ASPJ
Fall 2010 Volume XXIV, No. 3

To Fly, Fight, and Win . . . In Air, Space, and Cyberspace

AIR & SPACE POWER JOURNAL

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
2010		**00-00-2010 to 00-00-2010**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Air & Space Power Journal. Volume 24, Number 3, Fall 2010	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **Air and Space Power Journal,155 N. Twining Street,Maxwell AFB,AL,36112-6026**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			
unclassified	**unclassified**	**unclassified**	**Same as Report (SAR)**	**100**	

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

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Air and Space Power Journal
155 N. Twining Street
Maxwell AFB AL 36112-6026

e-mail: aspj@maxwell.af.mil

Visit *Air and Space Power Journal* online at http://www.airpower.au.af.mil.

Fall 2010
Volume XXIV, No. 3
AFRP 10-1

Senior Leader Perspectives

From the Editor

Features

Departments

Lorenz on Leadership

Part 3

Gen Stephen R. Lorenz, USAF

In 1987 I first wrote out my thoughts on leadership. The compilation included 13 principles that Air University published in the summer of 2005 as part 1 of what became the Lorenz on Leadership series.[1] Later, in the spring of 2008, Air University published part 2, which included an additional eight leadership principles.[2] Over the last few years, various experiences have highlighted yet another group that I present for your consideration.

When I first wrote down these principles, I certainly didn't intend to prescribe an approved way to think or lead. After all, none of these tenets is unique. I took them from other leaders who influenced me through the years, hoping that readers would develop their own set of principles.

This Is a Family Business

Families are important—this goes without saying. When I say that this is a "family business," realize that the term *family* encompasses more than just your immediate loved ones. In this case, it also includes our extended Air Force family. I can't tell you the countless times I've heard people thank their "brothers and sisters in the Air Force family." Sometimes they do so at promotion or retirement ceremonies, but I've also

heard the phrase at going-away parties and in daily conversations.

When we take time to reflect, we recognize that the bond we share with others in the Air Force is stronger than that for most coworkers in the business world. This is especially true when we factor in the ties we create after remote tours, overseas assignments, and long combat deployments. You see, the term *brothers and sisters in arms* is no accident. As we live, train, sweat, and bleed together, these bonds grow so strong that the only language we have to describe our feelings for each other is the language of family—the Air Force family.

Building a strong Air Force family means that all of us share a commitment to our fellow Airmen and treat them in ways that reflect our commitment. We should all live in a way that maximizes our ability to touch the lives of others. This means that we should have a healthy focus on others, not on ourselves. As motivational speaker Ken Blanchard once said, "Humility does not mean you think less of yourself. It means you think of yourself less."[3]

Now, I would most certainly be remiss if I didn't specifically mention our spouses. These are the men and women who keep us strong and help us through the tears—they are the foundation that enables each of us to serve in the world's greatest air force. Our lives need balance, and our spouses help provide that stability. I like to use the analogy that such balance is similar to the spokes of a bicycle wheel. You see, a bicycle needs balanced spokes in order to provide a smooth ride. Our lives are no different. I think of the spokes as the different priorities in our lives. If one of the spokes—like the relationship with your spouse, the needs of your children, or your responsibilities at work—gets slighted, the wheel no longer rolls the way it should. It might even stop rolling altogether.

We must balance the spokes in our lives very deliberately and carefully. When we are balancing shortfalls and managing a limited amount of time, money, and manpower, our spouses are often shortchanged. We can't afford to let that happen—we must always make time to tell our spouses how much we appreciate them. It takes only a minute to let them know how much we care. Maintaining the friendship, trust, and energy in a relationship is a full-time job. It's up to you to make it a fun job—for both you and your spouse.

Successful Teams Are Built on Trust

Although the Air Force family helps support and steer us through our service, trust is the foundation of our existence. This trust is a two-way street—both within our service and with the American public. When an Airman from security forces tells me that the base is secure, I know without a doubt that all is safe. Before flying, I always review the forms documenting maintenance actions on that aircraft. The aircraft maintainer's signature at the bottom of the forms is all I need to see to have complete confidence in the safety of that airplane. I liken it to the cell phone commercial many of you have probably seen. Although there may be a single man or woman in front, he or she speaks with the voice of thousands standing behind. A successful team is one that works together, enabled and empowered by trust.

On our Air Force team, everyone's ability to perform his or her function is what builds trust and makes the machine run so smoothly. Ultimately, we all share the same goal—the defense of our nation and its ideals. That's the common denominator, regardless of rank, where trust and mutual respect are paramount. At every base, in every shop and office, Air Force leadership (officer, enlisted, and civilian) consistently sets the example. We are all role models and always on the job. Our Airmen live up to these expectations every day.

The trust that we share with the American public is a different story. It is constantly under scrutiny—and for good reason. Members of the American public

"trust" us with their sons and daughters—and billions of dollars of their hard-earned money. That trust is built upon a foundation of accountability. To be accountable is to be subject to the consequences of our choices. Whether we choose to do the right thing—to act with integrity, service, and excellence—or not, we have to be prepared to accept the consequences.

We are accountable for the choices we make in our personal lives. The vast majority of choices that get people in trouble involve alcohol, sex, drugs, and/or money. Each year, some of us make wrong choices in these areas and are held accountable. If you know Airmen who are headed down a wrong path, help them before they make a bad choice.

We are also accountable for the choices we make as military professionals. We must adhere to the standards we learned from our first days in uniform. When Airmen cut corners by failing to follow tech order guidance or by violating a flying directive, we must hold them accountable. We must police each other because if we don't, small lapses will lead to bigger ones, and the entire Air Force family will eventually suffer. Overlooking a lapse is the same as condoning it.

When you assume responsibility for others as a supervisor or commander, it is important to realize that you've taken a big leap in accountability. Simply put, you are accountable for the choices your people make. That is why you must lead by example. Your people need to see that you set high standards and live according to those standards. You must also enforce standards within your unit. You should correct deficiencies at the lowest level before they grow into something bigger. Remember this: units with high standards have high morale. It's been that way throughout military history.

Feedback Fuels Change

Trust and accountability rely on feedback. We all have blind spots—areas where we think things are better than they are. To correct these, we need to be aware of them. This means that we need to encourage dissenting opinions and negative feedback. We should ask open-ended questions. What are we missing? How can we do this better? What's the downside? What will other people say?

When our people answer, we must welcome their inputs, even when those inputs don't cast our leadership in the best light. In the end, our time as leaders will be judged by the quality of our decisions and the accomplishments of our people. The personal price we pay in the short term for creating candor in our organizations is well worth the long-term professional and institutional benefits of hearing the best ideas and eradicating our blind spots.

In order to encourage our people to voice their alternative ideas and criticisms, we have to be confident enough in our people to listen to negative feedback and dissenting opinions, find the best way forward, and then lead in a positive direction. We all like the "warm fuzzies" we get when people agree with our ideas and give us positive feedback. We naturally dislike the "cold pricklies" that come when people disagree with us and point out our shortcomings. As leaders, we have to be mature enough to deal with criticism without punishing the source—the best leaders encourage frank feedback, especially when it is negative.

As followers, we must work at creating candor as well. The leader must set the tone for open communication, but it is important that those of us who voice dissenting opinions or give negative feedback do so in a way that will have the most effect. We can't expect our leaders to be superhuman—this means we should speak in a way that doesn't turn them off immediately.

We should also remember that the leader is ultimately responsible for the direction of the organization. If he or she decides to do something that you disagree with, voice your opinion—but be ready to accept the leader's decision. As long as the boss's decision isn't illegal or immoral, you should carry it out as though the idea were your own. That's the mark of a professional Airman.

All Visions Require Resourcing

As leaders, we must be prepared to face many kinds of potential challenges, both anticipated and unexpected. While working on the challenge, as a leader, you will be faced with balancing a limited amount of time, money, and manpower. In order to allocate these critical resources optimally, leaders must develop visions for their organizations.

To realize a vision, several things need to happen. First, you must align the vision with one of our core service functions. The closer to the core, the easier it will be to gain support and, eventually, resourcing. Next, take the vision and develop a strategy. Depending on your vision, the strategy may involve acquisition, implementation, execution, modification, or one of many other elements. Let your strategy start at the 40 percent solution, but then let it evolve to 80 percent and eventually to 98 percent. Realize that the process is continual and that you will never get to 100 percent.

With the strategy in place, you can start socializing the vision. Socialization will also help your vision progress and grow roots through increased organizational support and understanding. The support will help you champion the concept for resourcing. After all, your vision must have resourcing in order to come true. Those resources will go to winners, not to losers, so invest the time and energy to be a winner.

In life, and especially in the Air Force, priorities and personnel are always changing. Over time, your vision will need to adapt to the realities of change. It will require even greater persistence and objectivity. Giving your vision roots and aligning it with core functions will create something that can be handed off and sustained through change. The best ideas, sustained by hard work, can be carried forward by any leader.

You may also find yourself joining an organization and accepting other people's vision. In this situation, evaluate their vision against current realities and resourcing priorities. If they've done their homework, the project will be easy to move forward. If they haven't, assess the vision to determine if it should move ahead or if its time has passed.

Objective Leaders Are Effective Leaders

In essence, a leader develops a vision to help guide decision making. Most decisions are made without much thought—almost instinctively, based on years of experience. Some, however, involve time and thought, and they can affect other people. The process of making these decisions is an art—it defines who we are as leaders.

Saying this isn't a stretch. As leaders, we do things in order to create a desired effect. Making the "best" decision hits at the core of creating that effect; in turn, it is an essential aspect of being an effective leader. Now, these aren't decisions that involve "right versus wrong"—or lying, cheating, or stealing—we must never compromise our integrity. In fact, most of these decisions involve "right versus right," and the decision may be different today than it was yesterday. This is what can make them so challenging. Let's take a moment to look at the elements involved in making the "best" decision.

First and foremost, effective decisions require objectivity. The old adage "the more objective you are, the more effective you are" has never been more accurate or applicable than it is today. It can be tempting to view decisions as if you're looking through a small straw. Effective leaders must step back and gain a much broader view; they must open their aperture. I've always advocated looking at issues and decisions from the viewpoint of your boss's boss. This approach helps to open the aperture and maintain objectivity.

In order to gain the broad, objective view, leaders must work to gather a complete picture of the situation. Some call this situational awareness; others call it a 360-degree view of the issue. In either

case, that awareness involves considering all of the variables that weigh into the decision, the competing interests involved in the decision, and the potential consequences of the decision. The potential consequences must include possible second- and third-order consequences. Tough calls like these can involve individuals, organizations, and issues beyond those we might initially consider. Weigh the consequences against unit missions and organizational goals. Investigate how the decision will move things forward in the near, mid, and long term. This will provide the context for the decision and, although it involves a lot of work, will result in the broadest view of the entire process.

Lastly, tough decisions can be very emotional. Don't let emotion play into the decision-making process. Emotion serves only to cloud the issue; it can potentially result in a decision that produces near-term happiness but fades quickly into mid- and long-term unintended challenges. Leaders must look at decisions from the outside, unattached to the emotional influence from within. They must rise above such distractions in order to maintain their objectivity and keep their organizations headed in the "best" direction.

Train Wrecks—How Can We Prepare for an Impending Crisis?

Unfortunately, it is the unanticipated crisis that often derails organizations headed in a good direction. I like to call those unanticipated challenges "train whistles in the distance." In reality, it's pretty easy to know when trains are coming down the tracks. They are big, make lots of noise, and are typically accompanied by warning lights and bells. Trains usually run on a schedule, making it even easier to know when to step to the side or hop on board.

We rarely get the same notification from an impending crisis in the workplace. More often, it appears, seemingly from out of thin air, and immediately consumes more time than we have to give. Through frustrated, tired eyes we wonder where the crisis came from in the first place. Even though we vow never to let it happen again, deep down we know that it's only a matter of time before the next one hits our organization by surprise.

Such an outlook helped create an entire school of thought called "crisis management." We have crisis action teams and emergency response checklists—we even build entire plans describing how to deal effectively with the train that we never saw coming. These effects can be hard to absorb and typically leave "casualties" behind. Wouldn't it be better to prepare for specific contingencies and not rely on generic crisis-response checklists? Wouldn't it be better for the organization if a leader knew about the train long before it arrived?

So, how does a leader get the schedule for inbound trains? In many cases, just getting out of the office and talking to members of an organization can help a leader identify potential issues and areas of risk. By the same token, if you are a member of an organization and know of an upcoming challenge, it is your responsibility to research and report it.

Candor and objectivity alone will probably help catch 90 percent of the issues before they affect an organization. In order to reach 100 percent, a leader must work hard to avoid complacency. When things get "quiet" within an organization, it doesn't necessarily mean that everything is being handled successfully. In fact, the hair on the back of every leader's neck should start to stand up when things get quiet. After all, it probably means that the leader isn't involved enough in the daily operation of the unit and that the first two elements, candor and objectivity, are being overlooked. This is the time to be even more aggressive about candor, information flow, and objectivity.

Leaders who work hard to enable candor, remain objective, and discourage complacency have a unique opportunity to steer their organizations in the best direction

when challenges or crises loom. As they identify the inbound trains, leaders can decide whether to maneuver clear or hop on board. You see, each inbound train is an opportunity. It is a chance to fight for new resources—money and/or manpower—and to unify the team toward a common objective. Leaders should anticipate inbound trains as a means of improving their organizations.

So then, what is the best way for a leader to guide people through change? There are certainly many methods to do so, and each one depends on the type of change expected. In all cases, however, the principles that underlie the preparation for change are the same. Preparation builds confidence, helps a leader's organization be less fearful of approaching uncertainty, and ensures that the organization is much more effective once change arrives.

This is where education and training come into play. We educate in order to prepare for uncertainty. Education helps us understand why the change is necessary. It also helps us objectively assess the environment and rationale necessitating the change. With objectivity, we can unemotionally assess the benefits and drawbacks of the different potential courses of action. Education is a never-ending self-improvement process. The different levels occur at specific spots in our careers—opening doors and creating opportunities. Because the Air Force lines up education programs with future levels of responsibility, it can be difficult to catch up on education adequately. Never pass up the opportunity to further your education.

Whereas education helps us prepare for uncertainty, training programs are designed to prepare for certainty. After all, it's those things we expect that fill our syllabi and lesson books. We train for them over and over until recognizing and reacting to them become second nature. This is one reason that we use checklists so much in the Air Force. They help lead us accurately through challenging times.

Through experience, our collective list of "certainty" grows. It shapes the evolution of our training programs. You see, when we react to a challenge, we create a certain result. Positive results reinforce the action—and make us more confident. Although the favorable result "trains" us to use the same response next time, it typically doesn't teach us to handle anything other than exactly the same challenge. When we make mistakes or experience poor results, we truly have an opportunity to learn. Even though it may not be as much fun to investigate our failures, we are more apt to assess the challenge critically and develop other, more successful, potential courses of action.

As a leader, you must ensure that your people have the education necessary to prepare for uncertainty and the training to guide them through certainty. As an indi-

Preparation builds confidence, helps a leader's organization be less fearful of approaching uncertainty, and ensures that the organization is much more effective once change arrives.

vidual, you must aggressively pursue these opportunities to further develop yourself as well. Such preparation will instill the confidence necessary to embrace change.

In the End, People Are Still People

Although leadership will always be about the people we lead, technology has changed the way we do our jobs. Beyond the most noticeable and tangible aspects, like e-mail, PowerPoint, and cell phones, technology has transformed the workplace in three main areas: collaboration, automation, and personal accessibility. Collaboration includes our ability to network, collect, and share information. Getting the right information to the right people when they need it isn't always as easy as it sounds. After all, accurate information is a key element in making objective decisions, and objectivity is what keeps our organizations headed in the best direction. Today's challenge, however, is managing the sheer volume of available information. Technological advancements will only make this challenge greater in years to come.

By automation, I'm talking about technology's impact on the tasks we do each and every day. Historically, automation has been one of the enablers for doing "more with less." Our most expensive asset is our people. Technology gives us the ability to leverage certain efficiencies by replacing manpower with technology. Maintaining the balance of technology and manpower will only continue to be a daily leadership challenge.

Lastly, accessibility applies to our ability to contact anyone, anywhere, anytime through voice and data communication. There are two key aspects of accessibility: how leaders make themselves available to others and how you, as a leader, take advantage of the availability of others. It is important that commanders, while making themselves available at all hours of the day, don't foster an environment in which subordinates are afraid to get decisions from anywhere but the top. At the same time, leaders must guard against exploiting the availability of others, especially subordinates. Such exploitation will reinforce an impression that decisions can come only from the top.

Accessibility has also changed how we make ourselves available to others. Many commanders like to say that they have an "open door policy." Don't fool yourself into thinking that issues will always walk through the open door. Leaders still need to escape the electronic accessibility, namely e-mail, and seek human interaction. New Airmen in the squadron aren't going to raise a concern by walking into a commander's office, but they might if the commander is able to interact in their work environment. Leading by walking around will always be a principle of good leadership.

Each of us has reacted differently to the impact that technology has had on the workplace. In terms of dealing with technology, I like to think that there are three kinds of people: pessimists, optimists, and realists. The technology pessimists resist any change brought about by improved technologies. Technology optimists jump at the earliest opportunity to implement any technological advancement. Technology realists, who represent the lion's share of us all, accept that change is necessary and work to integrate improvements, but they don't continually search for and implement emerging technology.

Our organizations need all three technology types in order to run smoothly. It is incumbent upon each of us to understand what kind of technologist we—and those with whom we work—are. This is simply another medium in which one size won't fit all. Leaders must adapt their style, depending on whom they deal with and the nature of the task to be performed. The pessimist might not "hear" the things communicated electronically. By the same token, resist the temptation to always communicate electronically with the optimist. Instead, push

for the personal touch and realize that your approach must be different for each person.

In essence, leadership is the challenge of inspiring the people in an organization on a goal-oriented journey. Technology enables that journey, and we, as leaders, must successfully manage both the benefits and detriments of that evolution. Ultimately, leaders are still responsible for themselves, their people, and the results of their units. Through leadership, they can make a difference, both in the lives of their people and in the unit's mission.

It's Your Turn

In the end, a leader's true mission is to achieve a desired effect. As a result, I always approach each new assignment or responsibility with two main goals: to leave the campground better than I found it and to make a positive difference in people's lives. Working toward these goals—in concert with the Air Force's core values—helps us all to be servant-leaders, focusing on others rather than ourselves while accomplishing the mission. ✪

Notes

1. Maj Gen Stephen R. Lorenz, "Lorenz on Leadership," *Air and Space Power Journal* 19, no. 2 (Summer 2005): 5–9.

2. Lt Gen Stephen R. Lorenz, "Lorenz on Leadership: Part 2," *Air and Space Power Journal* 22, no. 1 (Spring 2008): 9–13.

3. Quoted in Gregory K. Morris, *In Pursuit of Leadership* (Longwood, FL: Xulon Press, 2006), 206.

Gen Stephen R. Lorenz, USAF

General Lorenz (USAFA; MPA, University of Northern Colorado) is commander of Air Education and Training Command (AETC), Randolph AFB, Texas. He is responsible for the recruiting, training, and education of Air Force personnel. The general attended undergraduate pilot training at Craig AFB, Alabama. Prior to assuming command of AETC, he served as commander of Air University. He has also commanded an air-refueling squadron, a geographically separated operations group, an air-refueling wing that won the 1994 Riverside Trophy for Best Wing in Fifteenth Air Force, and an air-mobility wing that won the 1995 Armstrong Trophy for Best Wing in Twenty-first Air Force. Additionally, he served as the commandant of cadets at the US Air Force Academy and as deputy assistant secretary for budget, Office of the Assistant Secretary of the Air Force for Financial Management and Comptroller, Headquarters US Air Force, Washington, DC. A command pilot with 3,500 hours in 10 aircraft, General Lorenz is a graduate of Squadron Officer School, Air Command and Staff College, Air War College, and the National War College.

Reenabling Air Force Command and Control for Twenty-first-Century Partnerships

Lt Gen Philip Breedlove, USAF
Maj Brian Tyler, USAF

It is time for Airmen to reenable the command and control (C2) of air operations as part of a joint force in today's complex security environment. Earlier this year, the Joint Staff released the latest version of Joint Publication (JP) 3-30, *Command and Control for Joint Air Operations*.[1] Like all doctrine, JP 3-30's publication marks both an end and a beginning. The product is the culmination of a joint process by which Soldiers, Sailors, Airmen, and Marines synthesized their experience and understanding of air and space C2 to provide future joint force commanders and staffs authoritative options. It codifies several important concepts, such as organizing with both theater and subtheater joint force air component commanders (JFACC), the role of air component coordination elements, considerations for the C2 of remotely piloted aircraft, and the potential for assigning JFACCs responsibilities for space-coordinating authority.

However, the publication of JP 3-30 also signals the start of its revision. Transformation in the information age requires continuous improvement, and our dynamic Air Force strives to maintain the leading edge in the domains of air, space, and cyberspace. So, as today's version of JP 3-30 shapes how our joint forces command and control current air operations, we challenge our Airmen to renew the conversation on how best to command and control air, space, and cyberspace forces for tomorrow's joint fight.

This discussion involves two overarching imperatives—joint trust and operational flexibility. With regard to the former, relationships between commanders are often more important than command relationships. History offers multiple examples of successful teamwork: Gen Robert E. Lee and Gen Thomas Jonathan "Stonewall" Jackson, Gen Omar Bradley and Maj Gen Elwood "Pete" Quesada, Gen Norman Schwarzkopf and Lt Gen Charles "Chuck" Horner, and Gen Tommy Franks and Lt Gen T. Michael "Buzz" Moseley, among others. The personal relationships, frequent interaction, and shared adversity of these great tandems (and their staffs) forged mutual trust and respect. However we organize our future air components and C2, we must intentionally maximize contact between *joint* commanders and *joint* planners to facilitate the *joint* trust necessary to attain the timeless principles of unity of (*joint*) command and (*joint*) effort. Following Stonewall Jackson's fatal injury at the Battle of Chancellorsville in 1863, General Lee lamented that he'd lost his right arm. Airmen succeed when they achieve that same level of relevance to their joint partners.

Turning to operational flexibility, future air components must capitalize upon the speed, range, and flexibility of air, space, and cyber power in a responsive and reliable manner to meet a broad range of security challenges. Introducing the Quadrennial Defense Review of 2010, Secretary of Defense Robert Gates said that "the United States needs a broad portfolio of military capabilities with maximum versatility across the widest possible spectrum of conflict."[2]

Assuming finite resources, our charge is flexibility. The imperative of flexibility carries a variety of implications for our force structure, force presentation, capabilities, missions, and processes. With regard to C2, JFACCs, joint air operations centers, and entire theater air-ground systems must be capable of operations ranging from major contingencies through counterinsurgencies to humanitarian assistance. This requirement calls for proficiency in both centralized (strategic attack) and decentralized (counterinsurgency) planning processes, and it demands effectiveness in both general- and direct-support relationships. Our joint and coalition partners recognize that no "one-size-fits-all" approach exists and that JFACCs must be supple enough to command and control air, space, and cyber power whenever and however required.

Furthermore, our operational flexibility becomes even more vital as the US Army migrates to modular brigade combat teams with assets previously controlled at the division level. Airspace control and area air defense—already complex endeavors—become even more so when indirect fires; air defense; and intelligence, surveillance, and reconnaissance assets are decentralized. Nonetheless, when the needs for responsiveness and asset assurance override the advantages of mass and efficiency, JFACCs must adapt or become irrelevant.

Finally, our discourse on future C2 should also consider forthcoming developments in cyberspace. In May 2010, the US Senate confirmed Gen Keith Alexander as leader of US Cyber Command (USCYBERCOM). Our Air Force has taken critical steps to support the Department of Defense's cyberspace efforts, including standing up Twenty-fourth Air Force as the service component to USCYBERCOM. As we work through the C2 of cyber capabilities, joint trust and operational flexibility remain pertinent. Centralized C2 of cyber capabilities makes sense in many circumstances. Conversely, we can also envision times when the synchronicity and responsiveness of certain cyber effects within a joint operating area are so crucial to the campaign that devolution of specific authori-

With regard to C2, JFACCs, joint air operations centers, and entire theater air-ground systems must be capable of operations ranging from major contingencies through counterinsurgencies to humanitarian assistance.

ties is appropriate. Just as JFACCs can assume responsibilities for space-coordinating authority, so should they be able to offer their joint force commanders the capability to assume responsibilities for cyberspace-coordinating authority. The bridge into Fourteenth Air Force and the space community offered by commanders of Air Force forces, directors of space forces, and the contingent of space professionals resident in our air and space operations centers creates enormous value for the joint force. Can a similar bridge link our joint commanders with relevant cyber capabilities?

JP 3-30 represents enormous progress in the maturation of the JFACC and C2. But it is already time for another healthy and introspective conversation on the future C2 of air, space, and cyberspace power. ✪

Notes

1. Joint Publication 3-30, *Command and Control for Joint Air Operations*, 12 January 2010, http://www.dtic.mil/doctrine/new_pubs/jp3_30.pdf.

2. Secretary of Defense Robert M. Gates, "Defense Budget / QDR Announcement" (speech, Arlington, VA, 1 February 2010), http://www.defense.gov/speeches/speech.aspx?speechid=1416 (accessed 18 June 2010).

Lt Gen Philip Breedlove, USAF

Lieutenant General Breedlove (BSCE, Georgia Institute of Technology; MS, Arizona State University; MS, National War College) is the deputy chief of staff for operations, plans, and requirements, Headquarters US Air Force, Washington, DC. He is responsible to the secretary of the Air Force and the chief of staff for formulating policy supporting air, space, irregular warfare, counterproliferation, homeland security, weather, and cyber operations. As the Air Force's operations deputy to the Joint Chiefs of Staff, he determines the operational requirements, capabilities, and training necessary to support national security objectives and military strategy. Prior to assuming his current position, he served as the commander, Third Air Force, Ramstein AB, Germany. A command pilot with 3,500 flying hours, primarily in the F-16, General Breedlove has flown combat missions in Operation Joint Forge / Joint Guardian.

Maj Brian Tyler, USAF

Major Tyler (USAFA; MPP, University of Maryland) is a student at the School of Advanced Air and Space Studies (SAASS), Air University, Maxwell AFB, Alabama. Prior to attending SAASS, he served as an Air Force Fellow / Strategic Policy Intern assigned to the Directorate of Operations, Plans and Requirements, Headquarters US Air Force, Washington, DC. Major Tyler previously conducted operational-level planning of information and cyberspace operations in Europe, Africa, and Afghanistan. He also led intelligence, surveillance, and reconnaissance collection and processing, exploitation, and dissemination operations for numerous U-2 and RQ-1 missions over the Korean peninsula and Iraq, and served as a detachment commander in the 67th Network Warfare Group, deputy director of intelligence for a combined joint special operations air component, and collection manager for Joint Task Force-Southwest Asia.

Desert Shield and Desert Storm

20 Years in Retrospect

Lt Col Paul D. Berg, USAF, Chief, Professional Journals

In 1898 John Hay famously characterized the Spanish-American War as a "splendid little war." On the 20th anniversary of Desert Shield and Desert Storm, US Airmen might say the same about those two operations.

An international response to Iraq's invasion of Kuwait in August 1990, Desert Shield was a buildup of coalition forces in the Persian Gulf region. For months the prospect of what Iraqi dictator Saddam Hussein threatened would become the "mother of all battles" worried Western leaders, who noted that the Iraqi military—one of the world's largest—boasted extensive Soviet-made weaponry and troops battle-hardened by an eight-year war against Iran. Flux in the international situation added to the uncertainties faced by US policy makers. The Berlin Wall had fallen the previous year. The Soviet Union appeared to be in terminal decline but remained heavily armed. Airpower would play a major role in any combat operation against Iraq, but the legacy of the Vietnam War gave US leaders nagging doubts about airpower's potential effectiveness.

The concerns about airpower proved unfounded. When Desert Storm began in January 1991, coalition airpower vindicated itself in dramatic fashion as television viewers around the world watched laser-guided bombs hit targets with seemingly unerring precision. Stealth aircraft slipped past Iraqi radars to strike heavily defended facilities with impunity. Coalition aircraft went "tank plinking" at night, using infrared sensors to detect armored vehicles hidden in the sand and then destroying them with guided bombs. Following weeks of air attacks, a blitzkrieg-style 100-hour ground offensive, lavishly backed with air and space power, swept Iraqi forces from Kuwait. Desperate Iraqi soldiers even surrendered to remotely piloted aircraft (RPA) used by the US Navy as spotters for its gunfire. Victory came swiftly and with few casualties. It was a good time to be an Airman.

Twenty years later, it is still a good time to be an Airman, but many uncertainties linger. Since Desert Storm, precision-guided bombs and RPAs have become much more prevalent and advanced, yet the international situation remains highly turbulent. Now fighting a second war in Iraq, we confront an array of regional powers and terrorist threats. US air and space power has no equal during conventional combat, but Airmen wrestle with how best to apply it in counterinsurgency operations. "Splendid little wars" have been scarce of late, but pausing to reflect on how Airmen triumphed during Desert Shield and Desert Storm can inspire us to devise innovative new ways to achieve our national goals around the world. *Air and Space Power Journal*, the professional journal of the US Air Force, is a forum for discussing the latest means of applying air, space, and cyber power. ✪

We encourage you to e-mail your comments to us at aspj@maxwell.af.mil. We reserve the right to edit your remarks.

BEDDOWN OPTIONS FOR AIR NATIONAL GUARD C-27J AIRCRAFT

Mr. John Conway's article "Beddown Options for Air National Guard C-27J Aircraft: Supporting Domestic Response" (Summer 2010) speaks to a bigger issue we could resolve with a transformational organizational shift within the Department of Defense (DOD) and the Department of Homeland Security (DHS). In a post–Cold War, post–11 September 2001, post-Katrina environment, we should model the Army / National Guard and Air Force / Air National Guard pairings after the model of the Navy / Coast Guard. By doing this, the National Guard and Air National Guard would each elevate to the status of separate services but simultaneously move from the DOD to the DHS. With this move, there would obviously be a shift in roles and missions, which would generate changes in force structure. However, within the Air Force, for example, you could still leverage the concepts of Total Force Integration to continue operating similar equipment (C-130s and remotely piloted aircraft come to mind) with the now-partnered DOD/DHS units. This move to the DHS would leave the Army and Air Force with active duty and reserves within the DOD (both of which are Title 10–funded components). It would also unite the National Guard, Air National Guard, and Coast Guard under the DHS for homeland security roles and missions such as augmenting border patrol and counternarcotics units; conducting search and rescue; and handling oil spills, hurricanes, and other national disaster responses. The "guards" are less encumbered with posse comitatus legal restrictions and are better suited for these roles than the active duty forces, but the current organizational construct of keeping them as components (and not services) within the DOD inhibits their ability to better serve in these roles.

Lt Col John M. Fair, USAF
Charleston AFB, South Carolina

BEDDOWN OPTIONS FOR AIR NATIONAL GUARD C-27J AIRCRAFT: THE AUTHOR RESPONDS

The idea of transitioning the Air Guard and Army Guard into Coast Guard–like organizations, separate from the Air Force and Army, merits serious consideration. However, one must remember that the Coast Guard has a unique peacetime mission (transitioning to the Navy only in wartime), while the Air Guard and Army Guard—currently focused on overseas combat operations—play key roles in future war plans. To extract them from the war-planning process and—as a direct consequence—the budgetary process stemming from it would reduce their ability to acquire and maintain equipment, coordinate training, and seamlessly integrate into Air Force and Army structures in time of war.

Although there must be more focus on military support to civil authorities (MSCA), the Air Force and Army simply are not organized to divest themselves of the National Guard in order to have the Guard support a still-evolving mission (MSCA).

Col John Conway, USAF, Retired
Maxwell AFB, Alabama

THE ART OF PERSUASION

As someone who has worked as a journalist, proposal writer, and corporate communications professional, I can only applaud Capt Lori Katowich's tips to contributing writers in "The Art of Persuasion" (Summer 2010). Her guidance is both elegant and universal—remove the publication-specific references and the advice translates to anyone who wants to persuade. I've practiced the essence of these tips as guidelines for more than 20 years and have found what she wrote to be valuable, effective, and, unfortunately, frequently ignored. I recommend this column as required reading for every new contributor—or at least the ones I would agree with. Thank you.

Lance Martin
Waco, Texas

SHOULD THE UNITED STATES MAINTAIN THE NUCLEAR TRIAD?

