded VCI would likely attract additional private capital for technological advancement. The service can in fact innovate on a budget.

- Developing new partners. Competition is the backbone of the defense acquisition system. By developing businesses, the Air Force stands to gain viable partners for years to come.
- Providing access to the newest technologies. Cyberspace innovation lies at the heart of today's information economy. Access to people and organizations at the leading edge of these technologies is imperative. An Air Force VCI can provide that access.

## Venture Capital as an Acquisition Tool

The Air Force commands a robust R&D framework, but, like all cyber businesses, it must compete in a commercial economy subject to Moore's law, which maintains that "the number of transistors incorporated in a chip will approximately double every 24 months."<sup>2</sup> Subsequently, direct access to the entrepreneurial world of cyber innovation has become increasingly important. Many organizations "believe that corporate R&D no longer offers the level of innovation that [previously] allowed firms to dominate their markets."<sup>3</sup> For some organizations, access to external innovation comes via a VC relationship. Offering funding and business mentorship, a VC organization bridges the gap between raw technological innovation and commercialization, investing in promising start-ups to share in the technological and/or financial success of their efforts. Accordingly, corporations and government entities, including the CIA and Army, have set a precedent for incorporating VC funding into their overall R&D strategies. The CIA and Army pursued the novel concept of VCIs with the understanding that the entrepreneurial private sector was pacing advances in military information technology.<sup>4</sup> Their leaders understood that in order to access the commercial market, they needed a tool unfamiliar to the government acquisition community.

Incorporated in 1999 by private citizens at the request and with the support of Congress and the CIA, In-Q-Tel would supply a necessary link between the agency and the innovation of Silicon Valley, as envi-

sioned by CIA leadership.<sup>5</sup> An autonomous entity, In-Q-Tel takes strategic direction from the government and has the authority to invest its resources using mechanisms common to the VC industry.<sup>6</sup> Those mechanisms, such as capital investments, joint ventures, and sole-source awards, benefit from fewer bureaucratic constraints, the absence of federal acquisition regulations, the ability to obligate funds in multiyear increments, freedom from the restrictions of civil service personnel policies, and the distinction that comes with CIA association.<sup>7</sup> Funded by the CIA through congressional other-transaction authority, the firm quickly attracted attention for its unique relationship and product-focused strategy.<sup>8</sup> A 2001 report by the Business Executives for National Security concluded “that creating a model like In-Q-Tel makes good business sense . . . [and] that the risk associated with such a venture is worth taking, from a taxpayer perspective, considering the technology access that could be overlooked—or denied.”<sup>9</sup> Through a strategy of modest investment, often on the order of \$500,000 to \$2,000,000 per effort, In-Q-Tel established its Silicon Valley cachet by investing in 37 start-up companies from 2003 to 2012—of which 36 were acquired.<sup>10</sup> That sort of investment track record has given the CIA unparalleled government access to the newest of the new while helping enlarge the company’s investment fund to more than \$170 million.<sup>11</sup> In-Q-Tel has proven that the audacity of innovative investment can be fruitful. Although the firm’s success was certainly not a foregone conclusion, the Army took the CIA’s lead and established a VCI of its own.

In 2002, Public Law 107-117, which legislated a “non-profit Army venture capital corporation,” led to the establishment of OnPoint Technologies.<sup>12</sup> Initially authorized to spend \$25 million from the Army’s existing basic and applied research funding, the secretary of the Army sought to establish “better collaborative ties with young, small, growth-oriented companies that take risks and push innovation.”<sup>13</sup> Thus, the service initiated OnPoint Technologies to pursue improvements in Soldier-carried power and energy sources that the RAND Corporation called a “model for development of relevant advanced technologies [that] could significantly help the Army . . . [in] affordably acquiring

the leading-edge technologies it needs.”<sup>14</sup> Now publicly invested in 12 companies as of December 2012, OnPoint Technologies’ VC strategy has made possible advanced products for Soldiers. The following excerpt from the sale announcement of PowerPrecise Solutions (PPS) to Texas Instruments outlines the role played by OnPoint in bringing a value-added Soldier product to fruition:

*The success of PPS is a prime example of the value of OnPoint Technologies and the Army Venture Capital Initiative. OnPoint identified PPS in 2003, led the company’s financing, and with management, built a powerful syndicate to accelerate the company’s growth. In 2004 in cooperation with the Army, PPS and OnPoint spearheaded efforts to develop a costeffective [sic] state-of-charge indicator for the Army and the Department of Defense’s most prevalent primary batteries. In 2005, the Army Audit Agency estimated that this technology could save the Department of Defense . . . approximately \$375M over a five year period. The Army moved to aggressively adopt this technology and to date, the company’s solution is the only one to meet Army specifications, with hundreds of thousands already shipped to battery vendors. According to feedback from Iraq and Afghanistan, the “return on technology” to the soldiers and marines is tremendous.<sup>15</sup> (emphases added)*

OnPoint Technologies’ investment in PPS proved the value of the VCI to the Army, just as In-Q-Tel’s many successes did for the CIA. Although their pursuits differ, these two unique entities share the same principles and benefits of investment. Both supply modest funding at the right time, develop new government business partners, and access valuable technologies. By investing in an appropriately structured VCI of its own, the Air Force could undoubtedly enjoy the funding, partnership, and technology benefits realized by the CIA and Army.

## Funding

An Air Force VCI would maximize service funding of R&D for cyberspace. By financially establishing a VC organization, the Air Force stands to leverage private investment while reaping the benefits of underwriting a start-up commercial success, yielding additional portfolio

funding for a nonprofit VCI. In effect, through modest Air Force investment, a cyberspace-focused VCI could become financially independent and continue to meet the service's need for innovation in cyberspace.

Looking to the precedent set by OnPoint, the Air Force could establish a VCI with an initial investment of about \$25 million or 18 percent of the service's cyberspace R&D budget for fiscal year 2013.<sup>16</sup> However, one has reason to believe that this proposed financing truly exhibits the potential for growth not currently realized in the Air Force's other R&D activities. Inherent in the government VCI is the ability to attract and leverage nongovernmental funding (i.e., capital). In 2001 In-Q-Tel, after only two years in business, was leveraging \$2.15 of private capital for every dollar provided by the CIA.<sup>17</sup> According to the agency's director, in March 2012, that number had grown to more than nine dollars for every CIA dollar invested.<sup>18</sup> Both OnPoint's and In-Q-Tel's modest funding strategy nurtures this attraction of external capital. By supplying typically no more than \$2 million per effort, the VCIs limit liability yet leverage partnered investment. Beyond funding by the government and private investors, a VC could recoup capital when the businesses it funds experience commercial success. Under a nonprofit structure, this means more money to invest for the needs of the customer. Successful investments yield opportunities for subsequent additional outlays.

