Features

Departments

105 ❚ Commentary

Editorial Advisors

Reviewers

The Threat Environment Demands Nuclear Weapons Modernization

Dr. Adam Lowther
Michaela Dodge

On 27 January 2017, President Donald J. Trump signed a national security presidential memorandum which said, "The Secretary shall initiate a new Nuclear Posture Review (NPR) to ensure that the United States nuclear deterrent is modern, robust, flexible, resilient, ready, and appropriately tailored to deter 21st century threats and reassure our allies."[1] President Trump's timing could not be more prescient for such a review. In the almost eight years since the last NPR, the threats facing the United States have changed for the worse, with the US's nuclear-armed competitors (Russia, China, and North Korea) aggressively pursuing

developments in their weapons programs that adversely affect the credibility of American deterrence.

As the Trump administration develops the next NPR during the second half of 2017, it will be important for its authors to have a firm grasp of the technological developments of the US's nuclear competitors. Not only are they well ahead of the United States in their own modernization programs, but should Congress waiver in its commitment to replacing aging weapons systems, the United States could see itself fall behind a peer competitor like Russia. If the following analysis is correct, then simply fielding new delivery vehicles with the same warheads may be insufficient to effectively deter competitors who are actively fielding systems that are designed to outmatch those of the United States.

Understanding the modernization programs of competitors, the limitations of existing American systems, and how these variables impact the stability of deterrence is important as the United States considers its nuclear posture and the direction it will take for the remainder of the Trump administration. A brief description of the modernization efforts of North Korea, Russia, and China is an instructive place to begin.

North Korea

As recent events demonstrate, North Korea and its unpredictable leader, Kim Jong-un, pose the greatest concern to the United States as the regime focuses its effort on its ballistic missile and nuclear weapons program.[2] Designed to provide the regime a capability that will deter what it sees as the real possibility of an invasion by the United States and South Korea, nuclear weapons are seen by Kim Jong-un as an equalizing force that effectively counters American and South Korean conventional superiority.[3] Kim Jong-un sees nuclear weapons as fundamental to his regime's survival, potentially lowering the threshold of their use in the case of a perceived threat.[4]

North Korea has demonstrated the ability to produce a spherical-lensed implosion device (based on the design that can be traced back to the Pakistani scientist A. Q. Khan)—that is believed to be in the 5–10 kiloton yield range.[5] Pyongyang has an active ballistic missile program, although its long-range missiles are likely not capable of delivering a nuclear payload just yet. Currently, there is no open source evidence to suggest that North Korea has mated a nuclear warhead with any of its ballistic missiles.[6] The North Korean medium-range ballistic missile, Nodong-1, is based off of a Pakistani Ghauri missile that can carry nuclear payloads. North Korea periodically conducts underground nuclear tests and reportedly cooperates with Iran. North Korean scientists and engineers are likely overcoming any existing challenges to mating their nuclear warheads with their ballistic missiles in the near future.[7]

The complete lack of transparency within the North Korean nuclear program makes it both difficult to offer much detail on delivery systems and warheads and makes the program particularly threatening despite North Korea's stated "no-first-use" policy. From what little we know of its nuclear doctrine, North Korea has claimed a no-first-use policy, as well as threatened a nuclear preemptive strike, which offers analysts little in the way of understanding North Korean red lines or predicting its

action. While Kim Jong-un is proving difficult to understand and predict, his support for a nuclear and ballistic missile program has been strong and continuous.

Russia

While less of a direct threat to the United States than North Korea, Russia is undoubtedly the single greatest strategic threat to American sovereignty.[8] Contrary to the United States, Russia spent much of the past decade actively working to improve its tactical and strategic nuclear capabilities. At a minimum, it is accurate to say that Russia has the most diverse and formidable nuclear arsenal of any nuclear weapon state.[9] In addition to a strategic triad of long-range bombers, which are less capable aircraft than those of the United States, Russia is armed with new nuclear cruise missiles, submarine-launched ballistic missiles (SLBM), and silo, road-mobile, and rail-mobile intercontinental ballistic missiles (ICBMs). It possesses a formidable "tactical" nuclear arsenal—estimated to be at least 2,000 weapons—that would make a North Atlantic Treaty Organization (NATO)–Russia conflict particularly dangerous and unpredictable.[10]

Russia is also conventionally superior to NATO on its borders. It should come as no surprise that NATO, which fields approximately 200 B61 nuclear gravity bombs, is at a distinct disadvantage, should Russia seek to engage the alliance in a limited war over the Baltics or Poland with the explicit aim of breaking up the alliance.[11] With a stated policy that includes "escalate to deescalate," Russia has clearly indicated that it intends to change the direction of a conventional conflict, if it appears to be losing, by using tactical nuclear weapons.[12] The diversity of its tactical nuclear weapon arsenal creates gaps on the US ladder of escalation, potentially making the calculus to attack NATO more appealing in Russian president Vladimir Putin's mind.

According to publicly released statements, President Putin and his military leadership believe that recent upgrades to Russia's operationally deployed strategic nuclear forces are sufficient to deter the United States from defending NATO in a limited conflict.[13] Because the Russian tactical nuclear arsenal is greatly superior to that of NATO in both size and delivery options, it is not unreasonable to believe that President Putin believes he has the strategic advantage and can compel the United States to negotiate from a position of weakness in the event of a conflict. Some of Russia's modernization efforts are worth noting, particularly in the context of the US inability to come up with a flexible and timely nuclear weapons modernization plan.

The Strategic Rocket Forces, which operates Russia's ballistic missile force, is fielding a number of new ICBMs as it seeks to replace Cold War-era weapons.[14] Russia is replacing its remaining SS-18 and SS-19 (model 3) ICBMs, which are equivalent to the US's Minuteman III ICBMs, with SS-27 Topol-M and SS-29 Yars-M ICBMs—designed in the 1990s and 2000s.[15] The latter can carry multiple reentry vehicles (RVs). These ICBMs are silo-based and road- or rail-mobile. Locating and targeting mobile ICBMs is particularly difficult.

By 2020, the Russians are expected to field the RS-28 Sarmat, which is referred to as the "country killer" because it can hold 15 thermonuclear RVs. It is also reported to be equipped with advanced defensive countermeasures (decoys) designed to defeat bal-

listic missile defenses. Such a weapon would prove a distinct advantage in a potential standoff between the United States and Russia and is considered highly destabilizing.

Russia is also fielding a new and far more advanced class of ballistic missile submarines to replace its fleet of six Delfin-class (Delta IV) submarines, which were launched between 1984 and 1992. The Borei-class ballistic missile submarine—the quietest submarine Russia has ever produced—can carry up to 16 of the new SS-NX-30 Bulava SLBMs. These weapons are both more accurate and deadly than the submarines and SLBMs fielded a decade ago.[16] With the first Borei-class submarine entering service in 2009, this latest class of submarines—with eight expected to be commissioned by 2020—significantly improves the effectiveness of Russia's sea-based leg of the triad. In comparison, the US strategic submarines that entered into force in the 1990s time frame are scheduled to remain operational until 2042.

The bomber leg of the Russian triad is also receiving significant attention. Its fleet of Tu-95 Bear-H and Tu-160 Blackjack bombers are believed to be receiving new radar and other upgrades while Russia designs and fields a new stealth bomber.[17] The Russians are also fielding a new nuclear air-launched cruise missile. First entering service in 2014, the Kh-102 can be launched by both of Russia's bombers while in Russian airspace and reach the continental United States.[18] Because of the altitude at which they fly and the size of their radar cross-section, the United States may not know these weapons have entered American airspace. The Russians have been aggressively intruding into NATO's airspace in an apparent effort to intimidate US allies and test the alliance's air defenses.

Russia is also believed to be making significant advances in the design of its nuclear warheads, reportedly working on the fourth generation of weapon warheads and nuclear warheads with new weapon effects.[19] Russia is growing increasingly concerned that the United States can disable or destroy incoming warheads with defensive countermeasures like ballistic missile defenses. A desire to ensure warheads detonate on target, and at the desired yield, has been a focus of Russian designers in recent years. While open source information is limited, Russia seems to be making advances in these areas. These technical developments must be considered in the context of President Putin's behavior. Russia has acted aggressively against neighboring countries but also increased the role and salience of nuclear weapons in its national security—the opposite of what the Obama administration did. Russia also is in violation of a whole host of its international obligations, including the Intermediate-Range Nuclear Forces Treaty and the "Mixed Oxide (MOX) Fuel Treaty."[20] Russia currently deploys several hundred more accountable warheads than allowed under the New Strategic Arms Reduction Treaty (New START), further increasing concern that it will not meet its obligations when the implementation period hits next year. Prospects for arms control are nil at this point in time. The Russian government has repeatedly stated that it will not negotiate the size of its tactical nuclear arsenal, which presents the greatest concern to NATO. Russia routinely threatens NATO allies with what it calls "preemptive" nuclear strikes and conducts military exercises simulating nuclear attacks on Poland. The possibility of a tactical nuclear exchange in Europe is increasing.

China

Although all indications suggest China maintains a nuclear arsenal considerably smaller than the United States and Russia, consistent with its policy of minimum deterrence, our knowledge of the Chinese nuclear weapons program is limited. This is because China purposefully maintains an opaque policy.[21] We do, however, know that China possesses a secure second-strike capability that is increasingly more robust, due to ongoing modernization efforts that are providing China a legitimate nuclear triad with advanced nuclear warheads and delivery systems.[22]

China has traditionally relied on its ballistic missiles as the bedrock of its nuclear deterrent. While ballistic missiles continue to be the primary building block of the Chinese deterrent, this is changing. The DF-5 (CSS-4) is a liquid-fueled ICBM first deployed in the mid-1980s and is more akin to the American Titan II ICBM than the later Minuteman III ICBM.[23] This heavy-lift ICBM was designed for use with a single large-yield warhead—with a range of approximately 7,000 miles—and an accuracy of approximately one-quarter of a mile. As part of its modernization effort, the DF-5 is due to be replaced by the DF-41, a heavy-lift, solid-fueled ICBM, which has a considerably improved accuracy and response time—making DF-41 locations harder to destroy in time of a serious crisis.[24]

In addition to the DF-41, China also is fielding the DF-31 (CSS-9)—a solid-fueled ICBM which was first deployed in 2006. China recently upgraded to a DF-31A variant, which can reach the United States with its three warheads—a clear technological step forward for China. An additional variant is the DF-31B—a road-mobile weapon. Part of what makes the DF-31 of great concern is China's development of advanced multiple independent reentry vehicle technology.[25]

With an estimated 20 DF-5 and 15 DF-31 missiles on alert in China, the newly reorganized People's Liberation Army Rocket Force can deliver enough firepower to destroy the US's largest cities. If loaded with a full complement of warheads, China is capable of delivering approximately 105 megaton class weapons on the United States. Given that China has a "counter-value strategy" focused on targeting American cities, the Chinese ballistic missile force is deeply concerning and an existential threat to American society.[26]

The People's Liberation Army Navy also is fielding a "continuous at-sea deterrent" with the introduction of the Jin-class ballistic missile submarine. The first Jin SSBN was commissioned in 2010, with a total of five expected. Open source literature describes the Jin as noisy enough to be detected and tracked by the US Navy, which makes it inferior to American and Russian ballistic missile submarines and susceptible to American antisubmarine warfare (ASW) efforts, but it is a clear step toward parity for China. Jin-class vessels will carry up to 12 JL-2 (CSS-NX-4) ballistic missiles, which have a range of approximately 5,000 miles and can strike the United States from relatively safe territory.[27] In 2013, China showed a map of the United States with nuclear fallout after a nuclear submarine attack.

The People's Liberation Army Air Force fields the H-6K bomber, which is a modernized version of the Soviet-era H-6 bomber.[28] While the H-6K is inferior to the B-52 and B-2, this bomber can carry the CJ-10K cruise missile. Although it is believed that the CJ-10K is a conventional-only weapon, China has the technical ability

to rapidly field a nuclear variant.[29] With China seeking regional dominance in Asia, the H6-K's 2,200–mile range provides the aircraft ample distance to hold targets in the region at risk.

Indications suggest that China is increasing the numbers of its operationally deployed strategic nuclear weapons from an estimated 200–300 to an unknown number.[30] Because China is not known to be actively producing additional weapons-grade uranium or plutonium, the ultimate size of its arsenal may be limited well below that of the United States and Russia. However, China's purposeful effort to obscure its nuclear weapons program and the opaque nature of Chinese nuclear strategy make it difficult for Western analysts to accurately assess the direction of the Chinese nuclear arsenal and the true nature of its use doctrine. From limited glimpses into the program, interaction with Chinese scientists, and publications by Chinese scientists, it is believed that China has a weapons development program that is of the same technical capability of the United States and Russia.[31] This means China may be developing warheads of similar sophistication and with similar combat environment concerns as those under consideration by American and Russian designers.

Understanding the Need for American Modernization

For those that are skeptical of US nuclear weapons modernization plans, the preceding discussion of adversary capabilities may be interesting but not particularly useful. Skeptics tend to believe that as long as the United States has even a small secure second-strike capability, any additional nuclear weapons are excessive and dangerous. The problem with this view is that it attributes a set of values and attitudes to American adversaries that evidence suggests they do not hold.[32] For example, American culture places a higher value on the lives of individual Americans than it places on the survival of the sitting government. This is not true of Russian culture which, for centuries, has demonstrated that the preservation of the regime is of the highest importance. Additionally, American culture also places great importance on transparency and openness. Russian culture, on the other hand, is deeply influenced by an inherent distrust of "others" and a particular paranoia when it comes to the United States.[33] Given that Russian history—for the last 600 years—is the story of one autocratic form of government replacing its predecessor, it should come as no surprise that President Putin acts as he does.

While China's culture and history have their own unique characteristics, the need to sacrifice the individual for the preservation of the state and a long history of autocracy are aspects that China shares with Russia. What separates China from Russia is opacity and ambiguity with respect to its nuclear doctrine, leaving the United States to divine the location of China's red lines.[34] For both Russia and China, cultural and historical norms make both countries more willing to accept casualties sooner in conflict if the sacrifice means the preservation of the regime and defeat of an adversary.

Thus, when advocates of "minimum deterrence" suggest that nuclear deterrence is stable at low numbers, and no adversary would dare use nuclear weapons against

the United States—so long as we possess a secure second strike—they are guilty of mirror imaging. Opposing US nuclear weapons modernization on the grounds of attributing American values to Russia, China, and perhaps even North Korea is misleading and can lead to making the deterrent relationships between the United States and its adversaries less stable and increasing allied doubts about US commitment to their security.[35] The effect is the creation of a perception—mass cognitive dissonance—that the United States lacks both the will and capability to fight and win a nuclear conflict.

Technical Challenges Facing the Arsenal

Nuclear weapon states undertake substantial efforts to better understand the capabilities of competing nuclear powers. While the intelligence efforts of the United States are highly classified, some general points are possible.

First, the primary means that the United States and other countries rely on to gather intelligence is not human intelligence. Rather than looking like a James Bond or *Mission Impossible* movie, much of the information gathered by the intelligence community is accomplished through technical means that rely on analysts with science and engineering backgrounds. These types of intelligence gathering include: electronic intelligence (ELINT), measurement and signals intelligence (MASINT), imagery intelligence, signals intelligence (SIGINT), communications intelligence, and geospatial intelligence.[36]

After combing the analytic results of these intelligence-gathering techniques, the United States, Russia, and China are able to develop a rather strong understanding of one another's nuclear weapons capabilities. What too few analysts realize is just how important of a role intelligence plays in shaping deterrence stability. Those within the disarmament community who suggest that a small number of nuclear weapons is enough to deter US adversaries and assure American allies fundamentally misunderstand that the thinking of senior leaders (civilian and uniformed) in the United States, Russia, and China is informed by the technical picture intelligence provides as they weigh the risks of a provocative action and how a nuclear-armed competitor may respond. Thus, the assertion that numbers do not matter or that American capability does not play a central role in shaping the risk calculation of Russia and China is fundamentally incorrect. As the historical analysis of Matthew Kroenig, a professor at Georgetown University, has shown, in crises where two nuclear weapon states are involved, the state with the superior nuclear capability prevailed in every single instance. The state with the inferior arsenal ultimately backed down.[37]

The problem for the United States is that it may soon find itself in a position where it no longer possesses a superior nuclear capability and must back down in a crisis. We can see glimpses of such a situation in Europe where Russia fields a clearly superior tactical nuclear arsenal.[38] If the United States does not modernize as currently planned, and perhaps beyond, it will soon see Russia and China increasingly, and aggressively, willing to challenge US interests in Europe and Asia while knowing that the American nuclear advantage no longer exists. Fortunately, the United States is not there yet, but in the next three decades this will no longer remain the case if the United States does not replace its existing weapons and delivery vehicles.

Today, the United States deploys 1,550 operationally deployed strategic nuclear warheads accountable under New START—more than a 90 percent reduction from the Cold War.[39] Although this may seem like a large number of nuclear weapons, the reality of warfare is that nuclear weapons, like conventional weapons, do not always reach and destroy their targets. While the specific probability of arrival and probability of kill (PK) numbers are classified for each of the US's nuclear systems, it is possible to say that the number is below one and declining. A brief description of the limitation of current systems is instructive.

Intercontinental Ballistic Missiles

The Minuteman III, designed in the 1960s and fielded in the 1970s, was built to counter Russian SS-18/19 ICBMs. According to public sources, they have a circular error probable (CEP)—the radius of a circle, centered on the mean, with a boundary expected to include the landing points of 50 percent of the rounds—of between 500–1,000 meters. While the silos in which the Minuteman III reside were built to hardness standards for earlier, and less accurate, Russian ballistic missile systems, the new SS-27 and SS-29 ICBMs are far more accurate, with much smaller CEPs, dramatically increasing the PK in an attack on American ICBM fields.[40] It is worthwhile to keep in mind that the 1980s MX Peacekeeper ICBMs were deployed partially due to concerns about the Minuteman III's survivability. American ICBMs are at a greater risk to be disabled in the first strike than ever before.

To counter a similar vulnerability, the Soviets hardened their launch facilities to counter an increased accuracy of the Minuteman III, according to a 1991 study by Irukhim Smotkin, *Hardening Soviet ICBM Silos*.[41] In doing so, the PK for the Minuteman III was reduced. In the four decades since the hardening occurred, the Russians have also continued to develop advanced integrated air defenses with the S-300, S-400, and S-500, which, if Russian reports are accurate, may have the ability to kill incoming American RVs and reentry bodies (delivered by SLBMs)—further reducing the certainty of a US president that the nation's ballistic missiles will reach their designated targets.[42]

To make matters worse, there are also open-source reports that Russia is working on enhanced radiation warheads for the Moscow region's Gazelle antiballistic missile system, which would have—if correct—further increased the probability of defeating incoming American RVs and reentry bodies.[43] Unlike the United States, Russia sees the utility of using nuclear weapons to defeat incoming nuclear weapons, which reduces the American confidence that it can hold Russian targets at risk and thus effectively deter Russian action.

Russia, China, North Korea, and Iran have paid close attention to American ICBM and SLBM tests and have garnered significant technical intelligence from them. In the case of Russia and China, intelligence-gathering ships are frequently deployed to gather ELINT, MASINT, and SIGINT on test shots off the California coast. The result of our adversaries' efforts is that they understand the reentry angle at which both RVs and reentry bodies attack their targets. Thus, each of our adversaries, particularly North Korea, have begun placing their most valuable command and control,

leadership, and nuclear weapons facilities in locations protected from American ballistic missiles. In the case of Russia and China, both countries understand the flight physics of ballistic missiles and have/are placing advanced integrated air defense systems in the exact locations needed to, at a minimum attempt to, defeat incoming American weapons. Nuclear conflict is not like horseshoes and hand grenades where close is good enough.

Ship, Submersible, Ballistic, Nuclear Missiles

Although the sea-based leg of the triad is often called the most secure leg, the United States, Russia, and China all have active ASW programs that are specifically designed to hunt and kill an adversary's ballistic missile submarines. According to a number of accounts of Cold War-era submarine warfare, the United States experienced a level of success in tracking Soviet ballistic missile submarines that is often unknown. Should Russia and China place an equal level of focus on not only attack submarine ASW, but sea-floor-based passive sonar and space-based systems, the world's oceans would certainly become much less opaque.[44] Additionally, ship, submersible, ballistic, nuclear missiles (SSBN) are by no means assured of reaching and destroying their targets.

If the United States were to eliminate either the bomber or ICBM leg of the triad, an adversary would be free to refocus resources on advancing its ASW capabilities rather than on hedging against all three legs of the triad. In many respects, limited resources play a critical role in preventing Russia or China from focusing on defeating American ballistic missile submarines, which can be destroyed with a conventional torpedo—making it hard for the United States to threaten the use of nuclear weapons in retaliation.

Bombers

American strategic bombers are particularly useful for two reasons. First, they are the only leg of the nuclear triad that can effectively signal an adversary American intent by increasing or decreasing their readiness levels and recalling them if necessary. Second, only bombers have the ability to strike targets our adversaries bury and harden in remote locations in an effort to shield them from an ICBM or SLBM. The problem, however, is the fact that Russia and China are both developing advanced an integrated air defense system (IADS) that not only prevent the venerable B-52 from penetrating defended airspace, but also make it difficult for stealth aircraft—like the B-2—to fly the necessary profiles required to reach the targets for which they were designed.[45] The simple fact remains that stealth aircraft are not invisible to radar. Instead, they rely on a complex flight plan that is specifically designed to minimize the radar signature of the aircraft. However, as increasingly dense IADS improve their ability to discreetly analyze ultra-high frequency, very high frequency, L-band, and X-band radar returns, stealth aircraft will find it difficult to penetrate the very airspace for which they exist.

While some maintain that the loss of a B-2 during a nuclear conflict is to be expected, the Air Force relies on its stealth bombers returning from a bombing mission so that they can regenerate and fly against additional targets due to the small number of B-2 aircraft. However, this requirement is growing increasingly unrealistic.

The AGM-86 nuclear cruise missile, which serves as the B-52's only nuclear weapon, does not fly fast enough to evade air defense missiles, lacks the necessary defense to defeat modern IADS, and does not have the reduced radar signature required to evade modern air defense networks.[46] This leaves the bomber leg of the triad facing a challenging air environment in which the probability of reaching and destroying a target is declining.

Overcoming Current Challenges

America's adversaries' aggressive modernization programs undermine the credibility of the United States' nuclear arsenal. Their actions make the technical requirements for US nuclear weapons modernization an imperative. Existing American capabilities are becoming increasingly inadequate to threats facing the country. The Cold War has long since passed, and Russia and China have spent the past decade and a half designing and fielding systems that undermine the credibility of American deterrence. Contrary to the view of many opponents of modernization in the United States, who suggest that virtually any effort to field modern systems is destabilizing, the reality is much different. Former Secretary of Defense Donald Rumsfeld's admonition that "weakness is provocative" is much more accurate than any assertion that American strength is the driver of strategic instability.

If President Trump and Congress are serious about maintaining the credibility of American strategic deterrence, the nation has no other option than modernizing each of the nuclear triad's three legs. With the bomber leg of the triad in perhaps the poorest relative condition because of the B-52's inability to penetrate defended airspace, the limited number of penetrating stealth bombers (20), and the limitations of the nuclear cruise missile, fielding the B-21 Raider (the USAF's new long-range bomber) and the long-range strike cruise missile (LRSO) is more important than ever.

According to press reports, the Air Force plans to buy at least 100 B-21 stealth bombers.[47] This will increase the number of penetrating bombers capable of delivering both nuclear cruise missiles and the B61 nuclear gravity bomb. It will also provide the United States a bomber with an unprecedented ability to integrate and employ offensive cyber-attack options and serve as a platform for gathering and disseminating real-time information. Thus, the B-21 will give the United States its best opportunity to penetrate IADS that are increasingly able to detect, track, and target aircraft and missiles at longer ranges.

While unpopular with many advocates of minimum deterrence and disarmament, a stealthy nuclear cruise missile is absolutely necessary.[48] Not only are America's adversaries building their most important facilities in locations that ballistic missiles cannot attack, but they are placing their most advanced IADS around them for additional protection. This may make it very hard, if not impossible, for even the B-21 to reach these targets and deliver a gravity bomb. The only means available for

striking these targets may very well be the LRSO, which, because it is stealthy and less than one-fiftieth the size of a B-2 or B-21, will have the greatest chance of reaching a target undetected.

Moving forward with the Ohio-class replacement program is also important for the nation's sea-based leg of the triad. The simple fact is Russia and China are investing in antisubmarine warfare and making it increasingly difficult to sail the world's oceans undetected. Not only will the SSBN be quieter, but it will not need refueling during its service life. This will allow for these submarines to play a much more effective role in providing a continuous at-sea deterrent.

Conclusion

Opponents of nuclear modernization are fundamentally misunderstanding how capability affects the stability of nuclear deterrence and how it shapes the actions of the civilian and uniformed leaders of Russia, China, and the United States. Nuclear weapons are more than simple "political weapons" that exist to deter the use of other nuclear weapons. For Russia, in particular, nuclear weapons are weapons of war and integrated into Russian warfighting doctrine. To credibly deter Russian aggression, the United States must also treat nuclear weapons as not only tools of deterrence but warfighting weapons. In this regard, Air Force Global Strike Command is correct. With a motto of "deter, assure, strike," the command is effectively conveying that the United States has the will and ability to deliver devastating effects to anyone who challenges America's core interests.