In his article "Should the United States Maintain the Nuclear Triad?" (*ASPJ*-English, Summer 2010; *ASPJ*-Chinese, Spring 2010), Dr. Adam Lowther concludes that since the effectiveness of US deterrence and extended deterrence continues to depend on a strong and enduring nuclear triad, "weakening the nuclear triad is unwise" (*ASPJ*-English, p. 28).

We understand that revisiting US deterrence policy is necessitated by changes in the international environment. After the Cold War, nontraditional security threats emerged and became the focal point of US policy. Dr. Lowther acknowledges these environmental changes yet has no intention of proposing adjustments to traditional deterrence theory. All he does is reinterpret the old theory under the new environmental parameters and reach the same old conclusion. This prompts me to probe the foundation of traditional deterrence theory, which evolved in the 1960s to the point of mutual assured destruction (MAD). Based on classic economics, the theory presupposes independent entities engaging in international relationships, exercising rational self-restraint, and building and maintaining law and order by maximizing self-interest and game playing. Nourished by classic economics, the MAD theory gains its persuasive power. Meanwhile, however, the same theory appears very rigid in that it rejects changes in environmental parameters that might affect the assumptions upon which it is based. In other words, MAD theory assumes that international relationships have been and remain dominated by the instinctive tendency of nation-state game players to defend their self-interests. Thus, it is not surprising that Dr. Lowther, though seeing the same environmental-parameter changes as nuclear abolitionists, is not able to provide a solution that addresses the impact of such changes.

Interestingly, Dr. Lowther also cites Francis Fukuyama's famous argument that Western liberal democracy played a vital role in winning the Cold War (*ASPJ*-English, p. 25). Readers would have benefited more had Dr. Lowther gone one step further and compared this argument with MAD theory—as well as addressed how the current US nuclear-deterrence policy could be reshaped accordingly. Indeed, the fast-changing world is forcing people to take a new look at a number of political theories built on classic economics. Analysts try to choose between physical hard power or faith as the determinant of a nation's behavior and relationship with other countries. Consequently, when discussing nuclear deterrence, one must keep in mind that many people attribute the collapse of the Soviet Union to the power of faith rather than that of physical strength.

Zhang Xinjun
Tsinghua University, Beijing, China

Dr. Adam Lowther's excellent article clearly and concisely presents a solid explanation of why our nuclear triad strategy was developed and why we need to maintain it to ensure the continued security of the United States. I have been deeply concerned for a long time about what is clearly a denuclearization shift in our military strategy and do not understand why a very serious debate about the dubious merits of what is, essentially, disarmament is not being heard. I am grateful to see Dr. Lowther and *Air and Space Power Journal* bring the discussion out into the open.

Experience shows that whenever the cost and risk of engaging in "bad actions" are reduced, the result is that more such actions are undertaken. That is why, for example, we have ramped up security for air travel. Although the number of people who might want to hijack or destroy a plane has not changed, increased security has significantly increased the cost and risk that prospective hijackers now face, leading to far fewer actual hijacking attempts.

The nuclear triad has been an effective deterrent for decades, and the need for it has clearly not disappeared. In fact, one can easily make the case that both the danger of an attack on the United States and the number of organizations desiring to undertake such an attack have increased.

With this in mind, Dr. Lowther's message needs to reach as many of the American people as possible so they can understand what is

at stake and start asking our leaders why we are following such a very dangerous path.

Frank J. Hannaford
Omaha, Nebraska

A CYBER PROVING GROUND

In addition to the excellent points laid out by Lt Col Kristal Alfonso in "A Cyber Proving Ground: The Search for Cyber Genius" (Spring 2010), I would add two of my own. First, there is evidence that a large part of success comes not from innate genius but simply from time spent doing a task.

For example, Malcolm Gladwell's book *Outliers: The Story of Success* (Little, Brown, 2008) posits the "10,000-hour rule"—that one of the keys to success in any field is spending a large amount of time actively working in that field. Therefore, to truly develop and nurture cyber geniuses, military personnel should be spending a lot more time in the cyber world than they currently do—10,000 hours is almost three-and-a-half years' worth of eight-hour days.

Second, given that developing cyber skills requires only a computer and access to the Internet (which may be the ultimate "cyber proving ground") and that the United States has only a small fraction of the world's population, it is highly unlikely that many of the future "cyber geniuses" will be Americans, due to simple demographics.

Brian Weeden
Montreal, Canada

IMPROVING COST-EFFECTIVENESS IN THE DEPARTMENT OF DEFENSE

I would like to thank Col Drew Miller for his thought-provoking article "Improving Cost-Effectiveness in the Department of Defense" (Spring 2010). The critical thinking and focused decision-making tools he describes are important for any leader—not only when considering cost-effectiveness but also when making any critical decision.

Col Lee A. Flint, USAF
Osan AB, South Korea

A PERFECT STORM OVER NUCLEAR WEAPONS

In April 2009, Pres. Barack Obama announced that the United States would strive for "a world without nuclear weapons."* This announcement, viewed widely as a major change to US nuclear-deterrence policy, received both support and opposition in the United States. Vice Adm Robert Monroe's article "A Perfect Storm over Nuclear Weapons" (*ASPJ*-English, Fall 2009; *ASPJ*-Chinese, Winter 2009) expresses a clear objection to that policy.

According to this article, US nuclear deterrence played a vital role during the Cold War and contributed to the collapse of the Soviet Union. However, after two decades of unannounced "nuclear freeze," the US nuclear arsenal has gravely deteriorated. Meanwhile, global efforts to prevent nuclear proliferation have experienced repeated setbacks, with more states joining the nuclear club and more nonstate actors seeking access to nuclear weapons. In this regard, the article is correct in raising our awareness about the reality of such threats.

On the other hand, the United States still retains the most powerful nuclear capability in the world. People therefore have reason to wonder if the US nuclear-deterrent capability is largely disproportionate to the real threat it faces today. Is it really necessary for the United States to maintain and upgrade its massive nuclear arsenal? While the United States was adjusting its nuclear policy, the world also saw the US military stepping up its conventional-deterrence capabilities in all domains. The trial launch of the X-37B space plane is only the latest example. Thus, people have more reasons to believe that "a world without nuclear weapons," as proposed by the current US president, is based on the United States' efforts to further upgrade its overall deterrence capacity and therefore represents a higher level of strategy to cope with "a perfect storm over nuclear weapons."

Niu Yinjian
Shanghai, China

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*Barack Obama, "Remarks by President Barack Obama," Office of the Press Secretary, White House, 5 April 2009, http://www.whitehouse.gov/the_press_office/Remarks-By-President-Barack-Obama-In-Prague-As-Delivered.

Ira C. Eaker Award Winners

for the top *Air & Space Power Journal* articles of the past year

First Place

Lt Col Thomas G. Single

"New Horizons:
Coalition Space Operations"

(Summer 2010)

Second Place

Lt Col Lorinda A. Frederick

"Deterrence and Space-Based
Missile Defense"

(Fall 2009)

Third Place

Lt Col James Mackey

"Recent US and Chinese
Antisatellite Activities"

(Fall 2009)

Congratulations to this year's winners! The award honors airpower pioneer Gen Ira C. Eaker and is made possible through the generous support of the Air University Foundation. If you would like to compete for the Ira C. Eaker Award, submit a feature-length article to *Air and Space Power Journal* via e-mail at aspj@maxwell.af.mil. All military personnel below the rank of colonel (O-6) or government civilian employees below GS-15 or equivalent are eligible. If *ASPJ* publishes your article, you will automatically be entered in the competition.

Achieving a Credible Nuclear Deterrent

Lt Col Samuel L. McNiel, USAF*

Imagine trying to keep a 1957 Chevy running in pristine condition—perhaps not difficult for a classic-car aficionado, but such a vehicle would not be practical for daily commuting. Gen Kevin Chilton, commander of US Strategic Command, points out that the B-61 warhead, designed in the 1950s but still in the US nuclear arsenal, contains vacuum tubes—something he equates to maintaining a '57 Chevy for everyday use.[1]

A credible deterrent requires adversaries to believe that (1) the instrument of deterrence will deliver the level of destruction claimed and (2) the entity wielding the instrument would actually employ it. The absence of either belief destroys the deterrent's credibility. Over the past two decades, both the reliability of US nuclear weapons and certainty about US political will to employ them have declined; therefore, the credibility of US deterrence, ultimately guaranteed by nuclear weapons, has also declined. Furthermore, the United States no longer maintains a sufficient industrial base for these devices—the nuclear weapons complex—to support its nuclear deterrence strategy. This article argues that America should restore the credibility of its nuclear deterrence by designing, testing, producing, and fielding a new nuclear weapon, which would effectively revive a viable nuclear weapons complex and demonstrate political resolve.

After offering a brief background on nuclear weapons and the weapons complex, this article examines the foundational nature of nuclear weapons with regard to deterrence strategy, our neglect of the nuclear weapons complex, the uncertain reliability of the weapons stockpile, and, consequently, the diminished credibility of our deterrence. It concludes by showing that designing and fielding a new weapon will correct these deficiencies and provide new military capabilities.

Nuclear Weapons and the Complex

A basic understanding of nuclear weapons—very complex mechanisms made up of thousands of parts—will help inform a discussion of their industrial base.[2] At the heart of a nuclear weapon resides the nuclear explosive package (NEP). All current US weapons consist of two stages. The first stage, or primary, works on the same principle as the atomic bombs employed during World War II. At the center of the primary lies a "pit," a hollow core of fissile material (usually plutonium) surrounded by a chemical explosive. When the explosives detonate, the resulting shockwave compresses the pit, which becomes so dense that it creates a runaway nuclear fission reaction. Before the pending nuclear explosion destroys the pit, a "boost gas" (a mixture of deuterium and tritium) is injected into the pit to increase the fraction of plutonium that undergoes fission, yielding greater energy

*A space and missile operations officer, the author currently attends the Industrial College of the Armed Forces at National Defense University.

for use in the second stage. The harnessed portion of the primary's energy then ignites the second stage's fusion fuel. Most of the energy yield from thermonuclear weapons comes from the secondary.[3] A *nuclear warhead* includes the NEP along with supporting components.[4]

A *nuclear weapon*, composed of a nuclear warhead and a set of supporting nonnuclear components, produces nuclear energy of a militarily significant yield.[5] The components consist of weapon-specific items such as fuses, batteries, and reentry vehicles and bodies.[6] All nine nuclear weapon types currently in the US stockpile were designed in the last century—some as far back as the 1950s but none more recently than the 1980s.[7]

Eight government-owned, contractor-operated sites make up the nuclear weapons complex:

> Los Alamos National Laboratory . . . and Lawrence Livermore National Laboratory . . . which design [NEPs]; Sandia National Laboratories . . . which designs nonnuclear components; Y-12 Plant . . . which produces uranium components and secondaries; Kansas City Plant . . . which produces many of the nonnuclear components; Savannah River Site . . . which processes tritium from stockpiled weapons to remove decay products; Pantex Plant . . . which assembles and disassembles nuclear weapons; and the Nevada Test Site, which used to conduct nuclear tests but now conducts other weapons-related experiments that do not produce a nuclear yield.[8]

Nuclear Weapons Strategy Remains Relevant

A credible deterrence, impossible without reliable nuclear weapons, advances US interests in three ways: (1) underpinning US national security by guaranteeing the US military's ability to bring overwhelming force to bear against an adversary, (2) helping prevent the proliferation of nuclear weapons by removing the imperative for allies to develop their own nuclear weapons, and (3) dissuading rivals from breaking treaties designed to control nuclear weapons and then engaging in an arms race. According to the Congressional Commission on the Strategic Posture of the United States, "In a basic sense, the principal function of nuclear weapons has not changed in decades: deterrence. The United States has the weapons in order to create the conditions in which they are never used."[9]

Nuclear weapons remain a critical underpinning of US national security and defense strategy, as noted Pres. Barack Obama, speaking in Prague in April 2009: "Make no mistake: As long as these [nuclear] weapons exist, the United States will maintain a safe, secure and effective arsenal to deter any adversary, and guarantee that defense to our allies."[10] The *Capstone Concept for Joint Operations* further amplifies this theme, observing that US forces once again need to make strategic nuclear deterrence a focus area and that US failure to maintain its nuclear capabilities could encourage potential adversaries.[11] With regard to the role of fielded forces, General Chilton said that the nuclear mission remains US Strategic Command's top priority, voicing his belief in the importance of maintaining a safe, reliable nuclear stockpile until nuclear weapons are no longer a part of the country's arsenal.[12]

In addition to the classic deterrence goal of preventing a massive nuclear attack against the United States, today's nuclear arsenal "should be designed to provide robust deterrence in the most difficult of plausible circumstances: during conventional war against a nuclear-armed adversary."[13] Without an ability to back up threats with force, deterrence is not credible. Ensuring the availability of nuclear capabilities that are militarily useful for all situations does not make the United States more likely to use nuclear weapons; instead, it gives credibility to US deterrence.[14] To remain an effective deterrent against lesser nuclear powers, especially during conventional conflict with a nuclear-armed enemy, the US nuclear arsenal should give the president options having the greatest probability of

destroying an adversary's nuclear forces without causing excessive casualties—a requirement that may call for new, low-yield weapons. Moreover, Keir Lieber and Daryl Press write that "any nuclear arsenal should also give U.S. leaders options they can stomach employing in these high-risk crises. Without credible and effective options for responding to attacks on allies or U.S. forces, the United States will have difficulty deterring such attacks. Unless the United States maintains potent counterforce capabilities, U.S. adversaries may conclude—perhaps correctly—that the United States strategic position abroad rests largely on a bluff."[15]

and the will to use it in defense of our allies. If our allies cannot depend on us, then they will be motivated to develop their own nuclear weapons and the means to deliver them. Most of them are capable of doing that in a few years."[18]

In addition to helping deter attacks against the United States and its allies and helping prevent nuclear proliferation, a credible nuclear deterrent also dissuades China and Russia from pursuing a nuclear arms race with the United States. As long as America can produce and field enough nuclear weapons to maintain strategic balance with Russia, that country has no incentive to break arms control agreements in an

Deterrence strategy is essential not only for helping to protect the United States from attack but also for assuring allies and partners.

Deterrence strategy is essential not only for helping to protect the United States from attack but also for assuring allies and partners. This assurance, stemming from a concept known as extended deterrence, eliminates the need for allies and partners without nuclear arms to pursue weapons programs of their own.[16] Many of those parties could launch successful programs and begin building their own nuclear arsenals within a few years if the United States fails to meet their deterrence needs, thus triggering global waves of nuclear proliferation contrary to US interests.[17] Gen John Loh, formerly the Air Force's vice chief of staff, clearly articulates the importance of extended deterrence: "Extended deterrence provides our umbrella of deterrence for others. . . . But that means we have to maintain a credible, robust nuclear force attempt to attain strategic supremacy. However, failure to do so could have a destabilizing effect, ignite a new nuclear arms race, and even tempt China to gain nuclear strategic balance with the United States.[19]

Atrophy of the Nuclear Weapons Complex

Any strategy that relies on nuclear weapons requires the existence of an industrial base—the nuclear weapons complex—capable of meeting the strategy's needs. Because the United States has underfunded and neglected its complex for two decades, the industrial base has atrophied to a point that, unless we take corrective action soon, we may lose the ability to maintain or produce nuclear weapons. If

that happens, we could regain it only through great expenditure of time and treasure. Melanie Kirkpatrick highlights the severity of the problem: "Since the end of the Cold War, the U.S. nuclear weapons program has suffered from neglect. Warheads are old. There's been no new warhead design since the 1980s, and the last time one was tested was 1992, when the U.S. unilaterally stopped testing."[20] Furthermore, the United States lacks the industrial capacity to manufacture nuclear weapons at production levels. True, it could produce a few by using laboratory assets, but that is not the same as serial production. Finally, only a handful of engineers and scientists still in the federal work force have designed and tested nuclear weapons—and all of them will retire in a few years.[21]

At the component level, the United States can no longer manufacture pits (the Rocky Flats plant, which produced pits, shut down in 1989) or produce tritium in weapons-complex facilities. In 2002 the congressionally mandated Panel to Assess the Reliability, Safety, and Security of the United States Nuclear Stockpile (the Foster Panel) said that the National Nuclear Security Administration (NNSA) had only mixed prospects of fulfilling its intended weapons refurbishments, including the B-61 and W-76 weapons, due in part to the inability to produce new pits.[22] Even though the NNSA declared in 2004 that "restoring our capability to manufacture plutonium pits is an essential element of America's nuclear defense policy," it delayed a decision to build a new pit-manufacturing facility, leaving the United States without production-level capability.[23] Critical to obtaining the designed yield, tritium has a decay rate of 5.5 percent per year, giving it the shortest shelf life of a nuclear weapon's components, but the US nuclear weapons complex has not produced it since 1988, when the K reactor at the Savannah River Site shut down. Tennessee Valley Authority reactors did resume production in 2005, however.[24]

Finally, the country is not producing top-level nuclear chemists to replenish the nuclear workforce. In the early 1960s, US universities granted up to 36 PhDs in nuclear chemistry each year, but that number has steadily declined.[25] The American Physical Society, the world's second-largest organization of physicists, commented that "only a handful of U.S. university chemistry departments currently have professors with active research programs in nuclear chemistry. . . . Thus, advanced education in nuclear chemistry education is all but extinct in the United States."[26]

The Obama administration's proposed budget for fiscal year (FY) 2011 includes $11.2 billion for the NNSA, a 13.4 percent increase from FY 2010's appropriation.[27] Thomas D'Agostino, NNSA administrator, said that more than $7 billion of the requested funds are for what NNSA terms weapons activities, which include increased investments to begin to recapitalize some physical infrastructure and build a resource base of human capital.[28] Although such a step is helpful, even the increase in funding for facilities will not allow the United States to reestablish the production level for pits. Further, it will not address the basic issue of uncertainty regarding the stockpile's reliability—an issue inherent in an approach that excludes full-scale testing of weapons. As the Foster Panel reports, even though no one can predict exactly when it will occur, "at some point, the nuclear test pedigree for a weapon will no longer be relevant."[29]

Weapons Reliability, Political Will, and Credible Deterrence

The Stockpile Stewardship Program (SSP) and Life Extension Program (LEP) may prove insufficient to ensure the reliability of stockpiled weapons—and any doubt is too much. The United States conducted 1,000 nuclear tests between 1945 and 1992.[30] Since self-imposing a moratorium on testing, the country has relied on the science-based SSP to certify the reliability of weap-

ons. That program, which "uses data from past nuclear tests, small-scale laboratory experiments, large-scale experimental facilities, examination of warheads, and the like to better understand nuclear weapon science," closely examines 11 stockpiled weapons of each type per year.[31]

If the SSP discovers problems with a warhead, then the LEP attempts to fix them by remanufacturing needed parts. Most experts agree that this practice has been sufficient to date and can probably continue for the short term, but they debate its viability in the long term. According to a report by the Lawrence Livermore National Laboratory in 1987, "Exact replication, especially of older systems, is impossible. . . . Documentation has never been sufficiently exact to ensure replication. . . . The most important aspect of any product certification is testing: it provides the data for valid certification."[32] In general, as the US nuclear arsenal matured through years of development, weapons became smaller and lighter so smaller delivery vehicles could carry them; thus, a single missile could carry more warheads, or a booster could carry warheads farther. This reduction in size required very exotic engineering, described by Ambassador Linton Brooks, former NNSA administrator, as "very close to performance cliffs."[33] Because of the need to make warheads as small and light as possible, yet assure that they would not accidentally detonate, even in very harsh environments, the designs included very little performance margin. In the absence of testing, Brooks feared that as the weapons aged beyond the time when engineers originally thought the warheads would be retired, the cumulative effect of changes from both the aging of the weapons and the utilization of remanufactured parts would induce increasing uncertainty about their reliability.[34]

In the case of the B-61 warhead, the LEP has gone beyond just attempting to replace original parts with similar new parts. It will try to change the B-61—essentially the only air-delivered weapon in the US arsenal—from utilizing analog circuitry to digital circuitry.[35] Under existing policies, this change—slated to take place by 2017—will occur without testing the complete nuclear weapon. Planning on untested weapons to deter existential threats to the country or expecting leaders of second-tier regional powers to believe that such weapons will always work as designed may be wishful thinking.

In addition to technical reliability, credible deterrence requires the political will to supply resources for nuclear weapons programs and to convince potential enemies that we have no compunctions about employing nuclear weapons if we must. The current administration and Congress are continuing the decades-long trend of allowing the credibility of US nuclear deterrence to erode. In his Prague speech, President Obama said,

> So today, I state clearly and with conviction America's commitment to seek the peace and security of a world without nuclear weapons.
>
> . . . First, the United States will take concrete steps towards a world without nuclear weapons. . . . We will reduce the role of nuclear weapons in our national security. . . .
>
> . . . My administration will immediately and aggressively pursue U.S. ratification of the Comprehensive Test Ban Treaty.
>
> And to cut off the building blocks needed for a bomb, the United States will seek a new treaty that verifiably ends the production of fissile materials intended for use in state nuclear weapons.[36]

Although administrations from across the political spectrum have endorsed the dream of a world without nuclear weapons, none in recent history have so overtly stated their intention to de-emphasize the role of these weapons in US national security.[37] Even though President Obama pledged to maintain a reliable nuclear-deterrent force, an adversary could interpret or misinterpret his position in a way that would raise doubt about US willingness to employ nuclear weapons under any circumstances, thus diminishing the credibility of US deterrence.

Through the power of the budget, Congress has also aided the demise of the nuclear weapons complex and diminished the credibility of the stockpile. In 2008 it cut off all funding for the Reliable Replacement Warhead (RRW) (formally terminated by the president in March 2009) and ensured that the NNSA did not proceed with its Complex 2030 program, which would have revitalized the nuclear weapons complex and positioned it to manufacture a new warhead.[38] Even if Congress approves the president's 2011 budget request to increase NNSA funding, improve some infrastructure, and refurbish Trident missile warheads and B-61 bombs, it has shown no willingness to commit strongly to nuclear deterrence by mandating design of a new warhead, ensuring production-level infrastructure, or directing new nuclear-yield testing of weapons.

The strongest political opposition to designing a new nuclear weapon or testing existing weapons comes from those who believe that engaging in design and test activities would increase the proliferation of weapons and weaken US credibility on nonproliferation. However, this position is inconsistent with historical events. Since the United States unilaterally stopped nuclear testing in 1992, France, China, India, Pakistan, and North Korea have tested nuclear weapons, three of those countries having conducted their first tests. Currently Iran is likely pursuing a nuclear weapons program. Libya, Syria, and Iraq had active programs, curtailed only after intensive military and political efforts. No evidence suggests that US restraint slowed other countries' determination to field nuclear weapons. Moreover, as previously discussed, if US allies no longer believe that America's doctrine of extended deterrence rests on reliable capabilities, they too may pursue nuclear weapons programs. The United States can best enhance its position on nonproliferation by not engaging in proliferation activities and holding accountable all who expand nuclear weapons technology. Designing and testing to maintain the US arsenal in no way extends nuclear weapons, but those activities do deter countries that might try to gain strategic equivalency with the United States or threaten the use of nuclear weapons to coerce it. Therefore, although well intended, the political opposition to maintaining strong, credible nuclear deterrence actually makes proliferation more likely.

If US allies no longer believe that America's doctrine of extended deterrence rests on reliable capabilities, they too may pursue nuclear weapons programs.

Recommendations

The United States should design, test, produce, and field a new nuclear weapon in order to maintain a viable nuclear weapons complex and ensure the credibility of the deterrent force. New technologies and materials allow for constructing a weapon with safer materials and antitampering technologies. Further, lower-yield weapons would add military utility and avoid unacceptable

levels of collateral damage. Additionally, a penetrating version could hold deeply buried targets at risk, obviating the need for high-yield weapons.

Before termination of the RRW program, Congress directed the NNSA to have the JASON advisory group, a prestigious organization of scientists who advise the government on defense matters, conduct an independent peer review of the need for the RRW.[39] According to that group, "To ensure the viability of its nuclear deterrent, the United States must initiate and invest in the RRW program now—so there will be no disconnect between today's credible deterrent and the one required for the future."[40]

The process of designing, testing, and producing a new weapon would revitalize the US industrial base for nuclear weapons, ensure that technical and intellectual capacity exists to validate the stockpile's reliability, and restore the credibility of US nuclear deterrence. Additionally, it would signal to friends and allies the United States' resolve to uphold its commitments to extended deterrence, thus assuring them they do not need to pursue their own nuclear weapons programs. Finally, the process will send a strong message to Russia and China that it is in their best interest to remain in the nuclear-weapons-control regimes and that they have nothing to gain by trying to attain nuclear supremacy over the United States. No technical reasons stand in the way of launching this program immediately—political desire and the will to do so are all we need.

Conclusion

Because of technological and fiscal realities, US deterrence depends upon nuclear weapons. Until we find a highly reliable way of defeating a nuclear attack on the United States and until advances in long-range strike enable a completely successful, disarming counterforce attack against any enemy's nuclear forces, America must rely on deterrence provided by robust nuclear capabilities. No other weapon systems offer the same level of assurance of US survival.

In a misguided attempt to create a safer world, the United States allowed its ability to support its nuclear deterrent strategy to atrophy, diminishing confidence in the reliability of the weapons stockpile and in the political will to use those weapons if necessary. Thus, the ensuing damage to the credibility of US nuclear deterrence increases, not decreases, the probability of using nuclear weapons. Designing, testing, and fielding a new nuclear weapon will both revitalize the US nuclear weapons complex and restore the credibility of America's deterrence. ✪

Fort Lesley J. McNair, Washington, DC

Notes

1. Melanie Kirkpatrick, "Sounding the Nuclear Alarm," *Wall Street Journal*, 22 November 2008, http://online.wsj.com/article/SB122731227702749413.html (accessed 24 April 2010).
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It's Time to Fight Back

"Operationalizing" Network Defense

Mr. Nicolas Adam Fraser
Lt Col Robert J. Kaufman III, USAF, Retired
Lt Col Mark R. Rydell, USAF, Retired*

The Air Force's decision to stand up Twenty-fourth Air Force under Air Force Space Command creates an opportunity to scrutinize existing network warfare constructs with the goal of ensuring that network warfare operations carry out the Air Force's stated mission: "to fly, fight, and win . . . in air, space, and cyberspace."[1] Such a sweeping review would involve a significant number of organizations inside and outside the Air Force, encompassing discussions of policy, funding priorities, personnel, and cross-service coordination, to name a few. This article does not attempt to address all of the complex issues surrounding cyberspace operations; rather, it examines the most visible component of cyberspace warfare—network defense (NetD).

Since 1992 the Air Force has monitored its networks and responded to malicious network events. As the service has matured its ability to command and control its networks, some operational principles have unintentionally blended NetD and network operations (NetOps). This article proposes new operational constructs that will force a healthy distinction between network warfare—particularly NetD—and NetOps. Cyber targeting, the first proposed construct, emphasizes the need to proactively find, fix, track, and target an adversary. Cyber targeting operations can ensure that mission-critical systems or even network paths remain free of adversaries. The second construct, cyber engagement, is a collection of responses specifically designed to affect an identified intruder. Current NetD constructs and cyber targeting enable cyber engagement operations. Finally, we must closely coordinate both targeting and engagement operations with combatant commands (COCOM) and other national agency operations. Both cyber targeting and cyber engagement induce a robust contrast between maintenance of the network and defense of the network. Making such a distinction and employing the proposed constructs should result in more effective NetD operations.

Setting the Stage for Change

The Air Force has been discriminating in its definitions of NetOps and NetD, the former providing "effective, efficient, secure, and reliable information network services used in critical Department of Defense (DOD) and Air Force communications and information processes" and the latter "employ[ing] . . . network-based capabilities to defend friendly information resident in or transiting through networks against adversary efforts to destroy, disrupt, corrupt,

*All three authors work at the 688th Information Operations Wing at Lackland AFB, Texas, Mr. Fraser as chief of the Network Access Engineering Branch, Lieutenant Colonel Kaufman as deputy director of the 318th Information Operations Group, and Lieutenant Colonel Rydell as a senior associate with Booz, Allen, and Hamilton. All served tours on the Air Force Computer Emergency Response Team.

or usurp it. NetD can be viewed as planning, directing, and executing actions to prevent unauthorized activity in defense of Air Force information systems and networks and for planning, directing, and executing responses to recover from unauthorized activity should it occur."[2] The fact that the joint community does not have a term to describe what the Air Force calls NetOps means that it considers NetOps either a subset of NetD or simply a maintenance function that does not warrant discussion in a joint doctrine publication.[3] Due to the differences in joint and Air Force doctrine, we suggest simplified versions of NetD and NetOps so that the reader can immediately recognize each operation's responsibilities and priorities:

- network warfare operations / NetD: operations that seek to produce desired effects against an adversary tactically, operationally, and strategically. These operations, which require planning and intelligence support, can be reactive or proactive. Most importantly, NetD operations consider the discovery of an adversary not just a threat but an opportunity for operational engagement.
- NetOps: operations in which the maintainer primarily *acts upon the network* to provide reliable and secure network services. In reality an adversary who disrupts operations is no worse than a hardware failure since the goal involves maintaining availability and performance requirements. Just as we can replace hardware, so can we rebuild a compromised computer.

We contend that the Air Force does not actually conduct NetD operations as defined above. We support this claim by examining two principles that lie at the core of the service's current approach to NetD and that keep the Air Force reactive, thus weakening its ability to defend the network effectively.

Principle 1: Detecting the Adversary Is Paramount

This principle, the foundation upon which we have built most traditional NetD, consumes the bulk of the Air Force's NetD resources. The service relies on real-time monitoring and emphasizes hardened network perimeters to detect enemy activity. However, its motivation for doing so is of great importance. The Air Force wishes to detect the intruder or attacker, not to take action against him but to find and fix a security problem. The situation is analogous to how a security forces member on flightline patrol responds to a suspicious event. Upon seeing an intruder enter through a hole in the fence, he or she shines his flashlight on the hole and begins to fix it instead of following and capturing the intruder. Currently the Air Force makes no distinction between sophisticated and nonsophisticated intrusions, treating all breaches equally and responding in a way that protects and reestablishes the health of the network. It does not focus on assuring that we can perform required missions and continue NetOps despite adversary attacks.

Though important, detecting the adversary is not the only way to protect a network. Rapidly and regularly changing its configuration would also offer protection and would not require detection of the adversary to produce results.[4] Additionally, we do not advocate the end of detection efforts, something critical to NetD operations as we define it, but the motivation behind detection efforts must change. Finally, we concede that our best perimeter defenses and patch-management methodologies fail to deter or hinder sophisticated adversaries.[5] Although these methodologies are useful, we must supplement our current approach with one committed to achieving effects against the adversary and assuring mission success.

Principle 2: NetD Operations Are Successful When a Compromised Computer Is No Longer Compromised

This principle relegates NetD operations to a maintenance role within the Air Force, emphasizing network health at the expense of determining the enemy's effect on ongoing or future missions. Furthermore, we rarely use a compromised computer to engage the adversary. In addition to finding, analyzing, and fixing compromised computers, NetD operators must contest the adversary, even on our own networks, conceiving of and executing defensive strategies that affect him while assuring the integrity of priority war-fighting missions.

Because of this principle, probably more than its companion, we should really define the current NetD as NetOps. When an intrusion occurs and we open an "incident," when do we close it? Not when an operation concludes but when we consider the computer free of intruders and allow it to rejoin the network. Is that success? No. We should measure success by combat effectiveness; consequently, we must take measurements at the strategic, operational, and tactical levels to determine if we are attaining NetD objectives such as deterring the adversary from establishing or employing offensive capabilities against US interests.[6]

A New Construct

We propose correcting these problems by establishing operational units (of yet undetermined sizes) charged with truly affecting adversary operations that target Air Force and DOD networks. True, units in Twenty-fourth Air Force (including the 688th Information Operations Wing and the 67th Network Warfare Wing) are responsible for executing the Air Force's cyber mission; however, no units within Twenty-fourth Air Force now do what we suggest below. Our new paradigms will require reshaping existing units and, possibly, creating new ones.

The first proposed organization would have the inwardly focused mission of seeking out the adversary on Air Force and DOD networks. The second would have the outwardly focused mission of engaging him on those networks. Although both would work closely together (and with the established, continuous network-monitoring mission), they would be set apart by their commitment to planned missions or "sorties" linked to a commander's operational needs and terminated upon completion of the mission. At strategic levels, proper policies need to endorse proactive NetD strategies such as targeting and engagement. Next, at the operational level, we must develop plans to address specific adversaries and prescribe approved courses of action that allow network defenders to realize unity of effort, mass, surprise, and timeliness in cyberspace. Finally, at the tactical level, we must train and certify operators on NetD weapons that can compromise attacks or thwart attempts to gain access to Air Force networks. These organizations and plans will allow the Air Force to perform NetD operations that seek, engage, and act upon adversaries in cyberspace.