Government VC funding and commercialized reinvestment of revenue supplemented by private capital could produce a self-sustaining organization.<sup>19</sup> Given its prospects for developing into a financially autonomous organization dedicated to Air Force-specific needs, a VCI represents a valid method for funding innovation in a fiscally constrained environment.

## Partnership

An Air Force VCI would offer access to additional government business partners and add depth to the contract-competition pool. One

could reasonably assume that the Department of Defense's reputation as a demanding acquisition organization precludes relationships with some businesses—especially those operating in the highly profit-driven cyberspace arena. A review of the creation of In-Q-Tel reveals that government agencies quite simply are “not connected to the creative forces that underpin the digital economy.”<sup>20</sup> An Air Force VCI, enjoying the bona fides of a high-technology service, leveraging the business credibility of a VC, and employing a late-stage funding strategy, could establish that connection.

The Air Force's reputation as a technologically savvy service endears it to high-tech business communities, but it sometimes struggles to maintain relationships with emerging innovators. In some cases, one can attribute this difficulty to restrictions imposed by the government under statute and regulation. Flexible business agreements between a privately held VC organization and a funded business inevitably offer an attractive alternative to bureaucracy-weary individuals who operate outside the realm of federal business opportunities.<sup>21</sup> Additionally, a VCI could solicit new government business partners by providing late-stage funding not typically targeted by the government's R&D awards.<sup>22</sup> As a complement to the existing Small Business Innovation Research construct that does well to conduct early-stage funding but relies upon unfunded commercialization, a VCI could be the key to reaching organizations previously caught in the valley between basic R&D funding and an acquisition program of record.

Recognition of the Air Force brand, combined with VC business methods and timely funding practices, could lead new cyber-innovation partners to the service. Ultimately, such partners mean increased competition, thus benefiting Air Force costs and performance.

## Technology

VCI resources and relationships open the door to unseen technologies. Often shrouded in intellectual secrecy, cyber technologies

emerge instantly to the surprise of competitors. The Air Force would prefer to initiate instead of react to this sort of revelation. VCs specialize in finding businesses poised to deliver these market surprises. By emphasizing connectivity, dissemination, processing, and exploitation technologies, an Air Force VCI could find, glean, and implement innovations earlier than its competitors.<sup>23</sup> These products could mean the difference in the Air Force cyber mission, which often does well to stay one step ahead.

## Challenges

Issues related to initiating and succeeding with an Air Force VCI include—but are not limited to—legality, management, funding, and distinction. Legality, though proven with In-Q-Tel and OnPoint, often becomes a complicating factor in establishing a viable acquisition tool. Ultimately, legal restrictions could limit the desired flexibility of a VCI, making it no more useful than existing mechanisms. Management and direction of a VCI would need to flow from a single Air Force body with the authority, vision, interconnectedness, and time to guide the effort appropriately. In light of the fact that manpower is often stretched thin, internal Air Force manpower requirements for a VCI could conceivably exceed the capability of the existing workforce. Funding will certainly prove contentious in a fiscally constrained environment. Unfortunately, start-up costs and annual financing for a VCI would most likely supplant existing government R&D, potentially orphaning an area of important research. Finally, distinction of the VCI as a viable entity in addition to established programs such as Small Business Innovation Research and the Rapid Innovation Fund is imperative to its success. Arguably, existing mechanisms offer sufficient access to the desired level of cyberspace innovation.

Implementation of an Air Force VCI faces numerous challenges that the service should consider in aggregate before pressing ahead with authorizations and approvals. However, government precedents suggest that the reward may be worth the risk. In light of a limited budget

amid unbridled technological advancement, the Air Force's desire to remain competitive may very well hinge upon establishment of a cyberspace VCI.

## Conclusion

Funding advantages, new business partners, and access to the newest technologies all represent potential benefits of an Air Force VCI. Financially the service stands to gain from private capital introduced through the VCI that, if successful, could yield funding sufficient to preclude annual government investment. New business partners cultivated by a VCI would improve competition and effectively open Air Force business to nontraditional contractors. VC relationships with innovative businesses could become the catalyst for introducing cutting-edge, commercial-based products. Even in a fiscally constrained environment, a VCI offers the service the opportunity to do what it has always done—innovate. ✪

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## Notes

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# Strategic Distraction

## The Consequence of Neglecting Organizational Design

Col John F. Price Jr., USAF

It seems that something happens to the concept of design during transition from the worlds of architecture, manufacturing, and engineering to the realm of organizational leadership. The clear principles of design that give it a revered position as foundational to success in the technical world are somehow lost when the focus shifts away from schematics and micrometer tolerances. Instead of embracing a discipline that brings precision and aligns organizational actions, one finds that its exacting standards often become blurred to the point that organizational design loses its significance. This devaluation results in leaders' failure to fully implement and execute organizational design, which leaves their institutions vulnerable to strategic distraction and misalignment. Even the Department of Defense (DOD), with its penchant for exactitude, has fallen prey to this neglect of organizational design and is suffering the consequences. A renewed understanding of such design is essential to ensuring that military and civilian leaders embrace and execute this critical process, thereby preventing strategic distraction.

### What's Wrong?

In a scathing critique, Prof. Bernard Finel of the Naval War College argues that the “focus on the now” by former secretary of defense Robert Gates and his “failure to act strategically has left the Defense Department weakened and in disarray.”<sup>1</sup> He attributes the secretary's shortfalls to the fact that his approach “was dominated by his inbox.”<sup>2</sup> Without the corrective emphasis on design within the organization, the DOD has begun what many individuals deem a decade-long “strategic honeymoon” in which political pressures and a myopic focus on

current operations have led to the neglect of future plans. The gradual cessation of hostilities in the Middle East and severe budgetary pressures are now bringing this negligence to light. The absence of a clear strategy for approaching existing and emerging threats with available resources and the hollow nature of the Quadrennial Defense Review as an aligning mechanism have created a precarious situation. Although America's wars may seem a worthy distraction, the country cannot afford to have its most senior leaders spending significant amounts of their time worried about the acquisition and movement of mine-resistant, ambush-protected vehicles to Afghanistan or the number of water bottles on pallets heading to Haiti for earthquake relief. The essence of organizational design demands that leaders at each level of the organization understand and assume the responsibilities associated with that level.