We should never forget that maintaining the capability to carry out any threat is central to the stability of deterrence. After all, our adversaries are watching. ✪

Notes

1. Donald J. Trump, *Presidential Memorandum on Rebuilding the U.S. Armed Forces*, 27 January 2017, https://www.whitehouse.gov/the-press-office/2017/01/27/presidential-memorandum-rebuilding-us-armed-forces.

2. Eli Watkins, "Trump: US Will Act Unilaterally on North Korea if Necessary," *CNN*, 3 April 2017, http://www.cnn.com/2017/04/02/politics/donald-trump-north-korea/.

3. Joel Witt, "North Korea's Unstoppable Nuclear-Weapons Program," *The National Interest*, 22 April 2015, http://nationalinterest.org/feature/north-koreas-unstoppable-nuclear-weapons-program-12686.

4. *North Korea: Overview*, (Washington, DC: *Nuclear Threat Initiative*, 2017), http://www.nti.org/learn/countries/north-korea/.

5. Steve Almasy and Euan McKirdy, "North Korea Claims to Have Nuclear Warheads that can Fit on Missiles," *CNN*, 10 March 2016, http://www.cnn.com/2016/03/08/asia/north-korea-nuclear-warheads/.

6. Daniel Pinkston, *The North Korean Ballistic Missile Program*, (Carlisle Barracks, PA: US Army War College, 2008), http://press.armywarcollege.edu/pubs/1937.pdf; see "Daniel Pinkston."

7. "North Korea's Nuclear Programme: How Advanced is it?" *BBC*, 6 January 2017, http://www.bbc.com/news/world-asia-pacific-11813699.

8. *Nuclear Weapons: Who Has What at a Glance* (Washington, DC: Arms Control Association, 2017), https://www.armscontrol.org/factsheets/Nuclearweaponswhohaswhat.

9. Alex Lockie, "How the US's Nuclear Weapons Compare to Russia's," *Business Insider*, 28 September 2016, http://www.businessinsider.com/us-vs-russia-nuclear-weapons-2016-9.

10. Dave Majumdar, "5 Russian Nuclear 'Weapons' of War the West Should Fear," *The National Interest*, 31 January 2015, http://nationalinterest.org/feature/5-russian-nuclear-weapons-war-the-west-should

-fear-12159; Will Lowry, "Russia, US and Nuclear Modernization," *Ploughshares* Fund, 9 December 2015, http://www.ploughshares.org/issues-analysis/article/russia-us-and-nuclear-modernization; and Hans M. Kristensen and Robert S. Norris, "Russian Nuclear Forces, 2015" *Bulletin of the Atomic Scientist* 71, no. 3, 1 May 2015, http://thebulletin.org/2015/may/russian-nuclear-forces-20158299.

11. Michaela Dodge, *U.S. Nuclear Weapons in Europe: Critical for Transatlantic Security*, (Washington, DC: The Heritage Foundation, 2014, http://www.heritage.org/defense/report/us-nuclear-weapons -europe-critical-transatlantic-security.

12. Nikolai Sokov, "Why Russia Calls a Limited Nuclear Strike 'De-escalation,'" *Bulletin of the Atomic Scientist*, 13 March 2014, http://thebulletin.org/why-russia-calls-limited-nuclear-strike-de-escalation.

13. John Grady, "Arms Expert: Russia Quick to Threaten Nuclear Strikes in Regional Conflicts," *United States Naval Institute News*, 28 June 2016, https://news.usni.org/2016/06/28/arms-expert-russia -quick-threaten-nuclear-strikes-regional-conflicts.

14. "Russia Strategic Rocket Forces Overview," *Nuclear Threat Initiative*, 14 May 2009, http://www .nti.org/analysis/articles/russia-strategic-rocket-forces-overview/.

15. Savo Ukropina, "R-36 (SS-18 Satan)," *Military-Today*, 1 January 2017, http://www.military-today .com/missiles/ss18_satan.htm; "UR-100N/SS-19 Stiletto," *Federation of American Scientists* (*FAS*), 29 July 2000, https://fas.org/programs/ssp/nukes/nuclearweapons/russia_nukescurrent/ss19.html; "RT-2UTTH /Topol–M/SS-27," *FAS*, 13 October 2000, https://fas.org/nuke/guide/russia/icbm/rt-2pmu.htm; Charles Vick, "RS-24/SS-29/Yars-M," *GlobalSecurity*, 16 April 2014, http://www.globalsecurity.org/wmd/world /russia/rs-24.htm; and David Reid and Alexander Smith, "Russia Unveils RS-28 Sarmat 'Satan 2' Nuclear Missile," *NBC News*, 26 October 2016, http://www.nbcnews.com/news/world/russia-unveils-rs-28-sarmat -satan-2-nuclear-missile-n673016.

16. Andrius Genyus, "Borei Class," *Military-Today*, 1 January 2017, http://www.military-today.com /navy/borei_class.htm.

17. Jacek Siminski, "Russia is Working to Modernize its Strategic Aviation to Maintain a Deterrence Capability," *The Aviationist*, 24 March 2015, https://theaviationist.com/2015/03/24/russia-strategic -aviation-updates/.

18. "Kh-101 /Kh-102," *GlobalSecurity*, 1 January 2017, http://www.globalsecurity.org/wmd/world /russia/kh-101.htm.

19. Ivanka Barzashka, "Technical Concerns: Why Russia Worries About Missile Defense," *Bulletin of the Atomic Scientist*, 14 May 2012, http://thebulletin.org/technical-concerns-why-russia-worries-about -missile-defense.

20. Andrew E. Kramer, "Vladimir Putin Exits Nuclear Security Pact, Citing 'Hostile Actions' by U.S.," *New York Times*, 3 October 2016, https://www.nytimes.com/2016/10/04/world/europe/russia -plutonium-nuclear-treaty.html.

21. Gregory Kulacki, *China's Nuclear Arsenal: Status and Evolution* (Washington, DC: Union of Concerned Scientists, 2011), 1–5.

22. Benjamin Schreer, "China's Development of a More Secure Nuclear Second-Strike Capability" *Asia Policy* 19 (January 2015), 14–20.

23. John Wilson Lewis and Hua Di, "China's Ballistic Missile Programs Technologies, Strategies, Goals," *International Security* 17, no. 2 (1992), 5–40.

24. "DF-41," *GlobalSecurity*, 2 February 2017, http://www.globalsecurity.org/wmd/world/china /df-41.htm.

25. "DF-31, DF-31A" *GlobalSecurity*, 21 December 2015, http://www.globalsecurity.org/wmd/world /china/df-31.htm.

26. Gregory Kulacki, *The Chinese Military Updates China's Nuclear Strategy* (Washington, DC: Union of Concerned Scientists, 2015), 2.

27. Andrius Genyus, "Jin Class," *Military-Today*, 1 January 2017, http://www.military-today.com /navy/jin_class.htm.

28. Noam Eschel, "Chinese Air Force Gets More H-6K Strategic Bombers" *Defense Updates*, 25 June 2013, http://defense-update.com/20130625_h-6k-bombers-delivered-to-pla-air-force.html.

29. "DH-10 / CH-10 / CJ-10 Land-Attack Cruise Missiles (LACM) Hong Niao/Chang Feng/Dong Hai-10," *GlobalSecurity*, 11 November 2016, http://www.globalsecurity.org/wmd/world/china/lacm.htm.

30. Hans M. Kristensen and Robert S. Norris, "Chinese Nuclear Forces, 2015," *Bulletin of the Atomic Scientist*, 1 July 2015, http://thebulletin.org/2015/july/chinese-nuclear-forces-20158459.

31. The authors have had informal conversations with both Chinese nuclear scientists and American scientists familiar with the Chinese weapons program who have indicated that China's nuclear weapons program has, during the past three decades, actively sought to catch up to the sophistication and capability of the American and Russian weapons programs and has been successful in doing so.

32. For an excellent discussion of how Eastern and Western societies think and process information, see Richard E. Nisbett, *The Geography of Thought* (New York: Free Press, 2003). For a better understanding of President Vladimir Putin's motivations and thinking, see Marcel Van Herpen, *Putin's Wars* (Lanham, MD: Rowman and Littlefield, 2014). To better understand the values of the Kim Regime, see Victor Cha, *The Impossible State: North Korea Past and Future* (New York: Ecco, 2013).

33. Anna Arutunyan, "Russia's Politics of Paranoia," *OpenDemocracy*, 22 December 2015, https://www.opendemocracy.net/od-russia/anna-arutunyan/russias-politics-of-paranoia; and Jeffrey Lewis, "Russia's Nuclear Paranoia Fuels Its Nuclear Propaganda," *Foreign Policy*, 22 August 2016, http://foreignpolicy.com/2016/08/22/russias-nuclear-paranoia-fuels-its-nuclear-propaganda/.

34. Hui Zhang, "China's Nuclear Policy: Changing or Not?" *Harvard Kennedy School Belfer Center for Science and National Affairs Power and Policy Blog*, 31 May 2013, https://www.belfercenter.org/publication/chinas-nuclear-policy-changing-or-not.

35. Richard Heuer, *The Psychology of Intelligence Analysis* (Langley, VA: Center for the Study of Intelligence, 2013), 65–75.

36. Robert M. Clark, "Perspectives on Intelligence Collection," *Journal of U.S. Intelligence Collection* 20, no. 2 (Winter 2013), 47–52.

37. Matthew Kroenig and Michael Weintraub, *The Nuclear Balance and International Conflict* (Washington, DC: Mortara Center for International Studies, 2011), http://www.matthewkroenig.com/Kroenig_The%20Nuclear%20Balance%20and%20International%20Conflict.pdf; see "Matthew Kroenig."

38. Julian Borger, "US and Russia in Danger of Returning to Era of Nuclear Rivalry," *The Guardian*, 4 January 2015, https://www.theguardian.com/world/2015/jan/04/us-russia-era-nuclear-rivalry.

39. Hans Kristensen, "New START: Russia and the United States Increase Deployed Nuclear Arsenals," *FAS*, 2 October 2014, https://fas.org/blogs/security/2017/04/newstart2017/.

40. "Russia Upgrades Its Missile Arsenal," *Janes Intelligence Review* (2015), 1–15.

41. Irukhim Smotkin, *Hardening Soviet ICBM Silos* (New York: Delphic Associates, 1991).

42. Dave Majumdar, "Russia's Deadly S-500 Air-Defense System: Ready for War at 660,000 Feet," *The National Interest*, 3 May 2016, http://nationalinterest.org/blog/russias-deadly-s-500-air-defense-system-ready-war-660000-16028.

43. Simon Shuster, "Why Russia Is Rebuilding Its Nuclear Arsenal," *Time*, 4 April 2016, http://time.com/4280169/russia-nuclear-security-summit/.

44. See Norman Polmar and Edward Whitman, *Hunters and Killers* (Annapolis: *Naval Institute Press*, 2016).

45. At present, only the B-2 is capable of penetrating Russian IADS such as the S-300 and S-400. The B-52 must operate from a stand-off position.

46. "AGM-86 Air-Launched Cruise Missile (ALCM)," *CSIS Missile Defense Project*, 29 November 2016, https://missilethreat.csis.org/missile/alcm/.

47. Oriana Pawlyk, "Air Force Unveils Name of Future Stealth Bomber as B-21 'Raider,'" Military.com, 19 September 2016, http://www.military.com/daily-news/2016/09/19/air-force-unveils-name-of-future-b21-bomber-as-tk.html.

48. Adam Lowther, "Nuclear Air Launched Cruise Missiles: They Still Matter," *The National Interest*, 28 October 2015, http://nationalinterest.org/feature/nuclear-air-launched-cruise-missiles-they-still-matter-14182.

Dr. Adam Lowther

Dr. Lowther (PhD, University of Alabama; MA, BA, Arizona State University), serves as the director of the School of Advanced Nuclear Deterrence Studies (SANDS), Kirtland AFB, New Mexico. He leads the academic, professional development, and research effort of the school and aided in the initial stand-up of SANDS. He previously served as the director of the academic and professional journals at the Air Force Research Institute (AFRI), Maxwell AFB, Alabama, where he oversaw the publication of the Air Force's professional journals: *Strategic Studies Quarterly* (SSQ) and *Air and Space Power Journal* (English, Spanish, Chinese, Africa and Francophonie). Before assuming this position, Dr. Lowther served as a research professor at AFRI, where he led and participated in a number of Chief of Staff of the US Air Force-directed studies. His principal research interests include deterrence, airpower diplomacy, and the Asia–Pacific. Dr. Lowther is the author or editor of five books. He has published in *The New York Times*, *The Boston Globe*, *Joint Force Quarterly*, *SSQ*, and a variety of other journals and outlets. Before joining AFRI, he served on the faculty of two universities where he taught courses in international relations, political economy, security studies, and comparative politics. He also served on a variety of committees and as a mentor to student groups. Early in his career, Dr. Lowther served in the US Navy aboard the USS *Ramage* (DDG-61). He also served at Commander in Chief, US Naval Forces, Europe–London and with Naval Mobile Construction Battalion-17.

Michaela Dodge

Ms. Dodge (MS, Missouri State University; BA, Masaryk University, Czech Republic) specializes in missile defense, nuclear weapons modernization, and arms control as a senior policy analyst for defense and strategic policy in The Heritage Foundation's Allison Center for Foreign Policy Studies. She has authored and coauthored research papers and commentary for Heritage, as well as contributed defense and national security posts to the think tank's policy blog, *The Foundry*.

Transforming Future Air Force Leaders of Tomorrow

A Path to Authentic Transformational Leadership

Dr. Fil J. Arenas
Dr. Jennifer Tucker
Dr. Daniel A. Connelly

If your actions inspire others to dream more, learn more, do more and become more, you are a leader.

—John Quincy Adams

Introduction

In the preceding quote by our sixth president, he managed to capture the essence of leadership in 19 words. Why has this concept of *leadership* become elusive to so

many? Leadership is a concept that has evolved over the course of humanity. Why are there so many theories? What is the best leadership model? For the past six years, the Squadron Officer School (SOS) at Maxwell AFB, Alabama has inculcated transformational leadership behaviors as a guiding light toward *authentic transformational leadership*. The focus of this article is to pinpoint the developed behaviors and leadership acumen of our SOS graduates today as measured through the Leadership Development Survey (LDS), a 40-item measure based on Mind Garden's Multifactor Leadership Questionnaire (MLQ) that captures propensity scores on eight leadership behaviors. As an analytical tool, the LDS not only sheds new light on the leadership behavior preferences of today's Air Force captains but also indicates, on an empirical basis, an optimal approach pattern for senior leaders—*how can senior leaders reach these captains and bring out their best in a common culture of leadership?* The following sections will describe the leadership philosophy that has become the foundation of the SOS curriculum and hopefully a leadership lexicon for future Air Force leaders.

The Full-Range Leadership Model

When we speak of the "full range of leadership," we are actually referring to transformational and transactional leadership theories to include laissez-faire (LF), the nontransactional approach to leadership. As depicted in figure 1, these three styles of leadership and associated behaviors comprise the Full-Range Leadership Model (FRLM).

Laissez-Faire	Transactional		Transformational			
Hands-Off Leadership	Management by Exception (MBE)	Contingent Reward (CR)	Individual Consideration (IC)	Intellectual Stimulation (IS)	Inspirational Motivation (IM)	Idealized Influence (II)
	Passive / Active					

Figure 1. Full-Range Leadership Model. (adapted from Bernard M. Bass and Ronald E. Riggio, 2006.)[1]

Originally, transformational leadership was first described in 1973 by James V. Downton. However, it was James MacGregor Burns who introduced this significant leadership approach in his classic text *Leadership*.[2] Burns attempted to link leadership and followership roles while making a distinction between transformational and transactional properties. Transactional leadership behaviors focused on the exchanges between leaders and followers as described in many earlier leadership models. For instance, leaders would offer incentives for performance to drive productivity; teachers would offer grades for completed assignments; or managers would reward employees for exceeding work goals. In contrast, a transformational approach seeks to engage a follower to not only foster a leader–follower relationship but raise the level of motivation and morality. A transformational leader is attentive to the needs and concerns of followers and strives to help them reach their potential. According to Bernard M. Bass, transformational and transactional leader-

ship approaches were not mutually exclusive and empirically documented to be positively correlated.[3] Additionally, the transformational model is one of the current approaches to leadership today. In their 2001 study of articles published in *Leadership Quarterly*, Kevin B. Lowe and William L. Gardner discovered that one-third of leadership research focused on the transformational or charismatic perspective.[4]

The literature suggests that individual traits reflecting the FRLM can be measured using the MLQ. This is a scientifically validated assessment mechanism for determining individuals' development levels in each of the FRLM behaviors depicted above. Unfortunately, this survey is expensive. Thus, the Air University's (AU) SOS developed an assessment measurement based on the MLQ—the LDS—to use as a military-specific leadership assessment instrument and growth tool (as approved by the author of the MLQ and the senior publisher, Mind Garden Inc.).[5] This survey has been used for developing SOS students since 2013. The vision of the LDS is to provide a metric for resident students initially and during the last week of their course to illustrate personal leadership growth and provide a snapshot for future leadership curriculum development. Bass emphasized a "full range leadership" approach that not only included these two styles but incorporated an avoidant LF style as well.[6] In addition to these three styles of leadership, Bruce J. Avolio and Bass identified relevant behaviors associated with each leadership style.[7] To begin our discussion of the FRLM styles and behaviors, we will start with the nontransactional behavior LF leadership.

Laissez-Faire Leadership

The French phrase *laissez-faire* or "hands-off" leadership, in this case, describes a leader who abdicates responsibility, delays decisions, is not interested in his or her followers' needs or in providing feedback, and does not develop followers.[8] This type of leader is not engaged with subordinates and avoids taking a stand on any organizational issues. Further, the LF leader is often absent from work meetings and other related obligations and may avoid the daily work responsibilities altogether.[9] Eventually, followers become frustrated leading to dissatisfaction with their leader, job, and organization.[10] In the military environment, this dissatisfaction could manifest into a variety of reactions ranging from substandard performance to separation. The next section describes a requisite style of leadership for our dynamic military environment; transactional leadership.

Transactional Leadership

Transactional leadership seeks to maintain organizational stability through regular social exchanges leading to goal achievement for both leaders and their followers. Burns described transactional leadership as an exchange relationship among leader and followers to satisfy self-interests. Building on this previous work, Bass included two relevant components; contingent reward (CR) and management by exception (MBE). Further, he divided MBE into active and passive approaches and included LF as an avoidant leadership behavior.[11] The following sections describe these behaviors in more detail.

Contingent Reward

CR is a *constructive transaction* between leaders and followers. It is constructive because the leader sets expectations for followers that describe what must be achieved to meet expected standards of performance. This action is also constructive since it utilizes rewards to reinforce positive performance. The CR approach has been called an effective and powerful method to motivate followers by creating consistent expectations between leaders and followers. Typically, CR is transactional when the reward is extrinsic or material such as a bonus or promotion. When the reward is psychological such as praise, this becomes more of a transformational approach.[12]

Management by Exception

Unlike CR, MBE is labeled as a *corrective transaction* and is usually not as effective as CR or transformational behaviors, but it is necessary in high-risk or life-threatening situations.[13] Further, MBE may take two forms; active (MBE–A) or passive (MBE–P). During the active approach, leaders *actively* monitor followers for deviations from standards in the form of mistakes or errors and take corrective action as necessary. During MBE–P or the passive approach, leaders *passively* take corrective action only when they feel they must get involved, which is usually too late. Transactional leaders are vital to the military mission, but as we will learn in the next section, *transformational leadership* has been empirically demonstrated as the most effective form of leadership.

Transformational Leadership

In contrast with transactional leadership, transformational leadership involves creating personal relationships with followers that raises their level of motivation and morality. A transformational leader is attentive to followers' needs and strives to transform followers into leaders.[14] The following sections describe each of the transformational behaviors.

Idealized Influence

Transformational leaders exhibiting *idealized influence* (II) project themselves as positive role models for followers to emulate. Typically, these leaders are respected, admired, and trusted completely. Followers identify with, not only the leader, but also with their mission or cause and often emulate the leader's behaviors and actions. In true idealized fashion, this type of leader addresses the needs of followers over personal needs. Principles and high standards of ethical and moral conduct are upheld by this leader who is consistently counted on to "do the right thing."[15] Mahatma Gandhi is probably the most celebrated idealized influence example in history. Incorporating the II approach embraces the tenets of the "Air Force Core Values,"[16] creating a paragon for ethical leadership.

Inspirational Motivation

There are times when leaders are required to enhance team spirit, provide meaning, and challenge their followers' work. Through enthusiasm and optimism, lead-

ers may inspire and motivate their followers to achieve what they never thought was possible. A powerful inspirational leader may motivate followers by what they say, by their actions, and, optimally, by both.[17] Air Force leaders will inevitably find opportunities that require inspiring followers to accomplish challenging goals, which is a crucial leadership skill.

Intellectual Stimulation

Leaders who foster creativity and innovation in their followers while supporting new approaches to overcome organizational challenges exemplify the intellectual stimulation (IS) behavior. This approach encourages followers to develop unique ways to carefully solve problems or complex issues within the organization.[18] Further, leaders leveraging IS stimulate members to become more creative by questioning assumptions, reframing problems, and approaching old situations or problems with new methodologies. You may need to collaborate with colleagues or peers for assistance, take courses in creativity or innovation, and do whatever is necessary to remove any obstacles for your followers.

Individual Consideration

Probably the most personal leadership behavior that you can offer a follower day-to-day is *individual consideration* (IC). A typical military leader is distracted, but utilizing the IC behavior is not only a powerful transformational instrument, but also a reminder to all of us what it is to be human! In addition to active listening and two-way communication, a leader leveraging IC considers each individual's needs for growth and achievement by assuming the role of teacher, coach, mentor, facilitator, confidant, and counselor.[19] Using this approach allows followers to feel valued, encouraging not only professional, but also personal growth. When leaders display these actions with followers, members become more amenable to expressing individuality.

However, using a full range of leadership with followers is not enough to truly transform your followers into future authentic leaders. In early 2016, SOS introduced an additional component of leadership development necessary for the continuity of leadership sustainment: virtues and character strengths.

Achieving Authentic Transformational Leadership

Bill George posited that authentic leaders develop genuine relationships while creating trust with their followers. Further, George claimed that when followers trust their leaders, they can perform at higher levels while being empowered to lead. *Authentic transformational leadership* (ATL), as described by John J. Sosik, is the integration of the transformational behaviors and associated character strengths categorized in Christopher Peterson and Martin E. Seligman's seminal research cited in hundreds of behavioral articles today.[20] Moreover, when our character strengths are aligned with our transformational leadership behaviors, and they are considered to be virtuous, such integration leads to authentic transformational leadership.[21] Virtues are the core characteristics universally valued by moral philosophers and religious thinkers as the foundation for good character and include: wisdom and

knowledge, courage, humanity, justice, temperance, and transcendence. Character strengths are the positive traits for displaying these virtues illustrated in figure 2 below:[22]

Wisdom	Courage	Humanity
Creativity Curiosity Love of learning Judgment Perspective	Bravery Perseverance Honesty Zest	Love Kindness Social intelligence
Justice	**Temperance**	**Transcendence**
Teamwork Fairness Leadership	Forgiveness Humility Prudence Self-regulation	Appreciation of Beauty and Excellence Gratitude Hope Humor Spirituality

Figure 2. Virtues and character strengths. (adapted from Peterson and Seligman, 2004)[23]

Wisdom and Knowledge

When one exercises good judgment and the appropriate use of intelligence, this is a virtue referred to as wisdom and knowledge. There are five associated character strengths that fall under this virtue: creativity, curiosity, love-of-learning, judgment, and perspective.[24] *Creativity* is typically characterized by someone's original or ingenuous abilities displayed by the way he or she thinks, talks, or performs. *Curiosity* describes someone who may have many interests, seeks novel ideas, or is open to new experiences. Those who are motivated by an intrinsic desire to learn new things are exercising a *love of learning.* By using *judgment,* one will consider alternative viewpoints, examine all evidence, and typically will not jump to rash conclusions without weighing all the facts. *Perspective* is the ability to consider all facets of a situation and integrate these views into one understandable solution for all to consider. Perspective is one of the key character strengths that can help to empathize with followers' needs.[25]

Courage

Unlike all other virtues, courage has been a fundamental part of the military throughout history. There are four related character strengths that reflect this virtue: bravery, perseverance, honesty, and zest. When someone speaks up for what is right in conflict with opposition or acts on convictions, this is an example of *bravery.* Courageous people learn to *persevere* despite challenges, obstacles, or setbacks. When one remains true to themselves and acts with *honesty* and authenticity, he or she has integrity. When we say that someone has vitality or displays good physical and mental well-being throughout challenges in their lives, we call this *zest.*[26] Military history is replete with stories of heroes overcoming harsh physical conditions, battle wounds, and mental warfare to meet their missions.