Cyber Targeting

Clearly, enemies—specifically advanced, persistent ones—reside within the Air Force network. Spearfishing attacks, which persuade users either to open a malicious attachment or click on a link to a malicious Web page, breach perimeter defenses without difficulty. The ease with which an adversary can gain access to DOD networks is outdone only by the ease with which he can navigate and maneuver after establishing "beachheads" within Air Force and DOD networks, both of which actions offer entry to high-value information or systems. A proactive approach, cyber targeting can identify intruders on our networks by using state-of-the-art NetD "weapons" not permanently located on the Air Force network, along with typical perimeter-security tools. We would conduct operations with a specific objective in mind, find the adversary, and then influence, disrupt,

or otherwise affect him. An operation would not terminate until we have identified the adversary and subsequently verified his absence, regardless of the terminating factor. These operations also demand proper planning and execution because of the tremendous amount of legitimate data in cyberspace, within which the adversary hides to do his work.

Cyber Engagement

Defense has always involved delaying, disrupting, deterring, or denying enemy objectives. However, if we assume the impossibility of completely stopping the adversary, then we must consider ways to significantly hinder or exploit his efforts. (By "exploit," we mean achieve second- and third-order effects on his decision-making capacity.) Cyber engagement makes the conscious decision to use DOD networks as a path to the adversary—a path for fulfilling defensive goals.[7] Upon discovering a compromised computer or network, NetD operators no longer would simply rebuild the system but would use intelligence and perhaps other NetD weapons to identify the intruder. Next, depending on the level of attribution and existing operation plans (OPLAN), they would conduct tactical operations against the adversary, utilizing the compromised computer or network as a launching point.[8] For example, during an operation, the NetD operator could intentionally pass inaccurate information to the enemy or manipulate exfiltrated data, rendering it untrustworthy. Regardless of the technique employed, the operator would always try to introduce unreliability, make intrusions more costly, or influence the adversary's actions. Consequently, operators must plan and coordinate these "response actions" with larger COCOM or national-level strategies.[9] Additionally, they must deconflict these kinds of operations from the day-to-day monitoring of network sensors.

As discussed above, cyber engagement covers a spectrum of operations, not simply network attack. Engagement assumes the inability of detection and protection efforts to defend the network properly. Instead it takes a different approach, one not limited to selection of a particular technology but concerned with actions necessary to meet defensive goals. To illustrate, during a football game, the offensive players attempt to reach the end zone, but the defense tries to stop them. Football defenses attempt to keep the opposing team out of the end zone not only by employing defense in depth (fielding a strong defensive line, linebackers, and safeties) but also by using different schemes to confuse the quarterback. For example, one linebacker might rush the quarterback while two others drop back in coverage—or the defensive coordinator might call for an all-out blitz. Regardless of the scheme, good coaches know they cannot always prevent the offense from scoring, but they can make its task difficult by confusing the opposing players, especially the quarterback.

With one eye on this analogy, we would have to say that the DOD currently plays defense without ever thinking about causing confusion amongst the offense. We don't have different defensive schemes, nor do we prepare plans for affecting the planning, execution, and, ultimately, the outcome of an encounter with the enemy. Instead our defense stands at the network perimeter, and we hope no one gets by undetected.

Cyber targeting and cyber engagement represent a significant paradigm shift in the way we conduct NetD operations. By factoring in the objectives of focused OPLANs, we can make NetD a stronger form of fighting than network attack.[10] Indeed, the US Army has already noted this in more traditional defensive operations.[11] Furthermore, NetD can take a more active role in network warfare while creating a much-needed distinction between itself and NetOps. Finally, these new constructs support the president's desire to go beyond criminal prosecution in responding appropriately to cyber attacks.[12]

A Simple Proposal

Planning and preparing for large-scale military operations, such as the invasion of Iraq in 2003, require that COCOM OPLANs be routed through each military service's lead NetD organization, thereby allowing network defenders to implement measures against enemy targeting of DOD networks and prevent any disruption of the OPLAN's execution. Requirements provided by the COCOMs usually address generic threats. When operations commence, we usually take proactive steps such as blocking the addresses of hostile Internet protocols.

In these traditional situations, we treat the networks as a support element. That is, our networks need to function without disruption in order for our symmetric warfare capabilities to operate—analogous to saying that the fuel trucks need to function so the F-16s can take off. It is difficult to contemplate fighting on US networks, but NetD operations must take advantage of access to enemy NetOps and respond by decreasing the credibility of stolen information, increasing the cost of an attack on Air Force and DOD networks, or allowing the United States to influence the adversary's perceptions prior to and during all phases of conflict.

We propose the following as a way of highlighting the utility of this new construct, which truly thinks of NetD as a form of asymmetric warfare. Currently, each OPLAN has an appendix that addresses NetD requirements. However, in addition to providing for preventive network protection, future OPLANs should identify the systems critical to performing traditional warfare operations (e.g., logistics networks, command and control nodes, etc.). Moreover, we should pinpoint high-threat adversaries so we can begin planning and coordinating cyber engagement operations, and we should plan and execute targeting operations on mission-critical systems identified by the COCOM. However, this time if we discover the adversary, we should commence engagement operations to affect or influence him.

Two important points merit emphasis. First, the adversary discovered during targeting operations might be entirely different from the one addressed by the OPLAN—a possibility that makes cyberspace such a challenging domain to dominate. Second, targeting and engagement operations do not necessarily have to be linked to a specific COCOM OPLAN. We can perform proactive targeting operations as long as we properly delineate and synchronize them with other operations. We should consider performing engagement operations every time we discover a network intrusion, whether through traditional detection techniques or targeting operations.

Conclusion

According to the 67th Network Warfare Wing, "The bottom line is that the Air Force must transition from a detection-centric orientation to an active network kill chain approach which integrates prevention, detection, response, and adversary engagement."[13] This vision cannot come to fruition without organizing and tasking NetD operational units to change their operational constructs from a reactive approach (monitor, detect, and respond) to one that, as recently described by Lt Gen William T. Lord, "seek[s] out threats and . . . detect[s] and defeat[s] them instantaneously."[14] We cannot do this in isolation. We need purposeful planning and coordination with intelligence and national-level agencies. Furthermore, the creation of US Cyber Command should help ensure that services act under the authority and direction of a COCOM. The cyber targeting and cyber engagement constructs truly "operationalize" NetD since they focus squarely on acting upon and affecting the adversary. In the future, we should pay comparable attention to mission assurance (i.e., continuing operations despite enemy attacks), an area that prevents the complete separation of

NetD and NetOps. However, we cannot adequately address it without planning and very good intelligence. The DOD spends $100 million every six months to defend the .mil network.[15] At some point, we must ask ourselves whether we are reaching our defensive goals and deterring adversaries. Today, we are not, but by operationalizing NetD and concentrating on affecting the enemy, we can reverse this trend so that the Air Force can fight back. ✪

Lackland AFB, Texas

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Satellites and Remotely Piloted Aircraft

Two Remotely Operated Ships Passing in the Fight

Col Keith W. Balts, USAF*

Don't fire until you see the whites of their eyes!

—Col William Prescott
Battle of Bunker (Breed's) Hill, 1775

Combat identification for unmanned aircraft systems (UAS) during time-sensitive targeting can be messy and may include inputs from the distributed common ground/surface system, the combined air and space operations center, the ground commander, and, of course, the UAS pilot.

—Pilot of a remotely piloted aircraft
Operation Enduring Freedom

Advances in technology allow modern forces to fight battles at extreme distances, separating the shooter from the target. Whereas Colonel Prescott delivered his famous directive in person and on the battlefield, the ground commander in Afghanistan communicates with the remotely piloted aircraft (RPA) unit in Nevada while inputs stream in from the distributed common ground/surface system in Virginia and the combined air and space operations center in Qatar.[1] Like RPA operations, space operations are distinguished by vast geographic separation between the ground and (space) vehicle segments. According to Gen Kevin Chilton, commander of US Strategic Command, space operations are "absolutely global in nature and indifferent to physical terrain or lines drawn on a map."[2]

Forces able to distribute their operations geographically can gain advantages in force protection, economy of force, flexibility, and system and personnel costs; however, such distribution also exposes them to unique vulnerabilities and challenges. With the advantages in mind, the military has already fielded many remotely operated systems or has them under development, demonstrating an evolutionary trend toward more, not fewer, distributed operations. The RPA example above is a prolific one in the air domain; examples exist in other physical domains as well. General Chilton has punctuated the growing reliance on distributed operations for the space and cyberspace domains, identifying them both as media "in which the United States can expect to be challenged."[3] In general, fourth-generation warfare theory also supports this trend by suggesting that military operations are more "likely to be widely dispersed and largely undefined."[4]

In light of this relatively new trend, military leaders need to consider potential second-order effects, uniquely associated with distributed capabilities, that may detract from the advantages that these capabilities bring to the fight. Comparing space and RPA operations illuminates several of these effects. By leverag-

*The author is vice-commander of the 30th Space Wing, Vandenberg AFB, California.

ing the experience gained from decades of space operations, military leaders can translate applicable lessons learned from a relatively mature unmanned community to a comparatively young one. Many of these lessons also apply to remotely operated capabilities in other domains.

Why should we compare space and RPA operations? Of all the terrestrially based remotely operated systems, RPAs currently make up the preponderance of those systems distributed across significant distances—that is, outside the immediate area of responsibility. Operators of other remote systems are in fairly close proximity to the vehicles they control, but those systems may grow more distributed over time; thus, their communities could also benefit from this discussion. Unlike the recent trends in air, land, and sea domains, historically, space operations have always been distributed (and remotely operated) due to the unique physical attributes of, technical challenges peculiar to, and risks in the space domain. As Gen C. Robert Kehler, commander of Air Force Space Command (AFSPC), remarked during a visit last year to Creech AFB, Nevada, home of Air Force RPAs, "We understand remote split operations in AFSPC. We have been operating UASs for many years. It's just that those UASs fly outside the atmosphere, and we fly things that are more than 22,000 miles away. We do that with remote split operations."[5] Military space operations do involve several *manned* weapon systems, especially ground-based platforms performing space-related missions. Examples include launch vehicles, most space situational-awareness sensors, and space-control systems with a direct physical, rather than a remote, connection to the weapon system; however, this article addresses satellites because they represent the preponderance of space operations and are, in essence, remotely operated space vehicles. Satellite system architectures closely resemble RPA architectures since both consist of control segments, vehicle segments, and the links connecting them.

Nevertheless, the crisscrossing evolutions of satellites and RPAs distinguish the two. On the one hand, space operations began in a distributed mode but have grown closer to the fight by deploying new systems and expertise into the theater of operations.[6] RPA operations, on the other hand, distribute key elements of traditional air operations away from the theater. Despite their differences in capability and operating domain, space and RPA operations share enough characteristics to make them worthy of comparison as examples of distributed operations.

Background, Analysis, and Embedded Recommendations

With the space community's more than five decades of experience in distributed operations, what lessons apply to the RPA community? The doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) construct used by the Joint Capabilities Integration and Development System, offers a framework for comparison and analysis.[7] A DOTMLPF analysis of space operations reveals some recommendations that can help remotely operated communities in other domains better prepare for future distributed operations.

Doctrine

Despite the importance of doctrine to military success, especially the effective employment of new technologies, military personnel have noticed a lack of an overall doctrine for RPAs.[8] The uniqueness of these aircraft and other remotely operated systems warrants specific guidance to address shortfalls and differences in existing doctrine.

Current command and control (C2) doctrine posed significant challenges to space operations in the late 1990s and early 2000s as space capabilities became more integrated with traditional military operations.

Most of these hurdles concerned command relationships, more specifically, the best way to present space forces and command and control them during major military operations.

Two nuances, unique to space operations at the time, forced leaders in-theater and in US-based space organizations to reexamine existing C2 doctrine for establishing command relationships. First, space units can create effects within the traditional area of operations without the need to fully deploy or undergo a change of operational control (CHOP) to theater. Second, space capabilities can create effects across the entire area of operations—even across multiple areas of responsibility simultaneously or within the same tactical timeframe (i.e., a single execution cycle for satellite planning, similar to a single Global Hawk sortie).

Traditional criteria for establishing command relationships did not address these nuances, so conflict ensued between supported and supporting commanders over how best to resolve this doctrinal gap. After years of experimentation, exercises, operational experience, and heated exchanges, the Air Force developed specific doctrinal criteria to help commanders establish the appropriate command relationships, such as operational control, tactical control, or a supporting affiliation.[9] Using this doctrine as a baseline, the RPA community should establish exact criteria for defining command relationships when units do not need to fully deploy or when their weapon systems can create simultaneous effects across traditional areas of operations.

Organization

During the past two decades, space expertise and organizations evolved within geographic commands in order to better integrate space capabilities into traditional military operations; advise senior theater leadership on space capabilities; and plan, coordinate, and execute theater space operations. The speed and effectiveness of this evolution depended on the location and organizational affiliation of the space personnel involved.

Initially, very few space-savvy personnel existed outside of US Space Command (USSPACECOM) to assist theater commanders in integrating these new capabilities.[10] Similarly, theater expertise did not flow back into USSPACECOM to help career space officers understand the environment, requirements, and culture of traditional military operations. To remedy this situation, in the mid-1990s USSPACECOM, AFSPC, and their equivalents from other services began deploying space support teams to theater organizations for planning, exercises, and real-world operations. The next step involved creating a permanent presence in major theater headquarters using liaison officers—specifically, officers working side by side with theater leadership but reporting to USSPACECOM or its subordinates. Finally, the Air Force assigned space experts—mostly graduates from the space course at the US Air Force Weapons School—to major theater headquarters, reporting directly to theater commanders. This evolution from deployable teams to liaison officers to permanent-party experts was a key element in increasing the effectiveness of space capabilities as geographic theater commanders gained more influence over space requirements and integration.[11]

While this evolution occurred at the junior-officer level, a similar one occurred at the senior level, although it lagged the junior-level process by several years. Senior space officers served as liaison officers, deployed, and then eventually became permanent members of theater headquarters as directors of space forces (DIRSPACEFOR), positions created to facilitate coordination, integration, and staffing activities in support of space-integration efforts for the combined force air component commander.[12] A critical milestone, establishment of the DIRSPACEFOR position gave space operations a forum and voice in theater headquarters that junior officers could not always provide. It also enabled senior

space leaders to gain direct experience in theater operations.

RPA operations had their roots in theater operations, but the evolution of theater space organizations is noteworthy because it demonstrates a desired end state for expertise in distributed operations. If the RPA community succumbs to the temptation to distribute too much expertise away from the theater, it could find itself in the same situation as the space community in the early 1990s. By keeping sufficient junior- and senior-level RPA experts embedded within theater organizations, rather than relying on liaisons, the RPA community will ensure effective integration of current and future capabilities. Although not examined here, several organizational changes also occurred inside space organizations to better support theater activities.

Training

Distributed operations carry with them the disadvantage of simultaneous authorities exercised over a single unit by both the "organize, train, and equip" chain of command of their military service and the operational chain of their combatant commands. When units do not CHOP into or out of a theater, commanders experience a dilemma in unity of command in that they must fight a war while they train for it. Space operations mitigate this disadvantage by establishing recurring training requirements for line crews and real-world proficiency standards for training and evaluation personnel (as well as unit leadership). Having to perform periodic real-world operations not only keeps instructors and evaluators proficient, but also enables them to help backfill line crews so the crews can interrupt their normal schedule rotation to fulfill monthly training and evaluation obligations. Major system upgrades and procedural changes can also stress the steady-state manpower levels needed to balance training requirements and real-world operations. Manpower needs must account for potential surge capacity for major modifications to the weapon system, procedures, or real-world operations tempo. Policies and requirements put in place by the space community could serve as a baseline for RPA units that must also train while they fight.

Distributed operations offer a key training benefit insofar as recorded data can contribute to better debriefings of individual missions and help train other operators. Unfortunately, the exclusive use of this data can also lead operators to "drink their own bathwater" by learning the wrong lessons in the absence of external perspectives from supporting or supported forces. Collaboration tools and opportunities to visit related locations in person can generate these external perspectives. Funding for site visits, key conferences, and select debriefings will help distributed operators improve their performance; in turn, those operators will educate forward units on the capabilities and limitations of emerging weapon systems. In fact the first real benefits from the evolution of theater space organizations came from educating theater commanders on space capabilities, which also led to increased credibility for the space community.

Materiel and Facilities

Since satellites and RPAs differ widely due to the operational domains involved, materiel considerations worthy of comparison reside mainly in facilities associated with the control segment and communication links. Despite tight cost constraints, requirements for control nodes should include capacity for growth in both size and coordination demands. The ability to surge efficiently beyond routine mission objectives will enable operators to carry out infrequent but complex operations that necessitate crew augmentation, accommodate outreach opportunities without interfering with operations (i.e., hosting tours for external organizations), and integrate unforeseen future capabilities. Expanding part of the system without major redesign represents

another advantage of distributed systems over traditional manned systems.

The role of simulators in distributed operations also enters into a discussion of the materiel element. Control nodes for remotely operated systems depend heavily on computers and data manipulation, making their functionality easier to simulate than manned systems that operate in the physical environment. Simulators for distributed operations can be incredibly realistic, especially for weapon system displays that use text and graphics versus live video or audio feeds. Close synchronization of upgrades between real-world systems and simulators is paramount since both training and operations occur simultaneously.

Finally, effective distributed operations depend upon links to the outside world. These links are important not only for vehicle connectivity and situational awareness but also for operators to feel connected to the mission and the people they support or who support them. Similarly, realistic visualization tools and meaningful collaboration capabilities can amplify contributions made by personnel operating outside the traditional area of operations. Three-dimensional common operational pictures and training tools, along with live video feeds, assist operators in comprehending the environment not physically present around them. Video teleconferencing, live chat, and ample travel opportunities can also build and maintain professional relationships for successful collaboration, allowing operators to understand the nuances and nonverbal communication behind the inputs they receive. Protection of control nodes and links should also occupy a high position on commanders' lists of priorities since they often represent the most vulnerable aspects of the weapon system.

Leadership and Education

The crisscrossing evolutions of the space and RPA communities also produce useful comparisons for overcoming leadership and education challenges associated with distributed operations. Leaders of distributed operations face two significant obstacles—instilling a warrior ethos and motivating personnel who operate away from their "band of brothers" in the war zone. Some of this disconnectedness can even lead to post-traumatic stress disorder among RPA crews involved in lethal operations.[13] Even though space operations do not currently involve lethality, motivated operators with a warfighter mentality are still critical to mission success, especially personnel integrated directly with ongoing military operations. Initially, the RPA community has the benefit of drawing its personnel from manned systems—these individuals bring their deployed experience with them. The challenge lies in sustaining that perspective in their new community while educating the next generation of operators who might not have the benefit of theater experience. Video teleconferencing, instant messaging, and other electronic collaboration methods can go only so far in creating and sustaining a feeling of connectedness with other personnel and weapon systems involved in the operation beyond the immediate control node. The experience is just "not as potent an emotion as being on the battlefield."[14] Distributed operations may yield huge cost savings and reduce risk, but to periodically connect operators with the battlefield, commanders should allocate funding and manhours for trips to the theater and other distributed elements. Waiting three years for new operators to take on a liaison or embedded RPA position in-theater is too late to benefit the mission during their first operational tour.

Personnel

The military space community grew out of an engineering culture whose early space operators included either officers with technical degrees or technically savvy contractors. In the 1990s, the Air Force transitioned to nontechnical officers and eventually to enlisted personnel as the mainstay of space operations, at the same time keeping con-

tractors involved to balance the loss of technical expertise. Although this move helped operationalize space capabilities and save money, the pendulum had swung too far, diluting experience at the junior and midcareer levels. The Air Force reacted by pushing for more technical, advanced degrees and for specialization within the career field to counter the degradation in technical proficiency. Moreover, the conversion to enlisted personnel cost young officers early opportunities to gain this expertise as part of their professional development. It is difficult to develop senior leaders in a community that offers few opportunities to acquire technical experience at a junior level. (Approximately 75 percent of second-tour space officers served as missileers in their first assignment.)[15]

In summary, the RPA community should not abandon its origins even though technology permits it to do so. Rapidly training new officer accessions or enlisted personnel to operate RPAs may seem attractive, but such policy changes should occur gradually, allowing commanders to identify and resolve second- and third-order effects before drastic corrections become necessary.

Conclusion

Distributed operations offer unique advantages in warfare, but they can also include serious side effects. By examining space operations and applying lessons learned to other distributed operations, military leaders can minimize negative second-order effects and thereby ensure mission success.

Lessons within each DOTMLPF element can prevent the repetition of mistakes when new domains open or when remotely operated systems appear in the existing operational environment. Distributed operations stretch our current understanding of established domains, thus driving the need for unique doctrine and organizational structures. Furthermore, personnel policies, leadership development, and training programs must adapt to incorporate nuances never before encountered in traditional warfare—or at least not encountered to the extent revealed by modern distributed operations. Finally, placing more emphasis on the design of control nodes, perhaps at the expense of some vehicle prominence, will allow leaders to leverage the most versatile and flexible segment of distributed weapon systems.

By taking a hard look at how space operators approached these elements, military leaders can improve the integration, evolution, and mission contributions of newer distributed systems such as RPAs. As space operations evolve toward and RPAs evolve away from their traditional operating environments, they learn many lessons for sharing—like two remotely operated ships passing in the fight. ✪

Vandenberg AFB, California

Notes

1. National Park Service, "Bunker Hill Monument," http://www.nps.gov/bost/historyculture/bhm.htm (accessed 22 September 2009); and Joseph L. Campo, to the author, e-mail, 28 September 2009.

2. Gen Kevin P. Chilton, "Cyberspace Leadership: Towards New Culture, Conduct, and Capabilities," *Air and Space Power Journal* 23, no. 3 (Fall 2009): 5, http://www.airpower.au.af.mil/airchronicles/apj/apj09/fal09/fal09.pdf (accessed 21 May 2010).

3. Ibid., 6.

4. William S. Lind et al., "The Changing Face of War: Into the Fourth Generation," *Marine Corps Gazette* 85, no. 11 (November 2001): 66.

5. Military doctrine does not specifically define *remote split operations*; rather, the term refers to operations described in this paragraph in which the operator and platform are geographically separated from each other. SSgt Alice Moore, "AFSPC Com-

mander Visits UAS Operations at Creech AFB," Schriever Air Force Base, 25 March 2009, http://www.schriever.af.mil/news/story.asp?id=123141399 (accessed 21 May 2010).

6. Maj Keith W. Balts, "The Next Evolution for Theater Space Organizations: Specializing for Space Control," in *Space Power Integration: Perspectives from Space Weapons Officers*, ed. Lt Col Kendall K. Brown (Maxwell AFB, AL: Air University Press, December 2006), 124, http://www.au.af.mil/au/aul/aupress/Books/Brown/brown.pdf (accessed 21 May 2010).

7. Sean C. Sullivan, "Capabilities-Based Planning: Joint Capabilities Integration and Development System and the Functional Capabilities Board," course reading (Newport, RI: Naval War College, 20 August 2008), 4.

8. P. W. Singer, *Wired for War: The Robotics Revolution and Conflict in the Twenty-first Century* (New York: Penguin Press, 2009), 210.

9. Air Force Doctrine Document (AFDD) 2-2, *Space Operations*, 27 November 2006, 10–14, http://www.dtic.mil/doctrine/jel/service_pubs/afdd2_2.pdf (accessed 21 May 2010).

10. Today, USSPACECOM's space-operations mission resides in US Strategic Command.

11. Balts, "Next Evolution," 124.

12. AFDD 2-2, *Space Operations*, 7.

13. Scott Lindlaw, "UAV Operators Suffer War Stress," *Air Force Times*, 8 August 2008, 1, http://www.airforcetimes.com/news/2008/08/ap_remote_stress_080708/ (accessed 9 January 2010).

14. Singer, *Wired for War* (see caption for third unnumbered plate in the photo gallery following p. 308).

15. US Air Force, "13S Career Paths, Deliberate Force Development," briefing, AF/A3O-ST, January 2009, slide 21.

Seeing the Whole Elephant

Envisioning a Successful Light Attack Program for the US Air Force

Lt Col Michael W. Pietrucha, USAF

Strategically, purchasing the OA-X in large numbers was probably one of the best things the Air Force ever did. It allowed us to balance our Air Force properly; project persistent airpower capabilities to places in the world that were previously very difficult to reach; started the construction of modern, combat-capable regional and national air forces where none had existed before; and provided a multirole capability that extended the life of fourth-generation fighters while we waited for the bugs to be worked out of the F-35 program. The current strength of the combat air forces comes from many sources today, but it is fair to conclude that without the OA-X, not only would the United States still be fighting the Long War in many more places, but the Air Force would have unnecessarily shed a great deal of capability in the past decade.

—US Secretary of Defense
Maxwell AFB, Alabama, 21 April 2018

Acquisition of a capable, multirole, light attack capability by the US Air Force (USAF) is not a foregone conclusion. Faced with budgetary pressures, diminishing resources, institutional resistance, and acquisition-system challenges, advocates of reestablishing a light attack capability have encountered substantial difficulty in encouraging the USAF to start a credible program. Much of the work completed thus far has involved advocating for a capability, determining operational requirements, and defining the costs and timelines for acquiring light attack capabilities exemplified by the notional "OA-X" aircraft. This article does none of those things. In order to argue the vision effectively, this discussion paints the complete picture—an idealized view of a complete OA-X program that the USAF aggressively pursues, rapidly procures, and completes by the end of this decade. Written from a 2018 viewpoint, the article looks back on the success of the program.

In this case, *idealized* does not mean entirely free of resource constraints. Although the total fleet size remains undefined, it is considerably larger than the 15-aircraft buy currently envisioned by Headquarters USAF. Notably, the OA-X remains a complementary capability rather than a replacement for either legacy fighters or the F-35; the increased fleet size reflects the likelihood that the emerging demand for this capability will likely prove far greater than anticipated. In order to present a story of a completed program in a relatively short time, the article imposes minimal constraints on acquisition and basing; specifically, it assumes that the USAF can procure off-the-shelf aircraft to meet immediate needs and can base them in locations that make the most sense. Because we have not selected a light attack aircraft, the use of *OA-X* here keeps the discussion platform agnostic, without favoring any candidate.

The OA-X Aircraft

For the sake of simplicity, one OA-X exists, derived from an existing capability and purchased off the shelf with relatively minor modifications, mostly related to the installation of sensors and communications. Air Combat Command's (ACC) OA-X Enabling Concept outlines its capabilities.[1] A two-seat, low-wing monoplane aircraft powered by a single PT-6A turboprop delivering approximately 1,600 shaft horsepower, the OA-X can fly for three-and-a-half hours on internal fuel or five hours with two external fuel tanks. The aircraft includes appropriate radios, an option for data link (including variable message format, situational awareness data link, or Link-16 capabilities), and an electro-optical/infrared sensor that can provide video via a ROVER-compatible data link.[2] The OA-X can employ GBU-38 as well as GBU-12 precision-guided munitions and deliver tube-launched weapons and sensors. It is also capable of accurate, computer-aided delivery of unguided Mk-81 and Mk-82 bombs. AIM-9M Sidewinder missiles, 2.75-inch rockets (including precision-guided variants), and .50-caliber guns fill out the armament. Qualified aircrews can reload the rockets and guns in the field. The aircraft has a viable austere-airfield capability that allows it to operate, combat loaded, from any airfield 3,000 feet long and capable of accommodating a C-130. The hands-on-throttle-and-stick cockpit, roughly equivalent to that of any other fourth-generation fighter, includes secure radios and data links, compatibility with night vision goggles, excellent air-to-ground visibility, and ejection seats capable of functioning at zero airspeed and zero altitude. Chaff and flares provide self-protection, just as lightweight

armor protects the cockpit and engine. Notably, none of these capabilities requires a developmental effort; all of them come from other programs.

It is equally significant to discuss what the aircraft does not include. The OA-X can accommodate radar-warning gear, but only aircraft based at Nellis AFB, Nevada, and in Pacific Air Forces (PACAF) have that equipment installed. The helmet-mounted cuing system and the Hellfire, Maverick, and AIM-9X missile capabilities were part of a spiral development plan—not an initial requirement, as was a missile-warning sensor. Although the aircraft cannot transmit video from the sensors beyond line-of-sight, it does have UHF satellite communications and Iridium, but solely for voice.

All of the aircraft can accommodate signals intelligence sensors, but only limited numbers have them, the latter typically tasked to support US Special Operations Command (SOCOM). Some of them carry a communications jammer externally for special missions.

Genesis

By 2010 the OA-X concept had been under consideration within ACC for two years. Frustrated by the slow pace of events, the secretary of defense began a strong push for a rapid-acquisition program following the outcome of the 2010 Quadrennial Defense Review. Buoyed by emerging demand from overseas major commands, particularly United States Air Forces in Europe (USAFE), and under pressure to show some institutional commitment to irregular warfare, Headquarters USAF began a rapid-acquisition program in late summer of 2010 and "piggybacked" on the required delivery of 20 light attack aircraft to the Afghan National Army Air Corps (ANAAC) by the fall of 2011.[3] The USAF requested both additional funding from Congress and the authority to reprogram fiscal year 2010 funds to support immediate procurement of an off-the-shelf capability, suitably modified to meet its requirements (mostly related to weapons and communications). With strong support from the Office of the Secretary of Defense, Nellis AFB hosted a competitive f yoff among a small pool of nondevelopmental aircraft in the fall of 2010. Two contenders had potential, but only one ref ected the state of development required by the USAF; consequently, the service signed a contract in the fall of 2010 that covered both the Afghan buy and the initial USAF purchase, with options for additional aircraft.

Continental United States

Following the success of phase two of the Imminent Fury (IF) combat demonstration of 2010 in Afghanistan, the USAF conducted an aggressive campaign to introduce OA-Xs into service, following an accelerated production and procurement schedule.[4] ACC accepted the first OA-X delivery in early 2011 and declared initial operational capability with the first 12 aircraft delivered at the end of the year. The first squadron stood up at Willow Grove Joint Reserve Base, Pennsylvania, following the previously scheduled retirement of the 111th Wing's A-10 Thunderbolts. Use of an Air National Guard (ANG) base allowed rapid stand-up of a field training unit (FTU) capability, and the choice of Willow Grove ref ected the need to preserve the accumulated attack experience of the 111th Wing. This OA-X squadron, although formally designated a training unit, not only provided training capacity for both USAF and Afghan pilots but also operationally deployed two- and four-aircraft elements to support various operations overseas. In the summer of 2012, the aircraft was in high demand on the air show circuit, which offered both cross-country f ight experience (particularly important for the Afghan pilots) and helped build public—and, therefore, congressional—support.

Mid-2012 saw completion of the Afghan buy and delivery of three aircraft each month to the USAF, with an additional one

aircraft per month going to the ANZUS (Australia, New Zealand, United States Security Treaty) OA-X program, a combined buy between Australia and New Zealand. The ANAAC lost two aircraft to pilot error in 2012, both of them replaced from new production. The aircraft acceptance rate for the USAF eventually grew to six per month. After the Turkish assembly facility came online in 2014, deliveries to overseas customers increased, with the USAF getting 50 percent or more of the total US production run of OA-Xs. Realizing that the AV-8B Harrier f eet was retiring faster than anticipated and faced with a major delay in the vertical-takeoff-and-landing variant of the F-35, the Marine Corps started OA-X procurement in 2013, successfully resisting pressure to buy Super Hornet aircraft that it did not want.

Today, eight years after the program began in 2010, ACC operates OA-Xs in five fighter squadrons, and the ANG has an additional five fighter squadrons similarly equipped, including both FTUs. Air Force Special Operations Command (AFSOC) operates a single squadron. ACC embedded squadrons within existing fighter wings to avoid the necessity of standing up new wings with their associated infrastructure and personnel. This method required only minimal additions to base populations and reduced the need for more military construction. The OA-X's small physical size, limited logistical footprint, and easy maintainability enabled existing facilities to accommodate it effectively.

Basing

The 2005 base realignment and closure had a significant impact on ANG force structure, realigning several fighter wings and assigning several more to f y C-21s as a "bridge" mission until the C-27J arrived.[5] Cuts to the C-27J program left several ANG f ying units with no long-term mission and generated considerable enthusiasm for getting OA-Xs on the ramp. Two factors motivated basing strategy for the OA-X in the continental United States (CONUS): (1) the need to maintain proximity to Army and Marine Corps training facilities and (2) the presence of existing fighter wings, with the latter criterion more heavily weighted. For the ANG, the criteria remained similar although existing fighter wings containing units that had lost or would lose their attack capability received priority. Thus, of the 10 bases that currently operate OA-Xs, Battle Creek's 110th Fighter Wing (FW) is the only unit without close proximity to Army facilities since planners made a priority of retaining expertise as the A-10s moved out (fig. 1).