## Seeking Clarity

Sufficient comprehension of the role of organizational design and the hazards of its neglect calls for mastering several key concepts. Thanks to the complexity of the English language, much of the confusion with design comes from the term itself. In a bizarre arrangement, *design* addresses the intent of the process, the process itself, and its desired outcome. That is, the organizational leader has a design (intent) to design (plan, process) the design (product, structure). This confusion has created a situation in which no generally accepted definition of *design* exists, and the term has different connotations in different fields.<sup>3</sup> Despite this lack of clarity, great leaders continue to describe design as an essential element of organizational success. The late Steve Jobs referred to design as “the fundamental soul of a man-made creation that ends up expressing itself in successive outer layers of the product or service.”<sup>4</sup> To compound this emphasis, Tom Peters argues that “the dumbest mistake is viewing design as something you do at the end of the process to ‘tidy up’ the mess, as opposed to understanding that it’s a ‘day one’ issue and part of everything.”<sup>5</sup>

Design appears in a number of managerial texts but often with shockingly little depth. Take for example Richard Daft's capstone text *Organization Theory and Design*. One might consider this study a treasure trove of design information, yet the author often seems deliberately to avoid addressing the topic directly. His rather expansive glossary includes no definition of design, and, despite hundreds of textual references to the term, only one minor sentence 60 pages into the text provides any explanation of it: "Organization design is the administration and execution of the strategic plan."<sup>6</sup> This delayed and obscured explanation is unfortunate because a perfect presentation of the concept appears almost 50 pages earlier. Without clearly identifying it as his core concept, Daft explains design as the actions by which "managers deliberately structure and coordinate organizational resources to achieve the organization's purpose."<sup>7</sup> This statement, which captures the enduring intentionality of design and its role in driving structure and resources toward the purpose, seems to embody the essence of organization design. Daft does supply a valuable depiction of what he terms "the structural and contextual dimensions of design" but fails to sustain the emphasis of those three pages in the following 500.<sup>8</sup>

Unfortunately, Daft is not alone in his mistreatment of the design concept. The otherwise marvelous text *Leadership: Enhancing the Lessons of Experience* by Richard Hughes, Robert Ginnett, and Gordon Curyph of the Center for Creative Leadership addresses design for the first time two-thirds of the way into the discussion—and then only as a synonym for *organizational structure*. The authors treat design not as an active process but as a collection of characteristics—complexity, formalization, and centralization.<sup>9</sup> Even Bernard Bass's tome on leadership deals with the concept directly only twice, briefly discussing its structural aspects.<sup>10</sup>

In Jay Galbraith's *Designing Organizations*, yet again the reader is treated to a game of hide-and-seek with the concept. One finds his best attempt to address design in the blurb on the dust jacket. There he includes an indirect reference to the book as "a leader's concise guide to

the process of creating and managing an organization—no matter how complex—that will be positioned to respond effectively and rapidly to customer demands and have the ability to achieve unique competitive advantage.”<sup>11</sup> This definition captures the multidimensional nature of design and its importance to success, but one finds it nowhere in the actual text. Only late in the discussion of the concept does Galbraith note that “organization design is a process; it is a continuous process and not a single event. . . . Leaders must learn to think of organize as a verb, an action verb.”<sup>12</sup> Unfortunately, he immediately clouds the idea by replacing *design* in the next sentence with the term *organizing* and fails to distinguish between them.

Given the pervasive mistreatment of the term and the associated confusion it creates, the managerial tool kits of many senior leaders understandably fail to appropriately include organizational design. For the purposes of this discussion, it encompasses leadership actions to structure and coordinate personnel, processes, and resources that fulfill the organization’s purpose. Having clarified design, the article now looks at a consequence that leaders should try to avoid.

## Path to Distraction

Organizational distraction entails the misallocation of leadership’s focus from important strategic issues to those less significant but more pressing, thus resulting in degraded organizational performance. Although a simple route, the path to such distraction comes in several forms—each beginning with partial understanding of the concept of design. Leaders grasp the latter’s structural aspects but fail to connect design concepts to other processes. Other leaders establish initial connections to implement design across the organization but fail to view it as a continuous process, resulting in the emergence of alignment problems over time. The final path to distraction is trod by leaders who grasp the concept and understand the enduring nature of their responsibilities but abdicate their role because of the complexity associated with managing organizational design. In each case, the lack of an un-

derstanding of design leads to decreased emphasis on the concept and partial implementation. Leaders can avoid this pitfall by renewing their comprehension of the purpose of design.

Such avoidance may seem simple, but distraction is an insidious threat not easy to safeguard against, especially in today's semichaotic operating environment. By way of analogy, most drivers are well aware of the myriad distractions that can quickly create hazards for themselves, passengers, and others on the road. This awareness allows responsible drivers to take actions to mitigate those distractions—at least the ones they can control. This leaves a significant number that they must still guard against. Senior leaders face this same challenge in terms of attending to the important aspects of organizational activity.

Part of the genius of organizational design resides in the creation of clear operating responsibilities for the senior leader. This role definition lays out a distinct path to ensure that executives focus on the strategic dimensions of the organization and are not distracted by those assigned to other levels. However, today's operating environment exerts strong "downward pressures" that can drive the unwitting leader's attention away from strategic responsibilities and into operational or even tactical issues—a situation especially true for senior military leaders. The enticement of reverting to lower levels of leadership based on their previous experience becomes potentially overwhelming. In these cases, one of the first steps toward avoiding distraction involves recognition and awareness of these pressures.

## Downward Pressures

Four significant pressures warrant leaders' consideration, the first of which is the availability of real-time information on all aspects of organizational activities, including those at the lowest levels. Unless treated appropriately, access to this information by senior leaders can quickly divert their attention from concerns more appropriate to their position. The natural human fascination with "frontline" operations and the familiarity often resident in senior leaders who have experi-

enced those activities create a significant source of distraction if safeguards of organizational design are not in place and enforced.