Humanity

Humanity often describes "strengths of others," or more importantly interpersonal strengths that we use to protect others in our work or personal lives. There are three character strengths associated with humanity: love, kindness, and social intelligence. Peterson and Seligman refer to *love* as caring or valuing close relationships with others, particularly when sharing or caring are reciprocated. There are times when compassion and understanding are needed to comfort followers during a crisis, a loss of a family member, or during other stressful times in their lives. Valuing humanity while demonstrating generosity, nurturance, and compassion describes *kindness.* When we recognize and control our emotions and engage in positive interactions with others, we are exercising the strength of *social intelligence*. Social and emotional intelligence have been linked with better life decisions, effective social functioning, more adaptive outcomes, and lower levels of aggression.[27]

Justice

Fostering a sense of fairness and righteousness describes the virtue of justice. There are three character strengths within this virtue: fairness, leadership, and teamwork. In many military situations, we must work well with other group or team members, display loyalty, and do our part of the workload to ensure harmony. Ensuring that we treat others the same without personal bias or preference defines *fairness.* This strength has been linked to a solid moral identity helping to foster trust among others. Peterson and Seligman describe a leader as someone who not only encourages a group to accomplish a goal but also maintains good relations among the group. According to these authors, then, the character strength of *leadership* is distinguished from the larger topic of leadership as the ability of a group member to push the group to task achievement while strengthening bonds of togetherness and trust. Finally, when we demonstrate a sense of loyalty, social responsibility, and citizenship, we are exercising *teamwork*.[28]

Temperance

Temperance describes the ability to exercise self-control and consider boundaries and limitations on personal desires and aspirations. There are four character strengths associated with this virtue: forgiveness, humility, prudence, and self-regulation. A person who exercises *forgiveness* and mercy avoids the human impulse to become vengeful in certain situations. Additionally, utilizing forgiveness at the appropriate times may not only restore positive emotions, moods, and attitudes, it may also reduce anxiety, anger, and depression. *Humility* involves remaining humble during one's achievements and not seeking the spotlight, or allowing one's performance to speak for itself. People exhibiting *prudence* are generally logical decision makers who make careful, thoughtful choices. *Self-regulation* and control describes the foundation of temperance as it relates to one's discipline to regulate appetites and emotions. Those leaders who possess a high degree of self-control typically inspire and build better relationships with their followers based on trust, fairness, and consistency.[29]

Transcendence

Transcendence, sometimes called "strengths of the spirit," provides meaning to one's life by making connections to the larger universe or looking beyond oneself and toward relations with others. There are five related character strengths associated with this virtue: appreciation of beauty or excellence, gratitude, hope, humor, and spirituality. Transcendent individuals learn to *appreciate beauty or excellence* in the skilled performance of others. Additionally, transcendent individuals are thankful for the good things in their lives and take the time to thank those who have had a positive influence, exercising *gratitude*. Looking to the future with a positive vision or optimistic outlook describes *hope*. Typically, hopeful individuals are high achievers in academics, athletics, politics, and other industries as they have a positive vision for the future and will set loftier goals. Transcendents often use *humor* to, not only encourage creativity, but also to relieve stressful situations. *Spirituality* is associated with possessing faith in something greater then themselves, or having beliefs about a higher purpose, meaning of life, or where one fits in the larger scheme of things.[30]

Methodology

Those who study leadership often focus on leadership styles and behaviors as they relate to accomplishing the mission or meeting specific timelines or goals. In our dynamic and complex military environment, we often fail to consider the human aspects of leadership and followership. Utilizing the profound tenets of Peterson and Seligman's research and the transformational applications of Sosik, we can make more meaningful connections with our superiors, peers, and followers. This section provides an overview of our SOS full-range leadership study of academic years (AY) 2014 and 2015.

Participants for the present research were military leaders (with other categories) in the US Air Force attending an intensive leadership course (table 1). The participants consisted of: 92 percent active duty Air Force captains, 2 percent DOD civilians, 1 percent international military officers, 3 percent Air National Guard members, and 2 percent Air Force reservists.[31] Participants from six resident SOS flights (classes) in AY 2014 ($N = 4,575$) and five classes in AY 2015 ($N = 3,065$) provided pre- and postcourse ratings on the LDS.

Table 1. Sample size responses

AY	Pre	Post	Total
AY14	3,213	1,362	4,575
AY15	2,154	911	3,065
Total	5,367	2,273	7,640

Of these, for the subsequent analyses, 1,358 and 910 participants provided postcourse responses for AY14 and AY15, respectively. One reason for the lower postcourse response rate may be the timing of the survey administration. The postcourse administration of the LDS occurs in the last week of the course a few days before graduation. Further, the LDS is not a graded event, although participation is

encouraged, it is not enforced. Taken together, these factors may lead to decreased interest in responding.

Measure

Leader Development Survey. The LDS is a 40-item measure developed by Dr. Fil Arenas, SOC, Maxwell AFB, based on Mind Garden's MLQ to measure propensity scores on eight leadership behavior.[32] It was modified for the current research for use with a military sample. The report provides individual scores on eight subscales (each consisting of five items) reflecting different leadership style/behaviors: LF, MBE–A, MBE–P, CR, II, IM, IS, and IC.[33] Participants responded to each item on a five-point Likert scale: (1 = Never; 5 = Always).

The "propensity scores" were based on the review of validated instruments that highlighted tendencies toward a particular style of leadership, while further illustrating specific behavior patterns.[34] The vision of the LDS is to provide a metric for SOS students initially (pretest) and during the last week (posttest) of their course to illustrate personal leadership growth and provide a model for future leadership development.

Procedure

The LDS was administered online as part of the SOS course curriculum. The link to the pre-LDS measure is provided during week one of the course. Students have approximately 72 hours to complete the premeasure. The link to the post-LDS measure is provided during the final week of the course, and students have approximately 72 hours to complete the postmeasure. For AY14, the course was conducted during an eight-week timeframe. For AY15, the course was conducted during a five-week timeframe. The class results are discussed by the instructor at the end of the course to apply the course content and allow the participants to reflect on their leadership behaviors and development.

Results

The takeaway from this section is that the independent variables of AY, prepost course responses, and gender showed enough stability to support inferential judgment, and additional analysis revealed the results showed strong consistency between AY14 and AY15, indicating that the change in course length did not weaken the data. The results from a multivariate analysis of variance, examining the mean level differences of AY, prepost course responses, and gender on the LDS subscales indicated significant main effects for all three predictors.[35] The results also indicated that were no interactive effects on the LDS subscales.[36] Although there was a significant main effect for AY (eight versus five weeks), the results indicated that there was not a gender*AY effect nor a prepost course responses*AY effect, suggesting that the difference in course timeframes did not affect the results for the study variables of interest. Finally, the gender* prepost course responses effect also was not significant, indicating that male and female officers did not differ significantly in their rates of change during the course.

Given the significance of the omnibus test, the univariate effects of prepost course responses on the LDS measures were examined using a corrected Bonferroni method (p = .05/8), which ensures that links across the data were not merely coincidental. The results indicated a significant effect for prepost course responses on LF [F(1, 7,582) = 22.17, p < .001, $\eta^2_{partial}$ = .003], MBEA [F(1, 7,582) = 10.04, p = .002, $\eta^2_{partial}$ = .001], IM [F(1, 7,582) = 23.13, p < .001, $\eta^2_{partial}$ = .003], and IS [F(1, 7,582) = 12.54, p < .001, $\eta^2_{partial}$ = .002] dimensions (table 2). Table 2 illustrates that the postcourse means were higher than the precourse means for the LDS responses except for the LF sub-scale, which was expected. The effect size estimates both for the multivariate effects and for practical differences between the means (Cohen's d) were small.[37]

Table 2. Summary of means and standard deviations on the LDS subscales for the study variables

LDS Subscales	Pre-Post Responses			Gender			AY		
	Pre (*n*=5,322) M(SD)	Post (*n*=2,268) M(SD)	Cohen's *d*	Male (*n*=6,113) M(SD)	Female (*n*=1,477) M(SD)	Cohen's *d*	8-week (*n*=4,536) M(SD)	5-week (*n*=3,054) M(SD)	Cohen's *d*
LF	1.83(.51)*	1.75(.53)	.16	1.80(.52)	1.84(.52)		1.80(.52)	1.81(.52)	
MBE–A	3.94(.53)*	4.00(.55)	.11	3.95(.54)*	3.99(.52)	.07	4.08(.54)*	3.78(.48)	.58
MBE–P	2.56(.62)	2.54(.63)		2.56(.62)*	2.49(.63)	.11	2.57(.63)*	2.52(.63)	.08
CR	4.28(.51)	4.29(.54)		4.27(.51)*	4.35(.56)	.15	4.28(.52)	4.29(.51)	
II	4.44(.41)	4.49(.44)		4.45(.42)	4.46(.39)		4.45(.42)	4.46(.42)	
IM	4.26(.53)*	4.35(.53)	.17	4.28(.53)	4.30(.51)		4.28(.53)	4.30(.53)	
IS	4.40(.62)*	4.48(.56)	.13	4.42(.61)	4.44(.55)		4.41(.62)	4.43(.57)	
IC	4.30(.53)	4.37(.57)		4.35(.59)*	4.46(.48)	.19	4.30(.57)*	4.35(.51)	.09

*p < .006 (.05/8)

Due to the significant main effect for gender on the average LDS scores (combined prepost scores), the univariate effects of gender on the LDS subscales were examined, using a corrected Bonferroni method (p = .05/8). The results indicated a significant effect for gender on the MBE–A [F(1, 7,582) = 8.06, p = .005, $\eta^2_{partial}$ = .001 MBE–P) [F(1, 7,582) = 13.49, p < .001, $\eta^2_{partial}$ = .002], CR [F(1, 7,582) = 15.62, p < .001, $\eta^2_{partial}$ = .002], and IC [F(1, 7,582) = 90.81, p < .001, $\eta^2_{partial}$ = .01]. Table 2 shows that females were higher on the MBE–A, CR, and IC scales, whereas males were higher on the MBE–P scale.

Building a Common Culture of Leadership

Why has the SOS focused on transformational leadership behaviors? What if this work has had the effect of creating an incipient common culture of leadership? To-

day, the tenets of full-range leadership have reached multiple AU curricula beyond the SOS to include the: US Air Force Academy, Officer Training School, Senior NCO Academy, First Sergeant Academy, International Officer School, and graduate-level electives at Air Command and Staff College and Air War College. What if this culture can provide a foundation for future leadership effectiveness? The authors feel that leveraging these salient leadership principles across our culture will generate superior leaders.

The English naval historian Julian Corbett wrote his classic text *Principles of Maritime Strategy* in 1911. He opens the book with a call for a common professional warfighting culture that would thrive due to shared understandings of concepts from a "common plane of thought."[38] Corbett's vision of a successful professional common culture is important enough to quote at length:

> It is a process by which we coordinate our ideas, define the meaning of the words we use, grasp the difference between essential and unessential factors, and fix and expose the fundamental data on which everyone is agreed. In this way we prepare the apparatus of practical discussion; we secure the means of arranging the factors in manageable shape, and of deducing from them with precision and rapidity a practical course of action. Without such an apparatus no two men can even think on the same line; much less can they ever hope to detach the real point of difference that divides them and isolate it for quiet solution.[39]

At nearly a century old, leadership studies as a discipline is relatively young—all the more reason for building up a common culture of leadership. Such a culture can become the primary means of transmitting organizational values and models of exemplary leadership, a necessary feature of the indispensable relationship between senior and junior leaders.

However, what would constitute such a common culture? According to philosopher Alasdair McIntyre, such cultures "should possess a language [with] shared rules."[40] The language of transformational leadership behaviors offers not only a useful and empirically validated lens for approaching leadership growth—but also a baseline language of leadership that satisfies both Corbett's and McIntyre's requirements for a thriving common culture. The SOS has already begun this work by teaching the terms and concepts of transformational leadership. However, this is only a start. A professional military education (PME) program of several weeks can only do so much in terms of internalizing values and patterns of behavior. Company grade officers will continue to be primarily shaped in the field by the expectations of their commanders and supervisors. Therefore, the stage is set for senior leaders to use the tools of transformational leadership to complete this learning, in the crucible of demanding jobs, military operations, and superior supervision. With a set of common conceptions, standards and expectations, goals may be clearer and easier to set and describe, and senior leaders may find extra time back in their schedules.

While the benefits of speaking the same language of leadership may be apparent in a general sense—facilitating clear communication and agreement on leadership goals—the SOS students in their responses to the LDS instrument demonstrated consistent patterns that the authors now turn to. The effort here is to reveal the specific contours of the fledgling common culture of leadership that the SOS indoctrinated USAF captains into, and that senior leaders may want to continue to build!

The Transformational Leadership Culture of Today's Captains

What concepts about leadership resonate for today's younger officers? More importantly, what qualities and aims do these officers possess that we can recognize and cultivate, empowering them to grow into mature, disciplined, selfless, and dedicated leaders? The research collected at the SOS covers the responses of thousands of company grade officers who have passed through Maxwell AFB. Based on the 40-item LDS, inferences can be made about the individual preferences of the students regarding leadership behaviors and the attributes of a burgeoning "common culture" of leadership. The authors propose three findings from an analysis of the data:

- **Air Force captains, if somewhat naturally inclined to practice transformational leadership, require education and reinforcement on its language and behaviors**. The study findings suggest that a learning process occurred during the course that changed the participants' perceptions of optimal leadership. Mean scores increased on all four transformational behaviors (II, IM, IS, and IC) and the two transactional behaviors (MBE–A and CR; one was significantly higher) that, taken together, require consistency and follow-through went up. On the other hand, the means on the two behaviors that downplay these qualities (MBE–P and LF; one was significantly lower) went down. The data also suggest a larger lesson for commanders and supervisors, to continue the work done at formal PME to good effect. If the course succeeded in inviting younger officers to internalize the terms and concepts of transformational leadership, line supervisors and senior leaders can encourage these officers to persist in the process of internalization, first and foremost, simply by using its language which SOS graduates have already learned. The statistically significant prepost changes in IM, IS, MBE–A and LF indicate that education on FRLM language may have the largest impact on optimizing these four behaviors. Conversely, younger leaders relying substantially on intuition and experience will have less beneficial impact as leaders in these areas without intervention.

- **Transformational leadership language and behaviors optimize Air Force captains' focus on the achievement of standards and use of other transactional leadership behaviors**. Prepost comparative results showed increases in the MBE–A subscale for both male and female officers. Interestingly, the results also demonstrated that, overall, these behaviors were more strongly endorsed by female officers. These findings suggest that indoctrination in the language of *transformational* leadership also reflects an increased attention to the importance of standards, which is a *transactional* behavior. Moreover, these results were obtained despite the precourse inclination for participants to value the four transformational behaviors over the transactional behaviors (see the mean scores in table 2), and despite the content's articulation that tends to value the transformational behaviors as a more ideal set of leader behaviors than transactional behaviors. Therefore, a course which inculcates transformational leadership can lead students to value self-

less regard for others *and* adherence to standards, producing officers who wish to prioritize accountability in their leadership.

- **Transformational and transactional leadership language and behaviors may maximize the use of behaviors in their relation to the virtue of humanity and in ways specific to qualities of male and female officers**. According to the combined pre and post scores (the second column of table 2), female officers scored statistically significantly higher than males on the IC, MBE–A and CR subscales and comparatively lower on the MBE–P subscale. Based on these results, which previous research has extensively validated,[41] female officers emphasized the importance of higher expressions of IC, MBE–A and CR more than their male counterparts as ideal leader behaviors. The implication that male AF captains tend to favor a more disengaged and passive leadership style than female captains is important and is corroborated in many studies along broader demographic lines.[42]

The aspect of this finding perhaps most significant to senior AF leaders is that male officers may be less inclined without intervention to individualize their leadership approaches to specific followers—some, but certainly not all, followers respond well to a more disengaged style. Research, curriculum, and senior leader intervention that emphasizes the importance of not only IC, but also of the high six virtues and humanity, in particular, will likely achieve important effects for both male and female officers. At the same time, males will be afforded more opportunities to learn a more individualized form of leadership. The authors recommend this as an important line of future research.

The results also revealed that, although not statistically significant, female officers showed a prepost increase in emphasis on accountability [MBE–A; precourse *Mean* = 3.98(*SD* = .51); postcourse *Mean* = 4.00(*SD* = .54)] and a prepost reduction in CR [precourse *Mean* = 4.36(*SD* = .56); postcourse *Mean* = 4.31(*SD* = .56)]. Male officers showed an increase in their MBE–A [precourse *Mean* = 3.93(*SD* = .54); postcourse *Mean* = 4.00(*SD* = .55)] and CR [precourse *Mean* = 4.26(*SD* = .49); postcourse *Mean* = 4.29(*SD* = .54)] scores. Bass' identification of "a transformational component" within CR[43] helps to account for the gender differences on this subscale. Male officers may have learned from the course that CR is an important aspect of leader-follower dyads, and with their inherently lower scores on the transformational behaviors, higher CR can effectively bolster a transformational leadership style. Conversely, female officers may have concluded that by lowering their CR behaviors they would enhance their already effective use of the transformational behaviors. Overall, female officers reported somewhat higher scores on all four transformational behaviors (although only IC was significantly higher). It is important to note that the nonsignificance of rates of prepost change according to gender may be due to ceiling effects, since the pretest scores for both male and female officers were very high, limiting the potential rates of change throughout the course. More research is required to examine the degree to which gender affects the leader behaviors that are elicited and the implications for these differences on how transformational leadership is taught in PME. The language of transformational leadership can raise younger officers to higher levels of selflessness and individualized attention to fol-

lowers, and in ways selectively responsive to the empirically-validated differences between male and female leaders.

Summary

This study proposed three major findings. First, Air Force captains' perceptions of leadership and of the priorities of leaders changed due to inculcation of a common leadership model and its associated language, reflecting greater emphasis on consistency and interaction. Second, Air Force captains valued an adherence to standards (transactional) while given opportunities for improved leader–follower dyads (transformational) during their PME. Third, exposure to the model and its language produced inclinations in the captains toward a more engaged, individualized, and humanized version of leadership, and in ways responsive to observed gender differences.

Although early awareness is a key step to establish a leadership lexicon for tactical, operational, and strategic leadership development, further research should connect data points at these career levels to measure leadership tendencies over time to adjust future topical concentrations at the PME levels. In the meantime, many applications of the content may be attractive to today's leaders. Operationally, senior leaders have the option of incorporating the behaviors in their models of supervision, evaluation, and feedback. Relevant concepts, properly used, have the benefit of condensing and simplifying communication and mentoring on leadership performance. Finally, PME designers will have opportunities to investigate the performance of their curricula for desired outcomes according to anticipated course goals. ✪

Notes

1. Bernard M. Bass and Ronald E. Riggio, "Transformational Leadership," (presentation, Mahwah, NJ: Lawrence Erlbaum Associates, Inc., 2006), 3–9.

2. Peter G. Northouse, *Leadership: Theory and Practice* (Thousand Oaks, CA: Sage Publications, Inc., 2007), 15.

3. Bernard M. Bass, *The Bass Handbook of Leadership: Theory, Research & Managerial Applications* (New York: Free Press, 2008), 618–19.

4. Northouse, *Leadership*, 185.

5. Reliability and validity determinations of the Leadership Development Survey (LDS) were based on LDS scale alphas such as those reported in the Methodology section and on the consistently close results of the LDS scales compared to the Multifactor Leadership Questionnaire (MLQ) in more than three years of reporting.

6. Bass and Riggio, "Transformational Leadership," 7.

7. Bruce J. Avolio and Bernard M. Bass, *Developing Potential Across a Full Range of Leadership: Cases on Transactional and Transformational Leadership* (New York: Psychology Press, 2002), 2–4.

8. Northouse, *Leadership*, 196.

9. John J. Sosik and Don I. Jung, *Full Range Leadership Development: Pathways for People, Profit, and Planet* (New York: Psychology Press, 2010), 272.

10. Ibid., 272–73.

11. Robert N. Lussier and Christopher F. Achua, *Leadership: Theory, Application, Skill Development* (Canada: Thomson, South–Western, 2007), 623.

12. Bass and Riggio, *Transformational Leadership*, 8.

13. Bruce J. Avolio, *Full Range Leadership Development* (Thousand Oaks, CA: SAGE Publications, Inc., 2011), 64.

14. Avolio and Bass, *Developing Potential*, 1.

15. Avolio, *Full Range Leadership*, 60.

16. Curtis E. LeMay Center for Doctrine Development and Education, "The Air Force Core Values," in *Volume II, Leadership,* 4 November 2011, 5, https://doctrine.af.mil/download.jsp?filename=Volume-2-Leadership.pdf.

17. Ibid., 45.

18. Northouse, *Leadership*, 193.

19. Sosik and Jung, *Full Range Leadership*, 18.

20. VIA Institute on Character website, "The VIA Survey," 22 December 2016, http://www.viacharacter.org.

21. John J. Sosik, *Leading with Character: Stories of Valor and Virtue and the Principles They Teach*, 2nd ed. (Charlotte, NC: Information Age Publishing Inc., 2015), 45.

22. The constellation of six virtues in figure 2 is the product of Peterson and Seligman's comprehensive review of the relevant literature in their book *Character Strengths and Virtues: Handbook and Classification*, (New York: Oxford University Press). These virtues also reflect Aristotle's "Doctrine of the Mean;" and "Strengths of Character and Well-Being," *Journal of Social and Clinical Psychology* 23, no. 5, 607. Each virtue is a medium between two extremes, for example, courage sits between recklessness and cowardice.

23. Christopher Peterson and Martin Seligman, *Character Strengths and Virtues: Handbook and Classification* (New York: Oxford University Press, 2004), 56.

24. Peterson and Seligman, *Character Strengths*, 29.

25. Sosik, *Leading with Character*, 53–56.

26. Ibid., 56–58.

27. Ibid., 58–61.

28. Ibid., 61–62.

29. Ibid., 62–65.

30. Ibid., 65–68.

31. These demographics were obtained from the first year of data in which the LDS was administered (AY14 data).

32. Survey items are adapted from the Multifactor Leadership Questionnaire copyright © 1995 by Bernard Bass and Bruce J. Avolio. All rights reserved. Published by Mind Garden, Inc. www.mindgarden.com.

33. Cronbach alpha reliability estimates were obtained from the AY14 precourse participant responses and are as follows: LF, alpha = .59, MBE–A, alpha = .70, MBE–P, alpha = .66, CR, alpha = .58, II, alpha = .60, IM, alpha = .74, IS, alpha = .67, and IC, alpha = .53.

34. Coordination with Mind Garden Inc., regarding the basis of the LDS on the MLQ scales. Permission was granted from the senior publisher on 15 July 2013 to add the following citation to the LDS: "Survey items are adapted from the Multifactor Leadership Questionnaire copyright © 1995 by Bernard Bass and Bruce J. Avolio. All rights reserved. Published Mind Garden, Inc. www.mindgarden.com."

35. MANOVA results are as follows: [AY (Wilks' Λ = .93, F (8, 7,575) = 70.91, p < .01, $\eta^2_{partial}$ = .07); prepost course responses (Wilks' Λ = .99, F (8, 7,575) = 6.28, p < .01, $\eta^2_{partial}$ = .01); gender (Wilks' Λ = .98, F (8, 7,575) = 21.44, p < .01, $\eta^2_{partial}$ = .02)].

36. Wilks' lambda, F and p statistics for the three relevant variable interaction effects are as follows: gender*AY effect (Wilks' Λ = .999, F (8, 7,575) = 1.04, p = .40, ns, $\eta^2_{partial}$ = .001); prepost course responses*AY effect (Wilks' Λ = 1.00, F (8, 7,575) = .41, p = .91, ns, $\eta^2_{partial}$ = .00); gender*prepost course responses effect (Wilks' Λ = 1.00, F (8, 7,575) = 1.24, p = .27, ns, $\eta^2_{partial}$ = .00).

37. Cohen's d provides an estimate of the magnitude of the effect or how practical the mean difference is (Small effect d = .2 to .5; Medium effect d = .5 to .8; Large effect d = .8 and above).

38. Julian S. Corbett, *Principles of Maritime Strategy* (Mineola, NY: Dover Publications, 2004), 5.

39. Ibid., 4–5.

40. Alasdair McIntyre, *A Short History of Ethics* (Notre Dame, IN: University of Notre Dame Press, 1998), 77.

41. Bass, *Bass Handbook*, 922.

42. Ibid., 923.

43. Ibid., 922.

Dr. Fil J. Arenas

Dr. Arenas (EdD, George Washington University [GWU]) is an associate professor and course director of leadership studies at Air University's (AU) Air Command and Staff College (ACSC), and is also an adjunct professor with the Air War College at Maxwell Air Force Base, Alabama. His current areas of research focus on leadership development, emotional intelligence, integrated learning environments, and virtual immersive learning models. He was an aerospace ground equipment technician and optometry technician in the Air Force and retired as a medical service corps officer in the Navy. Dr. Arenas retired from the military after 28 years of faithful service (14 USAF and 14 USN) in 2005.