OA-Xs are assigned to four active duty wings and a fifth integrated fighter group (active duty and Air Force Reserve) at Moody AFB, Georgia, although the latter is a group in name only for heritage reasons. The preponderance of Army units in the Southeast gives that area heavy representation, with OA-X squadrons at Seymour Johnson AFB, North Carolina; Shaw AFB, South Carolina; and Moody. Nellis AFB operates the 561st Fighter Squadron, again the sole operational fighter unit there, as well as the OA-Xs assigned to the 422nd Test and Evaluation Squadron and the Weapons School. Mountain Home AFB, Idaho, houses the final active duty unit. One four-ship operational detachment, deployed at Reagan National Airport since 2012, shares ramp space with the Coast Guard, conducting routine training with federal agencies in a complex urban area defined by the f ight-exclusion zone around Washington, DC, and occasionally supplementing the 113th Fighter Wing at Joint Base Andrews, Maryland, for air defense alert. More cynical observers have also pointed out that the presence of this detachment offers senior leaders in Congress and the Office of the Secretary of Defense visible proof of the USAF's commitment to irregular warfare; orientation f ights are rather common.

AFSOC operates its OA-X squadron at Cannon AFB, New Mexico. The Marine Corps squadrons are at Yuma, Arizona, and Cherry Point, North Carolina, while the Na-

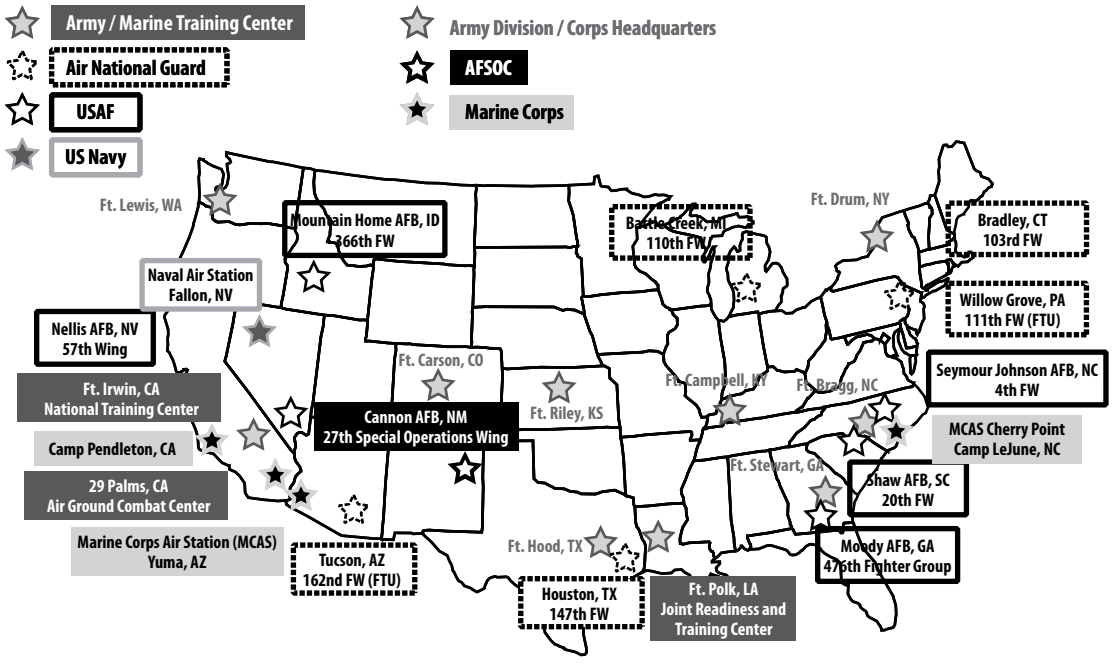


Figure 1. CONUS basing of OA-X aircraft

vy's sole squadron operates at Naval Air Station Fallon, Nevada. Two OA-Xs are assigned to the 85th Test and Evaluation Group at Eglin AFB, Florida, mostly for testing and weapons-integration work.

Training and Crewing

As expected, the OA-Xs were pressed into combat operations, virtually as soon as the USAF took delivery of the airframes, and the availability of experienced rated officers became a hot issue due to the existing shortage. The IF combat demonstration, shared with the Navy, gave the USAF an initial cadre of three combat-experienced crews by December 2010. Extension of the combat demonstration sent another three crews into the IF pipeline, a process that continued until the IF "detachment" became a Navy attack squadron in 2012. An unofficial exchange program established with the Colombian Air Force kept the initial cadre's skill sets sharp. When the FTU opened at Willow Grove, two Colombian instructors, present from the beginning as exchange officers, helped build an extremely successful formal relationship that has become both larger and multilateral.

The rapid drawdown of ANG fighter units produced an abundance of volunteer ANG pilots. Willow Grove had many pilots to choose from since a number of guardsmen were willing to commute substantial distances for the opportunity to be on the leading edge of a new program. The proximity of Willow Grove to Philadelphia had an unexpected side benefit—ANG pilots who were current or furloughed commercial airline pilots could easily commute into Philadelphia International Airport from significant distances. The instructor corps remained the bottleneck, but the IF crews, experienced ANG instructor pilots, and Colombian instructors opened up the pipeline much more quickly than anticipated. The USAF benefited from advanced planning

between ACC and the National Guard Bureau, which had anticipated the need and identified necessary resources well before the first aircraft arrived.

If volunteer pilots were abundant, weapons systems officers (WSO) were not—despite a number of enthusiastic volunteers—because of the limited availability of suitable candidates. The on-again, off-again nature of Specialized Undergraduate Navigator Training restricted the number of available fighter WSOs, and the lack of a two-seat fighter in the ANG left only very senior officers with F-4 Phantom time in the 1990s as potential ANG candidates. Thus, it fell to the active duty force and Air Force Reserve to supply fighter WSOs. To some extent, three concurrent efforts mitigated the acute shortage of WSOs: (1) a limited-period recall program from both the active Reserve and the participating Individual Ready Reserve, (2) a program to reassign WSOs who were manning staff positions CONUS-wide, and (3) a migration of fighter-experienced WSOs from remotely piloted aircraft (RPA) squadrons. Understandably, the last two programs received more volunteers than the Air Force Personnel Center was willing to reassign. The resulting initial WSO force for the OA-X resembled the initial F-15E WSO cadre from 20 years before—a few new lieutenants and a surplus of majors and lieutenant colonels who had called in every favor ever owed them to get into the airframe. AFSOC did not suffer the same problem because it had slightly differing requirements and only a single squadron to fill; moreover, it used both navigators and electronic warfare officers from its AC-130 gunships.

Making a virtue of necessity, ACC continues to man the OA-X squadrons at a higher ratio for pilots than WSOs, even now that both pilot and navigator training has been running at full output since 2011. The official rationale for doing so is that OA-X units employed in operations will often fly host-nation personnel (aircrews and others), joint terminal attack controllers (JTAC), ground personnel, and even linguists in the backseat, which requires a lower WSO-to-airframe ratio. The side effect is that in training, WSOs fly more sorties than pilots, a condition commonly referred to as the "WSO bonus."

The OA-X squadrons established at F-15E bases are unique in that a select number of crews dual-qualify in both the F-15E and the OA-X. This program sought to provide a companion aircraft to mission-ready crews and allow them to meet sortie requirements for proficiency while flying a less expensive airplane. As a side benefit, it allowed the F-15E wings to increase their ability to absorb new aircrews. Although successful enough to continue, the program has not expanded to other aircraft types. Essentially, the F-15E crews have divided into two bands of capability within the squadrons. On the one hand, crews that fly the F-15E exclusively tend to become instructors faster in that aircraft, and only those crews can maintain proficiency in certain weapons, including the GBU-15, AGM-130, and GBU-28. Crews qualified in both the OA-X and the F-15E, on the other hand, have an opportunity to accrue flying hours and obtain combat experience faster—an attractive prospect. The OA-X crews maintain proficiency as forward air controllers (airborne) (FAC[A]), which the F-15E Strike Eagles could not support; the F-15Es' FAC(A)-qualified crews are all dual-qualified.

The 147th Fighter Wing at Ellington Field, Texas, also maintains dual-qualified aircrews—but in the MQ-9 Reaper (originally the MQ-1 Predator) as well as the OA-X. Once again, this reflected acceptance of necessity rather than a planned option. That is, because an OA-X squadron was needed in close proximity to Fort Hood and because the 147th had already lost its fighters and transitioned to MQ-1s, OA-Xs were brought in without giving up the RPAs. This move also resulted in an unusual mix of capabilities in that WSOs also serve as sensor operators in the RPAs. The model did not expand, however, since the rapid influx of OA-Xs reduced the number of fighter WSOs available to RPA squadrons, and those

heavily tasked units generally stayed too busy to fly a companion aircraft.

Combat Operations

After the success of IF, nobody was surprised when OA-Xs participated in combat operations before the first squadron formally achieved initial operational capability. A four-ship became a permanent detachment at Kandahar Air Base (AB), Afghanistan, in 2011, allowing the IF birds to relocate to various sites in support of special operations. Crews rotated in and out as necessary while the OA-X remained in Afghanistan. Because of the ease of maintenance, the aircraft rarely had to return to the United States.

Afghanistan operations relied on a hub-and-spoke arrangement from Bagram AB and Kandahar AB. Although the main detachments occupied the asphalt-paved airfields, the OA-Xs made excellent use of smaller airstrips, including the gravel strips that compose the majority of airfields in Afghanistan. Aircraft commonly flew out-and-back operations, launching from the main operating base, flying a mission, landing at a forward base for refueling and limited rearming, launching again with the same crew for a second sortie, and returning to base at the end of the crew duty day. For certain missions, especially FAC(A), aircrews could land at the forward operating base (FOB) and perform the detailed face-to-face coordination required by the supported ground commander. Typically, aircrews refueled and rearmed by using the linked .50-caliber ammunition and 2.75-inch rockets that are ubiquitous at Army-controlled airfields.[6] The fuel requirements of the OA-X—less than 5 percent those of the F-15E—enabled trucks to supply forward bases. More than one OA-X got refueled from 55-gallon drums with a hand pump. When the United States lost permission to operate tankers from Manas AB, Kyrgyzstan, during lease-renewal negotiations in 2015, additional OA-Xs deployed to Afghanistan by C-17 and directly from North Atlantic Treaty Organization (NATO) units, taking over the lion's share of close air support (CAS) taskings. From that point on, even after we regained access to Manas, the OA-X always constituted at least 50 percent of the fighter fleet in Afghanistan.

The OA-X rapidly became the preferred aircraft for flying armed reconnaissance and overwatch missions. The aircraft's endurance enabled OA-X elements to maintain two-ships overhead longer than legacy fighters. In a typical eight-hour period, both OA-X aircraft were available for six of those hours, each having to refuel only once—usually from a nearby forward arming and refueling point. The fact that OA-X detachments would operate from either Army- or Marine-owned FOBs for days at a time in support of ground operations gave aircrews direct exposure to the units they supported, raised the confidence level of participants, and facilitated the detailed integration and planning necessary for a successful air-ground team. Both Army and Marine commanders and liaison officers would regularly fly in the backseat of the OA-X, providing valuable perspective for everyone involved. In a two-ship of OA-Xs, a single "rider" was considered the operational maximum. Such a formation would typically have the rider in the wingman's aircraft; the WSO in the lead aircraft could laser-designate weapons for either aircraft, offsetting the impact of having an inexperienced rider.

With regard to the deployment of OA-Xs, one valid concern involved the difference in response time between those aircraft and the legacy fighters, due to airspeed considerations. OA-X basing strategies only partly mitigated this concern, given the small number of those aircraft deployed and the fact that available bases outnumbered the OA-Xs. As the number of in-country aircraft increased and their distribution became more dispersed, response times eventually equaled or beat those of jet fighters in the areas closest to concentrations of major International Security Assistance Forces (ISAF). From ground alert, OA-Xs quickly

became airborne, often taking off less than five minutes after the crew touched the airplane and beating the jets into the air. The Afghans rapidly adopted this model for their own CAS missions and effectively covered the entire country with ground-alert aircraft based at Shindand, Kabul, and Kandahar (fig. 2).

OA-Xs provided CAS, FAC(A), rescue escort, and armed reconnaissance missions for both general-purpose forces and special operations forces (SOF). FAC(A) capabilities, historically underutilized in Operation Enduring Freedom, became commonplace after the success of IF in 2010. As predicted, SOCOM placed a high demand on the few OA-Xs available. For once, SOF did not have first priority on an available aircraft because daylight operations for general-purpose forces had priority; consequently, SOF largely had to make do with gunships, legacy fighters directly tasked to support them, and IF aircraft. This tug-of-war led directly to the stand-up of an AFSOC squadron and formation of the Navy's single light attack squadron.

The introduction of similar OA-X squadrons from several nations, combined with the Afghan acquisition, made the majority of fighter aircraft at Kandahar OA-Xs. One notable photo arranged by the Kandahar Air Expeditionary Wing features Colombian,

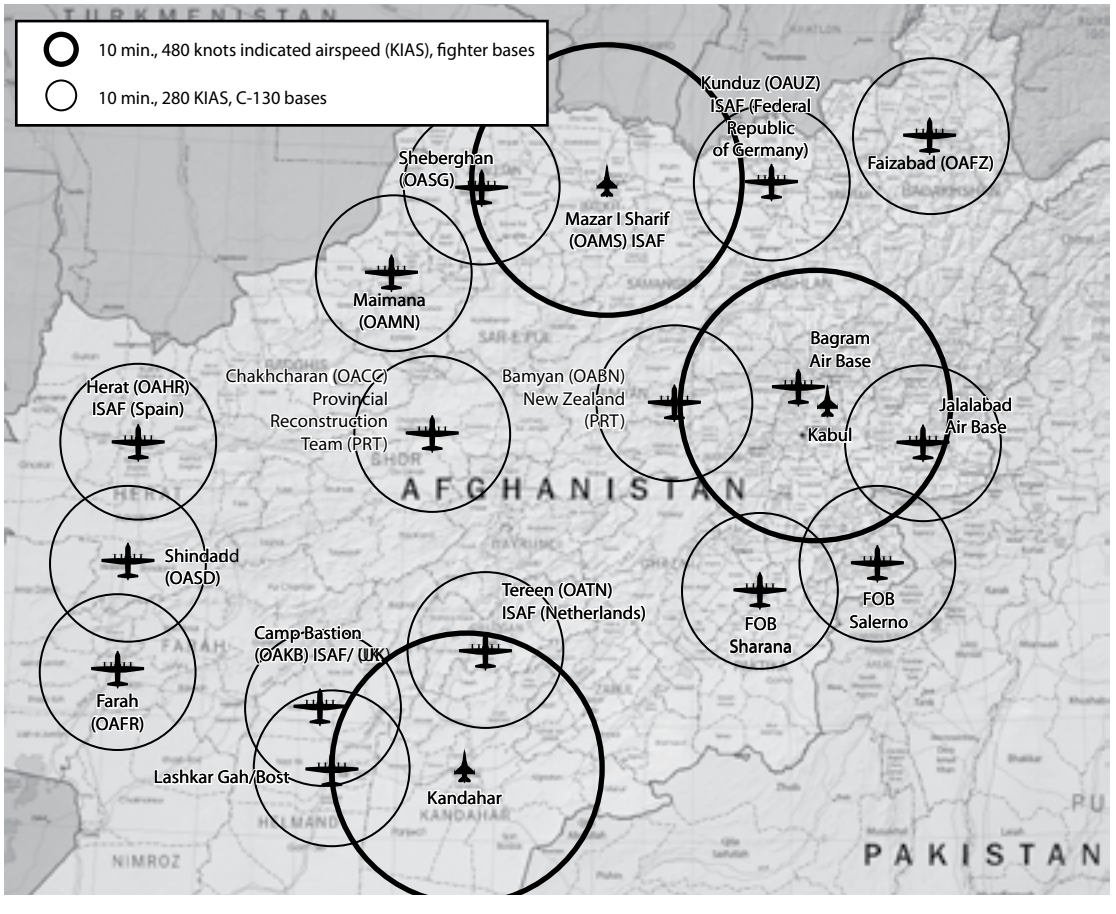


Figure 2. Coverage of Afghanistan with ground-alert aircraft

Afghan, NATO, Royal Air Force (RAF), USAF, and US Marine Corps OA-Xs in front of the old control tower. The commonality of the aircraft made it easy to "drop in" on other OA-X locations for a full rearming; instituting NATO Ample Train procedures for ISAF allowed load crews to put any available authorized munition on any OA-X.[7]

SOF had to accept a lower priority on OA-Xs in Afghanistan, but that did not apply in the rest of the world. The ability to load a four-ship of OA-Xs into a C-17, fly to a destination, and reassemble the aircraft within four hours of landing was a SOF dream. The Australian Special Air Service eagerly followed SOCOM's example. As early as 2012, aircraft assigned to the FTU at Willow Grove would disappear for a week or two at a time and then reappear weeks later in serviceable condition, smelling faintly of cordite and low-quality fuel residue. The havoc this played on training schedules was partially offset by temporary utilization rates that would have shattered a legacy fighter squadron; once again the maintainability of the aircraft and the hard work of the ground crews paid dividends.[8] The fact that each squadron consisted of 24 aircraft also helped them support simultaneous training and deployments.

Operating attack aircraft in areas of the world without 8,000-foot asphalt runways (and, consequently, with little possibility of persistent support from USAF or US Navy fighters) characterized the OA-X's support of unconventional warfare. Special operations support produced several innovations later adopted by the OA-X squadrons. The use of linguists and a signals-intelligence package, pioneered by the Ellington Field ANG unit in partnership with the Army Reserve in Houston, was readily adopted by AFSOC and the OA-X unit at Shaw AFB, which had ready access to the Defense Language Institute at Fort Jackson, South Carolina. As a result, the Ellington Field ANG unit became the preferred ANG squadron for AFSOC and improved the retention of linguists in the Houston Army Reserve. Unanticipated capabilities came to light after an unfortunate test mishap with a flare-sized jamming package on the Eglin AFB range led to the local disruption of cell phone networks. Though officially a mistake, the incident motivated the rapid prototyping of a capability that AFSOC eagerly adopted by procuring specialized jamming kits. These aircraft-powered units fit into the aircraft's existing ALE-47 magazines with only minor modifications, sacrificing eight flares out of a normal load of 60 in return for a jamming package on both sides of the aircraft. OA-Xs have also led the Department of Defense in adapting tube-launched weapons, sensors, air-deployed RPAs, and even expendable airborne communications relays. The low airspeed of the OA-X, compared to that of high-performance aircraft, significantly reduces launch stresses for tube-launched payloads and poses a much more surmountable engineering challenge. Of note, tube payloads for the OA-X and MC-12 aircraft are designed to be completely interchangeable.

No discussion of combat operations would be complete without addressing survivability. Early in the program, many analysts doubted the survivability of such a "low-performance" platform, yet these reservations did not arise from a firm appreciation of the threat. The A-10's slow airspeed did not measurably increase the rate at which it suffered hits from antiaircraft artillery in an environment where squad-level aimed fire from small arms represented the primary threat. In most cases, small-arms hits on OA-Xs were a result of making multiple passes from a predictable attack axis, precisely mirroring the previous combat experience of other attack platforms. Small-arms damage is uncommon enough that many air forces have removed the armor from cockpit walls to save weight, but most of them retain the armored cockpit floors and engine protection.

The aircraft has proven very difficult to hit with man-portable air defense systems, and no OA-X—tactically flown with an operational missile-warning system and flares remaining—has been hit by an infrared missile. The prop wash tends to diffuse the air-

craft's exhaust plume rapidly, and its slow speed limits the heating of the airframe's leading edge, greatly reducing the opportunity for infrared-guided missiles to lock onto the OA-X from a position forward of the aircraft.

Fleet Growth: Overseas Major Commands

USAFE, which had made an early pitch to get the first four OA-X squadrons, had to settle for the third and sixth, although both were 24-aircraft squadrons rather than the 12-aircraft units that European Command had requested. The need to establish a stateside FTU, the drawdown of the ANG fighter force, and the urgent demand for the OA-X in Afghanistan prompted commanders to give the CONUS buildup high priority. Nevertheless, USAFE reactivated the 495th Fighter Squadron at RAF Lakenheath in 2012 and the 480th Fighter Squadron at Spangdahlem AB, Germany, in late 2013. Taking a cue from the ANZUS binational purchase, USAFE encouraged the formation of two additional squadrons in Europe, the first a NATO attack squadron modeled after the alliance's successful Airborne Warning and Control System and C-17 squadrons. Having recently reentered the NATO command structure, France offered to host the squadron at an air base near Nice on the Mediterranean coast, which proved irresistible to the NATO staff at Brussels and ensured that the unit would never lack for volunteers. The unit has seen extensive combat experience supporting the ISAF in Afghanistan and maintains a close relationship with the Nigerian, Moroccan, and Egyptian OA-X squadrons.

The second European multinational squadron took much longer to form, not reaching initial operational capability until 2017. This unit, a cooperative effort among Estonia, Latvia, and Lithuania, is actually oriented towards training, surveillance, and air policing rather than ground attack. Taking advantage of the transferrable, affordable, modular, interoperable capabilities of the OA-X, the Baltic OA-X is a "sport" version without precision air-to-ground capability; however, it comes equipped with guns, AIM-9Ms, an infrared sensor, and Link-16. This selected set of capabilities both tailored the aircraft to unique needs and reduced the overall program cost by several million US dollars per airframe over the life of the program.

A relative latecomer to the OA-X program, PACAF may well have been inspired by the South Korean KA-1s, fielded as FAC(A)-capable observation aircraft. PACAF currently operates three 18-aircraft squadrons—two in Korea (at Osan AB and Kunsan AB) and one at Eielson AFB, Alaska. All PACAF aircraft have ALR-69 radar-warning gear installed, primarily due to the nature of the North Korean air defense threat. Despite initial doubts about the OA-X's survivability over North Korea, planners rapidly integrated the aircraft into war plans after realizing that every combat sortie **f** own by an OA-X over South Korea freed a jet aircraft to go north. PACAF units have turned the annual Cobra Gold exercise into a virtual OA-X convention since the exercise regularly attracts OA-Xs from throughout the region; even Korea-based OA-X squadrons spend a significant amount of time traveling to other countries in the Pacific region to build aviation partnerships.

Other Services and Agencies

As previously mentioned, both the US Navy and Marine Corps operate the OA-X. The Navy's aircraft, located in a single land-based squadron at Naval Air Station Fallon, support its special warfare units. Direct successors of the IF birds, these aircraft have the specialized equipment required for their direct-support role. The Navy has expressed no interest in expanding this capability to carrier aviation. (The OA-X design did not include an arresting hook, folding wings, or catapult gear.)

The Marine Corps operates four OA-X squadrons—two each at Marine Corps Air Stations Yuma and Cherry Point. The latter's aircraft are equipped with the same jamming package as the AFSOC squadron and benefit from a close relationship with the three remaining Marine EA-6B Prowler squadrons in North Carolina. Marine Corps OA-X aircraft operate as part of the Marine air-ground task force, much like the remaining F/A-18s. Two items make the Marine OA-Xs unique: (1) a wing-mounted probe-and-drogue air-refueling system as well as buddy-refueling capability salvaged from the A-4 Skyhawk and (2) their status as the only OA-Xs to operate from ships at sea, albeit in a very limited fashion. Stored disassembled, OA-Xs embarked for shipboard use are assembled only for one-time flights off *Wasp*-class and *America*-class amphibious carriers for transfer ashore. This capability gives the task force quick access to land-based airpower and increases the number of aircraft available. OA-Xs are assembled below decks, carried by elevator to the flight deck, and launch in a lightweight configuration (one pilot, a partial fuel load, and no weapons or ammunition) for recovery at a land base, where they enter combat service.

Additionally, the Customs and Border Patrol (CBP) branch of the Department of Homeland Security employs a squadron of OA-Xs split between Davis-Monthan AFB, Arizona, and Homestead Air Reserve Base, Florida. Primarily purchased to support counternarcotics efforts along the Mexican border and California coast, as well as in the Caribbean, these aircraft are flown by federal agents, who are not constrained by the military's posse comitatus restrictions and can interdict drug-trafficking aircraft and vessels headed for the United States. Like the Baltic aircraft they inspired, the CBP variants fly with guns and gas only, gaining longer endurance than the more heavily armed versions. CBP aircraft feature the additional communications necessary for successful operations with a wide variety of civil and military users, and some have wake-disturbance sensors intended to locate semisubmersibles. The CBP's consolidation from six interceptor aircraft types to one yielded considerable capability gains as well as cost savings in operations and logistics. The Davis-Monthan aircraft share maintenance facilities with the ANG unit there.

Foreign Users

The USAF is the main user of the OA-X. The most significant foreign user is the Royal Australian Air Force (in partnership with the Royal New Zealand Air Force), followed closely by Colombia and Pakistan. A number of air arms operate a single squadron although squadron size varies: Afghanistan, the United Kingdom, Turkey, Hungary, Morocco, Jordan, Lebanon, Thailand, the Philippines, Singapore, Indonesia, Malaysia, Nigeria, Croatia, and the Baltic states all operate customized variants of the USAF OA-X. Honduras and El Salvador each fly six aircraft, procured under the Regional Aircraft Modification Program, and deliveries for Guatemala and Nicaragua are imminent. As of 2018, procurement efforts for light attack aircraft are under way in Oman, Algeria, Sri Lanka, Portugal (which will give up some of its F-16s for them), and Vietnam. All told, over 800 aircraft are in service or on order in over 20 nations—a far cry from the 15-aircraft buy initially contemplated back in 2010.

The USAF was not the first air force to embrace turboprop-driven light attack. Air forces throughout South America in particular had operated similar aircraft for years before the OA-X program began. Afghanistan's need for a light attack aircraft paralleled the USAF effort and was closely tied to it. After the success of IF, the USAF embarked on an ambitious program to procure an initial 200 aircraft, spiking both interest and demand. Needing a replacement for its PC-9 trainers, Australia jumped at the chance to get a combat-capable aircraft that also could fill training roles and followed the USAF lead immediately, edg-

ing out the Marine Corps as the second major customer.

Consequently, the Australians became the first foreign customer, along with the Royal New Zealand Air Force, with an ANZUS-focused program that satisfied New Zealand's need to reestablish an attack capability, missing since the retirement of its A-4s earlier in the century.

NATO interest followed the USAFE introduction, led by the United Kingdom. The British Ministry of Defence, always on the lookout for cost-cutting options yet under pressure for underresourcing the British effort in Afghanistan, traded a large OA-X squadron for the equivalent number of F.3 and GR.4 Tornados and a handful of RAF-gained Sea Harriers. This move allowed the RAF to keep the same force structure and number of personnel while reducing operations and maintenance costs by 90 percent, compared to operations and costs for older aircraft. RAF OA-Xs have been a common sight in Helmand Province, Afghanistan, as well as in northern Wales. RAF instructors proved invaluable during the Hungarian buy after Hungary returned its leased Griffin fighters to Sweden, and provided the initial cadre for the long-awaited Baltic purchase.

Turkey followed the United Kingdom, even though both programs began simultaneously. Following a model utilized with its F-16 and rotary-wing fleet, Turkey held out for local assembly of the aircraft and subsequently supplied them to Jordan and Lebanon. Turkey will likely become the second-largest OA-X user, after the United States.

Not limited to ANZUS and NATO, the search for a light attack capability extended to Morocco, Pakistan, and Singapore, which faced unique security challenges that put a premium on endurance, flexibility, and ease of operations. The Lebanese, lacking a fixed-wing attack capability since the 1970s, were thrilled to purchase a combat system that even the Israelis could not consider threatening; Jordan followed suit for similar reasons. Lebanese and Turkish ties are particularly close, the Lebanese conducting all of their live-ordnance training drops on Turkey's Konya training range, located within convenient flying distance for the OA-X. Rounding out the decade were Indonesia and Malaysia, which combined their procurement programs; the Philippines, which received its program from US stocks when the Islamist insurgency problem spiked after the elections of 2015; and Honduras, Guatemala, Nicaragua, and El Salvador, which received or will receive OA-Xs under Air Forces Southern's Regional Aircraft Modification Program. Fueled by oil wealth, Nigeria remains the only sub-Saharan air force to complete a purchase, yet on-and-off negotiations with six other African air forces continue. Africa has proven a very tough market for the United States, Brazil, and China, mostly because of the very limited military budgets of most of the continent; South Africa's effort to sell its own light attack aircraft has been equally unsuccessful. Many observers believe that the sale to Nigeria went through only because of the example of the French-hosted NATO squadron in Nice.

Building Partnerships

Although this discussion focuses on the USAF program, one cannot overstate the OA-X's importance in building partnerships. In the 1970s, the USAF used surplus aircraft to build client air forces around the world. Many air forces, particularly in Asia and South America, received both their airlift and combat capabilities from surplus USAF aircraft. C-130s, C-123s, C-119s, and even C-7s rounded out the airlift fleet, while OV-10s, O-1s, O-2s, A-37s, A-1s, and F-5s provided attack and observation capabilities. The Navy contributed A-1, A-4, and A-7 aircraft. Some Marine OV-10s found their way outside the United States as late as the early 1990s. By 2000, US sources of those aircraft models were depleted, leaving only expensive, complex combat aircraft available for export (F-18, F-16, and F-15E), and even F-16s rapidly became unaffordable because

of the standardization effort established by the manufacturer. Surplus F-16As stored in the Arizona desert required $30 to $50 million in upgrade work apiece, making them as expensive as new aircraft. Because the United States could offer no options to air forces that could not afford to buy or operate the F-16, it lost an opportunity for successful engagement—a gap filled by Russia, China, and Brazil. In Africa, China had traded aircraft for mineral, oil, and fishing rights, which should have given it an advantage in aircraft sales, but poor support, customer dissatisfaction, and the fact that it could offer only a 1956 Soviet-based design as a primary trainer/light attack aircraft denied China the edge. Prospective customers considered the Hongdu/Yakovlev L-7 (Yak-152), which started flying in 2009, inferior to a US-designed OA-X.

Other nations often resent what they perceive as a paternalistic US attitude with respect to its domestically manufactured aircraft that the USAF does not operate. For example, foreign customers rejected the ill-fated F-20 Tigershark, an aircraft "not good enough" for the United States to buy. Originally, the USAF had decided to buy 15 OA-X aircraft for the undefined purpose of "building partnership capacity (BPC)," a proposal that would have left it with a niche capability of very limited utility and no outside interest. We avoided that outcome only by an unrelenting effort to explain, in detail, the OA-X's benefits to an air force that had become focused on technology rather than utility.

In late 2010, when the USAF announced it would procure both light attack and light mobility aircraft for its own use, we broke that pattern, and foreign air forces began to look seriously at what the USAF was doing. For small air forces worldwide, the opportunity to engage with the United States and capitalize on the USAF's training infrastructure and tactical knowledge acted as a powerful incentive. Afghanistan's purchase actually preceded the USAF buy, a sequence that caused no end of annoyance among ACC staff members who viewed themselves as originators of the program and elder members of what came to be called the "light attack priesthood."

In late 2010, when the USAF announced it would procure both light attack and light mobility aircraft for its own use, . . . foreign air forces began to look seriously at what the USAF was doing.

The Afghans took delivery of the first six of 20 OA-Xs in 2011, briefly giving them the world's largest OA-X fleet. In reality, Afghan pilots (with USAF instructors in the back) flew the first of these aircraft purely as trainers. The follow-on aircraft arrived fully combat capable and leased back to the USAF for a year to build the experience level of US crews while the Afghans struggled to train enough pilots to build a credible air force. This US-Afghan partnership turned out to be a tactical advantage in some respects, especially during support of Afghan Army units in the field. The Afghan OA-X, with its mixed USAF and ANAAC crews reflecting two different military cultures and featuring proficiency in two languages, eventually became an effective

battlefield coordinator. Though not always trusted to deliver ordnance close to ISAF troops, ANAAC aircrews became such an excellent battlefield interface that the Afghan Army did not share NATO's reluctance to employ ordnance under "danger close" conditions. Later, when the USAF employed larger numbers of OA-Xs, all deployed squadrons in Afghanistan (not tasked to SOCOM) were assigned an Afghan pilot or two (limited by supply, not demand), specifically as a result of the Afghan experience. This gave the USAF squadrons "organic" local knowledge and language skills as well as a built-in interface with the ANAAC. In turn, the Afghan pilots highly desired the opportunity to improve their English language and flying skills. Many experts think the crossflow between USAF and ANAAC crews initiated the rapid professionalization evident among Afghan attack aviators.