The same information technology that generates real-time internal distractions fuels the 24/7 global-media enterprise that can comprise a second source of downward pressure on leaders. Most organizations do not serve as topics for cable news discussions or business-magazine articles, but the advent of social media forums has created the “every man a journalist” culture. Strategic aspects of organizational vision and objectives probably will not go viral in this environment; however, lower-level policies and practices will likely engender significant attention and draw leadership to those levels. Additionally, the ever-present eye of external media fosters an attitude of self-protection that can drive the leader away from long-term strategic concentration and communication into a reactive cycle attuned to the latest hot topic.

The third downward pressure comes from internal performance pressure that accompanies the high-stakes nature of many organizational leadership positions. The military’s evaluation and promotion cycle feeds this short-term emphasis. The desire for quick victories and expectations of improvements to fleeting metrics drive leaders to a fascination with tactical details to the neglect of their strategic roles. Ironically, in seeking short-term gains, distracted leaders undermine the likelihood of long-term organizational success.

Finally, leaders are distracted by their own penchant for the tangible results and clarity rarely found in the boardroom (Pentagon conference rooms) but readily available on the production floor (operational squadrons). This personal pressure is exacerbated by enticements of real-time information and continuous scrutiny from higher echelons. Although leaders naturally desire day-to-day relevance, they must learn how to satisfy this need without abandoning their responsibilities as strategic guides for the organization. This neglect of essential leadership roles, induced by undue attention on internal or external issues not related to the strategic direction of the organization, repre-

sents the essence of strategic distraction. Leaders must become aware of this hazard and take action to prevent it.

## Strategic Inversion

When properly implemented, design plays several critical roles for the organization. First, it is the guiding intent that frames the basic path that the organization will follow. The design concept espoused by the founder or leading coalition provides the fundamental context for decision making and sets the benchmark for aligning the organization. Second, the design process, as a source of continuous refinement, coordinates or synchronizes the basic design elements of structure, process, incentives, and personnel. Galbraith calls the result of this coordination “strategic fit,” which occurs when all of the design elements “are aligned with the strategy and reinforce one another. A strategic fit means effectiveness because congruence among the policies sends a clear and consistent signal to organization members and guides their behavior.”<sup>13</sup> Finally, design acts as the objective or end state for the organization to target. In this aspect, it becomes the strategic goal that helps keep the leader’s attention on long-term results and sustainability. Each of these aspects of design must be implemented and sustained to counteract downward pressures and their adverse effects on organizational alignment.

The consequences of abdicating responsibility for strategic design are rarely immediate due to the natural inertia of an organization, but the results soon manifest themselves in organizational performance as flaws in alignment become apparent. The DOD, an agency renowned for its disciplined strategic focus and processes, has become a case study for the consequences of neglecting or misapplying design. The personalities, politics, and operational pressures of two major conflicts have created the potential for a strategic inversion in the department. In a fascinating twist driven by technology and media, some of the most junior enlisted members execute tactical actions that produce strategic effects on the front lines. The resulting media attention pres-

sure some of the most senior officers to delve into tactical minutiae through the portals of worldwide surveillance and global communications. Thus, the clear demarcations among tactical, operational, and strategic roles blur, and the organizational pyramid can become inverted. Without proper restraint, the continuous stream of information back to Washington can feed an infatuation with operational and tactical details that distract from strategic responsibilities.

## Succeeding by Design

The success of either the DOD or a much smaller organization depends upon ensuring that leadership understands and implements the basic aspects of design. Any leader seeking to walk this path should start by clearly defining the concept. The following definition offers a useful starting point: design is “a strategic approach that defines the plans, parameters, processes and actions within a specific context and its constraints to realize a desired outcome.” Next, leaders need to think of design as a unique change lever available all of the time and at multiple levels throughout the organization.<sup>14</sup> As such, it should be an active part of all leadership conversations. Lastly, design should emerge as the direct product of a well-developed strategy, executed through the four primary design elements that protect against strategic distraction: structure, process, incentives, and personnel.<sup>15</sup>

Before properly executing the design elements, one must establish a relationship between organizational strategy and design. In a proper connection, these two form a symbiotic relationship wherein design both flows from and informs the organizational strategy. As the foundational concept, design shapes the range of possible strategy options. Once selected, the strategy guides the design process through adjustment of the key managerial levers. As the organization moves forward, a robust design process supplies feedback to strategic-planning efforts and shapes adjustments to the future strategy. Leaders must maintain clarity between these two important concepts in order to ensure fulfillment of each role and sustainment of their complementary nature.

After determining the strategic direction, one can fold design into each of the previously mentioned areas; collectively, they will form an institutional safeguard against strategic distraction. Although the efforts across the organization occur simultaneously, for clarity the article addresses them sequentially, starting with structure.

Organizational structure, the most visible manifestation of the design process, is often treated as synonymous with design. In fact, design is the metaconcept that applies to all organizational aspects whereas structure primarily involves the distribution of power within the organization as well as the size and nature of operations conducted by the organization. Creation of an appropriate structure acts as an important preventive against strategic distraction because it aligns individuals with lanes of authority and responsibilities and establishes habitual relationships between those persons at different levels. Although not sufficient alone, a well-designed structure is an important initial barrier for maintaining organizational alignment.

Despite all of the attention usually paid to structure, Galbraith claims that “most design efforts invest far too much time drawing the organization chart and far too little on processes and rewards.”<sup>16</sup> This critique is important because structure provides only the starting point for organizational execution. The day-to-day processes and incentives drive performance and foster an organizational culture. Through incentives, design efforts can ensure the success of strategic processes and the elimination of a singular concern with short-term achievements. One can tailor incentives to guarantee that performance cultivates organizational alignment as well as “the bottom line.” Similarly, organizational processes must be designed to support strategy, structure, and incentives. Process design also helps ensure the execution of recurring validations of strategic alignment. Establishment of processes that repeatedly cycle back to the foundational design and strategy will make the organization both synchronized and adaptive to a changing environment.

The final lever of design implementation involves the organization's most valuable resource—its people. The transitory nature of some employees forces leaders not to depend too much on them for guarding against strategic distraction, but leadership can do a great deal through job descriptions, role definitions, and reporting responsibilities that go well beyond any particular individual. Implementing design through employees calls for deliberate hiring processes, robust developmental programs, and focused evaluation systems. Design in personnel requires that those who directly affect operations clearly grasp the intent of the organization and their role in ensuring its success.