Dr. Jennifer Tucker

Dr. Tucker (PhD, Portland State University) has been a Department of Defense researcher since 2004. During that time, she has worked for the US Army Research Institute for the Behavioral and Social Sciences, both as a senior researcher and team leader in developing and applying technology innovations to enhance leader and Soldier performance. These technologies have been developed in response to identified trends and gaps in enhancing human dimension and talent assessment initiatives. She also has worked for AU where she supported the university and the Air Force Culture and Language Center as the professor of assessment in determining how to develop and assess curricula at all levels of professional military education that embedded the study of cultural behaviors in socioeconomic and geopolitical systems and the leader skills needed to perform effectively in these complex contexts. She also co-taught a class on systems thinking for the ACSC which taught majors how to apply the principles of system dynamics to past, current, and future complex organizational problems to include foreign military, non-governmental, and US governmental and military organizations and structures. Dr. Tucker's current research interests include identifying and assessing the cognitive and system dynamics skills leaders and Soldiers need to effectively perform in complex cultural, socioeconomic, and geopolitical environments.

Dr. Daniel A. Connelly

Dr. Connelly (PhD, MA, Auburn University) is an assistant professor in the Department of International Security at the ACSC. He is a retired US Air Force officer whose background includes operational tours at headquarters and flying unit echelons and deployments to Southwest and Far East Asia. He teaches courses in international security, leadership studies, airpower theory, the "Just War" tradition, and Russian studies. Previously, Dr. Connelly served as dean of academic affairs at the Squadron Officer School.

Assessing ISR

Effectively Measuring Effectiveness

Capt Brian A. Hill, USAF

The first step is to measure whatever can be easily measured. This is OK as far as it goes. The second step is to disregard that which can't easily be measured or to give it an arbitrary quantitative value. This is artificial and misleading. The third step is to presume that what can't be measured easily isn't important. This is blindness. The fourth step is to say that what can't be easily measured really doesn't exist. This is suicide.

—Charles Handy's description of Secretary of Defense
Robert McNamara Vietnam-era measurement policies,
The Empty Raincoat: Making Sense of the Future

I ntelligence, surveillance, and reconnaissance (ISR) is a critical pillar in decision making, a key driver of operations, and in many ways an operation unto itself. Like all operations, it has an intended effect—generally to inform, shape, and facilitate other operations by providing decision advantage. Joint Publications 2-0, 3-0, and 5-0 all emphasize the importance of assessing operational effects. Assessing ISR effectiveness is often more complex than combat assessment, but it is no less important.[1] This is widely recognized, but although some initiatives are ongoing, not much progress has been made toward correction. Current guidance, including the Joint Publications previously mentioned, offers broad direction on who has the responsibility for assessments and a general framework for what assessments should look like, but literature explaining the nuts and bolts of actually producing effective assessments is scarce.

The RAND Corporation continues to conduct significant research into this domain to "develop detailed mathematical quantities that represent what are generally considered qualitative concepts."[2] During this work, RAND designed several mathematical models for evaluating improvements across ISR capabilities, but they are currently incomplete, appear specific to broad capabilities assessments, and likely cannot be rapidly adapted and used by all units who could benefit from a robust ISR assessments program. The Air Combat Command (ACC) also released an "ISR Assessment Framework" at the end of 2016 which brings guidance that is more applicable to operational and tactical assessments and is more detailed than the Joint Publications listed above.[3] However, this framework still stops short of breaking down the hands-on steps for the assessors themselves.

This article seeks to fill that gap. First, it briefly reviews the problems with ISR assessments, it offers recommendations for breaking down goals and tasks into effective measurements, and it gives examples of applying these methods in an ISR context. It finishes with additional considerations that will enhance ISR assessments, including changing the way we interpret numerical values in the assessments and, most importantly, by establishing a dedicated training program for ISR assessments.

Current guidance breaks assessments into measures of performance (MoP) and measures of effectiveness (MoE). According to JP 1-02, MoPs are criteria used to assess friendly actions that are tied to measuring task accomplishment, such as whether a sortie arrived at a location on time, or whether it collected all of its assigned images. MoEs are criteria used to assess changes in system behavior, capability, or operational environment that is tied to measuring the attainment of an end state, achievement of an objective, or creation of an effect.[4] For example, if the goal of an ISR mission is force protection, one possible MoE is how often a forward operating base (FOB) is attacked without warning. A common distinction is "MoPs ask if we're doing things right; MoEs ask if we're doing the right things." MoPs are most useful at the tactical level to units executing ISR operations, while MoEs are most useful to those planning and coordinating ISR operations, but both are inherently connected, and ISR assessors at all levels should constantly coordinate to develop holistic assessments.

An overreliance on MoPs is a recognized problem in ISR assessments, illustrated in examples of a system focused on whether collection occurred and not whether it

met the commander's intent.[5] The reason for this overreliance is ease: the percentage of tasked targets collected and number of sorties flown are obvious, easy to measure, and require no extra effort to quantify. In every assessments discussion, working group, and conference I've attended, everyone recognizes the need to focus on good MoEs to determine if ISR is achieving our desired effects. Some progress is made by individual units, but none have created an objective, quantitative, and repeatable method for developing proper MoEs.

One of the biggest roadblocks to proper MoEs is the pervasive idea that they are inherently qualitative and subjective, in contrast to easily quantifiable MoPs. Some assessment teams compensate with "false quantification," where they assign numerical values to subjective ideas. For example, they may use a weighted scale that assigns values based on what they feel is the "significance" of the collection: a zero if they deem it to have no significance, a one for low significance, and so forth. This is a somewhat backward way to quantify. It assigns significance to the intelligence and uses that to determine if the intelligence was effective, but, in reality, we can't know if it was significant unless we know it had an effect. This can result in a "false impression of accomplishment," noted in JP 5-0's Appendix D.[6] While this is still an improvement—since it acknowledges the need for objective quantification—the actual method is still subjective and privy to the opinions and moods of the analysts making the assessment. As Handy stated, "The second step is to disregard that which can't easily be measured *or to give it an arbitrary quantitative value. . .*" (emphasis added). To be clear, qualitative assessments and subjectivity do have a place, but only after a proper quantitative assessment is done, which is demonstrated later in this article.

There are two main assumptions people make in assessments that contribute to the myth of MoEs being inherently qualitative:

1. The thing being measured is not and cannot be well-defined, so objective quantification is impossible.

2. The method of empirical observation doesn't exist or isn't known.

Solving the first is relatively straightforward but can require significant intellectual effort. Problems must be well-defined, and once well-defined, they can be broken down into quantifiable measurable factors. Once they have been broken down, the second problem usually solves itself—often more easily than anticipated. Instead of focusing on these two problematic assumptions, assessors should start with these basic principles, adapted from Douglas Hubbard's model for measuring intangibles in business:[7]

1. If it matters, then it must have a detectable or observable effect.

2. If it is detectable, then it can be detected as an amount or range of amounts.

3. If it can be detected as an amount, then it can be measured.

An example in the business world is "employee empowerment." This is certainly not well-defined and by itself not obviously quantifiable. We have to determine what measurable factors we expect to see if employees are empowered. Empow-

ered employees should be able to make decisions at lower levels, which should mean faster decisions, quantifiable by time. Likewise, empowered employees should be open to formulating and pursuing their own ideas, so we can measure the number of new independent projects springing up. Both of these result in hard numbers, not arbitrary weights or gut feelings.

The Measuring Progress in Conflict Environments (MPICE) framework brings this closer to the military intelligence sphere. It provides excellent examples of how to break down less tangible concepts, like diminishing political grievances into specific measurable factors—the number of incidents of political violence, prosecution rates, and percentages of representation for various identity groups.[8] In this framework, nearly every measurable example used, even if not identified as "Quantitative Data," is in fact in a quantitative and objective form. This doesn't directly translate to ISR; by its nature, ISR generally requires additional levels of assessment since it informs the action that produces the effect, rather than producing the effect itself. However, the following examples use a similar approach to the MPICE framework, combined with Hubbard's model for business, to achieve a usable, quantitative assessment.

Quantifying Goals

Let's take a simplified ISR scenario: the fictional nation of Wadiya has made a number of threats to its neighbors, including US allies. It has five airfields, all of which can support bomber operations and three of which currently host bombers. The nation has three road-mobile ballistic missile garrison locations with 10 known dispersal/deployment sites for each, or a total of 30. Each garrison location owns 10 launchers. There are three fixed surface-to-air missile (SAM) sites and three more air defense units with mobile SAMs, each of which has four launchers and one radar.

The USAF is conducting two daily sorties, one collecting signals intelligence (SIGINT) and the other collecting geospatial intelligence (GEOINT), on Wadiya with the following goals:

1. Provide indications and warnings (I&W) of Wadiyan attacks.

2. Prepare the battlespace for strikes in the event of Wadiyan hostilities.

The MoPs are easily established, as usual. Did the sorties arrive and depart on time? Did they collect all assigned images (GEOINT) and total tasked hours (SIGINT)? How many additional (ad hoc) images were taken? Were there any cross-cues between the intelligence disciplines? These are all valuable questions. However, success across these performance metrics does not mean we are achieving our desired goals. We need MoEs. Let's take a look at our desired goals again:

1. Provide I&W of Wadiyan attacks.

2. Prepare the battlespace for strikes in the event of Wadiyan hostilities.

If we ask if the ISR provided I&W, or if it prepared the battlespace, then the slightest bit of intelligence can make the answer a "yes" depending on the point of view of the analyst. Here's where the subjectivity myth comes into play since the

objective measures aren't obvious. One analyst may look at a day's collection and say "this contributed greatly," while another may say it gave us something, but not anything particularly interesting. Instead, we need repeatable, objective measures. To do that, we have to break down the goals, much like how priority intelligence requirements are broken down into essential elements of information (EEI). In fact, if that process is done exceptionally well, the EEIs themselves can be quantifiable MoEs, but this is not always done correctly. In any case, the breakdown could look something like this:

1. Provide I&W of Wadiyan attacks.

    A. Monitor weapons of mass destruction (WMD) posture.

        1. Track location and posture of ballistic missiles.

        2. Track location and posture of bombers.

2. Prepare the battlespace for strikes in the event of Wadiyan hostilities.

    A. Monitor locations of attack capabilities.

        1. Track location of ballistic missiles.

        2. Track location of bombers.

    B. Monitor location of air defense capabilities.

        1. Track location of mobile SAMs.

        2. Monitor status of fixed SAMs.

Some of these ended up as repeats, leaving us with six items we're trying to track: (1) the location of ballistic missiles, (2) the posture of ballistic missiles, (3) the location of bombers, (4) the posture of bombers, (5) the location of mobile SAMs, and (6) the status of fixed SAMs.

Now we determine what constitutes an ideal "effect" state for each. For the first, recall that there are a total of 30 ballistic missiles launchers, 30 known dispersal sites, and 3 garrison locations. Naturally, we want to know the location of all 30 launchers. Did we successfully locate and image all 30? If so, then that day's ISR was successful at achieving the *effect* of informing leadership of the location and posture of the ballistic missiles. The key is to come up with questions that have quantifiable answers.

1. The location and posture of ballistic missiles

    A. How many of the known launchers were located (xx/30)?

        1. How many were imaged?

        2. How many were found by SIGINT but not imaged?

    B. Were any previously unknown launchers discovered, and how many?

Now say that we only got 28 out of 30, and sensor limitations prevent us from imaging three of the dispersal sites. The GEOINT was not 100 percent effective in

achieving its effect, but say the SIGINT platform was able to collect daily communications between the garrison and the dispersal site that located the 2 missing launchers on a dispersal exercise. On the one hand, even though the GEOINT platform alone wasn't 100 percent effective, the overall ISR was. On the other hand, perhaps every known site was imaged, two launchers were still missing, and SIGINT didn't fill in the gap. Something prevented 100 percent effectiveness, but now the cause is less obvious. Perhaps analysts failed to identify equipment at a site, or there's an undiscovered dispersal site. Leaders, planners, and analysts must now determine if and where adjustments need to be made to close that gap. In all of these cases though, the effectiveness was determined with objective, quantifiable MoEs.

The order of battle intelligence is fairly straightforward to measure in this way. A more difficult example is force protection. Unlike known equipment in a country, it's impossible to say how many attack plots one will discover before 100 percent are collected. Even if no surprise attacks occur, there may be undiscovered plots that are never executed. In this example, we can demonstrate the appropriate use of qualitative assessments and subjectivity after the quantitative assessment occurs. Context and qualifiers must be added, but the foundation of the assessment should still be completely quantitative, and the method for determining that quantification is the same.

Qualified Quantification

The primary goal of force protection ISR is to provide intelligence in order to protect a base or unit. For this demonstration, we'll break that down into discovering vulnerabilities and threats. Then we break those down into measurable factors, just like the previous example.

1. Discover weaknesses.

   A. How many gaps in perimeter defenses were found?

      1. How many were corrected?

      2. Were any exploited by an attacker prior to discovery? If so, how many?

2. Discover threats.

   A. How many external attack plots were discovered?

   B. How many attacks occurred without warning?

      1. How many of those attacks appeared to be planned versus spontaneous?

Again, each of these questions have objective, quantifiable answers. The numbers used to answer them are not analyst opinions, they are hard facts. However, they illustrate where in the assessments process subjectivity and qualifiers come into play. In this scenario, there is no "100 percent" goal because it is impossible to determine, but this is a key point: in many cases, there doesn't have to be a target number. We must divorce ourselves from the idea that certain numbers are inherently good

or bad and just use them as what they are: data to drive a decision. Using "discover weaknesses" as an example, say we found five gaps in perimeter defenses during the first week, one the week after, and none after that. Clearly the quantitative effectiveness of that ISR sortie in discovering weaknesses is down, but that doesn't mean there's anything wrong with it. Here we can probably add the qualitative assessment that there are simply fewer weaknesses left to discover, if any. Now ISR planners and base commanders must make a subjective recommendation and decision respectively. Is there anything we can adjust in our ISR that may allow further discovery? Also, is it worth it to keep that sortie examining base defenses, or should it be moved to a different task? The numbers themselves are still purely objective, it's in the recommendations and reactions stemming from those numbers where subjectivity comes into play.

Scaling Up

The previous examples are simplified and predominantly tactical in nature, but these principles can be scaled up to more complex scenarios or to operational and strategic levels, although it requires more intellectual effort to ensure the assessment is still based on objective, quantitative measures. Much of the conversion from a lower to higher level of warfare centers on the fusion of metrics across the battlespace. As noted in a 2014 article by Col Jason Brown, "the adversary's primary objective, or end, is *not* to shoot down aircraft; it is to *prevent* getting bombed."[9] We can take a similar thought process to convert the previously discussed tactical MoEs to operational MoEs. Let's go back to the force protection example.

The operational goal of force protection ISR is not to find vulnerabilities, it is to improve the security of US forces. One of the tactical-level quantifiable measures we used was the number of vulnerabilities in base defenses identified with the implication that they are then fixed. Let's assume similar ISR missions were flown around three additional FOBs across a region, with similar results. If after correcting all identified vulnerabilities, the bases experienced fewer successful attacks, we have a quantifiable, objective MoE at the operational level that force protection ISR is achieving its desired goals. If, instead there is an increase or negligible change in successful attacks—either across the board or at some of the bases—then that implies the operational objective is not being met despite the tactical ISR success at one or more bases.

Additional Considerations

Five changes will go a long way to improving ISR assessments across the Air Force. The first is already illustrated: changing the mindset that certain numbers are inherently good or bad. The previous two examples show when numbers should be considered that way, as in tracking 100 percent of the order of battle, and when they are neutral data to feed a subjective decision, as in force protection. This can be difficult to solidify. Once something is designated as a measure, our first inclination is to maximize that result. If, in the force protection example, one ISR planner

oversaw the first week and found five gaps in defenses and a new planner oversaw the second week and found only one, someone can imply the new planner was less effective, but this is an incomplete interpretation of the numbers. This is similar to units and ISR operations teams that tout their ability to add more and more targets to their collection decks regardless of whether those targets have value. Sometimes there needs to be a goal number, and sometimes more is better, but assessors and commanders both must recognize when that is not the case.

The second change is a shift to structured data formats for intelligence when possible, making it easy to query, discover, and add to the database. This is especially useful in the order of battle collection. In a real-world scenario, the time required to comb through every text report and image to count up the number of SAMs found during each collection mission and compare it to the known order of battle is astronomical. Shifts to structured data would make it much easier to search and compile and will turn this into a simple task taking only a few minutes. The intelligence community has tried shifting to structured data approaches before with varying levels of success. This is once again gaining momentum in the ISR community via structured observation management tools and elements of activity-based intelligence initiatives. Continued incorporation of advances in data science and artificial intelligence will further accentuate these benefits. This will not streamline all measurements for all types of ISR assessments, but will remove a massive manpower burden for some of the most tedious tasks.

Third is a requirement for constant communication and feedback. Customers, the air operations center, the collection units, and the production units must all constantly exchange information on the results of ISR. An exploitation node won't necessarily know about friendly changes to the battlespace unless those engaged in that space communicate. I repeatedly saw units identify and correct this problem during Operation Enduring Freedom. The change always brought about benefits to ISR assessments but eventually all units seem to slip back into not communicating. The necessity of customer feedback is a vital component in assessing ISR.

Fourth, we must recognize the need to continuously reexamine previous assessments of ISR performance in phases further and further removed from the ISR itself. The first effect of ISR is generally to inform, but the true effect is removed by additional steps. At a tactical level, a strike may have the effect of killing a high-value target; this effect is one step from the action that caused it. The ISR that led to the strike is removed by an additional step. This chain gets longer as the level of the effect transitions from tactical to operational and beyond, with the causal ISR always requiring additional connections beyond a combat assessment. For example, if ISR identifies a target that is later struck, that is often used as a marker of "effective" ISR. However, the next step must be assessing the effects of that strike. If ISR identifies a series of supply lines and shows that "destroying these will severely degrade insurgent materiel stores," we can't know for sure if that was accurate until we see indicators of reduced insurgent supplies *after* the strikes. Likewise, we'd then want to know whether the reduced supplies actually reduced insurgent activities. This chain becomes still longer for tracking operational-level intelligence and beyond. We're now several steps away from the original ISR, yet this remains a marker of the effectiveness of that ISR and the accuracy of the analysis based on it, and if

broken down properly can be measured in a purely quantitative way. It's possible these assessments take place at each piece of the chain, but the ISR unit, or units higher in the chain, may not follow up to link the pieces together in order to truly understand the effectiveness of the ISR.

Finally, ISR assessments must become a dedicated skillset. The ACC's recent ISR Assessment Framework notes the importance, and it bears repeating here.[10] This is the most important of these five additional considerations and replicating good ISR assessments across the Air Force depends on it. The rise of big data and analytics offer a huge opportunity for effectively quantifying measures and assessments. Despite the daunting vision of advanced math, using these tools for ISR assessments doesn't require a degree in the subject. However, it does require familiarity that many intelligence analysts don't currently possess. Further, the art of breaking down overarching goals into objective metrics requires training and practice. Different units have different ways of doing assessments due to varying mission sets, but the basic mindset and principles should be the same across the board. Also, the joint nature of operations necessitates a joint understanding of effects. Thus, a standardized training program for ISR assessments that incorporates joint capabilities, quantitative effectiveness assessment frameworks, and familiarization with data science and quantitative measures should be established.

Conclusion

Proper ISR assessments are vital to maximizing the effects of our ISR in a resource-constrained environment. MoPs are simple and widely used, but good MoEs remain a problem. To create good MoEs, we must stop seeing them as inherently qualitative and subjective and develop measurable, quantifiable, and objective ones. This can be done by thoroughly defining the goals of an ISR operation and breaking those goals down into objective, measurable factors with the mindset that any observable effect can be measured. This process can be intellectually intensive and requires creativity at times, but it is always possible. These purely quantified measures must form the core of assessing effectiveness, but it can then be framed with qualitative information to inform subjective recommendations. To get there, we must make several changes in our thinking. Most importantly, a robust training program for ISR assessors must be put in place to teach the art of establishing good MoEs and the science of knowing how to measure them. Intelligence is meant to provide decision advantage. Good measurements are the foundation of good decisions, and recognition of these points is the next step to strengthening the decision advantage that our war fighters deserve. ✪

Notes

1. US Joint Chiefs of Staff, Joint Publication 5-0: *Joint Operation Planning*, Appendix D (Washington, DC: US Department of Defense, 2011), D-6.
2. Walter Perry, David Signori, and John Boon, *Exploring Information Superiority: A Methodology for Measuring the Quality of Information and its Impact on Shared Awareness* (Santa Monica, CA: RAND Corporation, 2004), xxv.
3. Air Combat Command (ACC), "ISR Assessment Framework," 27 September 2016.

4. US Joint Chiefs of Staff, Joint Publication 1-02: *Department of Defense Dictionary of Military and Associated Terms* (Washington, DC: US Department of Defense, 2010), 151.

5. Jason Brown, "Strategy for Intelligence, Surveillance, and Reconnaissance," *Joint Force Quarterly* 72, (January 2014), 40.

6. US Joint Chiefs of Staff, Joint Publication 5-0: *Joint Operation Planning*, Appendix D (Washington, DC: US Department of Defense, 2011), D-9.

7. Douglas W. Hubbard, *How to Measure Anything: Finding the Value of "Intangibles" in Business*, 3rd Edition (Hoboken, NJ: John Wiley and Sons, Inc., 2014), 39.

8. John Agoglia, Michael Dziedzic, and Barbara Sotirin, *Measuring Progress in Conflict Environments (MPICE): A Metrics Framework*, (Washington, DC: US Institute of Peace Press, 2010).

9. Brown, "Strategy for Intelligence," 40.

10. ACC, "ISR Assessment Framework," 15.

Capt Brian A. Hill, USAF

Captain Hill (BS, Syracuse University; MA, American Military University) is the senior intelligence officer and an instructor and course manager at the joint Defense Nuclear Weapons School (DNWS) at Kirtland Air Force Base, New Mexico. He is responsible for running the Nuclear Policy Course and the Joint DOD/DOE Nuclear Surety Executive Course, DNWS's flagship course for senior nuclear leadership. Before this assignment, he was the assistant director of operations for the 693rd Intelligence, Surveillance, and Reconnaissance (ISR) Group, where he was in charge of establishing the group's ISR assessments program and represented the unit at the Twenty-fifth Air Force's ISR Assessments Working Group. He also served as the interim director of operations and flight commander of multiple signals intelligence and geospatial intelligence operations flights, 24th Intelligence Squadron.

Airpower against the Taliban

Systems of Denial

Col Jon C. Wilkinson, USAF
Dr. Andrew Hill

Successful organizations can be extraordinarily persistent and creative in denying the obvious, ignoring signals that suggest a need to challenge key strategic assumptions.[1] Military institutions tend to view doctrine as a final destination instead of a point of departure for successful adaptation in a changing environment.[2] Yet every theory of competition eventually succumbs to new facts, and airpower is no exception. The historical success of airpower makes it difficult to ques-

tion assumptions about what has worked in the past and easy to deny obvious signals in the present that indicate a need to adapt ideas about airpower to ensure its continued success in the future.

Today, after more than a decade of air dominance, the security situation in Afghanistan is deteriorating. Yet, as a Pentagon spokesman stated in January 2016, the Department of Defense leadership was "confident the current plan in place is adequate to deal with the situation in Afghanistan."[3] It is difficult to understand how an "adequate" plan results in a deteriorating security situation that in February 2017 was described as a "stalemate" by the top American commander in Afghanistan.[4] Although airpower cannot be held fully responsible for the lack of success against the Taliban, the fact that we are not winning does suggest that the joint force in general, and the US Air Force (USAF) in particular, is ignoring information that contradicts long-standing assumptions about the application of airpower. It also suggests that future success will require a new valuation of airpower's contribution to the achievement of the higher political end the counterinsurgency (COIN) campaign seeks.[5]

One could dismiss all these concerns as irrelevant to the core, strategic mission of the Air Force. Afghanistan is a peripheral conflict. A loss there, though lamentable, will barely register in terms of America's ability to support key allies and defend itself against its most capable potential adversaries. This is a tempting argument, but it is also a dangerous one. Indeed, research on the competitive effects of what Dr. Clayton Christensen terms "disruptive innovations" suggests that America's struggles in "low-end" wars should worry the US military.[6] It should pay attention to the strategies pursued by adversaries who successfully circumvent the huge US technological and operational advantages.

The USAF has gradually narrowed its theory of airpower into a band of specialization and values that creates areas of vulnerability and dysfunction.[7] This dominant theory focuses on an air superiority and bombing campaign, independently executed by Airmen through centralized control via the air operations center and 72-hour air tasking order (ATO) process.[8] The theory assumes that this is done in a contested environment against the latest-generation threats. It also focuses on the tangible elements of a combatant's means to fight; the destruction of aircraft, vehicles, equipment, buildings, bridges, bunkers, and so on.[9] However, the theory is ill-suited for airpower's application in low-intensity, irregular, population-centric conflicts that require a focus on the intangible elements of human will.