The Afghan model was hardly unique. Both foreign and deployed USAF squadrons took full advantage of the two seats to train partner-nation personnel and employ a variety of capabilities in operations. Having foreign "observers" on board surveillance and reconnaissance aircraft had long been a staple of US operations, particularly in Colombia, and the OA-X expanded the envelope to include foreign aircrews. Even in countries that did not welcome the presence of a US advisor, squadrons eagerly accepted advice from crews who had flown directly with US forces. In effect, rather than just examples, the USAF squadrons became mentors and de facto weapons school instructors for many a foreign officer. The two USAF FTUs, both of them necessary to handle the joint and combined training load, owe their continued existence to the investment made by the United States in training foreign OA-X crews.

Of course, foreign countries did not need to possess an OA-X to benefit from efforts at building partnerships. Indeed, possession and employment of the OA-X by the USAF became a key aspect of a partnership-building strategy for a number of countries facing an airpower deficit. The relative ease of deploying a four-ship of OA-Xs for an exercise, a demonstration, or a special mission meant that USAF presence could become more prevalent, particularly in Africa, thus providing a face-to-face training opportunity and offering a highly visible show of US support. In 2015 several Islamic insurgent groups saw an opportunity in the turmoil following the chaotic Philippine presidential election, and the Philippine government's lack of investment in the air force throughout the preceding three decades left the armed forces woefully short of airpower. Accordingly, the United States transferred 12 relatively new OA-X aircraft—along with munitions, spares, and a training system—directly from USAF stocks; moreover, in combination with Australia, New Zealand, and Singapore (which provided pilots), the aircraft granted the Philippines an instant combat capability that first neutralized the insurgents' ability to move via maritime pathways and later provided CAS for Philippine Army forces. Although the Philippine operation was much smaller in scale than Nickel Grass, many observers compared it to that 1973 airlift because it demonstrated US commitment to Philippine security (without a US presence) and may have given a critical boost to the pro-US candidate in the subsequent runoff election.[9]

At the tactical level, the OA-X enabled effective training of partner-nation JTACs. The OA-X's ability to facilitate CAS training affordably and regularly has benefited even allied countries that do not possess them. Both in NATO and particularly in Africa, certain nations have effectively trained terminal attack controllers without actually having very much airpower of their own. This has proven effective in combat operations in Afghanistan, where OA-X crews responding to a request for CAS will often encounter ISAF JTACs who trained with the OA-X—a capability that host countries could not have maintained, given the low availability of legacy fighter aircraft.

Second-Order Effects

A complete list of second-order effects gained by OA-X operators is too extensive to chronicle here. The OA-X, particularly in concert with light airlift aircraft, provides several air forces a wide array of capabilities with a small number of airframes. In addition, acquisition of these aircraft spurred local aviation development since most countries wanted to free themselves from outside support requirements as soon as possible. Nigerian OA-X crews have proven particularly entrepreneurial, using their aircraft for express-delivery services during training sorties, either landing or using a locally developed, parachute-retarded cargo pod. The Nigerian squadron also supports an African JTAC school, and the maintenance crews were instrumental in setting up a flourishing refurbishment center for the Pratt and Whitney PT-6A engine that powers the aircraft.

For the USAF, the second-order effects were significant. The increase in the number of available cockpits enlarged the overall size of the fighter/attack fleet (which had been steadily shrinking since just after Operation Desert Storm), allowing both pilot and navigator training to run at full capacity and ensuring that the shortage of rated staff officers would not last forever. It also had the little-recognized effect of creating a generation of aircrews much more attuned to and expert in the application of airpower in irregular warfare—a class of aviators underrepresented since the Vietnam War.

The presence of OA-Xs in the ANG succeeded in preserving thousands of hours of attack and fighter flying experience that we otherwise would have lost, and in creating a strategic reserve of aircrews. After all, it is much easier (and faster) to upgrade an OA-X pilot to fly the F-35 than to upgrade a student fresh out of pilot training. The benefits of the OA-X squadrons to individual US states went beyond simple job creation (or preservation) by including homeland security and defense roles. OA-Xs have flown well over 100,000 hours of drug interdiction, maritime patrol, border security, postevent reconnaissance, search and rescue, and even air-intercept sorties. In fact, an ANG OA-X operating in support of Joint Interagency Task Force-South gets credit for the largest single bust of a drug-carrying aviation asset.

Planners understood early that the OA-X would help fill holes in JTAC training for the USAF. In 2011 neither the CONUS nor USAFE had enough fixed-wing sorties available to train the existing JTAC force, a problem forecast to worsen as that force expanded and as fifth-generation fighters, with their staggering operations and maintenance costs, came online. The addition of 10 stateside OA-X squadrons largely ended this resource mismatch—current training problems arise more from scheduling difficulties for Army units in Colorado, Kansas, Kentucky, and Hawaii than from a lack of overall capacity.

If any secondary effect by itself qualified as a tremendous advantage, it turned out to be the business aspect, although this element of the OA-X program gained surprisingly little attention once the program began. In view of the operating costs per flying hour (in fiscal year 2010) of the F-16 (over $7,500), A-10 (about $5,000), F-15E (about $16,000), and B-1 (about $33,000), we must consider the OA-X's operating cost of $1,575 per flying hour a bargain.[10] Similarly, the fuel consumption per flying hour of the aircraft is less than 5 percent that of fast jets. For instance, the 26,000 pounds of fuel used by a Lakenheath F-15E for a 1.8-hour training sortie will yield 60 hours of flight time for an OA-X with a partial combat load. True, the USAF had to spend money to save money, but it was equally true that if one ignored the differences between procurement and operations funds, the OA-X program paid for itself—in combat flying hours alone—before the last of the USAF purchase rolled off the production line.[11] Adding to the savings, OA-Xs required no tanker support (except for the Marine Corps birds, which rely on that service's KC-130 tankers)

and became the first USAF fighter aircraft to use the C-17 and C-5 rather than the tanker fleet for intertheater deployment.

Finally, similarly equipped air forces, both with and without formal coordination with the United States, generated a secondary effect for America with respect to building partnerships. Partner nations conducted their own BPC efforts using the OA-X, often engaging where the United States could not. The presence of aircrews and aircraft from Singapore, Australia, and New Zealand did not garner comment in the Philippines in 2015, whereas US presence would certainly have caused an uproar. Those same three countries also proved instrumental in the stand-up of both the Indonesian and Malaysian OA-X squadrons. The New Zealand OA-Xs travel widely, sometimes under a US fund established specifically for the purpose, because the presence of Royal New Zealand Air Force trainers has not disturbed even the most alarmist Pacific basin countries. Similarly, Turkish instructors were involved in Jordan, Morocco, and Lebanon, and the NATO squadron at Nice (which sometimes acts like a French Foreign Legion unit despite its NATO connection) remains closely engaged in Nigeria and Morocco. The presence of a common, transferrable, affordable, modular, interoperable combat aircraft allowed our partners to build their own partnerships worldwide, a trend that shows no signs of abating.

Conclusion

Acquisition of the OA-X in large numbers restored a mix of expensive high-technology capabilities and affordable medium-technology capabilities to the USAF at a time when the twin pressures of a continued drive towards a fifth-generation force and combat operations in Iraq, Afghanistan, and elsewhere placed a severe strain on the USAF. Often derided as a "low tech" or "low utility" platform in the run-up to the acquisition program, the OA-X turned out to be neither, although it remained surprisingly close to the original goal of "low cost." In addition to obvious benefits to the USAF, the attractiveness of a US-owned OA-X allowed construction of what Secretary of Defense Robert Gates described in 2008 as the "100-wing Air Force," representing the combined efforts of many air arms worldwide.[12] Although the nature of the 100-wing Air Force extends far beyond a single, multirole aircraft, the OA-X has done its part. Today, in 2018, OA-Xs represent 36 squadrons' worth of the 100 wings, a substantial impact that 10 years ago existed only on paper. ✪

Author's note. The total USAF OA-X fleet postulated here is larger than the 200 currently necessary to support one sustained, deployed operation (in Afghanistan) while maintaining capability to build partnership capacity effectively in other locations worldwide. Similarly, the notional OA-Xs fill a great many more roles and fly in many more locations than any "BPC-only" construct would allow. The OA-X's African potential remains largely unexplored.

Notes

1. Air Combat Command, *OA-X Enabling Concept* (Langley AFB, VA: HQ ACC/A3F, 23 December 2008).

2. A short-range, point-to-point link that enables delivery of video from an airborne electro-optical/infrared sensor to a ground unit, the remote optical video enhanced receiver (ROVER) is compatible with the Army's one system remote video terminal (OSRVT).

3. "Light Air Support (LAS) Aircraft," solicitation no. FA8615-10-R-ZZ01, Department of the Air Force,

Air Force Materiel Command, Aeronautical Systems Center, https://www.fbo.gov/index?id=01768f9fe4885f2dbd7f7b4cc11aa4ec (accessed 19 March 2010).

4. Imminent Fury, phase two, is a planned combat demonstration of the EMB-314 Super Tucano aircraft as a surrogate light attack aircraft in Afghanistan. The program, which will involve USAF, Marine Corps, and Navy crews, will last for at least six months, starting in the summer of 2010.

5. See Department of Defense, *Base Closure and Realignment Report*, vol. 1, pt. 2 of 2, *Detailed Recommendations* (Washington, DC: Department of Defense, May 2005), http://www.defense.gov/brac/pdf/Vol_I_Part_2_DOD_BRAC.pdf (accessed 6 May 2010).

6. The introduction of laser-guided rockets gave precision capability even to aircraft that had dropped their precision-guided munitions and uploaded additional munitions at rearming and refueling points in forward areas. Army helicopter crews often grumbled about the higher priority for these munitions enjoyed by the OA-X.

7. A NATO exercise program, Ample Train allows one nation's aircraft to refuel and rearm from another nation's air bases. Ground crews are trained in refueling operations, weapons safety and loading, and cross-servicing for multiple NATO fighter types. The program began operating long before the dissolution of the Warsaw Pact.

8. A single C-17 would often fly to remote areas, land, off-load shelters, fuel bladders, fuel, and ordnance, and then depart the same night, leaving no large US cargo plane to draw attention during daylight. An 18,000-pound fuel download from a C-17 typically supports 40 flying hours for the OA-X.

9. During Operation Nickel Grass, the United States resupplied the Israel Defense Forces with modern fighter aircraft to offset heavy losses in the 1973 Yom Kippur War. The USAF transferred aircraft, including 36 F-4Es, directly to Israeli Air Force (IAF) stocks. Featuring USAF camouflage, these aircraft flew in combat with freshly painted IAF insignia.

10. See Table A15-1, "Aircraft Reimbursement Rates" [(per flying hour), fiscal year 2010], in Air Force Instruction 65-503, *USAF Cost and Planning Factors*, http://www.af.mil/shared/media/epubs/AFI65-503.pdf (accessed 6 May 2010). Rough estimates of operating costs for the OA-X come from open sources on costs for the AT-6B and EMB-314 Super Tucano (A.29). Program experience from the IF aircraft indicates that an operating cost of $1,575 per hour is a high estimate.

11. This statement is based on the price of $1.44 per gallon at $60 per barrel at the end of June 2009. HQ AFMC/FMB, https://afkm.wpafb.af.mil/ASPs/CoP/OpenCoP.asp?Filter=OO-FM-BD-11 (accessed 6 May 2010). During the summer of 2008, we were paying $4.07 per gallon.

12. Secretary of Defense Robert M. Gates (remarks to Air War College, Maxwell-Gunter AFB, AL, 21 April 2008), http://www.defense.gov/speeches/speech.aspx?speechid=1231 (accessed 6 May 2010).

Lt Col Michael W. Pietrucha, USAF

Lieutenant Colonel Pietrucha (BA, Pennsylvania State University; MA, American Military University) is an irregular warfare operations officer attached to Headquarters Air Combat Command/A3D, Langley AFB, Virginia. Commissioned through the AFROTC program in 1988, he has served at Spangdahlem AB, Germany; Nellis AFB, Nevada (twice); RAF Lakenheath, United Kingdom; and the Pentagon. As an electronic warfare officer in the F-4G Wild Weasel and later the F-15E, he has amassed 156 combat missions over 10 combat deployments, with two additional combat deployments on the ground in Iraq and Afghanistan.

Femme Fatale 2010*

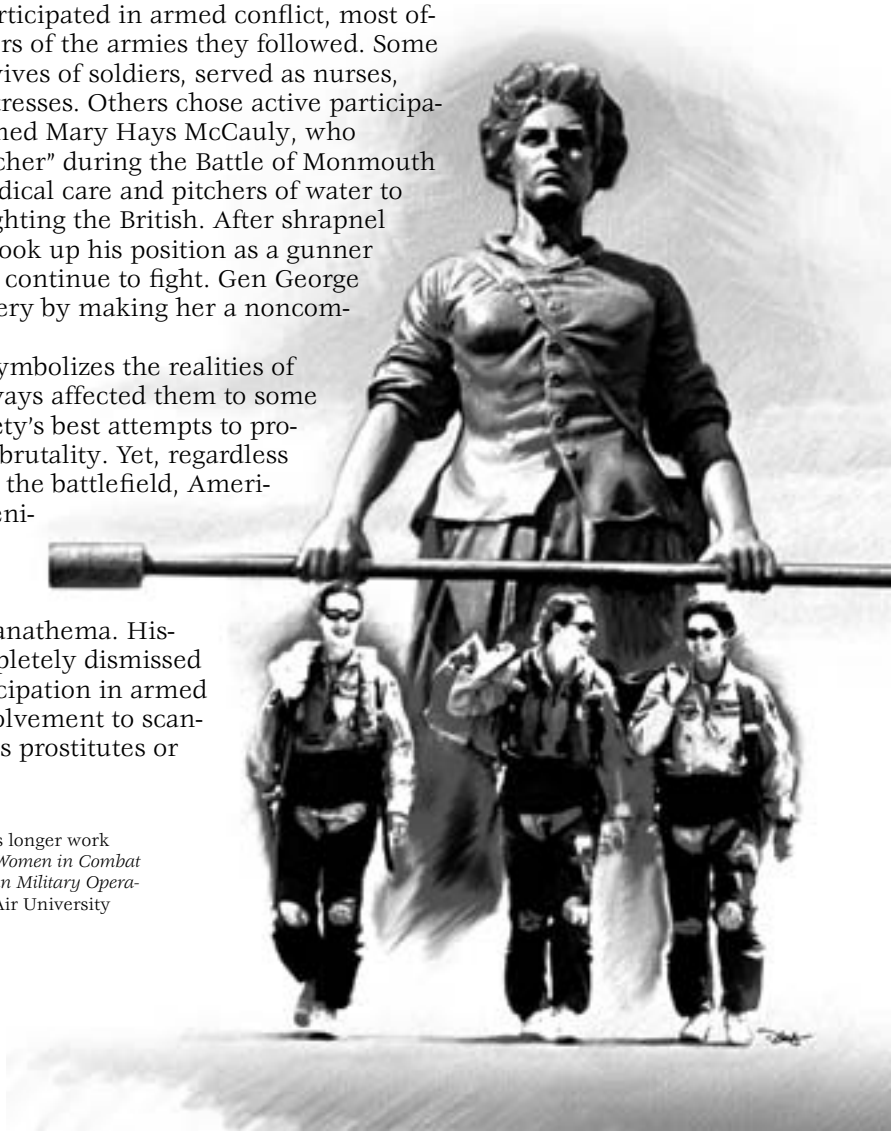
Lt Col Kristal L. Alfonso, USAF

According to Tolstoy, war and women are things that don't go together—they exist apart. But when I witnessed all the atrocities of 1941, the death of my friends and relatives, peaceful civilians, I wanted to liberate my people from the enemy. I want you to underline in red that it was the cherished dream of the girls to liberate the land, but none of us wanted to fight—to kill.

—Capt Mariya Dolina
125th Guards Bomber Regiment
Hero of the Soviet Union

Women have always participated in armed conflict, most often as active supporters of the armies they followed. Some women, usually the wives of soldiers, served as nurses, laundresses, cooks, and seamstresses. Others chose active participation in battle, including the famed Mary Hays McCauly, who earned the moniker "Molly Pitcher" during the Battle of Monmouth in 1778 when she provided medical care and pitchers of water to Continental Army members fighting the British. After shrapnel struck her husband, McCauly took up his position as a gunner so that the artillery crew could continue to fight. Gen George Washington rewarded her bravery by making her a noncommissioned officer.[1]

The story of Molly Pitcher symbolizes the realities of women and war, which has always affected them to some capacity, despite civilized society's best attempts to protect the gentler sex from war's brutality. Yet, regardless of Molly Pitcher's successes on the battlefield, American culture has traditionally denigrated female participation in war. In most cultures, even today, the idea of a woman engaged in combat operations is anathema. History, therefore, has either completely dismissed female contributions and participation in armed conflicts or relegated their involvement to scandalous supporting roles, such as prostitutes or pillow-friendly spies.



*This article is derived from the author's longer work *Femme Fatale: An Examination of the Role of Women in Combat and the Policy Implications for Future American Military Operations*, Drew Paper no. 5 (Maxwell AFB, AL: Air University Press, 2009).

In an effort to explore whether current US laws and policies excluding women from combat remain valid or need amending, this article reviews three case studies that demonstrate the variety of ways women have participated in modern armed conflict. The first one examines the experiences of World War II female Soviet pilots in their more traditional involvement in armed conflict. The second analyzes the asymmetric aspects of female participation during conflict, focusing specifically on terrorist activities. The final case study presents American females' experience in the All Volunteer Force, emphasizing their performance in combat operations since such participation began in the 1990s.

The article concludes by proposing how the US military and society should move forward in the debate over the role of women in combat. Despite the best attempts by critics to argue that society should protect women from the violence of war, in reality, women in the All Volunteer Force structure currently engage in combat.

The three case studies offer evidence that women have participated and always will participate in combat. Moreover, their successful contributions have made a difference. To deny citizens the right to fight for their country based solely on gender remains blatant discrimination. The United States should once again assume a world-leadership role with regard to equality, live up to the rhetoric of its principles, and demonstrate the civic parity of women and men.

Soviet Female Fliers of World War II

Over the centuries, Russian culture has embraced and even glorified the female warrior ethos.[2] Although the role of these *polianitsy* or warrior heroines diminished as more stringent patriarchal cultures emerged, legends of female fighters remained a part of Russian culture.[3] Evidently, whenever the motherland came under threat of invading forces, women stood to fight alongside Russian men.

The Russian Civil War presented women further opportunities for involvement in combat operations. The Workers' and Peasants' Air Fleet, for example, which desperately sought pilots to fight against the White anti-Bolsheviks, did not object to the use of women in combat roles. Marxist ideology promoted equality among the sexes. The struggle of women in a patriarchal society paralleled that of workers against capitalism; leaders of the communist revolution found willing supporters and participants among the disenfranchised half of the population. Communist leaders propagated the belief that once the revolution succeeded, "men and women naturally would become equals; there could be no gender discrimination in a socialist state."[4]

Under Bolshevik leadership, Russian women gained what few other females had: equality. Previously the provisional government had granted women equality under the law, equipping them with improved educational and professional opportunities.[5] The Bolsheviks championed the theory that Marxist socialism would resolve all societal difficulties, equating the establishment of a socialist government with the creation of a utopian society in which men accepted "women in combat as a matter of course, without sexist resistance or pious welcome speeches."[6]

Later, Soviet educational opportunities afforded women in the 1920s and 1930s allowed a number of them to receive flying training, mostly through aero clubs although a select few took military training. Soviet women recorded several civilian aerial achievements, including the nonstop flight of the *Rodina*.[7] Crewed by three females, this aircraft broke the women's international record for flight over a straight-line distance, establishing a new nonstop standard of just over 26 hours.[8] Further, Maj Marina Raskova, navigator on the *Rodina*, survived alone for 10 days in the subarctic forests of Russia on a couple of candy bars and wild berries following her bailout prior to the aircraft's emergency landing. She immediately became a hero in the Soviet Union, and Stalin himself propagated her heroic image.

Hitler Invades the Soviet Union

Despite the popularity of the *Rodina*'s female military officers, when Hitler initiated Operation Barbarossa, the Soviet military included very few women.[9] Although no government regulation specifically denied females acceptance into the military, Soviet military leadership discouraged them from volunteering for active military service and often turned volunteers away. Instead, Soviet leaders encouraged women volunteers to join paramilitary groups in order to receive various types of military training, including flight training. Sponsored by the Soviet Komsomol (a communist youth organization), Soviet women maintained higher levels of fitness through military-related sports; received weapons training, including sport sharpshooting; and even flight training.[10]

In response to Germany's invasion of the Soviet Union in June 1941, Raskova sought to tap this wealth of fighting potential among female Soviets, using her influence with Stalin and the Defense Ministry to persuade them to press forward with female aviation units. Women, particularly instructor pilots, inundated Raskova with requests to join her units or asked how they could "put their skills to use in the service of their country—more particularly, how they could get to the front, preferably in an airforce [*sic*] unit."[11] Stalin finally agreed to establish the 122nd Composite Air Group, comprised of three all-female units: the 586th Fighter Regiment, 587th Bomber Regiment, and 588th Air Regiment.[12]

The Result

Despite attempts to highlight the contributions of women during the war, the Soviet public and military apparently knew very little about the female combatants. Maj Marta Meritus of the 125th regiment described a reunion for veterans following the war: "The commander of the front, under whom we fought during the war, asked why we had been asked to this reception and who we were. We had to explain that we were the pilots and the mechanics of the 125th regiment. He had thought it to be a male regiment, and it was a surprise to him to learn about us after the war. Even now very few men can believe that women crews could fly the dive bomber."[13] Until recently, Western reactions were even further dismissive.

According to Kazimiera Cottam, Western scholars tended to regard female Soviet combatants merely as part of Soviet propaganda, noting that accounts of "female success in the military [were] often dismissed as anecdotal, propaganda-type stories."[14] The Soviet government and military did little to dispel such assumptions. Although Russia has a rich history of women successfully serving in combat, its modern armed forces represent a more conservative approach to women in combat, similar to the Soviet experience during and following World War II.

During the 1990s, half of the conscripts in the Russian Army were women, many of them serving in combat positions—including machine gunners.[15] The performance of these female combat troops bodes ill for future inclusion of Russian women in combat. According to Gen Vladimir Konstantinov of the General Staff's Organizational-Mobilization Main Directorate, "In 1999 all female contract soldiers of the Leningrad Military District 138th and 200th permanent readiness motor-rifle brigades refused to go to fight with their units in the second Chechen campaign, causing immense problems in refitting the units with men."[16] The Defense Ministry reports that the current percentage of female recruits is holding steady at 24 percent and that in future operations, the ministry will exclude women from combat operations.[17]

Shahidas in a Brave New World

Most Americans associate the current overseas contingency operations with conflict between Western secular ideals and radicalized Islamic traditions. The American press and media continue to reinforce this notion. Terrorism serves as a tool for oppressed peoples and groups seeking political upheaval, but state actors also often resort to terrorism to control their populations. In the

modern era, both the oppressed and the oppressors have used terrorism without mercy and without limitation.

Societal Expectations in the Modern Age of Terrorism

Encouraged by news reports, Americans further assume that Islam seeks to relegate women to subservient roles and that most Muslim women would resist this subjugation, if able, as American women did during their suffrage and equal rights movements. These assumptions are misguided. In the traditions of the three major religions (Judaism, Christianity, and Islam) stemming from the Middle East, a woman remains subservient to the man of the household. In contrast to male children, nonbelievers, and slaves, all of whom can rise above their initial positions of inferiority through age, acceptance of faith, and emancipation, women remain "irredeemably fixed in [their] inferiority."[18]

The veil has come to symbolize this struggle between the traditions of Islam and modern Western ideals. Attempts by the French government to remove the veil from Algerian women during Algeria's war for independence actually resulted (in addition to other, more gruesome tactics such as rape) in women joining the Algerian resistance movement. In ceremonies across Algeria, French military and colonial leaders *encouraged* women to unveil themselves in front of crowds of their fellow Algerians and Muslims.[19] Steps taken by the French military to emancipate Algerian women from cultural and societal traditions revealed two ironies. First, the French strategists demonstrated their ignorance of Algerian culture: prior to their initiatives, most Algerian women did not wear the veil.[20] Second, the act of unveiling represented the release of Algerian women from male oppression, but French soldiers raped them as a means of coercing obedience and acceptance of French rule by all Algerians.[21] After the colonial government instituted its program to lift the veils of Algerian women in 1958, they began to don veils in defiance of the French authorities.[22]

Instead of winning the hearts and minds of half the targeted populations in unstable areas in the world, Western attempts at liberating women from their traditional cultures have repeated the results seen in French-controlled Algeria. Women have turned away from Western ideals of freedom to seek justice for fellow Muslim or tribal members. As Bernard Lewis observes, "One of the most noticeable consequences of Islamic revival has been the return, by women though not by men, to full traditional attire."[23] Further, Lewis explains, Muslims have traditionally believed that "the converse of tyranny was not freedom but justice."[24]

The return to traditional dress is not the only way in which Muslim women currently demonstrate their dedication to culture, religion, and society. Increasingly, women from across the Muslim spectrum wish to join the fight against perceived Western oppression. Within the Palestinian territories, female combatant units have recently begun to form. In 2002 four young women conducted suicide-bombing missions against the Israeli military and civilians. These *shahidas* (female martyrs) became role models for Palestinian women who seek the release of their communities from Israeli control. In 2005 the first all-female unit formed under the military wing of Hamas—Izz al-Din Al-Qassam (derived from the name of a famous Palestinian religious leader who resisted the British rule of Palestine and founded the Black Hand).[25]

The impetus for women to join modern resistance movements and sacrifice their lives for their community parallels the motivations of female Soviet fighters in World War II. Modern female resistance fighters seek primarily to contribute to the defense of their national identity or tribes while bringing honor and security to their families. Similarly, modern female insurgents increasingly participate in combat operations as well as in more traditional supporting roles. The use of women in suicide operations by conservative Islamic groups has initiated a new phase in insurgent struggles worldwide. In the Israeli-Palestinian con-

flict, Palestinians have used women to send Israelis a deadly message: "Terrorism is not just a fringe phenomenon. Terrorists are not just strange young men whispering in dark rooms. Terrorists are high-school students, terrorists are women—and terrorists are all around you."[26]

Chechen Black Widows: Honor Is All That Remains

Chechen rebels have certainly exploited the tactical advantage of women combatants. Most Americans, if they are aware of the conflict between Chechnya and Russia at all, assume that the Chechens are simply another terrorist group motivated by a radical form of Islam. The tragic events of the school massacre in Beslan and the occupation of the Moscow theater by Chechen rebels as reported by Western media outlets encourage this perception.[27] More recently, reports of attacks by two female Chechen rebels on the Moscow Red Arrow underground train further highlight the infatuation with terrorists' religious views. A report from the British paper *Daily Mail* emphasizes the religious affiliation of suspected terrorists yet makes no mention of other underlying causes for rebels turning to terrorist actions.[28] The article accentuates the religious affiliation of the suspected bombers, claiming that the women were likely "Muslim women radicalized by the situation in the North Caucasus" and that they were part of the "Shahidka" movement, a term deriving from the Arabic word *shahid*.[29]

News reporting and comments from Russian officials continue to focus on the religion of the rebels rather than the political situation that precipitated this terror movement. Naturally, this perspective can encourage the reader to assume that this group is merely another radical Muslim terrorist organization. This assumption is incorrect and fails to acknowledge the key motivating factor for Chechen rebels, including female fighters: the cultural importance of personal honor. Chechen "Black Widows" or female suicide bombers adhere to the "rules of *Adat*, a traditional Chechen code of honor," which inspires them to "exact retribution for the sake of honor" against the Russian occupying presence in Chechnya.[30] For the same reasons their men challenge the occupation of their homeland by the Russians, Chechen women have demonstrated, with deadly consequences, their dedication to fighting for their people and culture.

In 2003 Chechen rebel commander Abu al-Walid al-Ghamidi explained why women account for 60 percent of Chechen suicide bombers: "These women, particularly the wives of the mujahedin who are martyred, are being threatened in their homes; their honour and everything are being threatened. They do not accept being humiliated and living under occupation."[31] Moreover, they are not the only women in the modern era who have suffered personal tragedies and then turned to terrorism; resistance fighters in Sri Lanka have channeled their grief and anger into weapons against their government.

Tamil Black Tigresses: Hindu Honor with a Nationalist Twist

The Tamil Tigers of Sri Lanka (LTTE), that country's minority Hindu population, sought the establishment of an independent Tamil state, free from involvement of the majority Buddhist population (Sinhala). LTTE actively recruits women, advocating their use in operations to secure political objectives. Such action brings considerable honor to the woman and her family; in turn, Tamil society reveres the "Black Tigresses" as saints since they are willing to die for their people. Acceptance of women in the Tamil insurgency even led to innovations in terrorist operations. LTTE developed the first suicide belt, for example, designing it for female use since it makes the wearer look pregnant, allowing the insurgent to pass through security checkpoints with ease.[32]

Thenmuli Rajaratnam—the first female Tamil Tiger suicide bomber, later honored as a saint by LTTE, and known as Dhanu—detonated a bomb, killing 16 bystanders during her assassination of Rajiv Gandhi.

According to most sources (and supported by LTTE propagandists), Dhanu's motivations for her action stemmed from her gang rape at the hands of Indian soldiers sent by Gandhi to Sri Lanka to suppress the Tamil separatist movement.[33]

In the case of Dhanu, the accepted explanation of her actions began when occupying Indian forces slaughtered her family and raped her.[34] In Tamil culture, such women see martyrdom for their people as their only option. According to Robert Pape, "Some of the female suicide bombers in Sri Lanka are believed to be victims of rape at the hands of Sinhalese or Indian soldiers, a stigma that destroys their prospects for marriage and rules out procreation. . . . 'Acting as a human bomb' . . . is an understood and accepted offering for a woman who will never be a mother."[35] Not only does suicide bombing release a woman and her family from the stigma of rape, but also it gives a woman unable to produce children a means to mother her society. In the Tamil culture, "Tamil mothers make great sacrifices for their sons on a daily basis; feeding them before themselves or the girl children, serving them and so on."[36] For a woman who cannot contribute to society in this fashion, fighting against her people's enemies may often seem the only option.

The American Experience

In the remote eastern Paktia province of Afghanistan, a roadside bomb exploded through a four-vehicle convoy of Humvees in April 2007, wounding five Soldiers. The medic assigned to the convoy rushed to protect the victims from insurgent gunfire "as mortars fell less than 100 yards away."[37] After the convoy held off the attackers, the medic told the Associated Press that she "did not really think about anything except for getting the guys to a safer location and getting them taken care of and getting them out of there."[38] The medic moved the wounded to a safer location over 500 yards away, where they received treatment on site before a helicopter evacuated them.

That Army medic, SPC Monica Lin Brown, received the Silver Star in March 2008 for her actions; ironically, Army regulations prohibit her from serving in a frontline combat role. The reality of combat operations has forced the Army to ignore those regulations since both Afghanistan and Iraq present cultural challenges demanding the presence of female Soldiers. In both locations, they "are often tasked to work in all-male combat units—not only for their skills but also for the culturally sensitive role of providing medical treatment for local women, as well as searching them and otherwise interacting with them."[39] The restrictions remain despite the Army's recognition that Specialist Brown's "bravery, unselfish action and medical aid rendered under fire saved the lives of her comrades and represents the finest traditions of heroism in combat."[40] The 19-year-old Brown became the second woman since World War II to receive the Silver Star, the nation's third-highest medal for valor.

Brown's actions in combat directly contradicted the policies of her commander in chief, Pres. George W. Bush, who announced in a 2005 press conference that he would not authorize women to serve in ground combat units although he accepted the roles of women on combat surface ships and in aircraft.[41] Although President Bush forbade women from serving in the infantry, artillery, armor units, and all special operations forces, he did not order them out of combat-support units and duties, such as medics, since such a directive would hamper the military's performance in Iraq and Afghanistan.[42]

Therefore, women carried on in their support duties and continued to excel in combat environments, with the exception of Specialist Brown. Within a week of the firefight that earned her the Silver Star, the Army chose to withdraw Brown from the field since, as she put it, "her presence as 'a female in a combat arms unit' had attracted attention."[43] This reaction by the Army appears dubious.