## Conclusion

Not a difficult process, the proper implementation of design must nevertheless be deliberate and continuous to produce the desired result of driving the organization forward and helping it avoid the perils of strategic distraction and misalignment. Senior leaders execute design as one of their strategic functions, but often they apply it only at the surface. The lack of thorough integration causes an organization to constantly pull the leader's view downward. Without appropriate safeguards or leadership intervention, institutional pressures undermine effective organizational design and drive misalignment. In the absence of rigorous design efforts, senior leaders become distracted from their strategic roles and succumb to the pressures of the tactical level. They must remain aware of this downward pull and ensure that organizational design goes beyond structural considerations and into all aspects of daily execution. ✪

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<http://www.airpower.au.af.mil>

## **Master of the Air: William Tunner and the Success of Military**

**Airlift** by Robert A. Slayton. University of Alabama Press (<http://www.uapress.ua.edu>), Box 870380, Tuscaloosa, Alabama 35487-0380, 2010, 304 pages, \$43.50 (hardcover), ISBN 978-0-8173-1692-1.

Given the tremendous impact of strong personalities on shaping the United States Air Force, biographies are a useful venue for studying Air Force history. Leaders such as Billy Mitchell, Hap Arnold, and Curtis LeMay developed the service's roles and missions, defining national strategy as well as operational and tactical doctrine. The relative importance of strategic bombardment, air superiority, interdiction, and ground support missions is still hotly debated by airpower advocates. Robert A. Slayton's *Master of the Air* successfully argues the case for the inclusion of military airlift as an indispensable element of American airpower and clearly establishes Lt Gen William Tunner's place on the short list of innovative Air Force leaders.

Slayton observes that of the four great military airlifts of the twentieth century (Stalingrad, the Burma Hump, Berlin, and Korea), Tunner was in charge of the three that succeeded. The author characterizes his subject as an innovator, entrepreneur, and organizer par excellence. His greatest achievement, the Berlin airlift, defied contemporary military logic: the Soviets saw the failure of German efforts to resupply the encircled Sixth Army at Stalingrad and expected the same result in Berlin. Tunner's determination, skill, and driving leadership beat the odds in spectacular fashion: his Airmen delivered vast amounts of food and fuel to an encircled city in the dead of winter with clockwork precision, forcing Stalin to back down in this decisive early Cold War contest.

The general was not afraid to tackle the establishment when it impeded mission accomplishment, a trait that earned him several highly placed enemies. Slayton describes in detail Tunner's adversarial relationship with Gen John Cannon, commander of US Air Forces in Europe. According to Tunner, "General Cannon came over, apparently, with the idea that he was going to run the Berlin Airlift and I was determined he wasn't" (p. 193). As the author explains,

On the one hand, Tunner clearly had the expertise to run the show, and he was right on how to go about it. But in the air force, on the other hand, just like in any other service, rank commands. Cannon was the boss, and Tunner had an obligation to get along with him. There would be precious little evidence that Tunner did much to accomplish that goal, resenting any kind of direct supervision of the type that Cannon was far too willing to apply. (p. 193)

Slayton then quotes Air Force historian Daniel Harrington: “Reform and innovation don’t occur in the abstract; they occur in institutions, and being right is just the start of the process” (p. 193). The author concludes that “Tunner’s methods and personality were not always appreciated in the air force, and this affected his career in substantial ways” (p. 202).

Despite his character flaws, Tunner gained strong political allies, especially Cong. L. Mendel Rivers (D-SC), who sat on the House Armed Services Committee. A strong advocate of the importance of military airlift, Rivers relied on Tunner (then head of the Military Air Transport Service [MATs]) as a witness in hearings conducted by his Special Subcommittee on National Military Airlift in April 1960. Among the committee’s recommendations were the redesignation of MATs as Military Airlift Command (MAC), giving it parity with Strategic Air Command and Tactical Air Command. A record appropriation of \$370 million (with \$250 million allocated toward jet transports) made possible the introduction of the first jet-powered long-range transport, the C-141 Starlifter, which entered service in 1965. MATs became MAC the following year, playing a significant role in transporting troops, supplies, and equipment to the conflict in Vietnam. Although Tunner had retired six years previously, his advocacy of military airlift made these historic milestones possible.

Robert Slayton’s *Master of the Air* has much to recommend it. The author’s writing style is engaging, his research thorough, and his analysis worth consideration by airpower historians and theorists. William Tunner constantly strove to expand the capabilities of military airlift. Although he often aggravated his superiors, he got results. On 7 De-

ember 1950, his Airmen dropped bridge sections from C-119 aircraft to Marines fighting their way out of encirclement by Chinese Communist forces in Korea, enabling them to make their way across the Funchilin Pass without abandoning their tanks and other heavy equipment. On 18 December, *Time* magazine featured Tunner on its cover with the caption “GENERAL WILLIAM TUNNER, AIRLIFTER. In the midst of the enemy, a bridge from the sky” (p. 229). He truly believed that, given the right aircraft and proper planning, anything was possible—and he had the determination and ability to prove it.

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**Selling Air Power: Military Aviation and American Popular Culture after World War II** by Steve Call. Texas A&M University Press (<http://www.tamupress.com>), John H. Lindsey Building, Lewis Street, 4354 TAMU, College Station, Texas 77843-4354, 2009, 224 pages, \$50.00 (hardcover), ISBN 978-1-60344-091-2; \$24.95 (softcover), ISBN 978-1-60344-100-1.

In *Selling Air Power*, Steve Call assesses the influence of American popular culture on public perceptions of airpower, describing popular culture as “media aimed at the largest audience possible” (p. 5). Films about airpower and the Air Force were a large part of the popular culture that Call analyzes, but he also offers in-depth coverage of novels, general-interest magazine articles, and even plays. Regarding the 1940s through the 1960s, he first examines the growing influence of airpower advocates, who promoted their subject as revolutionary and heroic; he then notes the advocates’ decline as airpower critics began to sway opinion toward a more sinister view, painting airpower as a grave threat to civilization. After World War II, airpower became virtually synonymous with nuclear bombing, so Strategic Air Command and nuclear strategy occupied the attention of advocates and critics

alike, although Air Defense Command and its shield against incoming bombers also became a factor.