The USAF's refinement of its dominant theory of competition into a narrow view of airpower in a large, near-peer conflict can be referred to as the "Cult of the Conventional." For 15 years, the USAF has conducted an air campaign against the Taliban in Afghanistan. The results (or lack thereof) of this campaign contradict core assumptions of the USAF's current theory of airpower. Yet the Cult of the Conventional ignores these anomalous outcomes; it twists and bends traditional airpower theory to accommodate circumstances that should lead to far more introspection and analysis. There is no evidence that the Air Force views its struggles in Afghanistan as relevant to its future strategic direction. Instead, the organization's responses have been predictably protective of core airpower assumptions—systems of denial to strategic anomalies that contradict long-standing assumptions.[10]

The Cult of the Conventional treats three aspects of the conventional conflict as doctrinal truths in the Afghan war: the superiority of strike, the acceptability of a risk-averse, defensive approach, and the centralized ATO as the only method of employing airpower. These three ideas may have a place in some wars, but they are ill-suited for airpower's application in unconventional conflicts such as the COIN campaign currently being waged against the Taliban. Bad ideas are an expensive luxury.
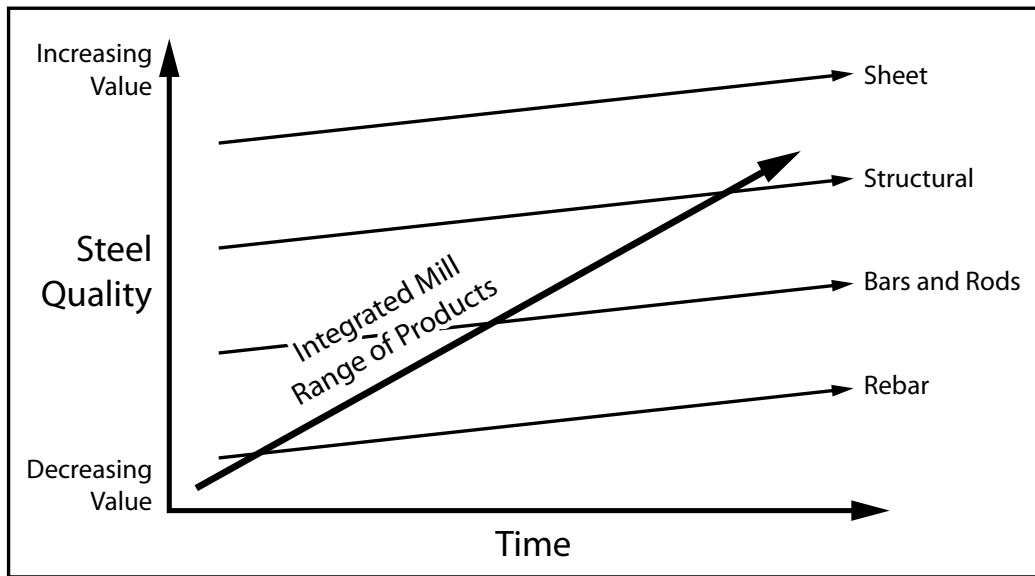
This article explores how the Cult of the Conventional is creating strategic risk for the US military. It highlights gaps in airpower employment and argues that the Air Force's continued emphasis on conventional dominance is increasingly irrelevant to the nation's strategic objectives in current conflicts. Finally, this article suggests changes at the tactical, operational, and strategic levels that will prevent the emerging gaps in airpower employment from causing the USAF's experiences in Afghanistan from heralding broader, more serious declines in its strategic relevance.

Organizational Theory

An easy rebuttal to any criticism of the USAF's performance in Afghanistan is to question, not the assertion that it has struggled, but to assert that it does not matter. Afghanistan has been a lamentable, ill-advised venture in building a nation that does not want to be built and whose instability poses no strategic threat to the United States or its allies. It is neither vital or important, and America's difficulties in the war therefore hold no important lessons. However, the theory of disruptive innovations suggests that this response may be foolish.

In *The Innovator's Dilemma*, Dr. Christensen explains how dominant businesses narrow the spectrum of what they value until they only compete in a narrow portion at the top of the market and are irrelevant everywhere else. These organizations seek to outperform their competitors by focusing the qualities of their product into a narrowing band of specialization as they move "up-market" into the top of the spectrum of valuation. This creates gaps at the bottom of the spectrum where they no longer place value and are no longer interested in competing with what they consider low-end products. It is within these gaps that the dominance of established competitors fades until they are irrelevant in the lower end of the market.[11]

The steel industry in the United States is an example of these concepts of specialization, gaps, and eventual irrelevance. Integrated mills monopolized the steel industry until the 1960s when minimills began producing low-quality steel at a cheaper cost (see fig. 1). The larger producers placed little value on low-quality products and were willing to shed them so they could specialize on higher-quality products that they valued more. As they moved up-market into a narrower band of specialization it created a gap at the bottom that was filled by their minimill competitors. The minimill expansion up-market, on the heels of the integrated mill retreat, continued until the large mills became mostly irrelevant in the production of everything except high-quality sheet steel. The once-dominant integrated mills moved into an ever-narrowing band of specialization at the top of the scale that created vulnerable gaps at the bottom of the market where their products became irrelevant.[12]

Figure 1. Integrated steel mill valuation scale[13]

Although Dr. Christensen uses principles from business, the framework he describes applies to all competitive organizations, especially those with a dominant position in their markets. The USAF is just such an organization. The Air Force has maintained virtually unchallenged dominance for more than a quarter-century. During that time (and much like the integrated steel mills), the USAF has moved up-market into a narrowing band of specialization at the top of its value scale, one that focuses on the most dangerous scenarios such as near-peer conflicts. This creates gaps in aircraft, missions, and operating concepts at the bottom that can lead to its strategic irrelevance in the most likely scenarios like those waged in Iraq, Afghanistan, and Syria in the past 15 years.

A value scale for airpower might be divided into the following seven categories: operating concept, manned aircraft, remotely piloted aircraft, control type, control mechanism, command relationships, and environment (see fig. 2). The extremes of the scale indicate what the USAF values most and least. The most desirable use of airpower (what the USAF values most) is an air superiority and bombing campaign in a contested environment, independently executed by Airmen through centralized control. A dichotomy exists between the type of conflict the USAF is focused on fighting and the type of conflict it actually fights, a dichotomy between the Cult of the Conventional toward the top of the valuation scale and the reality of current irregular conflict toward the bottom.

The aircraft and operating concepts at the bottom of the scale indicate what the USAF values least and is willing to shed as it specializes on higher-quality products that it values more.[14] The manned MC-12 unarmed ISR platform is no longer in the USAF inventory.[15] Remotely piloted, unarmed, tactical ISR platforms are no longer

in the USAF inventory.[16] The "low-end" A-10 single-mission ground attack platform was temporarily saved from no longer being in the USAF inventory by Congress but will eventually be replaced by the "high-end" multirole F-35 as the premier USAF CAS platform.[17] As the USAF moves up-market into a narrower band of specialization, it creates a gap at the bottom in low-end irregular conflict where these platforms are still relevant. Much like the minimill advance on the heels of the integrated mill retreat, organizations other than the USAF provide many of the low-end aircraft used on the battlefield (with the exception of the A-10).[18]

	Operating Concept	Manned Aircraft	Remotely Piloted Aircraft	Control Type	Control Mechanism	Command Relationship	Environment
Increasing Value ↑	Conventional Warfare	F-22 F-35 LRSB	Strategic intelligence, surveillance, and reconnaissance (ISR)	Centralized	Theater air operations center (AOC) ATO	Independent	Contested
	Air Campaign					Supported	
	Ground Campaign close air support (CAS)	Legacy Fighter Bomber	Tactical Armed ISR			Supporting	
	COIN	A-10	Tactical Unarmed ISR				
Decreasing Value ↓	Irregular Warfare	MC-12		Centralized	Unit Level	Direct Support	Uncontested

Figure 2. USAF valuation scale

Although the conflict in Afghanistan has demanded airpower that is lower on the valuation scale, the USAF remains fixated on the ever-narrowing band of specialization at the top that more closely aligns future conflict with the Cult of the Conventional. The most significant aspect of this move up-market is not the pursuit of high-value, highly-specialized missions, airframes, and operating concepts at the top of the scale, but the vulnerabilities and risk of irrelevance that it creates at the bottom. With predominantly high-end capabilities, the USAF solution to airpower problems will tend to be high-end as well, even when a low-end solution is sufficient. This is partially why highly capable, multirole F-16s are constantly airborne in Afghanistan tasked to provide the support a low-end ScanEagle unarmed ISR platform is capable of providing.

The danger of the Conventional Cult's move up-market is that it will achieve high-end tactical air dominance, yet neglect the opening gaps in irregular conflict at the low end in Afghanistan and ultimately lead to airpower's strategic irrelevance against the Taliban. Crucially, these low-end gaps are exploitable, not only by irregular adversaries in peripheral conflicts, but by *any* adversary seeking to impede the achievement of US strategic goals.

The Cult of the Conventional enables the USAF to maintain a system of denial that ignores information contradictory to long-standing assumptions and accepts three fallacies as truth: *the superiority of strike, the primacy of loss-prevention, and the sanctity of the ATO.*

First Fallacy: Whack-a-Mole (The Superiority of Strike)

The air operations center (AOC) provides combatant commanders with what air-power does extremely well: the ability to move things, watch things, and destroy things. With its joint integrated prioritized target list, joint target coordination board, battlefield coordination detachment, as well as air tasking stages dedicated to target development and weaponeering, the AOC is optimized for a 72-hour cycle of targeting enemy air forces, air defenses, ground forces, and infrastructure through a conventional air campaign—the AOC and the combat aircraft it controls are optimized to strike.

Conventional bombing campaigns focus on eliminating the tangible elements of a combatant's means to fight—the destruction of people and things. Irregular, population-centric conflicts focus on the intangible elements of human will, such as fear, honor and interest, and on the influence of culture, religion, history, social factors, and so forth. In one of the authors' experience while commanding an operations group in 2014–15 at Bagram Air Base (AB), Afghanistan, the AOC was attempting to win the hearts and minds of the Afghan population by having fighters constantly airborne to minimize the time to strike.[19] The AOC assessed airpower's success through measures such as the hours of close air support (CAS) flown, the number of requests for CAS filled, the number of bombs dropped, the number of hits achieved, response time to a troops-in-contact situation, and whether or not the tactical ground commander's intent was met. These are all measures of success for achieving subordinate, tangible ends, but they are grossly incomplete measures of achieving a higher end focused on the population's intangibles.[20]

In Afghanistan, despite 15 years of conflict that suggest otherwise, the USAF continues to view fighters, bombers, and their ability to strike as the solution to a population-centric competition for influence for which they are ill-suited, and to assess their employment through measures that are largely divorced from the strategic requirements of the war, focusing on tactical execution instead.[21]

A COIN campaign will always face problems that can be addressed by airpower's ability to move things and watch things. But airpower's third strength, the ability to destroy things, is only a solution while insurgents operate like a conventional force. Once they "go irregular" and meld with the population, it is very difficult to kill our way to victory. The cocked hammer of constant fighter coverage appeals to the Cult of the Conventional and the superiority of strike, but it often lacks utility in a war among the people where the higher-level political ends are most important.[22] The fighter and its ability to strike is still the preferred CAS solution for a conventional problem that can be solved by tangible destruction, but in an irregular competition over the intangibles that influence people, it is often not the *right* solution.

Asserting the relevance and necessity of airpower in low-intensity conflict is not a denial of the higher-end utility of airpower. It is simply an attempt to slow the USAF's retreat from missions and capabilities that are most needed by the nation in the wars that it actually fights. Airpower theory must return to an understanding of the changing character and constant nature of war. The USAF's approach to the Afghan war indicates a fundamental error, viewing the wrong aspects of war as unchanging and giving insufficient attention to those elements of war that actually endure.

War has always been a human endeavor; people fight today for fear, honor, and interests just as they did in the age of the Athenian historian Thucydides 2,500 years ago.[23] Since its invention a century ago, airpower, writ large, has remained an enduring part of war, but its employment is subject to changing circumstances. If the subordinate end of striking the enemy's means does not achieve the higher end of influencing the people's will, then we have merely confused activity with accomplishment and ensured that our conventional dominance will ultimately be strategically irrelevant. The USAF approaches war in the way that it prefers, while denying its enduring political nature.

Airpower in Afghanistan will remain in the morass of tactical execution with success defined by measures of performance until there is a higher, comprehensive strategy to lift it out.[24] To be strategically relevant in Afghanistan, airpower must move beyond "whacking the next mole to pop out of its hole" or viewing strike by high-end assets as the preferred airpower solution to a population-centric problem. Instead, airpower advocates must not deny the obvious signals that strike, ISR and airlift are only relevant when they achieve an effect among the population that fosters support for the Afghan government, emboldens the resolve of Afghan forces, or deters the Taliban from further action. The ability to strike will continue to have a fleeting role to play in Afghanistan, but 15 years of overmatch has so far contributed to nothing more than a stalemate and suggests that superb high-end strike capability is an incomplete solution in a low-end conflict. If the coalition's application of all forms of airpower is not laser-focused on the political end that the COIN campaign seeks, then this strategic disconnect will render irrelevant the coalition's tactical dominance.

Second Fallacy: "11 Goalies" (Preventing a loss is more important than a win.)

Fighters are constantly airborne in Afghanistan to support COIN operations, counterterrorism operations, and provide self-defense of forward operating bases. Although base defense seems like a valid reason to pull sorties away from the other two campaigns; in reality, it is another example of an active system of denial. The rules of engagement make it extremely unlikely that a fighter will be able to engage a hostile target around the perimeter of an operating base even when tasked to defend it.[25] Although F-16s were airborne over the Bagram airfield providing base defense CAS during multiple rocket and improvised explosive device attacks from 2014–15, they were not able to employ a single bomb or bullet in response.[26] Ironically, base defense is where superb strike capability could be most beneficial, yet it is where strikes are least likely to occur. The Cult of the Conventional views fighters orbiting over a base as a way to do something to defend against the Taliban, but

the rules of engagement (ROE) greatly reduce a fighter's ability to do more than just observe what is unfolding on the ground. Fighters, with their superb capacity for speed and firepower, provide only the illusion of support to friendly forces at risk as long as the rules severely restrict their ability to engage.

The combination of base defense sorties and restrictive ROEs is like a soccer team with 11 goalies blocking the goal. Our aversion to risk and focus on preventing the other team from scoring makes it increasingly difficult for us to support the two campaigns that could seize the initiative and consolidate strategic and political gains. The "11 goalies" obsession with defense at the expense of offense misunderstands the character of the war the Taliban is waging. Regardless of leaders' statements regarding the end of US combat operations in Afghanistan, if the Taliban wants to keep fighting, then the war will not end.[27] Our ROEs must reflect reality. We do not make ourselves successful simply by asserting our success.

The idea of fighters circling overhead a base may soothe forces on the ground and appeal to the Cult of the Conventional, but it is only the illusion of support if self-imposed rules prevent them from providing any more support than that provided by a tethered balloon with a fancy camera. On a team with all 11 players lined up in front of the goal so that they are doing "something," the most we can hope for while we run out the clock is a tie game with both sides achieving nothing. Unfortunately, the Taliban does not believe the 11 goalies fallacy and is still trying to win.

Third Fallacy: ATO über alles (The ATO is the only bridge across which airpower shall pass.)

The Cult of the Conventional makes it much easier to believe the fallacy that centralized control and a single ATO is the only way that airpower can be employed. The idea of the ATO, above all else, or "ATO über alles" suggests that the doctrine of centralized control and the tasking order process are the ultimate refinement of airpower doctrine and must be followed regardless of its applicability in a changing environment.

Created 40 years ago as part of the AirLand Battle operating concept to fight outnumbered and win against Soviet maneuver forces in a competition for terrain, the 72-hour air tasking cycle was designed for an environment that would remain relatively predictable for the duration of its OODA (observe, orient, decide, and act) loop. Today, in Afghanistan, the air tasking cycle is not responsive enough for the dynamic scenario of an enemy blending with the population and choosing when to emerge with lethal contact.[28] Crucially, the three-day cycle is ill-suited for supporting special operations forces (SOF) on a very short timeline in a competition for influence over a population.[29]

SOF are the only forces focused on something other than self-defense in Afghanistan. When it comes to providing airpower to coalition forces, SOF is the "only show in town."[30] Yet, SOF requests for support must compete with conventional forces that request fighters to fly base defense sorties or orbit overhead providing fighter presence; two missions that demonstrate activity but accomplish very little. Although

almost all air-to-ground engagements in Afghanistan are in support of SOF missions, the single air tasking process attempts to fill as many requests for support as possible from both conventional and SOF on a lengthy timeline that is much longer than the SOF OODA loop. The result is gross inefficiency, with aircraft returning to base in Afghanistan still carrying their bombs well more than 90 percent of the time.[31]

The fallacy of ATO über alles ignores CAS control processes that do not comply with the cult's traditional view of CAS to large maneuver forces. Although fighters in support of SOF are centrally controlled and executed, electronic warfare aircraft in support of SOF are not. EC-130 electronic warfare aircraft are conventional forces that have a place-holder in the ATO, but the details of if they will fly and what their mission will be is determined by SOF during their nightly SOF air allocation meeting just before mission execution. CAS could follow a similar template that would provide conventional fighter support to SOF and operate within the SOF OODA loop as opposed to requiring SOF to adjust to a 40-year old conventional process that delays the timeline. Airpower must move beyond the outdated doctrine of just maximizing the number of hours flown or the number of CAS requests filled and focus instead on providing support to forces based on the effect they are trying to achieve as it relates to the higher purpose of the campaign. Also, it must focus on accomplishing this with the shortest possible OODA loop.

Airlift control is also susceptible to the ATO über alles fallacy. Centralized control on a global scale of strategic airlift C-5 and C-17 aircraft through the AOC, and ATO is viewed as the only acceptable method of control for airlift of any type. But the strategic airlift OODA loop of the global transportation process is not responsive enough to support the very short OODA loop required of tactical C-130 airlift in the dynamic Afghan environment supporting SOF. Airlift requirements that are known ahead of time are adequately met by the current airlift process, but pre-planned, partnered operations with US SOF and Afghan forces are planned and executed on a very short timeline that the strategic airlift process is ill-suited for. The air expeditionary task force commander in Kabul has operational control authority over C-130 aircraft in Afghanistan and could make decisions on a very short timeline. However, the decisions as to what cargo the aircraft will carry, when they will take off and land, where they will fly, and which air strips they will operate out of are made in accordance with the three-day air tasking cycle 1,300 miles away in the AOC in Qatar. This further delays the airlift tasking process and often SOF are well within the conventional OODA loop and have passed the AOC's deadline by the time SOF have the details of what they need conventional airpower to do. If SOF cannot guarantee that they will have conventional air support as they develop their plans, they simply modify the plan to make-do with SOF-only air assets, which extends execution timelines and increases risk. Retaining decision authority at the AOC over forces that a general officer in Afghanistan has operational control authority over undermines the spirit of an air expeditionary task force commander trusted by the theater combined joint force air component commander as the face of airpower in Afghanistan. It denies the expeditionary commander a seat at the decision-making table with other commanders in the operating area and needlessly extends the tactical airlift OODA loop.[32]

The USAF is also ignoring airlift successes that do not comply with the Cult of the Conventional. Before 1999, all US Southern Command intratheater, tactical airlift operations of C-130 and C-27 aircraft were not centrally controlled or centrally executed by a three-day air tasking process in a theater AOC. Before the closing of Howard AFB, Panama, the execution of all Central and South American tactical airlift sorties were delegated to an O-6 at the wing in Panama and operated on a 12-hour cycle controlled at that level. Using the successful Panama example as a template, authority could be delegated to the air expeditionary task force commander in Afghanistan for tactical intratheater operations. SOF airlift support could be controlled by the expeditionary air wing at Bagram AB outside of the ATO process. It could be directly coordinated with the SOF air component staff across the street at Bagram within the SOF OODA loop as opposed to coordinating with the AOC 1,300 miles and a time zone away.

The ATO process is far from meeting the needs of an adaptive organization designed to out-OODA the enemy. A more adaptive approach is to shorten the CAS and airlift loop by pushing decision making further down the chain of command closer to the point of execution. The Cult of the Conventional's ideas about command are going in the wrong direction; rather than seek more centralization in the dynamic, unconventional environment at the lower end of the USAF valuation scale, it should seek less.

Airpower Axioms for Irregular Conflict

The strategic irrelevance of airpower in Afghanistan does not just increase risk in that conflict. Irregular warfare exposes low-end vulnerabilities in American air dominance that may eventually migrate "up-market," posing significant risks in more lethal wars. The Air Force can resist the Cult of the Conventional by focusing on the six axioms for the use of airpower in irregular warfare.

1) *Tactical airpower dominance is only relevant in irregular conflict when it achieves political ends.* Unclear political objectives set military forces adrift in a sea of strategic ambiguity that allows tactical execution to become an end unto itself.[33] This is not just a USAF challenge but one for sister services and the coalition writ large. How airpower is measured is critical. Maximizing the number of hours flown or number of support requests filled are measures of performance that are irrelevant unless their purpose is tied to the achievement of higher-level effects that directly support political objectives. Military leaders may not be able to set the political objectives in Afghanistan, but they can adapt the employment of airpower to align better with the objectives that civilian leaders give them. Military leaders can ensure that every choice about the use of airpower in Afghanistan first answers the question, "To what end?" Those requesting and providing airpower must understand that it should only be applied when it goes beyond mere activity and supports strategic ends.

In population-centric conflicts such as the one waged in Afghanistan, people are the battlefield and civilians are the targets, not to be destroyed as traditional targets in a conventional competition for terrain, but to be influenced in a competition for their hearts and minds to achieve political ends.[34] If the application of advanced

weapon systems that leads to air dominance does not ultimately achieve a favorable effect among the population then it is irrelevant. Airpower's superb capacity for destruction with aircraft constantly airborne waiting to strike may rarely be the solution in a competition for influence. It is not always the use of advanced weapon systems that matters, but the effect they achieve among the people.[35]

2) *When fighter aircraft are used, it should be in a manner that capitalizes on their strengths of speed and firepower*. Although the Cult of the Conventional views fighters as the solution to most air power problems, other platforms are better suited to orbit for extended periods and better suited to provide the ISR so critical in irregular conflicts. Lethal engagement, for which fighters are so well suited, is rarely required in this environment. Sustaining a constant orbit of fighters ready to strike requires significant air refueling and maintenance support and the vast majority of the time accomplishes nothing. Squandering the mission-capable status of fighters and air refuelers simply to be airborne when nothing is happening on the ground puts in jeopardy the readiness of these assets when they are truly needed. Fighters should be held in reserve in a short-notice alert posture on the ground unless the firepower of their strafe or 500 lb. and larger weapons is actually needed.

3) *Population-centric conflicts require aircraft, missions, and operating concepts at the bottom of the USAF valuation scale more than those at the top.* Ground forces in Afghanistan may not always have a need to destroy things with advanced weapons, but they have a constant need to move things and watch things. Their ability to maintain situational awareness of what is happening around them, to know where the Taliban is operating, who its key leaders are, and what they might do next and to have the mobility to respond to that information is critical. As the USAF moves up-market, it is shedding the dedicated CAS and unarmed tactical ISR air assets that ground forces need most. Ironically, as the USAF sheds ISR platforms such as highly capable MC-12-manned ISR aircraft, the US Army is taking them over.[36] Perhaps ground forces have a better view of what airpower should contribute in a successful COIN campaign. The Army's interests are certainly focused at the bottom of the USAF valuation scale. Recalling the disruption of integrated steel mills, the Air Force should think twice about ceding low-end missions to other services.

The Cult of the Conventional and belief in the Whack-a-Mole fallacy make it easy to deny there is any airpower solution other than an advanced aircraft constantly overhead ready to strike. Ironically, the Taliban has survived for 15 years without an air force or air defenses. Although not popular with the USAF writ large, lower-end CAS and ISR platforms are sufficient in the Afghan environment, and their lower cost makes possible an increased number of them as opposed to fewer, more expensive, high-end platforms that present an irrelevant tactical overmatch. The Afghan Air Force is providing its own CAS with the low-end A-29 light-attack aircraft.[37]

4) *The choice of weapon and the rules for its use must be in harmony.* The violent nature of war and the risk to forces that goes along with it can be partially mitigated, but never controlled; there will never be a zero-risk, armed conflict. War is violent, lethal, and sometimes unpredictable—war is war. Fighters are exquisitely capable of delivering lethal effects, but applying them where there is zero tolerance for risk cancels out their strengths, and attempts to make them something they are not. Like dusting fine china with a velvet-covered hammer, in employing fighters

with inappropriate ROEs, we have managed to make two mistakes: first, picking the wrong tool for the job, and then using it in the wrong way. It suggests that we are ignoring the obvious, that we are handicapping fighters to the point that they only provide the illusion of support, and that we are mistakenly dictating rules the Taliban doesn't follow. If the rules do not allow fighters to engage, then a fighter orbiting overhead is not the correct response to the question "airpower to what end?"

5) *Dynamic, cross-domain, irregular conflicts require airpower control alternatives with a shorter OODA loop than the 72-hour ATO process.* The unpredictability of dynamic environments require leadership that decentralizes control, delegates authority, and empowers the shortest possible OODA loop executed through decisions made at the lowest acceptable level.[38] Cross-domain interaction that shortens the OODA loop between SOF ground forces and conventional air assets supporting them requires less focus on the management of things and more on the leadership of people, less on centralized control of a process in a predictable environment and more on empowering subordinates with the freedom to determine their own actions that rapidly adjust to change and meet the commander's intent in a dynamic one. Uncertainty is the nature of war. Seeking tight control and extended OODA loops only works in a stable environment where the future is predictable. We all want to avoid "black swan" surprises of an unforeseen event by seeing what it will be before it exists.[39] However, this is simply not possible. It's wrong to use tight control when the OODA loop extends beyond the shortened uncertainty horizon of a dynamic environment. We cannot control that which is not controllable. Airlift control in Panama before 1999, SOF control of their own air assets, and EC-130 aircraft support to SOF are templates that demonstrated success in dynamic environments and should be used for future adaptation of the air control processes in unconventional conflicts.