Discrepancies between policy and combat realities in regard to Specialist Brown's case were not the first incident to highlight the shortcomings of current policies on women in combat. Ironically, in the same year that President Bush issued his policy on women in combat, Sgt Leigh Ann Hester from the Kentucky National Guard came under fire during an ambush of her unit in Iraq, an event that eventually led to her nomination for a Silver Star. Thus, she became the first woman to receive this medal in the current conflict.

As a member of the 617th Military Police Company, Hester and her squad were escorting a supply convoy when Iraqi insurgents attacked. During the middle of the fight, she "led her team through the 'kill zone' and into a flanking position, where she assaulted a trench line with grenades and M203 grenade-launcher rounds."[44] Hester went on to clear two trenches of insurgents, killing three of them with her rifle. Rather than reveling in becoming the first woman since World War II to win the Silver Star, Sergeant Hester simply took pride in "the duties I performed that day as a soldier."[45] She attributed her response under fire to the training she received, claiming that she reacted as any Soldier should: "It's your life or theirs. . . . You've got a job to do—protecting yourself and your fellow comrades."[46] According to the *Washington Post*, the awarding of Hester's Silver Star "underscores the growing role in combat of U.S. female troops in Iraq's guerrilla war, where tens of thousands of American women have served, 36 have been killed and 285 wounded."[47]

Unlike the Army, whose female members must enter either the aviation arm or the military police for combat opportunities, the Air Force has allowed and even encouraged women to volunteer for combat positions.[48] After Secretary of Defense Les Aspin opened up combat aircraft to women in 1993, they slowly began to enter the male-dominated world of combat fighters and bombers. Despite Air Force encouragement and recruitment efforts to coax women into fighter and bomber aircraft, the number of female combat pilots remains small. As of 2008, only 70 women fly fighter aircraft.[49] That number reflects about a 50 percent increase of the 47 who flew fighters in 2002.[50]

One female fighter pilot in this new generation, Maj Melissa "Shock" May, who flies the F-16, recently received the Distinguished Flying Cross for a combat mission over Baghdad. During that mission, May and her four-ship formation took out Soviet-made mobile surface-to-air missiles to allow the Army to continue its movement into the city by enabling US air superiority.[51] One wingman who took fire had to drop his external fuel tanks in order to evade an incoming Roland missile. May described the scenario in an interview with the *Air Force Times*: "There we were, in the weather and getting shot at. . . . And, after dropping his tanks, he [her wingman] was low on gas."[52]

In reality, women do serve in combat despite the best attempts of some pundits to restrict or completely deny them the opportunities to do so. The All Volunteer Force depends on the skills and professionalism of women, who make up nearly 15 percent of the force. Military leaders across the services recognize the crucial roles that women play in successful mission accomplishment. Even though they have proven themselves capable of handling the rigors of various combat roles, and even though senior military leaders acknowledge the necessity of female participation, there remains strong political opposition to the issue of women in combat.

The Way Backward

Although the US military currently utilizes female Soldiers in Iraq and Afghanistan to gather intelligence through conversations with local women and to assist in policing female suspects, these same Soldiers are explicitly restricted from assignment to combat positions.[53] In 2005, legislation introduced in the House of Representatives sought to increase restrictions on female

participation in the war on terror by prohibiting women from serving in forward support companies.[54] In a paper responding to the outcry over the proposed amendment, supporters stated that "there is no military or demographic reason, however, why America must expose young women, many of them mothers, to direct ground combat."[55]

The Center for Military Readiness (CMR) goes even further in its objections to women in combat, proclaiming that the discussion involves not only the exposure of young mothers to the violence of combat but also the effectiveness of a gender-integrated fighting force. The CMR espouses that the realities of physical capabilities, unit discipline, ability to deploy, and unit cohesion trump calls for equal civic opportunities.[56] The center claims to support the right of women to serve but only in jobs that do not involve direct ground combat.

In his scathing criticism of women serving in the military (*Weak Link: The Feminization of the American Military* [1989]) and his follow-up (*Women in the Military: Flirting with Disaster* [1998]), Brian Mitchell pushes the debate beyond serving in combat to serving in the military altogether. He bases his conclusions on the fact that women do not adhere to the expectations of typical male combatants, using evidence from the service academies and recent sexual-assault scandals to drive home his point: "There are two kinds of cadets and midshipmen at today's federal service academies. One is male: aggressive, strong, daring, and destined for combat; the other is female: none of the above."[57]

At the heart of the debate over women in combat remain three basic propositions. First, female physical capabilities, including pregnancy issues, obviously differ from men's and thus affect overall unit effectiveness. Second, critics argue that the presence of women hinders unit cohesion by limiting male bonding and creating disciplinary challenges due to the supposed sexually charged nature of coed units. Finally, many people assert that a civilized society based on Judeo-Christian morality should not send its mothers and daughters into harm's way.[58] This final argument also uses the issue of sex to suggest that captured female combatants will certainly become victims of rape or sexual brutality and therefore should avoid exposure to such risks.

For example, Mitchell's second book on the subject, *Women in the Military: Flirting with Disaster*, highlights the Navy Tailhook scandal, the controversies over the Air Force's Lt Kelly Flinn, and the sexual-assault scandal at Aberdeen Proving Ground.[59] Interestingly, Mitchell either ignores or has no knowledge of scientific studies of female physical standards and cases of successful combat-unit integrations in the Air Force that occurred between publication of his two books.[60]

Most notably absent from his follow-up analysis is the US Army Research Institute of Environmental Medicine's 1997 study of how female Soldiers responded to a physical fitness regimen designed to improve their performance of specified tasks associated with assigned duties, such as heavy lifting and long-distance marches with 75-pound backpacks.[61] Following the prescribed Army time constraints for physical fitness programs, the study revealed that appropriate training vastly improved female Soldiers' performance. The training regimen—which replicated the actual work the women would do instead of emphasizing the typical push-ups, sit-ups, and long-distance-running programs—concluded that 78 percent of the participants could meet the Army's minimum requirements for "very heavy" jobs, up from the prestudy level of 24 percent.[62]

The results of the study suggest that with proper training, women can perform physically demanding duties despite their perceived physical inferiority. Furthermore, the female stature offers benefits that exceed those of males. For example, the smaller bone structure of a female mechanic enables her to reach areas within an aircraft engine that an average man cannot access.[63]

This study also highlights an important aspect of military readiness, the gender issue aside. Traditionally, prescribed physical

standards for military jobs have had little to do with the actual work at hand.[64] A perfect example is the obstacle course present at most military installations. Most military jobs do not require a service member to jump up and over a wall, but a barrier of this type remains a common element of all the services' obstacle courses.

Less documented evidence exists for directly disproving the two other arguments readily cited by opponents of allowing women in combat and in the military. The contention concerning the effect of women on unit cohesion and discipline clearly falls under the responsibility of unit leadership, at either the squad or service level. Prior to the integration of women into the military, unit cohesion and the good order and discipline of a unit challenged its leadership.[65] To make a persuasive argument, opponents had to frame the debate in terms of negatives associated with integrating women into military units. Thus, the concentration on physical standards, unit cohesion, discipline, and mission effectiveness represented a shifting of the "debate from the grounds of belief to that of practical effects."[66] Critics of allowing women in combat and in the military essentially chose to ignore the ramifications and challenges associated with homogeneous groups in favor of trying to prove that the presence of women created more problems within military organizations.

Truly, for these critics the debate most often rests on the notion that the nation's political leaders cannot morally allow and condone organized violence against the female segment of the population. This argument also appears difficult to prove since it derives from subjective views of morality. On the one hand, it is acceptable to allow women to serve in traditional female roles in the military since those do not directly involve them in violence. In testimony to a 1992 presidential commission, Mitchell states that "women are desperately needed as military doctors and nurses, for the very reason that the military cannot get enough doctors and nurses, male or female, as it is."[67] As long as women are protected from organized violence, social values remain intact. As Senator James Webb implied in a 1979 opinion piece and as the CMR currently suggests, allowing women to serve in the military condones and even encourages violence perpetrated against them.

Furthermore, none of the critics addresses the social acceptability and nobility of men engaging in organized violence against other men. Generally, each opponent of including women in combat and in the military implies that violence perpetuated by men against other men remains an acceptable societal norm. Their arguments consist of two simple explanations: (1) it is acceptable for men to engage in violence against other men but not for women to engage in or become victims of violence, and (2) society values its female members more highly since they deserve protection from violence.

Again, this aspect of their argument appears untenable. From a different perspective, it seems that American society places the safety of its female citizens above that of its male citizens, thus discriminating against the latter. Moreover, a closer examination of opponents' arguments reveals a lack of respect for half of the American population since they suggest that men serving in the military need to behave inappropriately in order to bond, develop their violent tendencies, and become effective combatants.

If Mitchell's argument holds and civilian leadership removes the 15 percent of women currently serving in the Army, would combat effectiveness diminish? In a RAND study of the assignment of Army women during recent operations in Iraq and Afghanistan, individuals in the field testified that "there simply were not enough personnel to do the job without women."[68] Moreover, which option would do more damage to the fabric of American society: full inclusion of women into the military based on physical capabilities, or revocation of laws that have allowed them to serve for

almost a generation? Finally, has the integration of women into combat roles truly impeded combat effectiveness? The final assessment remains unclear; thus far, however, women have proven formidable combatants, whether participating in official or unofficial capacities.

Realities of the All Volunteer Force in Overseas Contingency Operations

As the number of women in the military increases, commanders recognize that without their service in a variety of roles, units would struggle or even fail at their assigned missions. Since the Gulf War, military leadership has recognized that the "United States [can] no longer fight a major war or campaign without women."[69] Detractors counter that this reliance on women in critical roles directly results from services' decision to assign women to those roles.

Current hostilities confronting the United States present no clear delineation between front and rear lines. Rosemarie Skaine, an expert on gender issues in the military, suggests "that the old front line no longer exists because present day conflicts are peacekeeping tasks and that modern weaponry is more technologically operated than in the past."[70] Current Department of Defense, Army, and Marine Corps policies continue to restrict women from direct ground-combat roles, yet support positions such as those in the military police, supply, and intelligence have placed women into Iraq's and Afghanistan's "fluid lines of conflict" and "challeng[e] traditional ideas about what constitutes a 'combat' position."[71]

Moreover, the notion that exclusion policies protect women from the dangers of combat directly conflicts with the realities of insurgencies or irregular wars presently ongoing in Iraq and Afghanistan. The disparity is most evident in the Army's use of women. Erin Solaro, a proponent of opening up combat roles to women, describes how, "in our current war, for example, female soldiers drive fuel tankers all over Iraq. They are not, however, allowed to crew tanks. A fuel tanker is not a glamorous target, but it is a lucrative one, particularly if it is resupplying tanks or Bradley fighting vehicles."[72] Although the Air Force continues to lead the services in terms of integration, specific career fields such as special operations remain closed to women. Women can fly close air support missions to assist special operations forces on the ground and risk being shot down and captured by the enemy; however, they cannot serve in those ground units.

Over the three decades since the integration of women into the armed forces, organizational decisions, cultural shifts and evolutions, and the performance of women have contributed to a convoluted organizational schema or thought process that now pervades the US military: Policies exclude women from combat, yet they have performed well in combat; since operational needs sometimes dictate the use of women in these traditional combat roles, the armed forces will merely temporarily attach them to those restricted roles.

Solaro explains how this organizational schema, instituted in the early years of the All Volunteer Force and in effect today, demonstrates "the lineal ancestor of the present pretense that women in Iraq and Afghanistan are not *assigned* to combat units, only *attached*" (emphasis in original).[73] The armed services have always accepted the possibility that women may become involved in combat yet have willingly chosen to deny them opportunities to serve in official, direct ground-combat positions. In reality, however, women do perform duties in direct ground combat. Paul Wolfowitz, former deputy secretary of defense, clearly recognizes the truth about the environment in which the integrated US military operates: "As we consider the issue of womanpower in the service today it's not just a matter of women being entitled to serve this country. It is a simple fact that we could not operate our military services without women. And as skill levels essential to our missions continue to increase, it will be even more essential that we draw

from all our citizens, that we draw from the largest pool of talent available."[74]

The Solution: Selection Based on Capabilities, Not Gender

Along with the apparent evolution of American society's perception of women serving in combat, one sees evidence of a cultural shift. In the two current wars, women have died in the line of duty and in combat operations with no outcry from the American public. Contrary to the opinion that the spectacle of bringing women home in body bags would trigger enormous public outcry, there is "little evidence that the [American] public is somehow less willing to tolerate their suffering than that of men."[75] The only public outcries have come primarily from antiwar critics who use the death of any service member to draw attention to their political position.

Fears that placing women in combat positions would precipitate declines in the military's combat effectiveness have not been realized. The fact remains that influences other than women's involvement—such as technological advances in communications—have created greater changes in the military.[76] Similarly, dependence on the All Volunteer Force has also induced the military to adapt to the realities of women making up an increasing percentage of the services. Since "the country's ability to maintain an all-volunteer army has been considered to depend on the effective use of the female labor force," military leaders who deride a return to the conscripted force have had to find a way to exploit the capabilities of women.[77]

Not all attempts have been successful, as Solaro suggests. However, just as the integration of black Soldiers took time to overcome organizational biases and obstacles, so is the integration of women into combat roles slowly moving forward. Senior Army leaders acknowledge the contributions of female Soldiers in the counterinsurgencies in Iraq and Afghanistan. Many Army leaders, including Gen Gordon Sullivan, former chief of staff, challenged a proposed congressional amendment in 2005 that would have further restricted women's combat roles simply because such a reversal would hamstring Army operations around the world by closing 21,925 slots currently open to female Soldiers.[78]

For the American military, much of the emphasis has shifted away from the inabilities of its members to the capabilities they bring to the fight. In the case of female Soldiers on patrol in Iraq, their gender has allowed the military to engage and interact with half of the Iraqi population without violating cultural taboos and restrictions, thus facilitating greater human intelligence, threat assessment, and access to the people often responsible for rearing the next generation of Iraqi citizens. If followed to the letter, current policies would deny the military these opportunities.

Critics suggest that Gen Norman Schwarzkopf condemned women to minor support roles in the military when he declared, "Decisions on what roles women should play in war must be based on military standards, not women's rights."[79] Schwarzkopf's assessment actually supports the idea that *capability, not gender* should enable or preclude an American from serving in combat. Furthermore, "the situation and 'the rules' have changed but our modern military has not adapted itself to this new world"; refusal by opponents to acknowledge the realities of the performance of women in combat roles only hinders the debate.[80] To ensure appropriate policies on combat forces, the military must practice honest and objective assessment.

Once capabilities rather than gender drive assignment decisions, all other issues associated with integrating women would become typical leadership challenges. Should members of an integrated unit, for example, engage in inappropriate relationships, unit leadership must address these situations and mete out appropriate punishment for violations under the *Uniform Code of Military Justice*.

Conclusion

> *The real catch was to have a female medic out there because of the cultural sensitivities and the flexibility that gave commanders. It is absolutely not about gender in terms of how they [women] will do.*
>
> —Maj Paul Narowski
> 73rd Cavalry Regiment

Overseas contingency operations have rekindled debate over the assignment of American women to combat positions, revealing that the regulations governing the role of women in combat are "vague, ill defined, and based on an outmoded concept of wars with clear front lines that rarely exist in today's counterinsurgencies."[81] Despite the realities of the current conflicts, the debate over the role of women in combat will never cease as long as political leaders continue to relegate women to inferior roles in American society.

By acknowledging the vital role women play in armed conflicts, the political leadership of the United States can shape American culture to recognize that women can and do engage in violence for and against the state. When Americans can culturally accept this fact, troops fighting the current wars will be better prepared to face female insurgents in the future. Ultimately, such insurgents share similar motivations and strive for the same universal objectives as military women and their predecessors in the resistance: they fight to give their children a safe future.

Abdullah Öcalan, leader of the Kurdistan Worker's Party, explains that modern female resistance fighters and suicide bombers are "fully aware of being free women with an important message to pass on and who could be examples to all women the world over."[82] Furthermore, tactics employed by terrorist organizations and insurgencies, including the use of female combatants, have rendered combat-exclusion policies pointless. A recent RAND study of the Army's assignment of women to combat roles found current policy "not actionable" since it was "crafted for a linear battlefield" that depended on notions of "forward and well forward [that] were generally acknowledged to be almost meaningless in the [current] Iraqi theater."[83] If America's current enemies, undoubtedly more conservative about the role of women in their societies, acknowledge the efficacy of female combatants in their operations, political leaders must recognize what military leaders have accepted as fact. Women can contribute successfully to combat operations and remain ready to do so.

American female warriors face strong criticism from pundits who desire a return to an all-male combat force. Like their sisters who fought for the Soviet Union, American women serve a nation that propagates notions of equality yet continues to discriminate, based on gender. When President Bush "forcefully backed the Army's [combat exclusion] restrictions" and proclaimed a policy of "no women in combat," he reinforced the notion that American women are not the equals of American men.[84] Such proclamations further inhibit the abilities of women to integrate fully and reinforce perceptions that they are incapable of effectively serving in combat roles.

Operations in Iraq and Afghanistan directly contradict the arguments put forth by critics of using women in combat. Females have proven that they are formidable fighters who can engage in direct ground combat. Combat units such as Private Brown's have accepted women as equal members, Brown's unit considering her "one of the guys, mixing it up, clearing rooms, doing everything that anybody else was doing," and wanting to keep her as its medic.[85] Recently, George Casey, the Army chief of staff, testified to lawmakers that combat-exclusion policies needed review "in light of how women have served in the two wars."[86] This announcement came after the Navy rescinded its policy banning women from serving on submarines. Apparently, a move to lift all bans and use capabilities-based standards to determine fitness for duty in

any position enjoys strong support, although conservative opposition continues to paint a picture of mothers going off to war. However, John Nagl, retired Army lieutenant colonel and president of the Center for New American Security, assessed that in light of the 220,000 women who have fought in both wars and the 120 who have paid the ultimate price, we should "simply recogniz[e] a truth that's already been written in blood and sweat on the battlefield."[87]

The wars in Iraq and Afghanistan have forced the United States to reevaluate a number of foreign and domestic policies as well as the organizational structures of American armed forces. These wars have also highlighted the need for policy makers to reconsider combat-exclusion rules that currently govern US combat operations. Women have always been subjected to the violence of war. It is now time for the United States to encourage and empower American women to serve in combat roles if they meet physical requirements determined by the specific role—not some arbitrary physical standard. Policy leaders should rescind current combat-exclusion policies and welcome American women as civic equals. ✪

Notes

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3. Reina Pennington, "Wings, Women and War: Soviet Women's Military Aviation Regiments in the Great Patriotic War" (master's thesis, University of South Carolina, 1993), 3.

4. Ibid., 8.

5. Kazimiera Janina Cottam, *Women in War and Resistance: Selected Biographies of Soviet Women Soldiers* (Nepean, ON: New Military Pub., 1998), xviii.

6. Pennington, "Wings, Women and War," 9.

7. Anne Noggle, *A Dance with Death: Soviet Airwomen in World War II*, 1st ed. (College Station, TX: Texas A&M University Press, 1994), 6.

8. Pennington, "Wings, Women and War," 25.

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10. Cottam, *Women in War and Resistance*, xix.

11. Noggle, *Dance with Death*, 7.

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14. Kazimiera Janina Cottam and Galina Markova, *Soviet Airwomen in Combat in World War II* (Manhattan, KS: Military Affairs/Aerospace Historian, 1983), xii.

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18. Bernard Lewis, *The Middle East: A Brief History of the Last 2,000 Years* (New York: Scribner, 1995), 206.

19. Marnia Lazreg, *Torture and the Twilight of Empire: From Algiers to Baghdad* (Princeton, NJ: Princeton University Press, 2008), 151.

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24. Ibid.

25. Kai Adler, "The Women of Hamas: 'Islam Protects Us,'" *Qantara.de*, 26 January 2006, http://www.qantara.de/webcom/show_article.php/_c-478/_nr-391/i.html.

26. Anne Applebaum, "Girl Suicide Bombers," *Slate*, 2 April 2002, http://www.slate.com/?id = 2063954.

27. For an example of this kind of reporting, see Caroline Wyatt, "Moscow Siege Leaves Dark Memories," BBC News, 16 December 2002, http://news.bbc.co.uk/2/hi/europe/2565585.stm.

28. Mail Foreign Service, "Hunt for 'Black Widow' Terror Gang after Female Suicide Bombers Kill at Least 38 in Bomb Attacks on Moscow Trains," 29 March 2010, http://www.dailymail.co.uk/news/worldnews/article-1261502/Female-suicide-bombers-Moscow-kill-30-attacks-tube-trains.html.

29. Ibid.

30. Christoph Reuter, *My Life Is a Weapon: A Modern History of Suicide Bombing* (Princeton, NJ: Princeton University Press, 2004), 150.

31. Robert Anthony Pape, *Dying to Win: The Strategic Logic of Suicide Terrorism*, 1st ed. (New York: Random House, 2005), 32.

32. Rosemarie Skaine, *Female Suicide Bombers* (Jefferson, NC: McFarland, 2006), 51.

33. Pape, *Dying to Win*, 229.

34. Ibid., 230.

35. Ibid.

36. Arjuna Gunawardena, "Female Black Tigers: A New Breed of Cat?" in *Female Suicide Bombers: Dying for Equality?* [JCSS Memorandum no. 84], ed. Yoram Schweitzer (Tel Aviv: Jaffee Center for Strategic Studies, Tel Aviv University, August 2006), 84.

37. Associated Press, "Female Texas Teen to Receive Silver Star," CBS News, 9 March 2008, http://www.cbsnews.com/stories/2008/03/09/terror/main3920151.shtml.

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39. Ann Scott Tyson, "Woman Gains Silver Star—and Removal from Combat: Case Shows Contradictions of Army Rules," *Washington Post*, 1 May 2008, http://www.washingtonpost.com/wp-dyn/content/article/2008/04/30/AR2008043003415.html.

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41. Erin Solaro, *Women in the Line of Fire: What You Should Know about Women in the Military* (Emeryville, CA: Seal Press, 2006), 141.

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50. Grant, "Quiet Pioneers."

51. Patrick Winn, "Female Airmen Deadly in Iraq, Afghanistan," *Air Force Times*, 13 January 2008, http://www.airforcetimes.com/news/2007/12/airforce_deadly_women_071229w/.

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53. Solaro, *Women in the Line of Fire*, 16.

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55. Center for Military Readiness, "The Hunter/McHugh Amendment to H.R. 1815: Codif cation of DoD Regulations Re: Women in Land Combat," 23 May 2005, 3, http://cmrlink.org/CMRNotes/Hunter-McHugh%20FAQ's%20052305.pdf.

56. Center for Military Readiness, "Women in Combat: Frequently Asked Questions," 22 November 2004, http://www.cmrlink.org/WomenInCombat.asp?DocID = 237.

57. Brian Mitchell, *Weak Link: The Feminization of the American Military* (Washington, DC: Regnery Gateway, 1989), 86.

58. Helena Carreiras, *Gender and the Military: Women in the Armed Forces of Western Democracies*, Cass Military Studies (London: Routledge, 2006), 89.

59. Lt Kelly Flinn, the f rst female B-52 pilot, created controversy by having an affair with an enlisted woman's husband. For more information, see "Times Topics: Kelly J. Flinn," *New York Times*, http://topics.nytimes.com/top/reference/timestopics/people/f/kelly_j_f inn/index.html. In 1996 Aberdeen Proving Ground had a series of incidents involving sexual harassment, assault, and rape, which led to the convictions of several Army off cers and noncommissioned off cers.

60. In 1992 a presidential commission examined the role of women in military service, addressing a variety of subjects, including combat exclusion. The 1992 Presidential Commission on the Assignment of Women in the Armed Forces recommended that women continue to be banned from combat posi-

tions; however, a number of commission members publicly dissented.

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63. Lorry M. Fenner and Marie E. deYoung, *Women in Combat: Civic Duty or Military Liability?* (Washington, DC: Georgetown University Press, 2001), 10.

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67. Brian Mitchell, *Women in the Military: Flirting with Disaster* (Washington, DC: Regnery Publishing, 1998), 350.

68. Margaret C. Harrell et al., *Assessing the Assignment Policy for Army Women* (Santa Monica, CA: RAND Corporation, 2007), 54, http://www.rand.org/pubs/monographs/2007/RAND_MG590-1.pdf.

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70. Rosemarie Skaine, *Women at War: Gender Issues of Americans in Combat* (Jefferson, NC: McFarland & Company, 1999), 25.

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73. Ibid., 162.

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75. Yeager, "Soldiering Ahead," 56.

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77. Carreiras, *Gender and the Military*, 84.

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79. Presidential Commission on the Assignment of Women in the Armed Forces, "Section II—Alternative Views: The Case against Women in Combat: Executive Summary" (Washington, DC: The Commission, 1992), 46, http://cmrlink.org/CMRNotes/PCAWAF-AV.pdf.

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81. Tyson, "Woman Gains Silver Star."

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83. Tyson, "Woman Gains Silver Star."

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86. Dan De Luce, "Wars Force US Military to Review Ban on Women in Combat," Agence France-Presse, 27 February 2010, http://www.google.com/hostednews/afp/article/ALeqM5gCawP28SAr_a-XX1k8Bpk8YpsIUQ.

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Lt Col Kristal L. Alfonso, USAF

Lieutenant Colonel Alfonso (BA, North Carolina State University; MAAS, School of Advanced Air and Space Studies; MMOAS, Air Command and Staff College; MS, Troy University) is currently assigned to the 566th Intelligence Squadron at Buckley AFB, Colorado. At the School of Advanced Air and Space Studies (SAASS), she received the Commandant's Award for Best SAASS Thesis on Leadership and Ethics for "Femme Fatale: An Examination of the Role of Women in Combat and the Policy Implications for Future American Military Operations," her master's thesis. A former aircraft maintenance officer and KC-135R pilot, Lieutenant Colonel Alfonso has also served on the faculty at the United States Air Force Academy and most recently as a defense analyst at the Air Force Research Institute. A frequent contributor to Air University's online journal *The Wright Stuff*, Lieutenant Colonel Alfonso recently published "A Cyber Proving Ground: The Search for Cyber Genius" in the Spring 2010 issue of *Air and Space Power Journal*.

Civilian Language Education in America

How the Air Force and Academia Can Thrive Together

Col John Conway, USAF, Retired

Higher education is primarily a long-term supplier of general and specialized talent for government and other sectors. It is an aquifer not a spigot. While it can respond quickly for "comet" needs of government, its strength is in maintaining "a constellation" of resources.

—Nancy L. Ruther
Yale University

The Quadrennial Defense Review (QDR) of 2006 first proposed that Department of Defense (DOD) language planners focus on preaccession language education instead of spending time and treasure to teach foreign languages to recruits and second-termers, a proposal echoed in the QDR of 2010.[1] Since "preaccession language education" almost always connotes formal college and university coursework, it appears that the last two QDRs seek to strengthen the linguistic skills of the officer corps. However, a lack of both direction for and understanding of what this nation's language education system can provide continues to hamstring efforts to expand preaccession language training.

We are still feeling the effects of changes in foreign language education in America that occurred in the World War I era. The decades prior to that war saw robust enrollment in foreign language courses, in both high schools and colleges, reflecting the country's strong immigrant heritage.[2] The

study of German had acquired "prestige" status as America's public schools embraced Germany's model of instruction. Many people considered German the language of the educated person; consequently, it comprised about 24 percent of all language instruction in public high schools in 1915.[3] Only the traditional study of Latin boasted a higher enrollment (37.3 percent). Moreover, one-third of all US universities required applicants to have studied German or French for two to four years, and fully 85 percent demanded that prospective students pass a foreign language competency test prior to matriculation.[4]

Upon America's entry into the war in 1917, German virtually disappeared from every high school curriculum in a wave of anti-German sentiment, attracting less than 2 percent of all language students.[5] Enrollment in French and Spanish rose, but neither reached German's earlier numbers. Latin remained strong, but the decline in German offerings prompted some students simply not to take a foreign language at all.[6] With German marginalized, French became the new prestige language, in time morphing into language instruction only for individuals seeking postsecondary education.[7] This trend became codified in the college preparatory track as a requirement for higher education—to the virtual exclusion of the vocational track. Consequently, enrollment in foreign language, once nearly universal across the American educational spectrum, continued to diminish in the decades after World War I.[8]

But a more ominous trend emerged: by 1920, 22 states had prohibited the teaching of foreign languages, some of them outlawing any such instruction below eighth grade.[9] Underpinning this linguistic xenophobia—fueled initially by anti-German feelings during World War I—was the idea that citizens could neither understand nor appreciate American ideals without learning them in English. Thus, the teaching of foreign languages became "un-American" or "unpatriotic."[10] Learning another language exposed students to other cultures and thus divided their loyalties, as expressed by a Nebraska statute of that era: "To allow the children of foreigners, who had emigrated here, to be taught from early childhood the language of the country of their parents was to rear them with that language as their mother tongue. It was to educate them so that they must always think in that language, and, as a consequence, naturally inculcate in them the ideas and sentiments foreign to the best interests of this country."[11]

It took no less than a Supreme Court ruling in 1923 to overturn such laws.[12] By then the damage was done, however. Foreign language education in the elementary grades virtually disappeared for the next four decades; initial language education was relegated to high schools; and the rise of isolationism in America kept the study of foreign languages on the ragged edge of patriotism.[13]

Thus, this country had truncated a basic tenet of language education theory—that mastery of a foreign language took a long time and should begin early. In 1940 a national report on what high schools should teach recommended the elimination of foreign language instruction, among other subjects, because the "overly academic" curriculum in high schools caused too many students to fail.[14]

Today that legacy continues. The No Child Left Behind Act of 2001 emphasizes the testing of students in reading and mathematics to the exclusion of many other subjects, including foreign languages.[15] Panelists at a Senate subcommittee hearing on federal foreign language strategy in 2007 specifically criticized the act, noting that such standardized testing impeded the addition of foreign language instruction to cur-

riculums. "Foreign languages are being left out due to No Child Left Behind," one of them bluntly declared.[16] A recent survey by the Center for Applied Linguistics reported that this legislation has negatively affected approximately one-third of public elementary and secondary schools with language programs, adding that it has diverted resources from foreign language instruction to "accountable" courses in mathematics and reading.[17]

Language Study as a Sequence

Why should the Air Force care about foreign language courses taught in elementary schools and high schools? A study conducted in 2002 points to elementary-level foreign language education as the "sequence starting point" for studying a second language in nearly every country except the United States, which tries to produce competent students of foreign languages in the unrealistically short span of two to four years of high school or two to four semesters of college.[18] The study's author echoes what many other linguistic scholars propose: acquiring any proficiency in a second language requires an extended sequence of study. In short, the sooner one begins language studies, the better.

Former White House chief of staff (and current director of the Central Intelligence Agency) Leon Panetta has described our current system of instruction in foreign languages as "discontinuous," with "considerable slippage" in language study between high school and college.[19] In 2000—the most recent year for which data on language enrollment in secondary schools are available—approximately 5.9 million students took language classes in high school.[20] Two years later, only about 1.4 million students took them in college.[21]

One explanation—that many high school students don't attend college—would account for some of this disparity. However, the enrollment in 2006 of only 1.58 million college students in language courses (of over 17 million college students nationwide) suggests some continuing apathy on the part of the students, colleges, or both.[22] Most colleges do not require a foreign language for graduation; in fact, many doctoral programs require no language, much less demonstrated proficiency in two languages for graduation.[23] Of the four-year institutions that responded to the Modern Language Association's (MLA) survey in 2006, 7.8 percent reported teaching no language courses at all.[24]

Moreover, most of these college language students enroll at the introductory level (first and second year), less than 20 percent of them going any further.[25] Given the gulf in language study between high school and college and the paucity of language students advancing beyond the basic four semesters of college, it is painfully obvious that college language instruction offers no easy solution to the Air Force's needs.

A Brief Quantitative Assessment of Language Education

How well does college-level language instruction prepare individuals to meet the military's needs? Does a correlation exist between classroom hours and DOD test scores? On the one hand, some scholars claim that no formula can accurately determine the length of time necessary to attain various levels of language proficiency because of the unquantifiable nature of motivation and aptitude. On the other hand, various other language authorities have attempted to quantify the abovementioned correlation.