Call leads readers through the decade or so after World War II, when, for example, the novel *Twelve O'Clock High* was made into a successful movie in 1949, and writers such as Alexander de Seversky published numerous proairpower articles in mainstream magazines. Airpower also entered the spotlight with the release of films like *Strategic Air Command* (1955) and *Bombers B-52* (1957). Until the late 1950s, most writings and films about airpower were complimentary, praising the Air Force and its vital importance in keeping the peace. The last hurrah of proairpower films came with *A Gathering of Eagles* (1963), but by then the scales had tipped, giving airpower critics the upper hand. Call points out that the launch of Sputnik and the looming threat of nuclear missiles made airpower (strategic bombers) seem less invincible; furthermore, as flying became more accessible to the public, the airplane itself began to lose its novelty. Movies such as *On the Beach* (1959) and *The War Lover* (1962) deglamorized war and, with it, strategic airpower. The pendulum had swung to the critics' favor, with hit movies such as *Fail-Safe* and *Dr. Strangelove* in the early 1960s and 1970's *Catch-22* painting a much darker, more dangerous picture of airpower.

The narrative does assume a conspiratorial tone at times, the author using the catchall terms *air power advocates* and *air power critics* almost as if they represented organized groups: "For several years air power advocates exploited their opportunity and through popular culture preached faith in air power with considerable success" (p. 132). To be fair, Call does move from general statements to very specific examples of who did what and what motivated them. He provides his readers an understanding of the context of the times and of the behind-the-scenes arrangements between the Air Force and filmmakers.

The book is meticulously researched and chock full of endnotes and bibliography entries, reflecting its origin as a dissertation. *Selling Air Power* is a keeper, a study that will stay on readers' shelves for future reference. Air-minded readers who consider themselves fans of both

military history and the history of popular culture may enjoy it, whereas a student of airpower history but not popular culture may find the book too arcane. But Airmen who can quote lines from *Bombers B-52* and recognize *Steve Canyon* should give it a try. They may find some useful context for understanding their own perceptions of airpower.

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**From Lexington to Baghdad and Beyond: War and Politics in the American Experience**, 3rd ed., by Donald M. Snow and Dennis M. Drew. M. E. Sharpe (<http://www.mesharpe.com>), 80 Business Park Drive, Armonk, New York 10504, 2009, 352 pages, \$99.95 (hardcover), ISBN 978-0-7656-2402-4; \$34.95 (softcover), ISBN 978-0-7656-2403-1.

In their historical narrative *From Lexington to Baghdad and Beyond*, authors Donald Snow and Dennis Drew take a Clausewitzian view that “war is a continuation of political activity by other means.” They expound upon that idea by examining US military engagements and relating how those experiences can inform future decisions when the use of power via military action is a necessary extension of the political process. Starting with the presupposition that at certain times military force is an appropriate means of furthering foreign policy objectives, the book covers our nation’s conflicts, large and small, in 300-plus pages. The authors tackle the daunting task of addressing lessons learned from large wars such as the Civil War and World War II as well as lesser conflicts like the War of 1812 and the Mexican War. In doing so, they provide a 70,000-foot view of our nation’s military experience, from birth to present day.

A great read for anyone interested in the relationship between politics and war in our nation’s history, *From Lexington to Baghdad and Beyond* starts by addressing the general mind-set of Americans and the ways it differs from that of citizens of most other countries. Our legacy

of military success and isolation from warfare on our home soil has created a unique sense of optimism, built partly on mythology. This “can do” attitude, coupled with our tendency to frame military actions in terms of moral absolutes, results in a lack of understanding among Americans of the relationship between politics and military force. Snow and Drew offer an alternative to the American tendency of viewing wars as isolated incidents resulting from a call to defend liberty and defeat a well-defined evil. This overly simplistic view has led to our failure to understand the complex relationship between political and military objectives. Americans expect the military, when called upon, to overcome both the will and ability of other nations. But can we overcome another nation’s will unless we embrace the political objectives that lead to military actions in the first place? As a nation, our record of attaining the political objectives for which military forces are deployed is much less impressive than our record of defeating the military forces of our adversaries on the battlefield. This book demonstrates the need to learn from our past military experiences in order to impose our will more successfully on our adversaries. After all, if Clausewitz is right, then the end game of all military action calls for realizing political objectives, not breaking things and killing people.

The authors first examine the American Revolution. Ironically, our initial experience at war was a draw, at best, on the battlefield but an absolute success in terms of imposing our political will on the enemy. The book moves well from one conflict to another, highlighting many political lessons along the way, such as how George Washington’s political intelligence guided some of his decisions on military strategies and engagements, what similarities existed between the British situation in America and the American situation in Vietnam, and how our failure to understand and adhere to our initial political objectives in Korea resulted in our snatching defeat (or, at the very least, a severely diluted victory) from the jaws of (absolute) victory. Snow and Drew address the significance of political objectives both during and after the war. For example, the differences between President Lincoln’s and his successor’s view of postwar peace are generally understood. Less well

understood is the mirroring of those differences on the international stage with respect to the treatment of Germany after World War II. The political decisions following the Civil War proved consequential for the nation, particularly for the South, and had long-lasting consequences. Similarly, the political decisions following World War I proved consequential for the world, particularly Germany, and planted the seeds for World War II. Failures in the international political realm after World War I set the stage for World War II, and failures in the international political realm after World War II set the stage for future conflicts in Vietnam and Korea.

By covering each of our nation's major military engagements, the authors shed light on the complex yet consistent relationship between war and politics. They do not hide the ball with regard to their criteria for "good" political objectives and their philosophical bearings. Rather, they seek to educate the reader on war and its purpose as a tool of national policy. Military conflicts never occur in a vacuum, despite our tendency to view them in such a way. The book is an excellent read, moving naturally from conflict to conflict, but the reader must understand what it is and is not. In short, *From Lexington to Baghdad and Beyond* is a windshield tour of war and politics in our nation's history. Far from an exhaustive study (no 3,000-page volume could be, much less one of 300 or so pages), it attempts to cover a considerable amount of history in relatively few pages—its principal weakness. If readers approach the book as a starting point, then they will not be disappointed. An important read for military leaders or anyone interested in war or politics (since the two are inseparable), it helps the reader understand the importance of political objectives in our military engagements—not simply until the sound of the first shot but throughout the war and the peace that follows.