In Afghanistan, the USAF should provide CAS and airlift support to SOF in the most agile, flexible manner, with the shortest possible OODA loop even if it distributes authority and control and is different than the operating concept of any other AOC or theater.[40] Current doctrine must be viewed as a common point of departure on the road to adaptation, not as the final destination on the road to dogma conceived 40 years ago. USAF introspection about airpower control must embrace a spirit of inquiry that is open to new ideas rather than a rigid grip on the past that is not.

6) *Irregular conflicts require agile transitions between high-end and low-end solutions.* If the USAF continues to move up-market and shed low-end capacities, its high-end dominance in a conventional fight against an adversary's means risks becoming increasingly irrelevant in the current unconventional conflicts to influence the people's will. Although unpopular in the USAF, as evidenced by its reluctance to support them, low-end solutions are sufficient to achieve the political objectives required in population-centric conflicts. The USAF should approach what it values and the type of conflict it is prepared to wage not as a "this *or* that" binary choice between most dangerous and most likely, but instead as this *and* that blend between high-end and low-end solutions.

Fixating on high-end solutions with the assumption that high-end, multirole capacity ensures low-end applicability also assumes that high-end capability will be used where low-end capability once was. It assumes, for example, that a high-end aircraft like the F-35 will be deployed to dusty, austere locations like Afghanistan to

constantly orbit overhead waiting to strike in the manner low-end aircraft like the A-10 that it will replace currently are. It assumes that high-end armed ISR platforms will be used where low-end, unarmed ISR platforms once were. It assumes that an air tasking cycle measured in days will continue to meet the time constraints of SOF operating on a decision cycle measured in hours. Until the assumptions of this nature are proven valid, the USAF should seek both high-end and low-end capability and focus aircraft, missions, and operating concepts on agile transitions between the two based on the current situation. It should seek the adaptability to operate across the spectrum of the valuation scale for airframes and operating concepts in the most effective manner that is tailored to each unique environment even though that solution may not work in other theaters or conflicts.[41] The alternative is to retreat up market much like integrated steel mills in the 1960s until the USAF has created gaps at the low end to be filled by other organizations or to remain open and increase the likelihood of tactical dominance overshadowed by strategic irrelevance in low-end conflicts like Afghanistan.

Conclusion

The Cult of the Conventional, with its myopic focus on the upper end of the valuation scale and the three fallacious beliefs it promotes, creates gaps at the lower end where airpower runs the risk of becoming irrelevant, and it denies evidence that long-standing airpower assumptions should be questioned. Invalidating this system of denial requires changes at the strategic, operational, and tactical levels. It requires more than just sustaining innovations that only improve current ways of doing things. It requires innovation that does things in new ways and that adjusts the established system of valuation to emphasis those elements that follow the most effective path to a higher end regardless of whether that solution requires high-end or low-end aircraft, missions, or operating concepts. It requires viewing current doctrine as a common point of departure for adaptation and new ways of thinking. It also requires the application of axioms that ensure tactical USAF dominance is strategically relevant and counters the Conventional Cult's fallacies of Whack-a-Mole, 11 goalies, and ATO über alles. ✪

Notes

1. Andrew Hill and Stephen Gerras, "Systems of Denial: Strategic Resistance to Military Innovation," *Naval War College Review* 69, no. 1 (Winter 2016): 109–132.

2. In the 1920s, military leaders denied the waning superiority of the battleship and Billy Mitchell's claims that sea power would be subordinated to airpower or dependent on it even after he demonstrated the vulnerabilities of the battleship to aircraft by sinking the *Ostrfiesland*. "William 'Billy' Mitchell: An Air Power Visionary," *HistoryNet*, 12 June 2006, http://www.historynet.com/william-billy-mitchell-an-air -power-visionary.htm.

3. "Pentagon Confident in Afghan Plan despite Troop Death," *The Hill*, 1 January 2016, http://thehill .com/policy/defense/264837-pentagon-confident-in-afghan-plan-despite-troop-death.

4. "Trump Advisors Call for More Troops to Break Afghan Deadlock" *New York Times*, 8 May 2017, https://www.nytimes.com/2017/05/08/us/politics/donald-trump-afghanistan-troops-taliban-stalemate .html?_r = 0.

5. In 2009, the campaign objectives shifted from a focus on destruction of the Taliban to a focus on the Afghan population. Kenneth Katzman, *Afghanistan: Post-Taliban Governance, Security, and Policy*, Congressional Research Service (CRS) Report No. RL30588 (Washington, DC: CRS, 2016), 25.

6. Clayton M. Christensen, *The Innovator's Dilemma* (New York: Harper Business, 2000), 186–195.

7. Robert M. Gates, *Duty: Memoirs of a Secretary at War* (New York: Alfred A. Knopf, 2014), 239, 248.

8. Alan J. Vick, *Proclaiming Airpower* (Santa Monica, CA: RAND Corporation, 2015), 67–85; and Air Force Doctrine Document 1 (AFDD-1) *Air Force Basic Doctrine*, "The Foundations of Airpower," states that airpower can simultaneously strike rapidly, unexpectedly, and directly across the adversary's centers of gravity, vital centers, critical vulnerabilities, and strategy. In AFDD-1, "The Foundations of Airpower," doctrine.af.mil, 27 February 2015, https://doctrine.af.mil/download.jsp?filename = V1-D22 -Foundations-of-Airpower.pdf; and Air Force doctrine states that airpower must be centrally controlled by Airmen. *Air Force Basic Doctrine*, "The Airmen's Perspective," *doctrine.af.mil*, 27 February 2015, https://doctrine.af.mil/download.jsp?filename = V1-D24-Airmens-Perspective.pdf.

9. Airpower success against the Taliban and Da'esh is described in terms of the destruction of targets that provide the means to fight. "Combined Forces Air Component Commander, 2011–2016 Airpower Statistics," US Air Forces Central Command (AFCENT) Public Affairs, 29 February 2016, http://www.af cent.af.mil/Portals/82/Airpower%20Summary%20-%20February%202016.pdf?ver = 2016-11-25-023 616-157.

10. Hill and Gerras, "Systems of Denial," 109–132.

11. Christensen, *The Innovator's Dilemma*, 89–108.

12. Ibid., 89–108.

13. The figure is the author's adaptation of the figure in the book; Ibid., 104.

14. While Robert Gates was secretary of defense, the Air Force was more concerned about a new bomber and F-22 for future fights than supporting the conflicts it was in. Secretary Gates pressured the Air Force to better support the current conflicts by focusing more on manned and remotely piloted intelligence, surveillance, and reconnaissance (ISR) platforms to include the manned MC-12 ISR platform. In 2014, after Secretary Gates left office, the USAF shed those platforms as it transferred the MC-12 fleet to the Army. Gates, *Duty: Memoirs of a Secretary at War*, 130–133, 239, 248, 319; and "The US Military's King Air 350ER Aircraft: Quietly Effective," *Defense Industry Daily*, 25 February 2016, http://www.defenseindustrydaily.com/us-military-orders-more-king-air-350er-aircraft-05165/.

15. "Beale AFB [Air Force Base] Farewells MC-12 as Spy Plane Moves to Army and SOCOM [Southern Command]," *Flight Global*, 25 September 2015, https://www.flightglobal.com/news/articles/beale-afb -farewells-mc-12-as-spy-plane-moves-to-army-417153/.

16. The USAF does not operate the unarmed ISR platforms ground units rely on such as the Scan Eagle, MQ-1 Grey Eagle, or other low-end platforms. Instead, it is focusing on higher-end, strike capable platforms. "US Air Force Terminates Predator Drones. Now You Will Fear the Reaper," *The Register*, 27 February 2017, https://www.theregister.co.uk/2017/02/27/us_air_force_put_predator_drones/.

17. "Report: A-10 Retirement Indefinitely Delayed," *Air Force Times*, 13 January 2016, https://www .airforcetimes.com/story/military/2016/01/13/report--10-retirement-indefinitely-delayed/78747114/.

18. Scan Eagle, MQ-1 Grey Eagle, and other low-end platforms are provided by ground forces, not the USAF.

19. Dag Henriksen, *Airpower in Afghanistan 2005–2010, The Air Commander's Perspectives* (Maxwell AFB, AL: Air University Press, 2014), 32, 65, 109, 194.

20. Ibid., 237–240; and Air Force Central Command (AFCENT), "2011–2016 Airpower Statistics," 2016.

21. Hew Strachan, *The Direction of War* (Cambridge, UK: Cambridge University Press, 2013), 218.

22. Rupert Smith, *The Utility of Force* (New York: Alfred A. Knopf, 2007), 3–8.

23. Robert B. Strassler, ed., *The Landmark Thucydides, A Comprehensive Guide to the Peloponnesian War* (New York: Free Press, 1996), 43.

24. James S Corum and Wray R. Johnson, *Airpower in Small Wars, Fighting Insurgents and Terrorists* (Lawrence, KS: University Press of Kansas, 2003), 425.

25. Airpower can only be brought to bear if it is in self-defense, if there is a positive identification, and if pattern of life has been established that clarifies what the suspect individual had been doing during the period leading up to the event. Henriksen, *Airpower in Afghanistan,* 214.

26. The only bombs dropped within the Bagram AB, Afghanistan, base defense area during this period while the author was the operations group commander at Bagram AB was a preplanned strike

on a weapons cache. The vast majority of successful attacks by the Taliban against Afghan and NATO forces were insider threats with improvised explosive devices (IED) and indirect fires (rocket, mortar, artillery) making up less than 50 percent. Fighters cannot prevent an insider attack and dedicated ISR is more capable of catching an IED or rocket emplacement which leaves fighters with limited utility in the most prevalent attack scenarios; The US Department of Defense (DOD), *Report to Congress: Enhancing Security and Stability in Afghanistan* (Washington, DC: DOD, December 2015), 20–22.

27. In December 2015, almost one year after the declared end of combat operations, six Airmen were killed by the Taliban near Bagram AB. "Six Airmen Killed in Afghanistan Identified," *Air Force Times*, 22 December 2015, http://www.airforcetimes.com/story/military/pentagon/2015/12/23/six-airmen-killed-afghanistan-identified/77777636/.

28. Tight controls and assembly-line like processes work best in a stable environment that does not change. A dynamic environment requires responsiveness that tight control and rigid processes tend to suppress; Henry Mintzberg, *The Rise and Fall of Strategic Planning* (New York: The Free Press, 1994), 146–150, 342–343.

29. John Boyd's view was that the competitor with the shortest OODA loop has the advantage. Grant T. Hammond, *The Mind of War, John Boyd and American Security* (Washington, DC: Smithsonian Institution Press, 2001), 123.

30. "Operation Freedom's Sentinel and Our Continued Security Investment in Afghanistan," *army.mil*, 1 October 2015, https://www.army.mil/article/156517/.

31. The exact percentage is of a higher classification than this article allows; 90 is a representative number only and it is chosen by the author because it is close to the disparity between sorties flown and sorties with weapons employment.

32. Mike Hostage, "A Seat at the Table, Beyond the Air Component Coordination Element," *Air and Space Power Journal* (*ASPJ*), 24, no. 4 (Winter 2010): 20, http://www.au.af.mil/au/afri/aspj/airchronicles/apj/apj10/win10/2010_4.pdf.

33. Strachan, *Direction of War,* 218.

34. Smith, *Utility of Force,* 6.

35. Ibid., 45–46.

36. Drew, "Beale AFB Farewells MC-12," 2015.

37. "Additional A-29s Arrive in Kabul in Time for Fighting Season," *centcom.mil*, 21 March 2017, http://www.centcom.mil/MEDIA/NEWS-ARTICLES/News-Article-View/Article/1124868/additional-a-29s-arrive-at-kabul-in-time-for-fighting-season/.

38. Mintzberg, *Rise and Fall,* 167–170.

39. A black swan event is an unexpected and unforeseen event that creates surprise when it suddenly occurs. A black swan event cannot be predicted since that would require foreknowledge of what it is in order to be able to predict it; it would remove the element of surprise, and would thereby make it no longer a black swan. Nassim Nicholas Taleb argues that unknowable black swan events cannot be known until they have already occurred. Nassim Nicholas Taleb, *The Black Swan: The Impact of the Highly Improbable* (New York: Random House, 2007), 40–42.

40. David Deptula, "A New Era for Command and Control of Aerospace Operations," *ASPJ* 28, no. 4 (July–August 2014), 13, http://www.au.af.mil/au/afri/aspj/archivepage.asp?id=33.

41. Germany, Russia, and the United States all had different organizational structures for the control of airpower that changed, based on the type of aircraft they used and how they used them. Michel L. Marshall III, *Clashes: Air Combat over North Vietnam 1965–1972* (Annapolis, MD: Naval Institute Press, 1997), 25–258; and Martin van Creveld, *Air Power and Maneuver Warfare* (Maxwell AFB, AL: Air University Press, 2004), 36, 137–138; and Corum and Johnson, *Airpower in Small Wars,* 433.

Col Jon C. Wilkinson, USAF

Colonel Wilkinson (BS, Utah State University; MS, Troy State University; Master of Strategic Studies, US Army War College) is a faculty instructor and director of theater air operations at the US Army War College. He is responsible for instructing theater strategy and campaigning, as well as the Joint Warfighting Advanced Studies Program. The colonel's most recent operational assignment was in 2014–15 as the 455th Expeditionary Operations Group commander at Bagram Air Base, Afghanistan, where he commanded more than 1,100 military and civilian personnel, executing A-10, F-16, MC-12, HH-60, EC-130, C-130J, and airfield management combat operations. A command pilot with more than 3,600 flying hours in the F-16, KC-135, C-130, C-27, and HH-60, Colonel Wilkinson conducted flying operations in Central and South America, Japan, South Korea, Singapore, Thailand, Egypt, Iraq, and Afghanistan. He previously served as the C-27 and C-130 current operations airlift coordinator, F-16 director of operations, operations support squadron commander, Seventh Air Force A3/A5 deputy director, and the US Pacific Command J54 Northeast Asia strategic plans branch chief.

Dr. Andrew A. Hill

Dr. Hill (PhD, Harvard Business School; MA, University of California; and BA, Brigham Young University) is the chairman of Strategic Leadership at the US Army War College. His research focuses on innovation, complex systems, and strategy development.

The Birth of American Airpower in World War I

Commemorating the 100th Anniversary of the US Entry into the "Great War"

Dr. Bert Frandsen*

Although the Wright Brothers invented the airplane, the birth of American airpower did not take place until the United States entered the First World War. When Congress declared war on 6 April 1917, the American air arm was

---

nothing more than a small branch of the Signal Corps, and it was far behind the air forces of the warring European nations. The "Great War," then in its third year, had witnessed the development of large air services with specialized aircraft for the missions of observation, bombardment, and pursuit. On the battlefield, machine guns kept infantry on each side pinned down. They sought safety in trenches, but were still vulnerable to indirect fire from artillery that caused even more casualties through concussion, shrapnel, and poison gas. Each side had come to realize the importance of gaining command of the air. It provided the means to observe the enemy and to direct accurate artillery fire on enemy trench-lines and the depth of his formations. Consequently, many believed that a "decision in [the] air" was required before a decision on the ground could be won.

In contrast to the European air forces, an American combat aviation arm did not exist. The Army possessed only 26 qualified aviators.[1] Their assignment to the Signal Corps can be traced back to the Civil War, when the Union linked observation balloons, the telegraph, and signal flags to provide intelligence on Confederate activity.[2] In 1907, the establishment of the Aeronautical Division of the Signal Corps, restructured by congressional legislation as the Aviation Section in 1914, signify the earliest forerunners of today's US Air Force (USAF).[3] As America entered World War I, the Aviation Section was equipped with a meager number of unarmed, and obsolete airplanes. Some pilots had seen active service as pilots during the 1916 Mexican Punitive Expedition. The single squadron that accompanied this expedition, commanded by then Maj Benjamin Foulois, consisted of eight aircraft—unarmed, underpowered, and unreliable. Consequently, the squadron proved useless for its observation mission and eventually served as a courier service—a mission that reflected the Signal Corps' ownership of the Aviation Section.[4]

How did the United States create airpower upon the Great War? The complete story is beyond the scope of this article, but an important part can be told through the contributions of three key architects of American airpower: Col Raynal Bolling, Major Foulois, and Gen William "Billy" Mitchell. These fathers of American airpower mobilized a combat aviation arm on par with the other branches of the Army. They harnessed public enthusiasm for airpower, developed the mobilization plans that turned recruits into aviation units, procured the airplanes, learned the operational art from the Airman's perspective, and provided a vision that inspired the future emergence of an independent air force and an airpower second to none.

Air-mindedness

The paucity of American military aviation in 1916 stands in stark contrast to the country's enthusiasm for airpower. Within months of America's declaration of war, Congress passed an appropriation of $640 million, the largest appropriation "by Congress for a single purpose up to that time."[5] Headlines such as "GREATEST OF AERIAL FLEETS TO CRUSH THE TEUTONS" appeared in American newspapers.[6] This unprecedented commitment of national treasure and enthusiasm for airpower is clear evidence that air-mindedness existed in America even at this early date.

Air-mindedness was stronger in civilian society than in the military. Just a few years before even Mitchell, America's future prophet and martyr for an independent

air force, testified in Congress *against* aviation's independence from the Signal Corps.[7] More to the point, the resistance within the upper echelons of the Army to such a large appropriation for aviation was so strong that the secretary of war, Newton Baker, bypassed the Army general staff when he took the proposed legislation to Congress.[8] The public's enthusiasm for airpower manifested itself in a Congress that exhibited an almost messianic faith in the airplane's ability to deliver victory as reflected in newspaper headlines.[9]

Air-mindedness owed much to civic organizations, especially the Aero Club of America, founded in 1905, which drew its leadership from the captains of industry.[10] The Aero Club was actually a federation of aviation clubs from across America that sponsored flying exhibitions, issued pilots' licenses, and promoted a nascent aviation industry.[11] Promoters of aviation envisioned growth of an aircraft industry as revolutionary as the automobile industry, which was then transforming American society. The efficiencies achieved by Henry Ford's assembly line had only recently brought automobile prices within reach of the average American, and sales were skyrocketing. In contrast, aircraft production was so small that airplanes were made in shops instead of factories, but hopes for the future were high. The Aero Club was a powerful lobby and had been largely responsible for legislation establishing the Aviation Section of the Signal Corps in 1914. The Club also lobbied for the establishment of aviation units in the National Guard. Bolling organized one of these units in New York.[12]

Raynal Bolling

A Harvard-educated lawyer and an aviation enthusiast, Bolling served on several of the Aero Club's executive committees, including those dealing with law, government affairs, and military aviation. He would become one of the key architects of American airpower. Many readers will recognize Bolling as the name of the USAF base near the Pentagon in Washington, DC. Bolling merited this honor for his role in creating American airpower during the Great War. He was also the senior US Airman killed in action during the war. His part in the birth of American airpower exemplifies how the National Guard and reserves played an important role in the formation of an American air force—the prologue to today's total force.

Bolling initially rose to fame as the chief lawyer for US Steel. At that time, it was the largest corporation in America and vitally important to any war effort. He helped defend US Steel from being broken up by President Theodore Roosevelt, "Teddy the Trust Buster."[13] He was also a member of the New York National Guard. "The Guard was a hotbed of early interest in aviation, and there were many efforts to form Guard aero units in various states, the most prominent being the New York."[14] Bolling's interest in aviation, combined with financial support from the Aero Club of America, led to his founding of the 1st Aero Company of the New York National Guard in 1915.[15]

Bolling's command expanded to become the 1st Reserve Aero Squadron (1st RAS) after the passage of the National Defense Act of 1916, which originated the nation's air reserve.[16] His squadron was among the first aviation units sent to France in the summer of 1917. It was the core organization that built and expanded into a huge American aviation training center at Issoudun, France. Bolling's second-in-command,

Capt James Miller, took charge of the squadron after Bolling left and became the first commander at Issoudun. Another member of this squadron was 1st Lt Quentin Roosevelt, the youngest son of President Roosevelt. Captain Miller and Lieutenant Roosevelt later became pilots in the 1st Pursuit Group (1st PG), the ancestor of today's 1st Fighter Wing. Both men were killed in air-to-air combat with the Germans.[17]

Bolling did not accompany his squadron to France because he was called to Washington to help plan the creation of a wartime air force. His aviation expertise, contacts with industry, and knowledge of the law made him an especially valuable asset in crafting legislation to create American airpower. He and Foulois drafted the bill that became the $640 million appropriation.[18] Foulois had also only recently come to Washington. He was one of the most experienced aviators in the regular Army.

After the passage of the historic aviation bill, Foulois and Bolling focused on the next major problem: how to translate the huge appropriation into a practical plan to man, train, organize, and equip an American air force. The United States was unprepared for war, and a strict policy of neutrality had minimized contact with the European allies. An air force needed modern combat aircraft, well-trained pilots, mechanics and support personnel, and a host of other items to create combat-ready squadrons. Bolling was sent to Europe to figure out what types of airplanes America should build.[19] Foulois concentrated on the establishment of mobilization and training centers across the country, where recruits were transformed into aero squadrons. The largest center was at Kelly Field near San Antonio, Texas.[20]

Benjamin Foulois, Father of the Air Force

If a single person can be called the father of the American air force, Foulois deserves that title. He flew with Orville Wright in 1909 on the Army's acceptance tests for its first airplane. He took Army number one to Fort Sam Houston, Texas, and amazingly, taught himself to fly it, just as he had been ordered. One could argue that he learned to fly through distance learning because Wright provided him advice through an exchange letters. Later, Foulois helped organize the Army's 1st Provisional Aero Company, and he commanded the 1st Aero Squadron (not to be confused with Bolling's 1st RAS) during the Mexican Punitive Expedition in 1916.[21]

Foulois's command on the Punitive Expedition represented America's first employment of airpower on a major expedition. Although his squadron was incapable of adequately accomplishing its reconnaissance mission, due to the inferiority of its airplanes, valuable lessons were learned that Foulois put to use in developing the mobilization plan that gave birth to American airpower. One of his most important insights from the Punitive Expedition concerned the ideal organization for an aero squadron. His design became the basic fighting unit upon which US airpower was built. He returned to Signal Corps headquarters in Washington after the Punitive Expedition and put his plan into effect.[22]

Foulois designed a squadron consisting of 150 men, not including the pilots. In most cases, pilots were not assigned to the squadron until after the squadron completed basic training and deployed to France. By organizing a standard-service aero squadron, Foulois incorporated the idea of interchangeability in terms of organizational structure. This system of standardization simplified mobilization because

only one type of airplane squadron—the 150-man squadron—needed to be initially organized. After squadrons had been organized and received basic training at Kelly Field, they deployed to Europe as soon as transportation was available. The concept of a standard-service aero squadron was an elegant but simple solution to the problem of building an air service in which the initial stages of organization took place in the United States, and the final stages were completed in Europe.[23]

Gen John J. Pershing, the commander of the American Expeditionary Forces (AEF), decided to conduct the final organization, training, and equipping of the Air Service in France. This was necessary because the Americans were so far behind the Europeans in military aviation. It was a key strategic decision perfectly suited to the strategy of the French and British, who needed to build American partnership capacity to help win the war. The AEF assembled in France in the rear of the French Army, which had been at war for more than three years by the time American fighting units began arriving. French advisors helped train and equip all types of American combat units for frontline duty. In the case of aviation, most of the advanced pilot training for the Americans took place under French Air Service instructors, who usually could not speak English.[24]

To facilitate interoperability, General Pershing decided to copy French Army organizational structures. This influence still persists, most obviously reflected in today's numerical designation for staff organizations (A-1 for personnel, A-2 for intelligence, A-3 for operations, and so forth).[25] It is also why the USAF's organizational hierarchy goes from squadron to group to wing, unlike the British system, which goes from squadron to wing to group.[26] As the AEF grew in combat capability, it took over a progressively larger part of the French Army's front line, but always within the bounds of the larger French Army sector.[27]

Another of General Pershing's decisions was even more significant for the birth of US airpower. He decided that the AEF needed an air service separate from the Signal Corps. The American air force took its first step toward independence in 1917 in France, when it became the AEF Air Service. As one historian noted, "In making aviation a service branch, like the infantry or cavalry, Pershing had duplicated the existing Royal Flying Corps organization."[28] It would take another year before the Air Service won independence from the Signal Corps in the United States. President Woodrow Wilson ordered the War Department to establish the US Army Air Service on 20 May 1918.[29]

The final manning, training, and equipping of squadrons took place in France at organization and training centers. Pilots, aircraft, vehicles, tools, and a host of other equipment were joined together at these centers to form combat-ready squadrons. Depending on the type of aircraft and trained pilots assigned, the standard service aero squadron would be transformed into an observation, pursuit, or bombardment squadron. Once the disparate parts came together in the center, the squadron and group commanders would establish standard operating procedures and conduct collective training. This included formation flying and familiarization flights to just short of the front lines, usually defined by the friendly balloon line. When final preparations had been completed, and the squadron was combat-ready, it deployed to a frontline airfield to begin operations.[30] The aircraft sent to the squadrons at these organization and training centers were the results of Bolling's work.