The International Language Roundtable (ILR) defines a listening/reading level of 1/1 as "elementary proficiency." In the listening category, level 1 denotes comprehension of utterances that meet basic needs for survival, courtesy, and travel. A score of 1 in reading indicates sufficient comprehension to read simple connected sentences.[26] The International Center for Language Studies calculates that 150 hours of class-

room instruction can produce a score of 1/1 in the Romance and Germanic languages, considered the easiest to master.[27] At the other end of the scale, Arabic, Mandarin Chinese, Japanese, and Korean—some of the most difficult languages for English speakers to learn—demand more than twice that figure (350), equivalent to nearly eight semesters of college instruction (assuming that four semesters of a college language course equate to about 180 hours of classroom instruction).[28] In most colleges and universities, eight semesters would certainly qualify a student for a minor concentration in a language. (See table 1 for the ILR's breakdown of hours required for various levels of proficiency. Note that any level beyond 3 calls for immersion studies in that language's native setting. In other words, classroom instruction will carry a student only so far.)

Furthermore, because college instruction in languages usually occurs at a relatively leisurely pace and is not as intense and goal-directed as classes at the Defense Language Institute (DLI) or Foreign Service Institute, students would probably have to take more classroom hours to attain the same results on the Defense Language Proficiency Test.[29] According to an interview with the DLI's acting chancellor in 2005, the institute's French students "burn through a typical college French textbook in about six weeks."[30] Lastly, the number of hours devoted to reaching proficiency rises exponentially, not linearly—a fact that substantially affects those who wish to increase their language skills but have limited time for language study. Basic language acquisition requires considerable time, and upper–level study even more, creating a problem in any Air Force work setting not directly tied to language proficiency. For example, medical personnel who participate in the International Health Service's language program would have to take increasingly more time away from clinical work (and their continuing education requirements as medical professionals) to score higher on the Defense Language Proficiency Test.

Table 1. Classroom hours required for proficiency levels by language difficulty

ILR Levels from S/L/R[a] 0 to:	*S/L/R 1*	*S/L/R 2*	*S/L/R 3*	*S/L/R 4*
Romance and Germanic Languages (French, Spanish, Portuguese, Italian, Romanian, German, Afrikaans, Danish, Dutch, Norwegian, Swedish)	150 hours	400 hours	650 hours	[b]
Arabic, Mandarin Chinese, Japanese, Korean	350 hours	1,100 hours	2,200 hours	[b]
All Others (e.g., East European, African, and Asian Languages)	250 hours	600 hours	1,100 hours	[b]

Adapted from International Center for Language Studies, "Classroom Hours to Achieve Prof ciency Levels by Language Difficulty," International Center for Language Studies, Washington, DC, http://www.icls.com/FLD/ILRlevels.htm.

Note: Reaching these goals assumes that the student will supplement every f ve hours of classroom study with a minimum of two to three hours of preparation.

T is table, an adaptation of the expected levels of speaking prof ciency for various lengths of training according to the US State Department's Foreign Service Institute, is intended to meet the needs of private-sector students.

T ese equations vary slightly: the Foreign Service Institute estimates that students will need 575–600 hours of its classroom instruction in the Romance languages to reach level 3/3. See Mary Ellen O'Connell and Janet L. Norwood, eds., *International Education and Foreign Languages: Keys to Securing America's Future* (Washington, DC: National Academies Press, 2007), 45. For the most difficult languages (Chinese, Arabic, etc.), the Foreign Service Institute mandates that students spend the second year of their 88-week course in the target country.

[a] S = speaking prof ciency, L = listening prof ciency, R = reading prof ciency

[b] Generally, classroom instruction cannot attain level 4 because such prof ciency demands extensive use of language in a native setting.

Such a time-management problem could force an Airman to choose between professional duties and the pursuit of improved language skills.

Producing Officers Prof cient in Foreign Languages

As the QDRs of 2006 and 2010 point out, the military should emphasize preaccession language training to meet most of its needs instead of relying on postaccession language study.[31] The intensive training nature of the first year of an officer's career, featuring Undergraduate Pilot Training, Undergraduate Navigator Training, or a host of other technical courses, seriously inhibits language training after commissioning.

One must also address a broader issue. With few exceptions, line officers in the US Air Force receive their commissions via three distinct routes: the US Air Force Academy (USAFA), Officer Training School (OTS), and Air Force Reserve Officer Training Corps (AFROTC). Although each produces some language-capable members, each has its own language drawbacks.

Given the finite number of USAFA graduates each year, only a few will have majored or minored in foreign languages. Moreover, even though the academy has increased its language offerings, they cannot possibly match the number found on civilian campuses across America (approximately 219 in 2006).[32]

At this writing, OTS admits only technical majors—engineers, biologists, and the like—so language majors who wait until after graduation for commissioning cannot pursue this route.[33] Native-speaker candidates for OTS more often reflect a happy circumstance than targeted recruitment; hence, only a small number of Air Force officers with native language ability obtain their commissions through OTS.

Consequently, America's colleges and universities represent the greatest "aquifer" of foreign language studies in the country. Opportunities for language majors to receive AFROTC scholarships have soared recently—an impressive number of such students could merit these awards.[34] In addition, senior ROTC cadets are taking advantage of a provision in the National Defense Authorization Act of 2009 that authorizes a bonus for completing coursework in a number of foreign languages, even if their studies do not lead to a degree.[35] The Air Force anticipates that the numbers of participants in the program will grow to nearly 1,000 in the 2010–11 academic year.[36]

However, as noted above, the American educational system has its own problems providing what the Air Force needs: about half of the US colleges and universities that host AFROTC detachments offer only French, German, and Spanish (the "Big Three"), and 15 percent of those campuses have no language programs at all.[37] If the Air Force truly desires preaccession instruction in the rest of the languages of the world, it will either have to place AFROTC detachments at civilian institutions that offer them or push for curriculum changes at existing AFROTC locations.[38]

Section 529 of Public Law 111-288 (which places into law the National Defense Authorization Act for Fiscal Year 2010) takes this concept a step further, authorizing the secretary of defense "to establish language training centers at accredited universities, senior military colleges, or other similar institutions of higher education" to accelerate "foundational expertise in critical and strategic languages." It authorizes a sweeping language education program tied to the nation's colleges and available for all military and civilian members of the DOD. The law also pays particular attention to incorporating these programs into ROTC.[39] Although it is too early to determine the implementation of this law, it does highlight the important role that colleges and universities will play in language education.

However, despite any wholesale push for less commonly taught language (LCTL) classes for AFROTC cadets, the differences between academia's language goals and those of the military are striking. The con-

cept of knowledge for knowledge's sake sets academia apart from the DLI or even the USAFA insofar as universities have no mandate to produce two dozen Dari linguists in six months. Rather, in academe, it is enough to explore Dari as a language. Colleges and universities have no imperative to create Urdu linguists at the 3/3 level, teaching any course in the Urdu language almost by happenstance and assuming that it *should* rather than *must* be offered.

Even if colleges offer niche language courses, they face the continuing issue of funding them. According to Dr. Gilbert Merkx, vice-provost for international affairs at Duke University, the language edifice at America's colleges is "pretty impressive but nonetheless fragile." He believes that many of the LCTL courses might possibly "disappear" unless sustained by federal funds.[40]

Moreover, the military now emphasizes speaking another language instead of just reading and listening to it.[41] A strong speaking requirement, however, runs contrary to the traditional academic approach to language study, which emphasizes grammar and literature, particularly in the foundational courses. Admittedly, schools offer classes in conversation, but they occur later in the academic process and build on acquired grammar and vocabulary skills. One finds this approach across all of academia: a heavy literary focus in foreign language studies instead of a flexible, student-oriented set of courses.[42] Some people view this situation as a clash between the "instrumentalist" approach used by "freestanding language schools" to meet their students' needs and the college/university foreign language department's "constitutive" approach, which focuses on the relationship between cultural and literary traditions, cognitive structures, and cultural knowledge.[43] An MLA white paper published in 2009 further emphasizes the constitutive approach: "language and literature need to remain at the center of what departments of English and languages other than English do. . . . The role of literature needs to be emphasized. . . . The study of language should be integral to the study of literature."[44] Even though this traditional approach remains in the best tradition of the liberal arts, one MLA committee does address the need to develop courses in translation and interpretation, citing a great "unmet demand."[45]

Congress has recommended targeting ROTC language and culture grants toward the largest "feeder schools, particularly the five senior military colleges," to develop programs in critical languages.[46] However, these five—the Citadel, Virginia Military Institute, North Georgia College and State University, Norwich University, and Texas A&M University—have varied lists of language offerings beyond the Big Three, courses in Arabic and Chinese being the most common. Virginia Military Institute and Texas A&M offer the most advanced classes, but all five adhere to the same literature-centric approach that characterizes language study at the postsecondary level.[47]

A defining factor regarding the difference between the academic and directed approaches to language training involves the relatively leisurely pace of the former and the intensity of the latter. The DLI turns out Arabic linguists in a year or so, equivalent to a four-year college curriculum with summers off or maybe one overseas immersion. Many language experts believe that anything less than majoring in a language won't produce an adequate linguist.[48]

Finally, language majors have few incentives to become officers in the Air Force. The service offers no officer Air Force Specialty Codes for linguists, translators, or the like, and no real opportunities for them to serve. AFROTC currently does not require a foreign language for commissioning, and officers have few opportunities to use language skills immediately upon commissioning.[49]

Language Enrollments

Language enrollments continue to rise in both two- and four-year colleges, up al-

most 13 percent between 2002 and 2006 (table 2). The raw numbers for 2006 (1.58 million students enrolled) represent real growth of 160 percent over enrollments in 1960 (608,749). However, the 2006 numbers represent only 8.9 percent of total college and university enrollments of 17.65 million. That ratio is roughly half of the 1960 ratio of 16.1 percent.[50]

Spanish, the language most widely taught in college since 1970, boasted 822,985 students in 2006, eclipsing the total enrollment of all other languages combined (approximately 755,000), a trend that has persisted since 1995. French is a distant second (206,426), and German third (94,264). Surprisingly, the fourth most widely taught language in American colleges and universities, with 78,829 enrollments, is American Sign Language. These four make up over 76 percent of all college language enrollments for 2006. However, Spanish, German, and French are considered abundant in the Air Force, although one can make a case for needing French in Africa Command's area of responsibility. American Sign Language has no practical military use at all.[51]

Some explanations and caveats to the totals in this table are in order. These data reflect raw numbers and do not indicate whether students take more than one language course at a time, which would lower the aggregate totals. If one excludes two-year colleges from the data, introductory language classes account for over 78 percent (approximately 915,000) of these enrollments, with advanced classes making up the remaining 22 percent (approximately 255,000), for a ratio of 7:2.[52]

Moreover, these data do not identify the number of classes in conversation, presumably in the advanced-class category. Since 198,598 of the enrollments in advanced classes are in Spanish, French, and German (198,598 of a total of 255,105 advanced enrollments—nearly 78 percent), it suggests that colleges and universities teach relatively few other languages above the introductory level.[53]

Nevertheless, one sees an increasing trend toward students earning degrees in

Table 2. Fall 2002 and 2006 language course enrollments in US institutions of higher education (languages in descending order of 2006 totals)

	2002	2006	% Change
Spanish	746,267	822,985	10.3
French	201,979	206,426	2.2
German	91,100	94,264	3.5
American Sign Language	60,781	78,829	29.7
Italian	63,899	78,368	22.6
Japanese	52,238	66,605	27.5
Chinese	34,153	51,582	51.0
Latin	29,841	32,191	7.9
Russian	23,921	24,845	3.9
Arabic	10,584	23,974	126.5
Greek, Ancient	20,376	22,849	12.1
Hebrew, Biblical	14,183	14,140	–0.3
Portuguese	8,385	10,267	22.4
Hebrew, Modern	8,619	9,612	11.5
Korean	5,211	7,145	37.1
Other languages	25,716	33,728	31.2
Total	1,397,253	1,577,810	12.9

Reprinted from Nelly Furman, David Goldberg, and Natalia Lusin, *Enrollments in Languages other than English in United States Institutions of Higher Education, Fall 2006* (New York: Modern Language Association, 13 November 2007), 13, table 1a, http://www.mla.org/pdf/06enrollmentsurvey_f nal.pdf.

other languages. According to graduation data compiled by the National Center for Education Statistics, US colleges and universities awarded 17,866 bachelor's degrees in foreign languages and literatures in 2007–8, almost 72 percent of them in Spanish (9,278), French (2,432), and German (1,085).[54] This still leaves a substantial cohort of 5,071 students with bachelor's degrees in other languages (including 289 in Chinese and another 57 in Arabic), possibly representing a fertile source of recruitment.[55]

The Rise of Less Commonly Taught Languages

Other than Biblical Hebrew, enrollments in the rest of the top 15 languages show sustained growth and, happily, the Air Force needs most of them. Among those languages, Arabic (Modern Standard) and Chinese (Mandarin) have seen the greatest increases in the number of students (126 percent and 51 percent, respectively) since 2002 and in the number of institutions offering classes.[56]

Both of these languages fall into that linguistic grouping commonly referred to as LCTLs. Although the phrase "less commonly taught languages" seems self-explanatory, the concept itself requires some clarification. In reality, LCTLs include all languages other than the Big Three. Some, such as Igbo, are used by small population groups. Most of the others suffer from the paucity of courses available throughout academe—something particularly true of African languages such as Hausa and Yoruba, as well as tongues from the Pacific Rim such as Malay and Indonesian.[57]

Instruction in these and many other LCTLs is available across the country but usually only at larger universities, some of which have formal centers for such languages. Classes are generally small and in some cases taught not by permanent faculty members but by native speakers in the United States on Fulbright scholarships. Characteristically, universities may offer coursework in an LCTL one year but not the next; textbooks may not be readily available; and the quality of instruction may vary widely.[58] Though commonly thought difficult to learn, LCTLs run the gamut from no more problematic than French or Spanish (languages such as Portuguese and Swahili) to extremely difficult (Chinese, Japanese, Korean, and Arabic).[59] Not surprisingly, the Air Force and the other services have great interest in drawing many LCTLs from the aquifer of academia.

A "Social Demand Theory" of Language Education

Perhaps in America one really doesn't perceive a lack of speakers of foreign languages so much as lack of a formal *demand* for them—a view described as a "social demand model." Such a model involves a gap between the need (in this case, language experts in numerous, albeit less commonly taught, languages) and the actual product (language majors in Spanish, French, and German—all of them abundant in the Air Force, as mentioned previously).[60] To portray the social demand model accurately, its disciples point out the necessity of detailed information on the need. That is, if you don't know exactly what you need, you can't demand it. Therefore, in the absence of specific demand, you get what's available.

Despite a DOD-wide review of the department's language requirements, little has emerged that amounts to a clear call for offering specific languages in academia. The substantial rise in college enrollments in Arabic and Chinese, as noted above, is encouraging, but the interest in Arabic most likely stems from the events of 11 September 2001 and from military activity in Iraq. Increases in Chinese enrollment may proceed from the realization that China will become a near-peer competitor in the coming decades or, perhaps, from a second-generation Chinese-American population that seeks to better understand and appreci-

ate its ethnic heritage. These reasons seem much more likely explanations than a clarion call from the DOD. On the other hand, the simultaneous, substantial rise in the number of students taking American Sign Language, and with nearly the same intensity, fits neither pattern. Unless and until a clear connection exists between the specific language needs of the DOD and the language aquifer that is America's colleges and universities, both will pursue divergent paths, crossing only by happenstance.

T e Junior College Solution

Among the most ravenous consumers of raw talent in America, college football coaches project their needs—an outside linebacker here, a punter there—years in advance of the prospects' playing days, cull the best qualified from the high school ranks, and then pursue them with a zeal that often runs afoul of good sense as well as National Collegiate Athletic Association rules. Not surprisingly, these master recruiters often find proven—emphasis on the word *proven*—talent within the ranks of junior colleges. Although these players lack four years of playing eligibility, they have two more years of experience than high school seniors, and coaches can carefully select them to fill a particular need. If college football coaches can recruit the best players from junior colleges, so can language managers of the Air Force and AFROTC recruit the best language students.

The nation's two-year colleges have seen strong growth in language courses during the past decade, especially in Chinese, Arabic, and Japanese.[61] Granted, two years of instruction does not yield proficiency, especially in the more difficult languages such as Arabic and Chinese, but it is a start. More importantly, such enrollment demonstrates the student's interest and intent. Simple online research can identify colleges that teach languages of interest to the DOD, many of them located near communities of native speakers that feed into the school system. For example, it is no coincidence that most two-year colleges teaching Mandarin Chinese are on the US West Coast.

One must note, however, that, given the small number of students and the scarcity of instructors, specific course offerings at two-year colleges may wax and wane. Nevertheless, the available courses can offer a practical, affordable way to identify potential linguists with the right skills and aptitudes, thus reducing training time and costs. To illustrate, the Air Force could recruit junior college graduates with four semesters of a desired language into its senior ROTC programs at four-year universities to complete their degrees as language majors. Clearly, Air Force recruiters as well as AFROTC detachment "coaches" should pursue this avenue.

Final Observations

The DLI's Foreign Language Center routinely produces competent linguists in difficult languages, but one cannot expect it to provide all of the languages for all of the services all of the time. Civilian language education in America can serve as an additional source of talented linguists for the US Air Force and its sister services.

AFROTC is already making inroads into foreign language curricula insofar as it recruits and compensates majors in specific languages. However, because this is not a requirements-driven, proactive approach between AFROTC and university language departments, it lacks focus at the collegiate administrative level.

The DOD's process for determining its language requirements remains incomplete, and the part available lacks service-specific granularity. This vacuum has led the Air Force to believe it has few specific language requirements, but that belief may prove incorrect, causing the service to fall behind in language emphasis. This attitude also overlooks the joint nature of modern military operations as well as the deployment of over 10,000 Airmen in joint expeditionary

training billets every year—essentially "boots on the ground" assignments with their Army and Marine counterparts. If we fight alongside these Soldiers and Marines, who value language training, then shouldn't we value it as well? And what of the growing demand to speak the language, not just read and understand it? How will we train and test this skill?

Finally, in light of the current emphasis on preaccession language training, what do we do with all of these officers who have newly acquired, very fragile language skills? Do we acknowledge their hard work with a bonus for proficiency in a foreign language? Do we have assignments that take advantage of their skills? On a much more practical level, do we acknowledge their linguistic capabilities and sustain them throughout a career?

Where Do We Go From Here? Recommendations

Although the following recommendations for improving language skills in the Air Force by using America's colleges and universities apply to our service, they have equal relevance to our sister services and to the DOD.

First, the Air Force should lift its embargo on nontechnical majors, allowing college graduates who majored in languages to attend OTS. Many college students and graduates choose a military career only after testing the civilian job market. According to a study commissioned by the MLA, government service does not appear as a "job category" in a national survey of college graduates whose first bachelor's degree is in foreign languages. Although it may be buried in the 6.3 percent listed as "other occupations," government service of any type—including the military—does not appear as a career of choice for the vast majority of language graduates.[62] If the prohibition of nontechnical majors appears to violate OTS policy, then the Air Force should regard the acquisition of fluency in a foreign language as a "technical" major.

Following this same theme, critical language skills must become a recruiting priority. Even in the face of this "newfound" desire for linguistic competency in officers, the strong need for enlisted language specialists continues unabated.[63] Although that aspect of the issue falls outside the scope of this article, recruiting for this cohort must also become a priority.

Following the Army's successes in this area, the Air Force Recruiting Service should explore America's many foreign-language-speaking communities to target specific languages.[64] An easy and accurate tool, the MLA language map pinpoints those areas of potential recruits.[65] However, recruiters should be advised that most of these "heritage speakers" will need additional training in order to become militarily effective.

The Air Force should take the lead in implementing new congressional legislation to establish language research centers at colleges and universities. In selecting suitable sites, it should look at colleges that host AFROTC detachments and those near Air Force bases. Additionally, the Air Force could build on the curricula at many colleges' existing critical language centers to meet its language needs. For example, Texas A&M University—one of the five "military colleges" highlighted in a congressional study and in the 2010 QDR—not only has an outstanding corps of cadets but also a large, diverse faculty and student body. Its capacity for growth and diversity lends itself to such an undertaking.

We should also use the social demand theory for discussing curriculum development with college and university language departments, stressing the need for making available more introductory conversational courses to the entire AFROTC corps of cadets as a method of encouraging language education throughout the corps. To add leverage, AFROTC detachments should team with the other ROTC programs on campus

to present a consolidated statement of need for specific language classes.

At the high school level, we should encourage Air Force Junior ROTC (AFJROTC) cadets to enroll in available language programs, a move that would cost the Air Force nothing, help extend the sequence of language education down to the high school level, increase the "demand" for language courses in secondary education (not a bad thing), and help instill a sense of the "global" nature of the Air Force in AFJROTC cadets. Such high school programs could also promote competition for senior ROTC language scholarships across a wider base of students. Other incentives within AFJROTC could include language competitions among schools (similar to drill competitions) and the awarding of ribbons for students with exceptional grades in foreign languages.[66] Given the narrow range of languages available in most American high schools, enrollment in any language—even Latin—would be a plus.

To complete this sequence, the Air Force should encourage its language professionals who wish to teach to become AFJROTC instructors or—better still—return to school and become language teachers under the DOD's "Troops to Teachers" program. To show the military utility of languages, we should encourage those who have "been there and done that" to become mentors and role models. Finally, but most importantly, we cannot allow the current DOD and Air Force emphasis on foreign language education to fade from view, as it has so many times before.

By definition, attaining language proficiency is a long sequence, best begun early and continued unabated throughout the educational system—a fact particularly true of the more difficult (to Western students) languages that the DOD desires. We must keep the language aquifer flowing. ✪

Notes

1. *Quadrennial Defense Review Report* (Washington, DC: Department of Defense, 6 February 2006), 17, http://www.comw.org/qdr/qdr2006.pdf; and *Quadrennial Defense Review Report* (Washington, DC: Department of Defense, February 2010), 54, http://www.defense.gov/qdr/QDR%20as%20of%2029JAN10%201600.pdf.

2. Paul Simon, *The Tongue-Tied American: Confronting the Foreign Language Crisis* (New York: Continuum Press, 1980), 3. Mr. Simon is a former US senator. See also Deborah M. Herman, " 'Our Patriotic Duty': Insights from Professional History, 1890–1920," in *The Future of Foreign Language Education in the United States*, ed. Terry A. Osborn (Westport, CT: Bergin and Garvey, 2002), 12, table 1.1, "Public High School Students Studying Foreign Language." In 1900 "at least 600,000 elementary students [were receiving] some part of their education in German." "Timeline: The Bilingual Education Controversy," in *School: The Story of American Public Education*, 2001, Public Broadcasting System, http://www.pbs.org/kcet/publicschool/roots_in_history/bilingual_timeline2.html.

3. Jamie B. Draper and June H. Hicks, *Foreign Language Enrollments in Public Secondary Schools, Fall 2000*, American Council on the Teaching of Foreign Languages, US Department of Education Grant no. PO17A000017-01, May 2002, [5], table 1, http://www.actfl.org/files/public/Enroll2000.pdf. Although 73 percent of high school students studied a foreign language in 1915, that ratio would fall to 43.8 percent by 2000. In 1915 Spanish comprised only 2.7 percent of total enrollments in high school, a ratio that would rise to 30.2 percent by 2000. Ibid., 1, 5.

4. Simon, *Tongue-Tied American*, 3.

5. Iowa had the dubious distinction of being the first state to ban the speaking of German in public: in churches, on trains, and even on the telephone. See Herman, " 'Our Patriotic Duty,' " 11.

6. Ibid., 12.

7. Ibid., 17.

8. Enrollments hit their all-time low in 1948 (21.7 percent) but have since enjoyed a slow but steady rise. Draper and Hicks, *Foreign Language Enrollments*, [5], table 1.

9. "This prohibition did not extend to the 'Ancient or dead' languages—Latin, Greek, Hebrew." Elizabeth Mertz, *Language and Mind: A Whorfian Folk Theory in United States Language Law*, Sociolinguistics Working Paper no. 93 (Austin, TX: Southwest Educational Development Laboratory, July 1982), http://ccat.sas.upenn.edu/~haroldfs/540/theory/mertz1.html.

10. Herman, "'Our Patriotic Duty,'" 12.

11. *An Act Related to the Teaching of Foreign Languages in the State of Nebraska*, 9 April 1919, quoted in Meyer v. State of Nebraska, 262 US 390 (1923), decided 4 June 1923, Justice Oliver Wendell Holmes dissenting.

12. Even then, the court's ruling was predicated on the 14th Amendment (i.e., "No state . . . shall deprive any person of life, liberty or property without the due process of law") rather than the 1st Amendment (freedom of speech, etc.). Ironically, a survey by the US Department of Education in 2000 showed *zero* Nebraska seventh and eighth graders enrolled in foreign language classes, against a national average of 14.69 percent. However, the same survey showed Nebraska leading the nation in the percentage of high schoolers enrolled in language studies (78.49). Draper and Hicks, *Foreign Language Enrollments*, [6], table 2.

13. Numerous studies in the 1920s concluded that bilingual education was harmful to children. Most of these studies targeted socioeconomically disadvantaged children, testing them in their weakest language—English. See Harold F. Schiffman, *Linguistic Culture and Language Policy* (London: Routledge, 1996), 315.

14. Dr. Ray Clifford, chancellor, Defense Language Institute—Foreign Language Center (remarks at the National Briefing on Language and National Security, National Press Club, Washington, DC, 16 January 2002), http://www.nflc.org/policy_and_strategy/language_and_national_security/nflc_briefing_january_2002/full_transcript.

15. James Campbell, "The Fixes 'No Child' Needs," *Baltimore Sun*, 6 December 2006, http://articles.baltimoresun.com/2009-12-06/news/0912070036_1_minority-students-state-takeover-yearly-progress.

16. "Impediments to U.S. Push on Languages," *Inside Higher Ed*, 26 January 2007, http://www.insidehighered.com/news/2007/01/26/languages. The *Baltimore Sun* reported on a survey by the Center on Education Policy which revealed that "71 percent of the nation's 15,000 school districts had reduced the hours of instructional time [in] . . . other subjects [including foreign languages] to make more time for math and reading." Campbell, "Fixes 'No Child' Needs."

17. Nancy C. Rhodes and Ingrid Pufahl, *Foreign Language Teaching in U.S. Schools: Results of a National Survey* (Washington, DC: Center for Applied Linguistics, November 2009), "Executive Summary," 6, http://www.cal.org/flsurvey.

18. Herman, "'Our Patriotic Duty,'" 18.

19. Leon E. Panetta, "Foreign Language Education: If 'Scandalous' in the 20th Century, What Will It Be in the 21st Century?" Stanford University Conference Paper, n.d., 5, https://www.stanford.edu/dept/lc/language/about/conferencepapers/panettapaper.pdf.

20. Draper and Hicks, *Foreign Language Enrollments*, [6], table 2.

21. Nelly Furman, David Goldberg, and Natalia Lusin, *Enrollments in Languages other than English in United States Institutions of Higher Education, Fall 2006* (New York: Modern Language Association, 13 November 2007), 13, tables 1a and 1b, http://www.mla.org/pdf/06enrollmentsurvey_final.pdf. These numbers represent all modern languages and include Latin and "Greek, Ancient."

22. Ibid.

23. MLA Ad Hoc Committee on Foreign Languages, *Foreign Languages and Higher Education: New Structures for a Changed World* (New York: Modern Language Association, May 2007), 5, http://www.mla.org/foreign_languages_an.

24. Furman, Goldberg, and Lusin, *Enrollments in Languages other than English*, 2. Moreover, 9.1 percent of the nation's two-year colleges offered no foreign language classes. Ibid.

25. Panetta, "Foreign Language Education,"5; and Furman, Goldberg, and Lusin, *Enrollments in Languages other than English*, 4.

26. "Interagency Language Roundtable (ILR) Proficiency Levels," http://www.icls.com/FLD/ILR.pdf.

27. International Center for Language Studies, "Classroom Hours to Achieve Proficiency Levels by Language Difficulty," International Center for Language Studies, Washington, DC, http://www.icls.com/FLD/ILRlevels.htm. Generally speaking, these ILR levels measure linguistic proficiency via the Defense Language Proficiency Test.

28. Margaret E. Malone et al., "Attaining Higher Levels of Proficiency: Challenges for Foreign Language Education in the United States" (Washington, DC: Center for Applied Linguistics, 2005), http://www.cal.org/resources/digest/attain.html.

29. According to an interview with the DLI's commander, "graduates of a six-month Spanish course at DLI will typically speak better than a graduating Spanish major at a four-year university." Tim

Kilbride, "Language Emerges as Element of National Security," American Forces Press Service, 31 March 2009, http://www.defense.gov/news/newsarticle.aspx?id=53726.

30. Katherine McIntire Peters, "At a Loss for Words," *Government Executive*, 15 June 2005, http://www.govexec.com/features/0605-15/0605-15s3.htm.

31. *Quadrennial Defense Review Report*, 2006, 79. "We will continue our emphasis on enhancing these skills in general purpose force officers during pre-accession training." *Quadrennial Defense Review Report*, 2010, 54.

32. Furman, Goldberg, and Lusin, *Enrollments in Languages other than English*, 5. In addition to the top 15 listed in the table, the MLA reported 204 less commonly taught languages offered at America's colleges and universities.

33. OTS can add or subtract from its acceptance demographic, based on the needs of the Air Force.

34. See "In-College Scholarships," US Air Force ROTC, http://www.afrotc.com/scholarships/in-college/foreign-language-majors/.

35. "Foreign Language Incentive Pay For Precommissioning Programs," 37 *USC*, chap. 5, sec. 316a.

36. "Air Force Officials Developing Cross-Culturally Competent Officer," Air Force News Service, 11 December 2009, http://www.af.mil/news/story.asp?id=123181940.

37. Briefing, AFROTC, subject: In Contact—Incorporating Language Training and Cultural/Regional Education into Officer Force Development Plans, August 2005, slide: "Military-Affiliated Collegiate Foreign Language Programs." This is a DOD-wide problem as well as an Air Force problem. Undersecretary of Defense Michael Dominguez points out that 1,321 colleges host ROTC detachments (of all services) and that 1,148 of them have foreign language programs. However, he also states that the vast majority of them rarely teach more than Spanish, French, and German; less than 40 percent teach Chinese or Arabic; and less than 10 percent teach Farsi. Though admittedly an improvement over the percentages reported for AFROTC-affiliated schools in 2005, these are still low for the languages that the Air Force needs. Senate, *Statement of the Honorable Michael L. Dominguez, Principal Deputy Under Secretary of Defense (Personnel and Readiness), before the Senate Committee on Homeland Security and Governmental Affairs, Subcommittee on Oversight of Government Management, the Federal Workforce, and the District of Columbia, "Lost in Translation: A Review of the Federal Government's Efforts to Develop a Foreign Language Strategy,"* 110th Cong., 1st sess., 25 January 2007, 8, 9, http://hsgac.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=7ce18437-63be-44ea-8f56-87ebbbdc186d.

38. The University of Minnesota's Center for Advanced Research on Language Acquisition is an outstanding resource for determining where languages are taught and a good starting place to research the issue. Center for Advanced Research on Language Acquisition (CARLA), University of Minnesota, http://carla.umn.edu/. For details of schools and language offerings, see also a listing of the 15 national foreign language resource centers. "Foreign Language Resource Centers," Michigan State University, http://nflrc.msu.edu/index-1.php.

39. *National Defense Authorization Act for Fiscal Year 2010*, Public Law 111-288, 111th Cong., 1st sess. (7 October 2009), sec. 529, pars. (a), (b) (4), http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=111_cong_reports&docid=f:hr288.111.pdf.

40. Dr. Gilbert Merkx, "National Briefing on Language and National Security" (remarks at the National Press Club, Washington, DC, 16 January 2002), http://www.nflc.org/policy_and_strategy/language_and_national_security/nflc_briefing_january_2002/full_transcript.

41. Briefing, Iris Bulls, deputy director, Defense Language Office, subject: Distance Learning: Preparing the 21st Century Total Force, 15 March 2007. This observation was based on early returns from the combatant commanders' language requirements survey.

42. Gaylord George Candler, "Linguistic Diglossia and Parochialism in American Public Administration: The Missing Half of Guerreiro Ramos's Redução Sociológica," *Administrative Theory and Praxis* 28, no. 4 (2006): 553.

43. MLA Ad Hoc Committee on Foreign Languages, *Foreign Languages and Higher Education*, 2.

44. Modern Language Association, *Report to the Teagle Foundation on the Undergraduate Major in Language and Literature* (New York: Modern Language Association, February 2009), 3, 6, http://www.mla.org/pdf/2008_mla_whitepaper.pdf.