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**Beer, Bacon, and Bullets: Culture in Coalition Warfare from Gallipoli to Iraq** by Gal Luft. BookSurge Publishing (<http://www.booksurge.com/>), 7290B Investment Drive, Charleston, South Carolina 29418-8305, 2010, 326 pages, \$18.99 (softcover), ISBN 978-1-43-926096-6.

War fighting and peacemaking in the twenty-first century are much more complex than in centuries past, yet the pivotal role of coalitions of nations, as well as their inherent cultures, in the success or failure of military operations has not changed. With *Beer, Bacon, and Bullets*, Dr. Gal Luft, executive director of the Institute for the Analysis of Global Security and a former member of the Israel Defense Forces, offers a compelling and readable piece of scholarship important to all students of military culture. He presents his argument through the prism of five case studies (chapters 2–6) bookended by an exceptionally clear introductory chapter and an analytical treatise (chapter 7). The sixth chapter draws from his personal experience working with the South Lebanon Army for a number of years. Dr. Luft's thesis deals with the way soldiers of dissimilar cultures “live and work together in a combat environment and how they overcome their cultural dissimilarities” (p. x). The cultural lenses he uses to convey his argument include “language barriers, religion, customs, philosophy, values, stereotypes, heritage, gender roles, education, mentality, ethnic background, [and] economic and social outlook” (p. xii). Not content to present a one-dimensional view of these factors, he ventures deeper, exploring the underlying question “does culture matter?” (p. xii) .

According to Luft, culture creates many difficulties for the scholar in terms of the interpretation and presentation of cases for study. Biases, stereotypes, and generalizations often lead to misinterpretation, which often causes military failure if the cultures that enter coalitions do not understand one another. The introductory chapter delineates the boundaries of the term *culture*, providing a brief review of the literature on the integration of cultural studies and military affairs as well as offering plausible explanations of the origin of tensions in coalition operations. The book intentionally veers from “good cases of military co-

operation between countries of similar cultures” (p. xix) since these do not represent useful points of departure for the purposes of this book.

Chapter 2 examines relations between the Ottoman Empire and Germany during World War I, particularly in the context of the Gallipoli campaign. Luft enlightens the reader with what appeared on the surface to be a functioning partnership but actually proved culturally incompatible and laced with mutual hostility.

Delving into the relationship between Great Britain and Japan in 1914 during World War I, the third chapter focuses on the Battle of Tsingtau. Though obscure, this battle demonstrated the beneficial cross-cultural dealings of these different societies.

Chapter 4 addresses the relationship between Western—mostly American—armed forces and China during World War II, primarily in the China-Burma-India theater, one of the war’s less visible fronts. American interest in keeping China free from Japan’s imperialistic influences led to this otherwise unlikely coalition. The Americans’ preconceived notions of Chinese culture prompted their superior attitudes and disdain for their Chinese hosts. In some instances, these notions were reinforced by prolific graft, corruption, and lapses in integrity seemingly acceptable to Chinese society writ large during this era.

Switching gears, chapter 5 discusses another improbable but rather successful coalition—the one between the United States and Saudi Arabia during the Gulf War of 1990–91. Although military victory (and an overwhelming one at that) defined the success of this coalition, it also allowed many of the senior personnel who fought in Southeast Asia to state with confidence, “We’ve kicked the Vietnam Syndrome once and for all!” (p. xxi).

Chapter 6 describes the unique relationship between the Israel Defense Forces and the South Lebanon Army from 1985 until Israel’s withdrawal from Lebanon in 2000. Though technically not a coalition as defined by the previous case studies, this relationship owed its long existence to the countries’ mutual interest in keeping peace in their

border area. Political expediency and a campaign platform led to Israel's withdrawal from the coalition after successful, long-standing relations had kept it together for so many years.

*Beer, Bacon, and Bullets* is a valuable resource for military personnel, scholars, historians, and policy makers who seek a better understanding of the influence of culture on planning and executing coalition operations. Such knowledge will acquire increasing importance as coalition operations become the norm, as evidenced by the ongoing work of the International Security Assistance Force in Afghanistan. Here, we have seen over three dozen nations come together for a common purpose, successfully coexisting in a cross-cultural melting pot of mutual interest. The lessons gleaned from this and other recent operations like those in Libya during 2011 build upon each other while enhancing security cooperation in an era of tight constraints on defense budgets.

**Col Chad T. Manske, USAF**

*New York, New York*

**Global Air Power** edited by John Andreas Olsen. Potomac Books (<http://www.potomacbooksinc.com/Books/Features.aspx>), 22841 Quicksilver Drive, Dulles, Virginia 20166, 2011, 560 pages, \$44.00 (hardcover), ISBN 978-1-59797-555-1; \$28.00 (softcover), ISBN 978-1-59797-680-0.

In *Global Air Power*, John Andreas Olsen, deputy commander and chief of the NATO advisory team at that organization's headquarters in Sarajevo and visiting professor of operational art and tactics at the Swedish National Defence College, offers a companion to *A History of Air Warfare*, a book of similar style and scope he compiled in 2010. Whereas *A History of Air Warfare*, an introductory text for air warfare students, examines the most important conflicts in which airpower played a vital role (essentially at the high tactical / low operational level of war), *Global Air Power* utilizes a longitudinal case-study

method of representative air forces to “emphasize the sociopolitical contexts that have shaped air power as an instrument of war” (p. xviii).

The editor’s rationale for these case studies is simple: “To think clearly about the future, we need to know where air power came from and how it developed into what it is today” (p. xviii). The first of the book’s three parts deals with “the evolution of airpower thought and action in the three most combat-proven air forces in the world: those of Britain, the United States, and Israel” (p. 1). The second examines emerging global players: Russia, India, and China. Each air force faces the same questions as the Royal Air Force, US Air Force, and the Israeli Air Force; however, each nation is drawing different conclusions based on their respective contexts. The third part investigates air forces from the Asia-Pacific region, Latin America, and Continental Europe. In the afterword, Lt Gen Dave Deptula, USAF, retired, contemplates the future of airpower and concludes with his opinion regarding what constitutes success or failure in Brig Gen Billy Mitchell’s “aeronautical era” (p. 415).