The "Bolling Mission"

Bolling led a group of officers, technicians, and other experts (more than 100 personnel) on what became known as the "Bolling Mission" to Europe to determine what types of airplanes the United States should manufacture. They met with aviation officials in Britain, France, and Italy. As a result of these meetings, Bolling realized that American aviation technology was so far behind that it would be necessary, at least initially, to rely upon the European Allies for airplanes.[31] At this point in aviation history, the airplane reflected an immature technology, and unlike today, improvements were inexpensive and rapid. Also, the proximity of European aircraft designers and their factories to the battle area gave them a distinct advantage in turning out improved models based on combat experience.

As it turned out, American industry had so much difficulty producing acceptable warplanes that most of the AEF's airplanes came from foreign sources. It was a scandalous failure for the nascent American aircraft industry, especially given the huge aviation bill passed by Congress. This disgrace resulted in a series of congressional investigations after the war. Accordingly, it is no surprise that France, which had the largest aviation industry the world, supplied 80 percent of the AEF's airplanes.[32]

Bolling's aircraft purchases were of great consequence. As one historian noted, "The Bolling Commission actually played one of the most important roles in the war."[33] This is because the numbers and types of aircraft that he recommended for production in the United States, as well as those purchased from the Allies, would shape the air strategy in terms of the weight of effort for air superiority, observation, and bombardment.[34] The contract he negotiated with the French, known as the 30 August Agreement, in 1917, called for 875 training planes and 5,000 service-type aircraft. Since the war would be over in a little more than 14 months, these early decisions had significant impact. In the event, however, French manufacturers were unable to deliver on time, resulting in aircraft purchases from the Britain and Italy.[35] The table below illustrates the sources of frontline Air Service aircraft:

Table. Sources of Aircraft for the American Expeditionary Force Air Service in France

Source	Number of Aircraft	Representative Types
France	4,791	Nieuport 28, SPAD XIII, Breguet 14, Salmson 2A2
Britian	261	Sopwith Camel, SE-5
Italy	19	Caproni Bomber
US	1,216	DH-4

Sources: Irving B. Holley, *Ideas and Weapons*, 131; and John Morrow, *The Great War in the Air Military Aviation from 1909 to 1921* (Washington: *Smithsonian Institution Press*, 1993), 338.

General Pershing was so impressed with Bolling that he retained him in France, promoted him to colonel, and appointed him as chief of the Air Service's line of communications. In addition to aircraft procurement, Bolling was responsible for logistics, reception of aviation units, and pilot training. The other main part of the Air Service was called the Zone Advance, where the training and organization centers were located. Col William "Billy" Mitchell was in charge of it.[36]

Billy Mitchell

When Mitchell arrived in France, he was one of the senior officers in the Aviation section of the Signal Corps, but not yet a qualified aviator.[37] He was one of the rising stars of the Signal Corps, having been the youngest officer appointed to the Army's new general staff. One of his responsibilities before the United States entered the conflict was briefing the president and members of Congress on the developments in the European war. He became the deputy officer in charge of the Aviation Section to help "instill old fashioned discipline" in the section after a scandal occurred at the Signal Corps Aviation School in San Diego, California. During this period, he developed a rocky relationship with Foulois, who eventually replaced Mitchell when he left Washington for France shortly before the declaration of war. Mitchell's job was to observe how airpower was being employed in the war. Mitchell was one of the first members of the Aviation Section to arrive in France, just four days after the United States declared war on Germany.[38] Timing is everything, and Mitchell's timing was perfect.

Mitchell was well-suited for the job as an official observer because he spoke French, and the assignment provided an ideal stepping-stone to air command. He toured the front, took detailed notes, and learned about air strategy, tactics, and organization through repetitive visits with the French and British air commanders and their units.[39] Most importantly, Mitchell's job required him to systematically record, reflect on, and analyze what he had seen. "I was a different breed of cat from any of the others they had seen," he wrote in his hotel room at Châlons-en-Champagne after visiting a French pursuit group headquarters. "Deep into the night they could hear my typewriter clicking as I wrote up my notes."[40]

The colonel would become the AEF Air Service's senior operational commander, and he mastered the operational art from the Airman's perspective, most famously demonstrated in his orchestration of airpower for the Saint Mihiel offensive, the largest coalition air operation of the war. Mitchell's success provides a case study in learning and adapting.[41] Being an official observer required him to reflect on what he saw and clarify this thoughts through the process of writing reports. He continued this practice even when he was no longer an official observer, keeping a journal throughout the war. Daily writing supercharged his learning and disciplined his reflection. His systematic and disciplined approach to learning helps explain why a relative newcomer to aviation like Mitchell surpassed the more experienced Army aviators like Foulois to become the senior operational air commander.[42] Foulois taught himself to fly. Mitchell taught himself the operational art from the Airman's perspective.

During his period as air commander of the zone of advance, Mitchell did not command much of anything because squadrons had yet to arrive at the organization and training centers. Instead, he served mainly as a senior planner. Significantly, he developed the tables of organization for pursuit, observation, and bombardment squadrons using the 150-man aero squadron as his basic building block. He modified the French model discussed earlier, however, by following the British example of an 18-plane, 3-flight squadron.[43] This demonstrates how the AEF Air Service borrowed ideas from both the British and French. A similar synthesis would take place in the development of air tactics.

General Pershing had originally requested that Foulois accompany him to France to command the AEF's Air Service. The challenges of mobilizing an American air force, however, kept him stateside. By November 1917, mobilization was well underway, enabling Foulois to leave Washington. He arrived in France wearing the rank of brigadier general to assume command of the AEF's Air Service.[44]

Foulois brought his own staff and reassigned both Bolling and Mitchell to new jobs, removing them from key positions in the headquarters and replacing them with hand-picked officers who had accompanied him across the Atlantic. Mitchell was greatly embittered with this treatment: "A more incompetent lot of air warriors had never arrived in the zone of active military operations since the war began. . . . The competent men, who had learned their duties in the face of the enemy, were displaced and their positions taken by these carpetbaggers."[45]

Foulois's dismissal of Bolling and Mitchell was a colossal error. It further poisoned the poor relationship that had developed between them. More to the point, the veteran from the Punitive Expedition failed to transition from tactical to senior leadership, where building consensus with other senior leaders and peers is so important. In effect, his reassignment of Mitchell and Bolling decapitated the Air Service at a critical time when recently acquired institutional knowledge was more important than ever. The mobilization assembly line that began at Kelly Field was just then beginning to surge aero squadrons into France.

Foulois appointed Bolling as a liaison officer to the Royal Air Force. Bolling became the senior Airman killed in the war when his car was ambushed by a German patrol while he was attempting to visit elements of two American aero squadrons that were attached to the British. The Germans had just launched their long-anticipated spring offensive, and the front line had dissolved in that sector. Bolling was the most knowledgeable officer on aircraft procurement. His loss contributed to the unhinging of the Foulois regime.

Foulois assigned Mitchell to be the chief of Air Service, I Corps.[46] Although a personal setback, this "demotion" removed Mitchell just as a tsunami of administrative and logistical issues arrived at the doorstep of his successor. American aero squadrons were beginning to arrive in the zone of advance at various organization and training centers (pursuit, bombardment, observation), where they received their aircraft and equipment and were made combat ready before being assigned to the front.[47] In contrast, when Mitchell arrived at the recently created I Corps headquarters, it did not yet have operational control of any American combat units. He joined a headquarters whose staff was itself undergoing organization and training. As before, he did not command much of anything, but was perfectly situated to continue learning.

Like the other members of the staff, Mitchell conducted a study of his area of responsibility undistracted by the daily grind of command. This time he focused on the enemy: the organization, aircraft, and operations of the German air force.[48] Thus, by the spring of 1918, Mitchell had spent a year in France, developed plans for the tactical organization of the Air Service, and conducted in-depth studies of both the friendly and opposing air forces. He knew more about these subjects than any other senior American officer.

Mitchell also polished his flying skills. He arrived in France without the wings of an aviator, but the limited responsibilities of successive jobs enabled him to build on the flying lessons he began in the states. By then, he had become an accomplished pilot, even learning to fly America's first fighter, the French-made Nieuport 28, which was a difficult plane to handle because of the gyroscopic effect created by its rotary engine. In May 1918, he led a six-plane exhibition flight of 94th Aero Squadron's Nieuport 28s during an awards ceremony in which the commanding general of the French Eighth Army presented the *Croix de Guerre* to several officers of the 94th, including Eddie Rickenbacker, in recognition of their first victories against the Germans.[49]

In contrast, many of the experienced prewar Army aviators, such as Foulois and Col Robert Van Horn, who had replaced Mitchell as commander of the zone of advance, were so overwhelmed with the workload of building the Air Service that they simply could not devote time to learning to fly the latest combat aircraft. They could never lead by example as Mitchell did.[50]

While at Toul, Mitchell anticipated the establishment of an Army headquarters that would be needed to control multiple corps as American doughboys poured into France. He established a provisional air headquarters for First Army. As happened before to Mitchell in the zone of advance, however, he was removed from this position just as First Army was nearing activation.[51]

The deteriorating state of affairs in the Air Service, exacerbated by the earlier decapitation of its senior leadership, resulted in General Pershing dismissing Foulois. His replacement, engineer officer Maj Gen Mason Patrick, remembered the general describing the Foulois regime as "good men running around in circles."[52] As the dominoes fell, Foulois arrived at the provisional air headquarters for First Army and told Mitchell, "There's no use beating around the bush, Billy, I'm here to take over your office, your files, and your job. You are relieved as of this moment."[53]

First Battles

Yet again, this setback would ironically provide Mitchell the opportunity to further his study of air warfare, gain experience in a major coalition air operation, and surpass Foulois as the most important American air leader to emerge from World War I. By the end of May, Germany's last great offensive, launched in March, had reached Château-Thierry, only 40 miles from Paris. The resulting panic led to the piecemeal commitment of Soldiers and Marines to reinforce Sixth French Army, which was reeling back from the German onslaught. The Marines fought one of their most famous battles at Belleau Wood, and the Army's 3rd Infantry Division won the moniker "Rock of the Marne" for its stalwart defense along that river.[54]

After observing these initial battles, one of General Pershing's colonels observing the action sent a strongly worded report back to AEF headquarters: "I recommend that an observation and a pursuit squadron of aero planes be sent here to work with this division at [the] first opportunity. The Germans have control of the air and embarrass our movements and dispositions."[55] Consequently, General Pershing ordered

American aviation to the Marne sector along with the 1st Corps headquarters, which provided overall command for additional American units reinforcing the French.[56]

Despite their previous falling out (but also getting Mitchell away from the First Army sector), Foulois put Mitchell in command of 1st Air Brigade, a new organization created to accompany US reinforcements to the beleaguered Sixth French Army. Mitchell's command consisted of the 1st PG and 1st Observation Group (1st OG). The lines of authority were unclear. The 1st PG received its operations orders from the chief of the Air Service of Sixth Army, which was in overall command of the sector. That was logical because the American pursuit group replaced Sixth Army's former pursuit group, which had been practically shot out of the sky. The 1st OG, which directly supported 1st Corps with reconnaissance and artillery adjustment, took its orders from the corps.[57]

These unclear command relationships created a difficult conundrum for Mitchell's subordinates, who sometimes received orders from multiple headquarters. Lieutenant Roosevelt, the 1st PG operations officer, explained, "I had to spend a lot of time seeming to obey their orders while really making my own dispositions. . . . All our orders really came from the French—which [Mitchell] approved."[58] To be sure, the Army was still working out the nuances of command relationships between the pursuit and observation groups and the armies and corps they supported. This was made all the more difficult while fighting under French command. Today, we would we would call Mitchell a commander of Air Force forces, who had operational control of the US's 1st PG and 1st OG. He was supporting a French combined force air component commander, who had tactical control (TACON) of the 1st PG, while the 1st (US) Corps had TACON of the 1st OG. But these sorts of command relationships had yet to be created.[59]

Nevertheless, Mitchell's presence enabled him to organize a tactical headquarters, which he located adjacent to the air headquarters of Sixth French Army just as it was preparing to conduct the largest combined air operation of the war up to that time. The Marne campaign served as his postgraduate education in aerial warfare.[60]

Major Air Operations

Anticipating a renewal of the German offensive, Allied commander in chief (Marshal of France) Gen Ferdinand Foch assembled a large air force as a strategic reserve. It consisted of the French Air Division, the Royal Air Force 9th Brigade, and US 1st PG. The French Air Division was the largest single aviation unit of the war. Its two brigades represented 370 fighters and 230 bombers. The RAF's 9th Brigade provided an additional nine squadrons of offensive airpower. Added to that were the four squadrons of the US 1st PG.[61]

With his brigade headquarters collocated with the French Sixth Army air headquarters, Mitchell learned how to integrate multinational airpower in a large operation. Once the battle began on 15 July 1918, the combined forces established air superiority and attacked German crossing sites along the Marne. Air operations helped defeat the German army in the most decisive battle of the war, known as the Second Battle

of the Marne. Afterward, the Allies seized the initiative and never lost it. Germany would be defeated a few months later.[62]

Meanwhile, General Pershing finally activated the US First Army and was preparing for the Saint–Mihiel offensive. The stakes were high because the United States had yet to demonstrate the ability to campaign on the European battlefield. Realizing that Mitchell was his best and most experienced air commander, General Pershing returned him to the position of chief of Air Service of First Army, replacing Foulois who, to his credit, supported the decision and took a new job that focused on training and logistics.

First Army's mission was to reduce the Saint–Mihiel salient, a large bulge in Allied lines that had existed since the early days of the war. General Foch was eager for General Pershing to finish this attack quickly because he wanted the Americans to concentrate their main effort in the Meuse–Argonne sector, joining the French and British for the final offensives. Accordingly, he reinforced General Pershing with troops and enablers, especially artillery and aviation.[63]

The French, British, and even Italians provided air units to reinforce the American Air Service's 28 squadrons. The total force numbered 701 pursuit planes, 366 observation planes, 323 day bombers, and 91 night bombers, adding up to 1,481 aircraft for the largest air operation of the war.[64] In contrast to the Allied defensive battle on the Marne, Mitchell's plan supported an offensive operation and therefore took an entirely different approach. While American combat aviation operated within 3 miles of the front, Mitchell ordered the French Air Division to attack 12–20 miles behind enemy lines. By pressing the attack, he kept his enemy off balance and on the defensive, unable to interfere with the First Army offensive.[65]

Saint–Mihiel occupies a special place in airpower history, and not only because it was the largest single air operation of the war. The concentration of coalition air forces did its part in helping General Pershing to wipe out the salient and achieve a successful inauguration of American arms in continental warfare. Mitchell's example provided a vision for unity of command that would inspire Airmen long after he passed from the scene. His continued command for the upcoming Meuse–Argonne offensive was a foregone conclusion. Just before the end of the war, General Pershing made Mitchell chief of the Air Service for an Army group that would command First and Second US Armies.[66]

By the end of the war, the US air arm had grown from a handful of men with obsolete airplanes to a combat arm of the line. The AEF Air Service consisted of 14 groups—seven observation, five pursuit, and two bombardment.[67] Yet, the AEF Air Service represented only 40 percent of the total American air arm. Including what had been created in the United States, the Air Service had grown to more than 190,000 men and 11,000 aircraft.[68]

Although a separate service would not be created until 1947, America began embracing airpower long before the birth of the US Air Force. As we have seen, the foundations for a total force consisting of National Guard, Reserve, and active air forces had been established from the beginning. Although the American airplane production failed shamefully, the war helped launch an aviation industry that would grow to be second to none. The experiences gained by American Airmen stimulated a variety of visions about how airpower would change the character of future war,

and Mitchell emerged as the leading American theorist and foremost advocate for a separate Air Force and Department of Defense. Moreover, an era of air-mindedness unfolded because the advance of aviation technology stimulated by the war further inflamed the imagination and enthusiasm of the public. Indeed, the birth of American airpower in the Great War would transform the American way of war. ✪

Notes

1. Roger G. Miller, *A Preliminary to War: The 1st Aero Squadron and the Mexican Punitive Expedition of 1916* (Washington, DC: Office of Air Force History, 2003), 53; and Juliette A. Hennessy, *The United States Army Air Arm: April 1861 to April 1917* (Washington, DC: Office of Air Force History, 1985), 196.

2. Hennessy, *US Army Air Arm*, 5.

3. Bernard C. Nalty, ed., *Winged Shield, Winged Sword: A History of the United States Air Force 1* (Washington, DC: Air Force History and Museums Program, 1997), 10.

4. Herbert Malloy Mason Jr., *The Great Pursuit: Pershing's Expedition to Destroy Pancho Villa* (New York: Smithmark Publishers, Inc., 1995), 103–109; and John S. D. Eisenhower, *Intervention: The United States and the Mexican Revolution, 1913–1917* (New York: W. W. Norton, 1993), 254–257, 276.

5. James J. Hudson, *Hostile Skies: A Combat History of the American Air Service in World War I* (New York: Syracuse University Press, 1968), 6.

6. Benjamin Foulois, *From the Wright Brothers to the Astronauts: The Memoirs of Major General Benjamin D. Foulois* (New York: McGraw-Hill, 1960), 150.

7. Alfred Hurley, *Billy Mitchell: Crusader for Air Power* (Bloomington, IN: Indiana University Press, 1964), 17.

8. Foulois, *From the Wright Brothers to the Astronauts*, 146.

9. Joseph J. Corn, *The Winged Gospel: America's Romance with Aviation, 1900–1950* (New York: Oxford University Press, 1983), vii-viii.

10. Charles J. Gross, *The Air National Guard and the American Military Tradition* (Washington, DC: Historical Services Division, National Guard Bureau, 1995), 28.

11. Today known as the National Aeronautic Association, the Aero Club of America helped bring the Wright Brothers invention to the attention of President Theodore Roosevelt. See Foulois, 53.

12. Gross, *The Air National Guard*, 28.

13. "Bolling Won Fame as a Young Lawyer," *New York Times*, 16 April 1916, 1.

14. Gross, *The Air National Guard*, 26.

15. Hudson, *Hostile Skies*, 13; and Gross, *The Air National Guard*, 30.

16. Gerald T. Cantwell, *Citizen Airmen: A History of the Air Force Reserve, 1946–1994* (Honolulu, HI: University Press of the Pacific, 1997), 5.

17. Bert Frandsen, *Hat in the Ring: The Birth of American Air Power in the Great War* (Washington, DC: *Smithsonian Books*, 2003) 22–24, 31.

18. Henry Greenleaf Pearson, *A Businessman in Uniform: Raynal Cawthorne Bolling* (New York: Duffield and Company, 1923), 109; and Foulois, *From the Wright Brothers to the Astronauts*, 143–147.

19. Irving B. Holley, *Ideas and Weapons: Exploitation of the Aerial Weapons by the United States during World War I; A Study in the Relationship of Technological Advance, Military Doctrine, and the Development of Weapons* (New Haven, CT: Yale University Press, 1953; reprint Washington, DC: Office of Air Force History, 1983), 53.

20. Foulois, *From the Wright Brothers to the Astronaut*s, 141–148.

21. Bert Frandsen, "Learning and Adapting: Billy Mitchell in World War I," *Joint Force Quarterly* 72, (January 2014), 97.

22. Frandsen, *Hat in the Ring*, 10–11.

23. Ibid.

24. Frandsen, "Adapting and Learning," 97.

25. J. D. Hittle, *The Military Staff: Its History and Development* (Harrisburg, PA: Stackpole, 1961), 211.

26. See map, "Western Front," in Edward M. Coffman, *The War to End All Wars: The American Military Experience in World War I* (Madison, WI: University of Wisconsin Press, 1968, 1986), xv.

27. Frandsen, *Hat in the Ring*, 13.

28. Alfred F. Hurley, *Billy Mitchell: Crusader for Air Power* (Bloomington, IN: Indiana University Press, 1964), 30.

29. George M. Watson Jr., "United States Air Force: Organizational History," in *Air Warfare: An International Encyclopedia 2*: "United States Air Force: Organizational History," ed. Walter J. Boyne (Santa Barbara, CA: ABC–CLIO, 2002), 643.

30. Herbert Frandsen, "The First Pursuit Group in the Great War: Leadership, Technology, and the Birth of American Combat Aviation" (PhD diss., Auburn University, 2001), 49–52.

31. Holley, *Ideas and Weapons*, 53; and Hudson, *Hostile Skies*, 21.

32. For production in the United States, the Bolling mission selected the British DH-4 for observation and day bombing; British Bristol and French SPAD as fighters, and the Italian Caproni as a long-range night-bomber. Irving B. Holley, *Ideas and Weapons*, 59–60.

33. Hudson, *Hostile Skies*, 14.

34. Maj R. C. Bolling to the chief signal officer of the Army, Washington, DC, "Report of Aeronautical Commission," 15 August 1917, 7–8; Gorrell's History of the American Expeditionary Forces Air Service, 1917–19, series A, 16, RG 120, National Archives at College Park, Maryland; "Agreement of French Government dated 30 Aug. 1917," 3, Gorrell, series I, 28. See also, Pearson, *A Businessman in Uniform*, 146; Hudson, Hostile Skies, 22.

35. Ibid.

36. Hurley, *Billy Mitchell*, 32.

37. Frandsen, "Adapting and Learning," 96–101.

38. Ibid., Hurley, *Billy Mitchell*, 22.

39. James J. Cooke, *Billy Mitchell* (Boulder, Colorado: Lynn Rienner, 2002), 51.

40. William Mitchell, *Memoirs of World War I: From Start to Finish of Our Greatest War* (New York: Random House, 1928), 26.

41. Mitchell's published memoir probably represents his diary to a remarkable degree with little editing. Ibid., vi.

42. Frandsen, "Learning and Adapting," 98, 101.

43. Frandsen, *Hat in the Ring*, 11–13.

44. Foulois, *From the Wright Brothers to the Astronauts*, 156.

45. Mitchell, *Memoirs of World War I*, 165–166.

46. Ibid., 178.

47. Frandsen, *Hat in the Ring*, 8.

48. Mitchell, *Memoirs of World War I*, 179.

49. Ninety–fourth Aero Squadron Alert Log, National Air and Space Museum Archives, file 1247, 216.

50. Frandsen, "Adapting and Learning," 98.

51. Ibid., 99.

52. Mason Patrick, *The United States in the Air* (New York: Doubleday, Doran and Co., 1928), 16.

53. Foulois, *From the Wright Brothers to the Astronauts*, 172.

54. Bert Frandsen, "America's First AirLand Battle," *Air & Space Power Journal* (Winter 2003): http://www.au.af.mil/au/afri/aspj/airchronicles/apj/apj03/win03/frandsen.html.

55. Col Walter S. Grant to [Col Fox] Connor, 15 June 1918, in *United States Army in the World War* (Washington, DC: US Army Center of Military History, 1988), iv–490.

56. Frandsen, "Adapting and Learning," 99.

57. Frandsen, *Hat in the Ring*, 150.

58. 1st Lt Philip J. Roosevelt to his father, 8 July 1918, Philip J. Roosevelt Papers, the Family Collection of Philip J. Roosevelt II, Chappaqua, New York.

59. Thanks to Lt Col Jim Burlingame, USAF, Ret., LeMay Center, Doctrine Division, Maxwell AFB, AL for clarification on contemporary command and control relationships.

60. Frandsen, "Adapting and Learning," 99.

61. Ibid.

62. Ibid.

63. Ibid., 100.

64. Patrick, *The United States in the Air*, 27.

65. First Army Air Service, Operations Order 1, 11 September 1918, in *United States Army in the World War*, viii (Washington, DC: Government Printing Office, 1918), 216.

66. Frandsen, "Adapting and Learning," 100.

67. "Air Force History," *Military.com*, accessed 25 October 2017, http://www.military.com/air-force-birthday/air-force-history.html.

68. Lt Col Peter R. Faber, "Interwar US Army Aviation and the Air Corps Tactical School: Incubators of American Airpower," in *Paths of Heaven: The Evolution of Airpower Theory*, ed. Col Phillip S. Meilinger (Maxwell AFB, AL: Air University Press, 1997), 186.

Dr. Bert Frandsen

Dr. Bert Frandsen (PhD, Auburn University) is the deputy director of the Department of Leadership and Warfighting at the Air War College, where he teaches "Future Conflict and Air Warfare" and "Theater Strategy and Campaigning." He is also the exercise director for Global Challenge, a one-week war game conducted at the end of the academic year involving all faculty and students. His publications include *Hat in the Ring: The Birth of American Air Power in the Great War*, published by *Smithsonian Books*, which was selected in 2013 for the Chief of Staff of the Air Force Reading List. Dr. Frandsen previously served on the faculties of the Air Command and Staff College and Auburn University, and retired from the US Army after 20 years of service.