45. MLA Ad Hoc Committee on Foreign Languages, *Foreign Languages and Higher Education*, 9.

46. House, *Building Language Skills and Cultural Competencies in the Military: DOD's Challenge in Today's Educational Environment, Report of the US House of Representatives, Committee on Armed Services, Subcommittee on Oversight and Investigations*, 110th Cong., 2d sess., November 2008, Committee Print 110-12, 36–37, http://armedservices.house.gov/pdfs/Reports/LanguageCultureReportNov08.pdf.

47. See "Department of European and Classical Languages and Cultures," Texas A&M University, http://euro.tamu.edu/; "Modern Languages and

Cultures," Virginia Military Institute, http://www.vmi.edu/show.aspx?tid=37083&id=100; "Undergraduate Programs," Norwich University, http://www.norwich.edu/academics/undergrad.html; "Majors and Minors," Citadel, http://www.citadel.edu/main/academics/majorsminors.html; and "Academic Majors," North Georgia College and State University, http://www.ngcsu.edu/LandingPages/Default.aspx?id=4373.

48. Stephanie van Reigersberg, "National Briefing on Language and National Security" (remarks at the National Press Club, Washington, DC, 16 January 2002), http://www.nflc.org/policy_and_strategy/language_and_national_security/nflc_briefing_january_2002/full_transcript. Even so, a 2008 MLA report observed that even "four-year language majors often graduate with disappointingly low levels of linguistic ability." MLA Ad Hoc Committee on Foreign Languages, *Foreign Languages and Higher Education*, 7. Everette Jordan of the Department of Defense takes this argument even further, believing that even a language major needs an additional three to five years to gain the experience level needed to perform his job. Everette Jordan, "National Briefing on Language and National Security" (remarks at the National Press Club, Washington, DC, 16 January 2002), http://www.nflc.org/policy_and_strategy/language_and_national_security/nflc_briefing_january_2002/full_transcript.

49. Briefing, Air Force Manpower and Personnel Center, Randolph AFB, TX, spring 2005, subject: Intelligence Careers, slide: "Save Languages for a Second Tour."

50. Furman, Goldberg, and Lusin, *Enrollments in Languages other than English*, 18, table 4.

51. Classes in American Sign Language have had a meteoric rise, from less than 0.1 percent of total enrollments in 1990 to 5 percent in 2006. Furman, Goldberg, and Lusin, *Enrollments in Languages other than English*, 3. For the purposes of this study, we must discount this language because it probably does not have applications outside the United States. According to the Deaf Resource Library, no universal sign language exists. See Karen Nakamura, "About American Sign Language," Deaf Resource Library, http://www.deaflibrary.org/asl.html.

52. Furman, Goldberg, and Lusin, *Enrollments in Languages other than English*, 21, table 7b.

53. For Arabic the introductory to advanced ratio is 7:1; for Chinese, 7:2. These ratios are surprisingly strong, but Korean surpasses them at 3:1. Ibid.

54. "Table 308. Degrees in modern foreign languages and literatures conferred by degree-granting institutions, by level of degree and sex of student: selected years 1949–50 through 2007–08," *Digest of Education Statistics, 2009*, National Center for Education Statistics, http://nces.ed.gov/programs/digest/d09/tables/dt09_308.asp?referrer=list; and "Table 309. Degrees in French, German, Italian, and Spanish conferred by degree-granting institutions, by level of degree: selected years, 1949–50 through 2007–08," idem. In the same year, colleges and universities also awarded 2,650 master's degrees (1,522 in the Big Three) and 773 doctorates (346 in the Big Three). See tables 308 and 309.

55. "Table 310. Degrees in Arabic, Chinese, Korean, and Russian conferred by degree-granting institutions, by level of degree: 1969–70 through 2007–08," *Digest of Education Statistics, 2009*, National Center for Education Statistics, http://nces.ed.gov/programs/digest/d09/tables/dt09_310.asp?referrer=list.

56. Four hundred sixty-six institutions offered Arabic in 2006, up from 264 in 2002. Six hundred sixty-one offered instruction in Chinese in 2006, up from 543 in 2002. Furman, Goldberg, and Lusin, *Enrollments in Languages other than English*, 3.

57. Timothy Reagan, "Toward a Political Economy of the Less Commonly Taught Languages in American Public Schools," in *The Future of Foreign Language Education in the United States*, 125. Reagan has created a hierarchy of LCTLs based not on linguistic factors but on the likelihood that they will be taught in public school. They include the following:

> Level 1: Commonly Taught Languages (French, German, Spanish)
>
> Level 2: Most Commonly Taught LCTLs (Arabic, Chinese, Japanese, and Russian)
>
> Level 3: Rarely Taught LCTLs (Portuguese, Italian, Norwegian, etc.)
>
> Level 4: Never/Virtually Never Taught LCTLs (all African languages; most Asian and Oceanic languages)
>
> Level 5: Nonlanguages (American Sign Language, Esperanto)

See ibid., 130–32.

58. Ibid., 131.

59. "Less Commonly Taught Languages," Department of Classical and Modern Languages and Literatures, Texas Tech University, http://www.depts.ttu.edu/classic_modern/undrgrad/lctl/lctl.php.

60. Mary Ellen O'Connell and Janet L. Norwood, eds., *International Education and Foreign Languages: Keys to Securing America's Future* (Washington, DC: National Academies Press, 2007), 37. The authors tend to focus on teaching vacancies to the exclusion of any real military application.

61. Furman, Goldberg, and Lusin, *Enrollments in Languages other than English*, 16, table 2b. In 1980 one-fifth of junior colleges offered no foreign language courses. Simon, *Tongue-Tied American*, 3.

62. Modern Language Association, *Report to the Teagle Foundation*, 32. The Air Force might profitably recruit at elementary and secondary schools, where many (about 25 percent) language majors are employed. The same survey identifies 2.2 percent of those graduating with a bachelor's degree in a foreign language as employed in "food preparation and services." Ibid. The State Department's Stephanie van Reigersberg may have pinpointed the reason that more language majors don't enter government service in any capacity, much less the armed services: money. "Language knowledge is not rewarded financially at all," she contends. "How do you convince people . . . who can go and work in [an] international banking environment to work for government if the government wants them to be GS-9s?" Van Reigersberg, "National Briefing on Language and National Security."

63. *Newfound* is a relative term. One can trace calls for linguistic skills in officers back almost 50 years. "Officer Foreign Language Study," a Headquarters USAF/AFPDP report of November 1962, cites a letter of 24 August 1961 about officers' language training which announced the goal that "all Air Force officers be proficient in at least one foreign language" (p. 21).

64. Since 2003 the Army has actively recruited native speakers (primarily Arabic) through its 09L Interpreter/Translator Program. According to Gail McGinn, the DOD's senior language authority, it is a "particularly successful program." House, *Statement of Mrs. Gail H. McGinn, Deputy Under Secretary of Defense for Plans and the Department of Defense Senior Language Authority, before the House Armed Services Committee, Subcommittee on Oversight and Investigations*, 110th Cong., 2d sess., 10 September 2008, http://www.dod.gov/dodgc/olc/docs/testMcGinn080910.pdf. According to its latest posture statement, the Army plans to expand this program beyond the Central Command area of responsibility into Pacific Command and Africa Command. "Army Culture and Foreign Language Strategy (ACFLS)," *2010 Army Posture Statement*, https://secureweb2.hqda.pentagon.mil/vdas_armyposturestatement/2010/information_papers/Army_Culture_and_Foreign_Language_Strategy_(ACFLS).asp.

65. "The Modern Language Association Language Map: A Map of Languages in the United States," Modern Language Association, http://www.mla.org/map_main.

66. The Air Force Intelligence, Surveillance, and Reconnaissance Agency's annual "Sensor Olympics" language competition would be an excellent resource for establishing such a program. For a review of the original program, "Comfy Olympics," by its innovator, see Maj Gen Doyle E. Larson, USAF, Retired, "ESC Commander Starts Comfy Olympics," *Spokesman Magazine*, December 2004, http://findarticles.com/p/articles/mi_m0QUY/is_2004_Dec/ai_n15622859/?tag=content;col1. For a more current view of information about Sensor Olympics, see 1st Lt Karoline Scott, "Sensor Olympics XXIX Honors AF ISR Agency's Enlisted Airmen," Air Force ISR Agency Public Affairs, 10 November 2008, http://www.afisr.af.mil/news/story.asp?id=123123472.

Col John Conway, USAF, Retired

Colonel Conway (BA, MA, University of Alabama) is a military defense analyst at the Air Force Research Institute, Maxwell AFB, Alabama. He served as an intelligence officer with major assignments at Headquarters Air Intelligence Agency, North American Aerospace Defense Command, and the National Security Agency. He was the senior intelligence officer at Headquarters Air Force Reserve Command (AFRC), Robins AFB, Georgia, and held several wing and squadron intelligence assignments, including a combat tour with the II Direct Air Support Center in Pleiku Province, Republic of Vietnam. For his last active duty assignment, he was the chief, Counterdrug Support Division, Headquarters AFRC. Following active duty, Colonel Conway was a systems engineering and technical assistance contractor to the U-2 Directorate at Robins AFB and a civilian adviser to the Gordon Regional Security Operations Center, Fort Gordon, Georgia, following 11 September 2001. He is a frequent contributor to *Air and Space Power Journal* and Air University's *The Wright Stuff*.

In Hostile Skies: An American B-24 Pilot in World War II by James M. Davis. Edited by David L. Snead. University of North Texas Press (http://www.unt.edu/untpress), P.O. Box 311336, Denton, Texas 76203-1336, 2006, 256 pages, $27.95 (hardcover), ISBN 1574412094; 2007, 256 pages, $14.95 (softcover), ISBN 1574412396.

Day after day, "ordinary" men performed extraordinarily heroic deeds and faced certain death as members of Eighth Air Force's bomber crews over Nazi-occupied Europe. One of these men, James "Jim" Davis, from Texas, recounts his experiences in the book *In Hostile Skies: An American B-24 Pilot in World War II*, edited by David Snead.

Lieutenant Davis recounts his wartime experiences, from his early years on a ranch in central Texas during the Depression, including his first exposure to airplanes; through his training and quest to become a pilot; to his combat experiences. Ultimately, he would fly 24 combat sorties before his unit, the 489th Bomb Group, returned to the United States for conversion to the B-29.

Financially unable to go to college and pursue his dream of becoming an Army Air Forces (AAF) pilot, Davis had to pass an aviation-cadet training exam to begin his flying career. Doing so on his second attempt, he was accepted into a program that condensed the first two years of college into roughly two months. After initial pilot training, Davis took a series of advanced courses, culminating in deployment to the European theater and combat operations.

The book includes several themes, the first of which addresses the great risks faced by Eighth Air Force aircrews, not only in combat but also in training. Repeatedly, Lieutenant Davis tells stories of how aircrew members met violent deaths as a result of training accidents or action in combat, the latter often the result of a direct hit that left only an orange burst of flame and a cloud of debris where a bomber once flew. A second theme covers the physically demanding nature of flying a bomber in combat day after day and the toll it takes on the aircrew. The mystery of war, which makes us ponder why some men live and some die, comprises the third and final theme.

Among the library and bookstore shelves filled with autobiographies of World War II aircrew members, *In Hostile Skies* stands out as a true gem. Davis's writing style brings readers into the cockpit of his B-24 and holds them there until it safely lands back in England after another harrowing mission. More than just an "I was there" story, the book provides a clear understanding of the day-to-day stresses, hopes, and lives of B-24 pilots. Moreover, its detailed description of bomber-pilot training offers a valuable look into an area of AAF history often glossed over. Even in training, the risks were real, and Airmen lost their lives.

Intent on preserving Lieutenant Davis's original text, David Snead provides subtle editing support throughout in the form of documentation and minor clarifications that facilitate the reader's understanding. He thus increases the value of the text by verifying its accuracy while maintaining the original flow of this engaging, easy-to-read book.

Humble in its approach, *In Hostile Skies* is a superb selection for anyone who wants an in-depth look at experiences of the pilots and aircrew members aboard Eighth Air Force's B-24 bombers during World War II.

Lt Col Daniel J. Simonsen, USAF, Retired
Ruston, Louisiana

Risk and Exploration: Earth, Sea, and the Stars, NASA SP-2005-4701, edited by Steven J. Dick and Keith L. Cowing. National Aeronautics and Space Administration, Office of External Relations, NASA History Division (http://www.nasa.gov), Washington, DC, 2004, 304 pages, $44.00 (hardcover). Available free from http://history.nasa.gov/SP-4701/riskandexploration.pdf.

After the loss of the shuttle *Columbia*, NASA found itself on the defensive as critics began to claim that the potential benefits of space exploration did not justify the danger involved. As part of NASA's response, in September 2004 during the NASA Administrator's Symposium at the Naval Postgraduate School, Monterey, California, it brought together some of the most famous ocean explorers, mountaineers, cavers, astronauts, and scientists to

talk about the risks and rewards of exploring frontiers. Among the speakers were *Apollo 13* commander James Lovell, ocean researcher Sylvia Earle, movie director James Cameron, and many other astronauts and scientists. This book records the transcribed proceedings of that conference.

Readers may select from over 25 speeches, along with transcripts of question-and-answer sessions. Throughout the book, one finds very interesting anecdotes and some compelling insights into risk during exploration activities that are instructive to today's air and space professional. James Lovell explains the danger of "risk [as] overkill" (p. 12) regarding his experiences on the lesser-known *Gemini 7* mission. Polar exploration expert Jack Stuster describes the difficulty of scheduling everything (allowing no flexibility) on exploration missions: it's impossible to meet all of the objectives, and attempting to do so will only irritate the crew. Other useful tidbits include an overview of the three phases of exploration operations, the supremacy of logistics to any endeavor, and a rationale for choosing mission members. Scattered among the pages are many such nuggets of wisdom from today's foremost explorers.

Less interesting are the myriad explanations for why the taxpayer should fund the government's exploration efforts. Platitudes such as a need to "look over the next hill" (p. 233) or "over the next horizon" (p. 102) abound. They also ring hollow after the first few readings, as people blessed to experience some of the most incredible adventures of all time (on the back of the taxpayer) lament that average folks will not fork over more money so that an astronaut who has flown in space can also fly to Mars, or an aquanaut can go another 1,000 feet deeper.

This is a fundamental flaw of both the symposium and the book. Often, risk is not the reason that exploration missions never get out of the planning stage: it is money. Exploration is expensive, and the exploration of the earth, sea, and stars conducted by most of the speakers in this book has no underlying relevance to the economic or material well-being of society. Mostly, they cite "science" as the reason for their actions, which to a lay reader seems a thin cover to ask for a blank check to have fun doing something a regular person has no chance of experiencing. With the notable exception of Dr. Harrison Schmitt, who lauds private exploration and the use of space resources; James Cameron, who funds his own endeavors; and some others, the contributors to this tome tend to suggest that society at large (through government) has a duty to support a few self-chosen explorers' exploits—and is stupid if it doesn't. It's much easier to have this opinion if the person happens to be someone waiting for a spot on the next shuttle launch rather than a worker worrying about covering his or her mortgage after paying taxes.

That this collection is a transcript of a symposium offers both advantages and disadvantages to the reader. Selections are often only a few pages in length and can be read easily and quickly. Also, the speakers cover a great many different subjects that offer something worthwhile to almost any reader. Unfortunately, even though the book spans a wide breadth, the individual speeches do not contain significant depth. The 10- or 20-minute speeches, which comprise the bulk of the book, are necessarily limited in the detail that readers may desire.

Overall, *Risk and Exploration* is an appealing selection to anyone interested in exploration as well as the politics and risk involved—or, indeed, anyone who likes to read about the exploits of mountaineers, astronauts, and deep-sea explorers. However, the book is short on depth, and some of the speakers have a tendency to preach. The prospective reader must determine if it merits an expedition.

Capt Brent D. Ziarnick, USAFR
Spaceport America, New Mexico

The War Managers, 30th anniversary edition, by Douglas Kinnard. Naval Institute Press (http://www.usni.org/navalinstitutepress/index.asp), 291 Wood Road, Annapolis, Maryland 21402-5034, 2007, 228 pages, $19.95 (softcover), ISBN 9781591144373.

Even in the short time between the US withdrawal from Vietnam and the fall of the South to Northern forces, attempts to understand what went wrong had already begun. Among the more notable examinations of the way the war unfolded was Brig Gen Douglas Kinnard's 1974 survey of US general officers who served in Vietnam, the findings of which are the basis for *The War Managers*. Now reissued in paperback by the Naval Institute Press, the work deserves examination by all who would lead forces into war.

The author retired in 1970 as a brigadier general after a final tour as chief of staff to a major command in Vietnam. The work rests on a questionnaire he sent to all 173 generals active in the US effort there, 70 percent of whom responded. Not surprising in hindsight, the results are remarkably on target, given the nearness to the event. Most dismaying is the finding that the generals overwhelm-

ingly agree that they had little grasp of their purpose and that their troops had even less. The war was not so much mishandled—most of the questions about military aspects elicited reasonably favorable responses—as it was micromanaged and directionless. Even the caliber of the forces went unchallenged, an assessment that soon gave way to the hollow force and a long, expensive effort to rebuild a military capable of avoiding the catastrophic collapse that the late-war Army suffered.

Chapters deal with war aims, conduct of the war, advisory and pacification efforts, composition of the American force, ending of the war, and the survey. Within these headings lie sections on strategy and tactics, rules of engagement, command and control, mobilization of the reserves, relations with the media, the Vietnamese military, and more. The work also contains a short section on the implications of this narrow study for a broader world. Appendices include the questionnaire, along with a breakout of results; a statistical analysis designed to determine whether the author confirmed his hypotheses; and a listing of all commanding generals between 1965 and 1972. The short preface to the new edition contains a sampling of reactions that the original volume generated.

Kinnard does not merely reproduce the survey findings although the work contains the complete questionnaire and tabulated results for each answer. He also provides a good political and military narrative of the war itself—an overview that holds up reasonably well in competition with works generated by the subsequent 30 years of additional research and analysis on the topic. Moreover, for a study of the failure in Vietnam, it has the virtue of being relatively short. Kinnard places the questionnaire answers squarely into context, fleshing out the percentages with pertinent remarks from the generals who chose to go beyond the simple multiple-choice answer.

As an interesting sidelight, Kinnard's profile of the generals is quite revealing. All of them belonged to the same generation, born between 1910 and 1926. Most, but not all, graduated from college—about half from the US Military Academy at West Point. Almost all were married, averaging 25 years in the service. And, naturally, they were all white, male, and predominantly Protestant. About half had qualified for airborne duty, 60 percent having infantry backgrounds. Service in Vietnam earned a promotion for each of them. Given the marked similarity of backgrounds, their divergences on the nature of the war are remarkable. More remarkable is how the homogeneity of the 1970s, nonreflective of the military of the era, has given way to diversity in the current officer corps, including the generals—diversity that matches that of the enlisted men and women.

Readers will find *The War Managers* accessible and easy to navigate—almost hard to put down. Granted, it is a snapshot of another time, but insofar as it dispels the myth that leaders are of one mind and voice, it is both timeless and timely. The 30th anniversary edition adds little to the original, but the new preface does offer a nice touch to an interesting book.

Dr. John H. Barnhill
Houston, Texas

The Battle of Ap Bac, Vietnam: They Did Everything but Learn from It by David M. Toczek. Naval Institute Press (http://www.usni.org/navalinstitutepress/index.asp), 291 Wood Road, Annapolis, Maryland 21402-5034, 2007, 224 pages, $19.95 (softcover), ISBN 1591148537.

Situated southwest of Saigon, the hamlet of Ap Bac in Tien Giang province is the site of a single-day encounter between a regiment of the People's Liberation Armed Forces (PLAF) (North Vietnam) and a division of the Army of the Republic of Vietnam (ARVN) (South Vietnam) and its American advisors on 2 January 1963. The battle ended in an allied defeat because of the PLAF's ability to counter the firepower of armored personnel carriers and helicopters fielded in the operation. The fact that political factors constrained the ARVN's leadership also contributed to the outcome.

First published in 2001, 38 years after the operation, *The Battle of Ap Bac, Vietnam* is surely the definitive account of the fight. US Army major David Toczek, a professor of history at the US Military Academy (West Point), provides the reader an operational, historical narrative and tactical analysis of the battle. Divided into five chapters, arranged chronologically, the book includes a foreword by Gen William B. Rosson, former deputy commander of US Military Assistance Command, Vietnam. The first two chapters are notable, the author providing historical background of the US Military Assistance Advisory Group, Indochina; the Vietnamese National Army; and the PLAF. Here, Toczek describes both the organizational and historical development, as well as political factors influencing the two opposing forces, and details the operational aspects (air mobility) in the ARVN and the role of the advisory system. Moreover,

he thoroughly discusses the strategic and political framework from which the PLAF waged war.

Focusing on the battle itself, the third chapter addresses the preparations, strategic planning, cooperation, frustrations, shortcomings, and decision making under fire on both sides, followed in chapter four by an account of reactions to the battle's aftermath by the senior officers and advisory group involved. The penultimate chapter also considers the PLAF's notion of the battle as its victory as well as media articles and releases that followed.

Rather than treating the battle as a small-scale encounter, the fifth chapter offers the author's conclusion about the defeat at Ap Bac, placing it in the larger context of the Vietnam conflict. He notes that the battle provided a window that could have changed America's policy or plan for the war.

This paperback edition from Naval Institute Press coincides with the 45th anniversary of the battle. Major Toczek highlights not only its outcome and effect on the conflict in general, but also the essence of the lessons learned that have relevance to contemporary issues concerning national-security decision making and counterinsurgency—factors of interest to currently serving officers and personnel, especially those deployed in counterinsurgency operations and advisory roles. Extraordinarily researched and well written, the book includes an extensive pictorial account of key persons during the period, notes for each chapter, appendices, a substantial bibliography, and an index.

The Battle of Ap Bac, Vietnam will make a valuable addition to the libraries of all officers; senior noncommissioned officers; ambassadors; diplomats; historians; professors; defense, air, and naval attachés; and enthusiasts of leadership and counterinsurgency warfare. It is a commendable contribution and significant addition to the literature of the Vietnam War.

Cdr Mark R. Condeno, Philippine Coast Guard
Manila, Philippines

Aircraft Carriers: A History of Carrier Aviation and Its Influence on World Events, Vol. 2, **1946–2006**, rev. ed., by Norman Polmar in collaboration with Minoru Genda et al. Potomac Books (http://www.potomacbooksinc.com), 22841 Quicksilver Drive, Dulles, Virginia 20166, 2008, 560 pages, $39.96 (hardcover), ISBN 1574886657.

Few ships are as awe inspiring as the aircraft carrier. To say "it's big" does not do the carrier justice. The vast amount of military might contained in this one ship, let alone its size, is simply staggering. It is only appropriate that an author with a reputation as impressive as that of the aircraft carrier take on the task of revising and updating the previous edition of this book. After reading *Aircraft Carriers*, I can say that Norman Polmar was the right man for the job. An internationally known specialist in naval, aviation, and technical intelligence issues, with over 40 books to his credit and service as a consultant or adviser to three secretaries of the Navy and two chiefs of naval operations, Polmar comes well prepared for the task.

I found this book a very interesting coffee-table-sized historical reference with insightful analysis woven into the text. Like the ship, this soup-to-nuts compilation of aircraft carrier information is beyond "big." Polmar has clearly done his research and performs yeoman's work, bringing relevance to each phase of carrier operations he discusses. He ends most of the chapters with a summary that captures the major points in a few concise paragraphs.

The author's narrative begins just after World War II ends, when US leadership begins to debate the future of the aircraft carrier in light of atomic (and, later, nuclear) weapons, the jet age, and, eventually, space technology. Polmar describes this ongoing debate over relevancy through Korea and Vietnam, well into the Reagan presidency. Not surprisingly, each time a crisis flares up, the American leadership first asks, "Where are the carriers?"

Especially interesting are the chapters on foreign navies' carrier investments and ventures, including an entire section on the Falklands War, which summarizes very well the British experience with expeditionary war in the late twentieth century. Also insightful was the extended chapter on the Soviet Navy during the tenure of the Soviet Union.

The second volume of *Aircraft Carriers* is a magnificent piece of research. The chapters guide readers through naval history by putting the aircraft carrier into context with the crises of the times. As a historical text, this is a good read, with the tables and pictures providing color commentary that accompanies the text. The summaries offer a concise wrap-up of the chapters, leading the reader smoothly into the following chapter. In all, I highly recommend this book to Airmen—if for no other reason than to gain a professional awareness of our flying brethren in the Navy.

Maj Paul Niesen, USAF, Retired
Scott AFB, Illinois

Astronautics: A Historical Perspective of Mankind's Efforts to Conquer the Cosmos, Book 1, **Dawn of the Space Age**; Book 2, **To the Moon and Towards the Future** by Ted Spitzmiller. Apogee Books / Collectors Guide Publishing (http://www.apogeebooks.com), 1440 Graham's Lane, Unit no. 2, Burlington, Ontario L7S 1W3, Canada, 2006, 232 pages, $24.95 (softcover), ISBN 9781-894959-63-6; 2007, 336 pages, $25.95 (softcover), ISBN 978-1-894959-66-7.

The tally for publications in Apogee Books' Space Series now amounts to several dozen, including Ted Spitzmiller's two-volume set titled *Astronautics*. To celebrate the 50th anniversary of Sputnik, the world's first artificial satellite, Spitzmiller has attempted to synthesize a concise, encyclopedic history of rocketry and spaceflight. In 39 chapters, each one designed to give readers "a relatively complete understanding of a special interest area without the need to ferret information from multiple chapters" (p. 9), he chronicles humankind's exploration of space from Copernicus in the early sixteenth century to exotic new forms of spacecraft propulsion for interplanetary voyages in the twenty-first century. The chapters in book 1 cover individual pioneers, early rocket societies, Peenemünde and the V-2, rocket planes, planning for an Earth satellite, military spy satellites, harnessing liquid hydrogen, piloted spaceflight, planetary exploration, and more. Chapters in book 2 include the race to the moon, the space shuttle, space stations, expendable booster development, the search for extraterrestrial life, deep-space missions, and competitive partnering in space.

Spitzmiller eschews primary documentation, except for a few memoirs, and relies almost exclusively on biographies, histories, and Web sites as source material. He characterizes his sources as typically sacrificing scope and presenting an overwhelming level of technical detail. Consequently, he seeks in *Astronautics* "to simplify and clarify technology, politics, and events to make them easier to comprehend" (p. 9). His goal is commendable and, grammatically and stylistically, he achieves it. The word picture he paints of Russia's Sputnik launch will grip most readers, and his telling of the *Apollo 13* saga will captivate them.

Unfortunately, in an attempt to significantly broaden the scope of his narrative, Spitzmiller too often sacrifices scientific, technical, and historical accuracy or completeness. The most surprising example of scientific inaccuracy in *Astronautics* is his apparent misunderstanding of Newton's third law of motion: for every action, there is an equal and opposite reaction. He explains that "the action-reaction of the exhaust gases was pushing against the inside of the rocket motor to provide the propulsive force" (p. 19). Toward the end of book 2, Spitzmiller perpetuates this inaccuracy when he says that "expanding combustion" in a ramjet engine "'pushes' (Newton's third law) against the 'wall' of incoming air to provide thrust" (p. 472) and, again, that a spacecraft powered by a mass driver would have "to have a significant quantity of some material to react against" (p. 473).

Historical accuracy also suffers in these volumes. Spitzmiller describes the Guggenheim Aeronautical Laboratory's successful solid-propellant jet-assisted takeoff (JATO) experimentation under Air Corps contract in 1941, explaining that "it would be two more years before a liquid-propellant rocket engine, constructed by the Aerojet General Corporation, was tested in a Consolidated Aircraft Co. flying boat on San Diego Bay" (p. 33). He never mentions that the liquid-propellant JATO units resulted from US Navy experimentation led by Robert C. Truax and Robert H. Goddard. Similarly, he acknowledges the contribution of the Army Air Forces and Project RAND in early 1946, which studied the feasibility of an Earth-circling spaceship, without once mentioning the manned spacecraft proposal by US Navy lieutenant Robert Haviland and Cdr Harvey Hall in August 1945 or the Navy's subsequent establishment in October 1945 of a Committee for Evaluating the Feasibility of Space Rocketry. As for the history of military communication satellites, Spitzmiller credits the US Army Signal Corps, explaining that "*Courier* was a prototype for a more advanced military satellite communications project known as *Advent* which placed much larger satellites in geosynchronous orbits several years later" (p. 155). Apparently, he does not understand that the Army's *Advent* program failed and, consequently, that the Air Force launched the world's first dedicated military communication satellite—operationally known as the Initial Defense Satellite Communications System—in 1968. Other misstatements, incomplete explanations, or oversights occur throughout *Astronautics*.

These volumes might disappoint readers, even those with only a basic knowledge of space history, because blatant errors in spelling mar the narrative from beginning to end. From "mils" instead of "miles" (p. 37) to "essentailly" instead of "essentially" (p. 408), the errors detract from the quality of Spitz-

miller's presentation. Furthermore, seeing "Maxime Faggot" instead of "Maxime Faget" (p. 335), "Neal Armstrong" instead of "Neil Armstrong" (p. 348), "Robinson Caruso" instead of "Robinson Crusoe" (p. 476), and "Caiden, Martin" instead of "Caidin, Martin" (p. 481, bibliography) might prompt readers to question how much attention the author, or his copy editor, paid to factual details.

As much as one might try to focus on positive attributes and overlook shortfalls in *Astronautics*, obstacles ranging from typographical errors to substantive inaccuracies tend to obscure the brilliance of Spitzmiller's narrative style. Perhaps a reprinted version—with errors corrected, inaccuracies clarified, and oversights covered—might render these volumes worthy of consideration for classroom use or a prominent place on collectors' bookshelves.

Dr. Rick W. Sturdevant
Peterson AFB, Colorado

Stabilization and Reconstruction Staffing: Developing U.S. Civilian Personnel Capabilities by Terrence K. Kelly, Ellen E. Tunstall, Thomas S. Szayna, and Deanna Weber Prine. RAND Corporation (http://www.rand.org/publications/index.html), 1776 Main Street, P.O. Box 2138, Santa Monica, California 90407-2138, 2008, 130 pages, $29.00 (softcover), ISBN 0833041371. Available free from http://www.rand.org/pubs/monographs/2008/RAND_MG580.pdf.

How should the US government handle civilian staffing for reconstruction operations? The authors seek to answer this question in light of US involvement in contingency operations in the recent past, utilizing the example of the Coalition Provisional Authority (CPA) in Iraq. Two of the book's authors, who served as members of the CPA, draw on personal experience in their assessments and recommendations. In light of their experience and research, the authors do not believe that the US government's current human-resources infrastructure enables effective civilian staffing.

Composing this work as part of a RAND Corporation research project, the authors seek to analyze how civilian staffing has occurred in the past as well as develop a road map for more effective staffing in future stability, security, transition, and reconstruction (SSTR) operations. They contend that the methods used for civilian staffing proved less than effective and did not create a so-called A-Team in Iraq, a team comprised of first-rate talent and experience.

The authors see a variety of problems at the root of the failure to field such a team. One fundamental issue lies in the stereotypically slow speed of the federal government to hire civilian employees, both from within its ranks (internal applicants) and from outside the federal pool (external applicants). However, institutional inertia vis-à-vis civilian hiring does not act as the sole villain. They cite a number of other interrelated problems, including differences in compensation from agency to agency, home agencies blocking deployments of their employees to support their own operations, unwillingness or reluctance (on the part of both the employee and the home agency) to have employees deploy for extended periods of time, and the difficulty of finding employees to fill particular niche positions demanding expertise as well as a suitable background in language and culture.

There lies a way ahead. The authors see several possibilities for better results in future operations, while acknowledging the frustration of trying to slice through the proverbial red tape. One suggestion with possible merit concerns creation of a by-name civilian reserve—a pool of employees sortable by skills and expertise. Administered within the US State Department, since it would likely serve as the lead agency for SSTR operations, the list would stand as a ready supply of willing participants to fill needed vacancies. The authors also surmise that centralizing the administration of deployed civilians within one agency could generate more enthusiasm for deployment insofar as it could possibly create equities in compensation and reduce cross-agency idiosyncrasies. Finally, promoting deployment as a positive career step could likely attract more and better talent. Although the authors don't see any one step as a magic bullet, they predict that institutional change could foster improvement.

Overall, *Stabilization and Reconstruction Staffing* has fairly narrow utility. It serves neither as a primer on civilian staffing in any sense of the word nor as any kind of assessment of operations in the global war on terror, from either a military or civil standpoint. Readers will find this work useful if they are interested in research within the civil service. Though readable, it is brief and written from a fairly technical human-resources perspective.

David J. Schepp, Seventh Air Force Historian
Osan Air Base, Republic of Korea

Submissions

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