*Global Air Power* is a superlative read for a couple of reasons. First, the contributors not only provide impressive case studies individually but also stick to the editor’s framework, thus allowing easy comparison and contrast across multiple air forces that should enable American Airmen to unearth some of their implicit biases (good, bad, and ugly)—if they are intellectually honest. Second, the extensive notes and entries in the selected bibliography attest to the authors’ credibility and offer readers any number of paths to expand their knowledge. (Indeed, readers struggling with a topic for their next paper would do well to select from the multiple issues dealt with in *Global Air Power* and make use of its extensive citations of reference material.)

In his examination of the Israeli Air Force, Brig Gen Itai Brun succinctly gives professional airmen the best motivation to read this book: “Decision makers were fascinated by the availability and flexibility of airpower” (p. 144). Recent instances of drone warfare and cyber attacks point to the continuing fascination with low-footprint, flexible

applications of dissuasive or coercive diplomacy. For anyone looking for the most useful allocation of his or her precious time, *Global Air Power*—together with *A History of Air Warfare*—provides a solid foundation for understanding why air forces worldwide developed their own particular grammar to respond to their respective civilian leaders' sometimes malleable logic.

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**Afghanistan: Graveyard of Empires; A New History of the Borderland** by David Isby. Pegasus Books (<http://pegasusbooks.us/>), 80 Broad Street, 5th Floor, New York, New York 10004, 2010, 464 pages, \$28.95 (hardcover), ISBN 978-1-60598-9.

*Afghanistan: Graveyard of Empires* differs from other histories of that country in its focus on the borderland between Afghanistan and Pakistan. Author David Isby attempts to define the region and the various conflicts involving these two nations, examining the Federally Administered Tribal Areas and the North West Frontier Provinces on the Pakistan side and discussing how these areas affect what happens in Afghanistan. The author shows how the future of this area may evolve by addressing five major conflicts: (1) the fight against the international terrorism of al-Qaeda; (2) the conjoined insurgencies in Afghanistan and Pakistan; (3) the actions directed against the cultivation and trafficking of narcotics; (4) the multifaceted internal strife within Afghanistan itself; and (5) the conflict within Pakistan, where the insurgency is essentially part of a crisis of governance that has directly affected its neighbor Afghanistan (p. 373). By examining these conflicts, Isby identifies the various issues within the region and provides a comprehensive look at the area in terms of political, social, ethnic, and economic considerations. Thus the reader comes to understand why certain ethnic and insurgent groups behave the way they do. Furthermore, the author points out the linkages between Afghanistan and Pakistan and explains why the war on terror had to expand into the Federally Ad-

ministered Tribal Areas and North West Frontier Provinces to be successful against various terrorist groups in the region.

Throughout the book, Isby demonstrates his vast knowledge of the area, augmented by contacts and personal relationships established over the many years that he has researched and studied Afghanistan. Indeed, his attention to detail makes this book a must-read for anyone who will deploy to that country since a better understanding of the motivations of some of the regional insurgent groups facilitates the conduct of intelligence assessments. Although some of the data is a bit dated and no longer valid, it nevertheless helps to explain the rationale for some of the military actions now taking place there, such as the drone strikes that occur almost daily.

The book is especially effective in its holistic assessment of the history, culture, and ethnic conflicts prevalent in the region, including both sides of the border. The level of detail, ease of reading, and amount of information conveyed are also commendable. Moreover, it is one of the few studies of this area to concentrate solely on the borderland. Consequently, as mentioned above, anyone deploying in and around this area, especially the Kandahar region, should read *Afghanistan: Graveyard of Empires*.

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*Nellis AFB, Nevada*

**Six Essential Elements of Leadership: Marine Corps Wisdom of a Medal of Honor Recipient** by Col Wesley L. Fox, USMC, Retired. Naval Institute Press (<http://www.usni.org/store/books>), 291 Wood Road, Annapolis, Maryland 21402, 2011, 192 pages, \$24.95 (hardcover), ISBN 978-1-61251-024-8.

In what could be considered a top-tier resource for any aspiring leader, retired colonel Wesley L. Fox turns his more than 40 years of military experience into a leadership primer consisting of the most critical attributes that leaders must have to ensure success for them-

selves and their organizations. These six essential elements include basic human and leadership-centric functions often forgotten in today's fast-paced, results-driven, and high-tech military and business organizations. A clear understanding of the elements of care, personality, knowledge, motivation, commitment, and communication offers leaders a bedrock for leadership success.

The author wrote this book because he wished to translate his experience into knowledge that others could use to better themselves and their contemporaries, whether subordinates or superiors. He does so by means of vivid examples of his own leadership experiences (as well as those of others) during his time in the US Marine Corps. That career, which spanned four decades, included service during the Korean and Vietnam Wars and stints as commanding officer of the Corps's Officer Candidate School and as deputy commandant of cadets at Virginia Tech University. Colonel Fox further advances his thesis within the context of a leader's main purpose—to sustain the morale of the organization—and through what he describes as “the meaning of leadership to Marines,” specifically, to know the people whom he or she leads (p. 8). Additionally, through his examples, he makes the point that followers envision two types of leaders: (1) the position-based leader who exercises authority through position, title, or rank, and (2) the people-based individual who shows concern and regard for followers. The author alludes to these two types in his leadership examples throughout the book. He tends to favor the second type as a more successful approach to motivating and understanding people, who, according to Colonel Fox, reside at the core of leadership and constitute its *raison d'être*. People are why the topic exists.

Not a scholarly work, the book would not appeal to readers looking for leadership principles derived from a theoretical framework. Furthermore, it does not compare and contrast those principles, and it does not offer an all-encompassing discussion of leadership styles. Rather, it is based on personal thoughts and experiential elements that the author has developed by reducing the subject of leadership to its most

basic parts and substantiating it by citing real-life examples and instances of leadership in the field. He does cross-reference his experiences with a list of sources, thereby adding validity to his philosophic and academic understanding of the topic of leadership. These sources add research value for any reader who wishes to learn more about leadership along the lines of the author's interpretation.

*Six Essential Elements of Leadership* has wide appeal to an audience involved with managing or leading people, but the work is most relevant to the company grade and noncommissioned officer whose management and leadership at the tactical level require hands-on decision making, clear communication, and acute people skills. A sound understanding of leadership at this level prepares such officers for success at the operational and strategic levels. Because Colonel Fox's book offers that sound understanding, aspiring leaders should add it to their short list of must-read material.

**Capt Frank J. Shoaf, ANG**  
*Pennsylvania Air National Guard*

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