Formulaic Leadership

Ahistorical, Anachronistic, and Wrong for the Air Force

Capt Jeffrey C. Copeland, USAF

Every eight weeks, several hundred Air Force captains and some Department of Defense (DOD) civilians gather at Maxwell AFB, Alabama, for the five-week Squadron Officer School (SOS), a course that can be a defining moment in their careers. Some are sent off with some portentous words from well-meaning commanders, supervisors, and mentors that sound something like: "Now, Captain, remember that the Air Force puts a lot of value in superior performance in developmental education, and I don't have to tell you what being a distinguished graduate at SOS means for your career." The truth of such a statement is not lost on any officer, and understanding the meaning full well, those captains head off for Alabama for a leadership laboratory that is meant to challenge, inspire, motivate, mentor, and indeed, at the end, separate the wheat from the chaff.

In its current, abbreviated iteration (it was shortened from eight to five weeks in 2014), the SOS is a short course on Air Force heritage, history, and above all, leadership. In this, the SOS does a fine job given its temporal limitations (even the disaffected cannot escape the rebluing effect of Air Force professional military education [PME] for five weeks), and the Full-Range Leadership Model (FRLM) that forms the bedrock of much of the curriculum hits all the right touchstones of the human element of leadership. Similarly, the lectures that emphasize the hallmarks of history's greatest leaders, and the best of our airpower heritage, are without doubt the kind of curriculum that our future strategic thinkers need to get, and are characteristic of the courses offered by the Air Force.

However, the SOS stumbles in its devotion to metrics to determine success, and as I will argue, it is a problem that is not any fault of the SOS cadre, but rather one that is enmeshed in our fabric as a service. At the SOS, flights compete for top honors and earn points based on a number of team and individual events intended to offer objective metrics to select the best leaders from the best flights and identify some of the next generation of senior leaders. There is a disconnect, therefore, between what the SOS acknowledges through its academic curriculum as the right way to lead and the way it privileges the clever in selecting its best leaders, thereby

imprecisely highlighting the next generation of Air Force senior leaders, based on a dedication to numbers that, as we have done before, deceives us into thinking we are doing it correctly.

Thus, my primary contention is that the Air Force's understanding of what characterizes a leader, demonstrated by the way it privileges metrics to determine success and great leadership, is simply not supported by even a brief reading of history and its greatest leaders. The leaders I will highlight never resorted to a simple formula to determine success; rather, they understood that leadership requires that *people* be *led* and so, despite their shortcomings, became some of history's greatest. Furthermore, as I will argue, there are periods in our military history where simply associating a set of data points with leadership and victory has cost thousands, if not tens of thousands, of lives. Similarly, we err if we incentivize this variety of "leadership" in primary developmental education (PDE) by assigning yet another metric to determine future senior leadership potential. "Educating" captains as "future Air Force leaders" may be the first of the three-part SOS mission, but the education is in many ways a reinforcement of the mistaken notion that the best leaders are the ones who score the highest on tests, run the fastest or have the best stratifications. Leadership is an inherently *human* endeavor, and we go wildly astray to the point of risking the lives of our fellow service members to think that success in leadership can be distilled to mere figures.

Some might say, "He's just grumpy about not being a distinguished graduate (DG)." Hardly. I can't deny that I would have enjoyed the accolades, but I simply wasn't the guy, and those aren't my goals. Rather, my motivation is more on behalf of Chris, David, Matt, and many others—the great officers and leaders to whom flights at the SOS look and say, "That's who I would want as my wing commander," but who did not get a DG award they earned. I also realize this is likely to rile those SOS DGs who have benefitted from their distinction. I must emphasize that my goal is not to be inflammatory, but evocative, and to spark a conversation about how we view leadership as a service.

Currently, the SOS selects DGs, in part, by a calculation based on flight performance (11 percent), individual performance in team events (26 percent), academic events (21 percent), and peer (21 percent) and flight commander assessments (also 21 percent). The devil is in the details, however, for the DG allocation is not equally distributed among flights; the top-performing flights receive as many as three DGs while flights at the bottom get one or none. This first filter in the DG selection process consists of on-time written assignments (20 percent), physical challenges (29 percent), and team problem-solving events, or the "riddles" that I describe below (51 percent).[1]

This two-tier selection process that privileges mythical leadership situations in the ranking, therefore, means that outstanding leaders in poorly performing flights are not given the DG nod while top-performing flights get the preponderance of them with great shock that certain members received the distinction and an equal amount of shock that those officers would very possibly lead a squadron, group, or wing one day. Some will always "slip" through, but the way the current system rewards the cleverest flights by the weight assigned to these team riddles denies the great, *actual* leadership from outstanding officers in poorer performing flights.

Throughout my stay at the SOS, I kept asking myself, "What are we *really* learning here?" The academic curriculum has the right focus, but the leadership activities send conflicting messages about what leadership really is. As an example, flights compete in several "team leadership problems" (never mind the contradiction in terms), wherein they are given a riddle to solve in 15 minutes with no other input. Presumably, it is possible to solve these riddles in the allotted time, but almost comically, my flight never did, and accordingly was ranked near the bottom. Told that we weren't succeeding because we needed a better "process," a group, that otherwise got along and worked well together, walked away frustrated and were assumed to be a bunch of poor leaders for not having "team leadership" (whatever that is). Furthermore, it sent all the wrong messages relative to what the curriculum taught about decisive, strong, personal leadership. The takeaway for our future leaders, therefore, is that if a team just has a good "process," then it will be successful and earn all of the "points" in the real-world challenges they will face back in their units. There are a great many reasons to think otherwise.

The SOS actually comes tantalizingly close to the mark by emphasizing the most significant element of leadership—the human element. It makes a great deal of Bruce Avolio's FRLM, which emphasizes how leaders must realize that their people always require a different style of leadership for the organization to succeed, and significantly, there is no mention of figures or formulas to measure that success. Transactional leadership—a positive approach in which very specific standards are set and expected to be met—certainly has its place for achieving goals and meeting "a very broad range of performance outcomes," as Avolio asserts. Transformational leadership, however—the inspirational and intellectual stimulation a leader provokes in those he or she leads—creates breakthroughs, imbues the highest moral values in followers, and fully develops them as employees *and* people. Utilizing both kinds of leadership is pivotal, otherwise "leaders and those led would be limited in their ability to succeed."[2] Put another way, Avolio's list of transformational leaders includes Dwight Eisenhower, Mahatma Ghandi, Nelson Mandela, and Andrew Carnegie, notable for envisioning a better future, practicing empathy, self-sacrifice, developing independent followers, and not arbitrarily adhering to a formula or a process to measure success.

This, of course, contradicts the messages implicit in the SOS system of stratification and the overt messages conveyed by the flight commanders. The implicit *and* explicit message is that if a person could only devise the right kind of system or workable formula, he or she would have better success in most events. It is immediately obvious, of course, that to solve problems in a group in real life, one also has to do things that do not fit neatly into any kind of "process"—manage personality conflicts, massage egos, and incorporate all members of the team. These are the things that history's best leaders did so well. Furthermore, with the DG allocation biased toward flights that perform better on the team leadership problems and physical challenges, the top-performing flights are assumed to contain the better leaders when, in fact, they may just have a more fortuitous combination of riddle-solvers and runners. Because it is so entrenched in formal training that such metrics are the only way to determine success relative to one's peers, these metrics—not classic behaviors of great leaders—become the filter by which our next top leaders

are chosen. This is a part of our PME that begs to be changed in light of the lessons of history.

Doris Kearns Goodwin's comprehensive *Team of Rivals* captures the essence of transformational leadership in her characterization of Abraham Lincoln as a master of men. Indeed, to think that, like George Washington, he took the time to manage the petty squabbles of his cabinet members while also managing the nation's greatest existential crisis speaks volumes about his innate transformational leadership. As Goodwin says, his natural way with people enabled him

> to form friendships with men who had previously opposed him [as with Salmon Chase and William Seward, political "enemies" who Lincoln managed to bring into the cabinet based on their expertise rather than their conformism]; to repair injured feelings that, left untended, might have escalated into permanent hostility [as he did routinely in the early days of his presidency with Seward's very sensitive ego]; to assume responsibility for the failures of subordinates [as he did by taking the blame when conservatives cited Secretary of War Edwin Stanton for the failure of the Peninsula Campaign]; to share credit with ease [as he did routinely for his cabinet members and generals]; and to learn from mistakes [like he did after firing [George] McClellan and not hesitating to replace generals thereafter].[3]

Obviously, this was a transformational leader who saw victory, not through simple damage assessments or death tolls, but in relationships like the one with his unlikely best general, Ulysses S. Grant. Although Grant finished almost dead last in his class at West Point and failed at almost every civilian venture before the Civil War, Lincoln nevertheless gravitated toward him because, in the president's words, "he fights"—no small accolade in light of the heel-dragging McClellan who preceded him. Yet even with a track record of failure, Grant brought the mettle to the fight against Robert E. Lee's Army of Northern Virginia and the steadfast endurance that kept his men fighting and dying in the tens of thousands on the Peninsula Campaign to bring the war to an end. Even in victory, Grant was magnanimous enough to take stock in both the strength of his enemy and his own shortcomings: he acknowledged his regret over launching the Battle of Cold Harbor, while at Appomattox Courthouse he joyously declared, "the Rebels are our countrymen again," offered generous terms to Lee, and was eager to resume his friendship with his old West Point comrade, James Longstreet.[4]

If these examples are ancient history to Air Force readers who think I'm being anachronistic in my old-timey examples, let us consider an instance from our airpower past: the Anglo–American combined bomber offensive (CBO) against Germany in World War II. There is no doubt that the destruction the Eighth Air Force and Royal Air Force exacted on Germany in that campaign was unprecedented, but the numbers the US Army Air Forces (AAF) touted in the *United States Strategic Bombing Survey* (USSBS) show too great a concern with battle damage assessment metrics as a measure of its effectiveness. On the first page of its summary report, the USSBS boasted of the 2.7 million tons of bombs dropped, more than 4 million sorties flown, the 3.6 million German homes destroyed, and 300,000 civilians killed as evidence of "the scars across the face of the enemy, the preface to the victory that followed." Yet these impressive figures and the conclusion that "Allied airpower was decisive in the war" mask the shortcomings throughout the report: in aircraft

production, ball bearing, and rubber production, and the USSBS admitted that German production *increased* or had no effect, despite the bombs and Allied lives lost.[5]

Worse still, the Royal Air Force, also a party to the destruction and without an axe to grind about an independent air force, reached a rather different conclusion, noting that the CBO "clearly failed" to break the morale of the civilian populace and noted the "remarkable increase" in armaments production.[6] I do not intend to impugn the great leadership that existed at all levels of the Eighth Air Force that inspired men to continue flying in the face of such great peril, but the AAF's analysis ignored those cases in favor of its metrics as a measure of success. One could go on with examples of airpower advocates using numbers to argue for effectiveness in World War I when they clearly weren't or the fantastic dogfights over the Yalu River in Korea that did nothing to break the stalemate that had set in by 1950, but it should be obvious that this is a problem that has been with us from the start.

The most egregious case of an overdependence on metrics to determine success arises from the Vietnam War in the Lyndon B. Johnson administration and in the DOD under Secretary of Defense Robert McNamara. Well-known for his efficiency and a penchant for statistical analysis, McNamara quickly became the filter for the information from the Joint Chiefs of Staff (JCS) to the president, displaying his supreme loyalty to his boss by knowingly modifying reports to make the administration look good. With the president's complicity, he created a hostile environment between them and their military advisors that had catastrophic consequences for the Vietnam War. Surrounded by the "whiz kids" who formed his inner circle of advisors, McNamara marginalized the JCS, their decades of experience distrusted, suspected, and dismissed when they proposed courses of action based on military expertise rather than the figures the secretary preferred. Still expected to offer the professional military stamp of approval for the administration's military decisions, the JCS sat helpless while McNamara and his civilian coterie set about devising war plans based on the best odds of success or public reception, including the much-derided plan of "graduated pressure." Once the fighting had broken out in earnest, moreover, a belief in favorable kill ratios became the yardstick of success. When division commanders began criticizing their troops for an 18 to 1 kill ratio as too low, we can see how widely the whiz kids had spread their influence in the military, and how poorly a metric can determine real success, something that was not lost on contemporary officers.[7]

Ironically, North Vietnamese President Ho Chi Minh also thought about kill ratios as a yardstick, except in his formulation, 10 to 1 meant victory for the Vietnamese. Writing while imprisoned in 1942, Ho Chi Minh wrote regarding the impending conflict with the French, "If we have to fight, we will fight. You will kill 10 of our men and we will kill one of yours, and in the end it will be you who tire of it." Already looking ahead to the end of World War II, the North Vietnamese president was predicting the armed conflict that became the eight-year First Indochina War after France had gotten back its colony at the end of WWII. Indeed, Ho Chi Minh's words proved to be prescient not once, but twice. At the end of the conflict with the French in 1954, casualty figures were closer to "only" four Vietnamese dead to one Frenchman, it was the French who quit their colony, and it is well known that in

1968 when the war was turning badly for the United States, it was nevertheless meeting McNamara's 10 to 1 target, and therefore was tallied in the winning column in the Pentagon and Oval Office. Of course, we now know that assessment was, at best, a delusion of the secretary of defense, or, at worst, a willful deception to give an insecure president the information he wanted.[8]

Finally, the current SOS model that is meant to identify the best of the current generation only exposes the fissures in the aging, sagging structure of the promotion and personnel system from previous generations that is plain for all to see, even outside of the military. A fabulous article in *The Atlantic* by Lt Gen David Barno, USA, retired, and Nora Bensahel highlights the anachronistic system in place today that may have worked fine in decades past, but is at risk of chasing off a trove of highly talented millennial officers across the DOD, a phenomenon they dub a "brain drain." Because of its arcane and outdated adherence to shoehorning every officer into a command track and forcing fast risers to keep pace with their more steady moving peers for the first decade of service, the personnel system continues to choose the eminently understandable path of choosing from the widest possible pool, but at the cost of some of the best up-and-coming officers who are seeking the opportunities they desire elsewhere, out of the military.[9] One of the common complaints that Barno and Bensahel uncovered in their survey of DOD officers was the lack of opportunities to attend civilian graduate schools to earn degrees that have wide application both in and out of the military. The current paths to master's degrees through the Air Command and Staff College or the check-the-box online school simply don't command the same clout on the open market (something millennials appear to think about more than their predecessors). It is just one example, but it represents the desperate need for change in the current PDE and intermediate developmental education (IDE) options.

Clearly, there is room for improvement. If we continue to privilege metrics-chasing above known leadership qualities and alienate strong natural leaders in the process of selecting our next generation of senior leaders, we will fail at ensuring the best leadership makes it to the top. This is not a revolutionary idea (various authors have floated similar ideas in *ASPJ* before)and it speaks to the desperate need to reform not only the selection process at PDE, but also the officer promotion process writ large.[10] I must reiterate that I am taking aim at the SOS, not because it is a *bad* program; rather, it is only that while some officers get culled off for senior leadership, everyone learns the ahistorical, anachronistic, and ultimately incorrect lesson that the top 10 percent have been chosen in large measure because they had a better process. As I have argued, we should know better, and do better. I therefore propose the following recommendations:

1. *Change the selection criteria for the next generation of Air Force senior leaders.*

   It is obvious why the Air Force wants some kind of distinguished graduate program to continue: it creates a pool of officers who, in the eyes of promotion boards, are primed for senior leadership. School-selected below-the-zone promotions, and the stratifications that result from an SOS DG box being checked, are all the signposts along a career path that lead to promotion to O-6 and beyond—

things that all begin at the SOS where captains compete for the first time against their peers across the Air Force.

SOS (DG/Top Third)	
Flight commander	
MWS (IP, EP)	
Boarded Programs (WIC, PHOENIX, HORIZON, ELDP, Olmsted, and others)	
Exec/Aide (level)	
IDE (Complete/Select)	
Staff	
HAF	
Joint	
SDE (complete/select)	
Squadron commander	
AAD (Blank until meeting 0-5 promotion board)	

Figure. Force development ribbon chart. (An Air Mobility Command-developed force development ribbon chart depicting an SOS DG as a first "gateway" to promotion to higher ranks. That it ends with "AAD (advanced academic degree)" for promotion to O-6 suggests that those with all "green" boxes will have better odds at that board and beyond. The more accolades in those boxes are, of course, better than fewer or none.)

It is no mystery—indeed, it is shared openly at the SOS—that DGs are the school selects, who in turn get below-the-zone promotion to O-5 and O-6 and become the "shiny pennies" that get the jobs that groom them for senior leadership. A perfect example is the force development ribbon chart (figure above) published by various

career fields that demonstrates all the "check boxes" along the path to higher and higher promotion, and the first box is naturally an SOS DG. My suggestion is not to eliminate the SOS DG program, but to change it in a way that better ensures our future leaders are those who embody the qualities of history's most successful leaders and the FRLM that the Air Force touts.

This suggestion is not as radical as it may seem; I am merely suggesting that the criteria used to select SOS DGs be changed to privilege peer evaluations over the weight assigned to the fictitious "leadership" problems and physical challenges. This is not a popularity contest; quite the contrary, four- to seven-year captains have led enough and experienced enough good and bad leaders to know a real leader when they have worked and lived with one. Furthermore, there is already a mechanism for this built into the SOS stratification system: the criteria flights use to nominate the "greatest contributor" are remarkably similar to what I have argued are historically verified features of superior leaders—an ability to engage in deep thought on challenging issues and solicit and engage the opinions of others to reach a carefully reasoned solution. In other words, the officers selected for this award have the right balance of interpersonal skills, emotional quotient, and assertiveness that history has shown to make a great leader. I propose that this become the greatest weight in a vastly more simplified SOS scoring system: each flight could select three of these officers, and the flight commanders would either validate or veto the nominations (the latter only with a strong reason seconded by the student squadron commander and create a pool from which the DGs would be selected).

The system is not purely subjective (and perhaps to indulge our service's penchant for numbers), about half of this pool of nominees would be filtered out to select the top 10 percent of SOS students using the metrics of graded individual performance on briefings, written assignments, and so forth. The final product, therefore, would be the "whole package" officer—one who is respected by his or her peers as a friend, confidante, and leader, who has outstanding written and oral communication skills, and can exercise the FRLM naturally and effectively like the Air Force wants its leaders to do.

2. *Create joint and civilian SOS alternatives that develop strategic thinkers earlier in an officer's career and will entice millennial officers who desire options in their career.*

   At a course that introduces strategic thinking to tomorrow's leaders, there is very little said about how the other services approach leadership. Furthermore, when the top graduates from this course go on to senior leadership, gaining a joint perspective earlier than the mid-to late-career IDE is of pivotal consequence for tomorrow's leaders. The reality is that more officers are interacting with other services earlier and earlier in their careers anyway, so for as much benefit as there is for captains to interact at a deeper level across career fields at the SOS, adding Army, Navy, and Marine O-3s would be a huge boon to developing better strategic thinkers earlier. This notion is not new, and has been argued in *Joint Force Quarterly* to incorporate joint curriculum into existing PME for DOD O-3s.[11] I propose to go a step further.

Integrating a handful of captains into applicable Army captains' career courses and portions of Marine Expeditionary Warfare School will also create better joint thinkers earlier in an officer's career, and those chosen for in-residence joint PDE will go on to diffuse the joint leadership lessons they learned at the other services' PME. Because it would be difficult, impractical, or impossible for these officers to compete for distinguished graduate in Army or Marine courses, the officers selected for this joint PDE should be standouts among their peers with the *potential* for command and senior leadership, and a joint PME credit should reflect this on the member's records. To ensure these participants still get the desired amount of "blue" in their PDE, SOS by correspondence should be a prerequisite.

Furthermore, there are a number of top universities like the Massachusetts Institute of Technology and Oxford that already offer one- to four-week summer courses for working professionals on history, leadership, management, and other professional development topics. I propose to allow officers to take the initiative on attending one of these programs as an alternative to SOS, similar to the way the Air Force grants equivalency credit for ACSC for various Air Force Institute of Technology and Education with Industry programs. A cost of $27 million will permit 1 in 10 company grade officers (CGO) to attend such schools.[12] At present, the Air Force spends north of $63 million on tuition assistance per year,[13] and for officers whose AAD completion is masked to the O-6 board, and who have ample opportunities through Air University to complete a free master's degree, tuition assistance for online degrees at for-profit universities is plainly unnecessary and could be an easy source of this funding. Tuition assistance for enlisted members should clearly continue, untouched.

Even if the whole $27 million simply gets added as a new line item, the additional 2.7 percent increase to the Air Force's training budget and a mere .06 percent to the Air Force's fiscal year 2017 budget would pay enormous dividends to the officer corps in just a few years.[14] Those CGOs would get the same kinds of leadership training at these civilian institutions, but with the added benefit of top officers (like the joint basic developmental education option, participation in this program should be predicated on future leadership potential) acting as the "face" of the Air Force to a civilian populace increasingly unfamiliar with its military.[15] Again, history serves as a guide, since there is a strong correlation between leadership ability in wartime and formal schooling in civilian, Army, and Navy schools. For example, flag officers like General Eisenhower, Fleet Adm Chester W. Nimitz, and Gen George Patton, and 74 percent of corps commanders in World War II spent at least 10 years in the 2 decades preceding 1941 in professional schools, including 200 graduates from the Harvard Business School.[16] Lt Gen H. R. McMaster comes to mind as a recent example. We could earn a similar return on investment by broadening our scope at the lowest level of officer PME.

This article ends with a lament and a hope. Like Barno and Bensahel's argument, the lament is that new, fresh ideas that have the potential to transform our services for the better often struggle to gain traction under the crushing weight of military bureaucracy. On the one hand, retaining the best and brightest and ensuring they get promoted to senior leadership is increasingly difficult under the current system for this generation and is situated to alienate and push out those we should want to promote the most. On the other hand, my hope is that the encouragement from our

senior leaders to innovate and improve is not simply talk; that someone, somewhere, will relax the bureaucratic stranglehold on change enough to improve our dearly loved Air Force and the DOD by changing the methods by which we choose our next generation of leaders. In the process, we will also raise the next generation of leaders at all levels to have a better understanding of the fundamentally human endeavor that leadership is, and how to think deeply on critical issues rather than bungling ahead with a pretty formula in hand, thinking it will offer success because, well, the numbers just add up. ✪

Notes

1. Squadron Officer School (SOS), *Student Evaluations and Guidebook* (Maxwell AFB, AL: SOS: Air University, 5 June 2015), 4–5.

2. Bruce Avolio, *Full Range Leadership Development*, 2nd ed. (Los Angeles: SAGE, 2011), 49.

3. Doris Kearns Goodwin, *Team of Rivals: The Political Genius of Abraham Lincoln* (New York: Simon and Schuster, 2005), 17.

4. Shelby Foote, *The Civil War: A Narrative, Red River to Appomattox* (New York: Vintage Books, 1986), 951.

5. *The United States Strategic Bombing Survey* (Maxwell AFB, AL: Air University Press, 1987), 6.

6. Sebastian Cox, ed., *The Strategic Air War Against Germany, 1939–1945:* Report of the British Bombing Survey Unit (London: Frank Cass, 1998), 79.

7. Gregory Daddis, "No Sure Victory: Measuring U.S. Army Effectiveness and Progress in the Vietnam War," (PhD diss., University of North Carolina, 2009), 319–20.

8. My thoughts on Vietnam are shaped principally by Mark Philip Bradley's *Imagining America and Vietnam: The Making of Postcolonial Vietnam, 1919–1950* (Chapel Hill: University of North Carolina Press, 2000); and H. R. McMaster's *Dereliction of Duty: Johnson, McNamara, the Joint Chiefs of Staff, and the Lies That Led to Vietnam* (New York: Harper Perennial, 1998).

9. David Barno and Nora Bensahel, "Can the Military Halt Its Brain Drain?" *The Atlantic*, 5 November 2015, https://www.theatlantic.com/politics/archive/2015/11/us-military-tries-halt-brain-drain/413965/.

10. Indeed, another thoughtful captain first sounded the generationally-minded caution about the SOS in 2001; see Alison Iverson, "Professional Military Education for Company Grade Officers: Targeting for 'Affect,' " May 2001, http://www.au.af.mil/au/afri/aspj/airchronicles/apj/apj01/sum01/iversen.html.

11. Rhonda Keister, Robert Slanger, Matthew Bain, and David Pavlik, "Joint PME: Closing the Gap for Junior Officers," *Joint Force Quarterly* 74, July 2014, http://ndupress.ndu.edu/Portals/68/Documents/jfq/jfq-74/jfq-74_65-71_Keister-et-al.pdf.

12. Air Force Personnel Center, "Regular Officer Career Family Career Field Rank Gender as of January 2017," accessed 15 February 2017, http://www.afpc.af.mil/Air-Force-Demographics/. This document shows about 34,000 company grade officers, and tuition and travel costs are estimated at $8,000 per traveler.

13. Air Force Operation and Maintenance I, fiscal year (FY) 2017, 512–521, http://www.saffm.hq.af.mil/Portals/84/documents/FY17/AFD-160205-032.pdf. Total enrollments in tuition assistance programs in FY 2017 is planned for 252,617, and $250 per "enrollment" puts the total at more than $63 million.

14. Air Force Financial Management and Comptroller, "FY16 Pocket Guide," http://www.saffm.hq.af.mil/Portals/84/documents/FY16/AFD-150202-046.pdf. Using FY 2016 figures, the Air Force's O&M budget of $47 billion and its training budget of $1 billion yields these figures from $27 million.

15. James Fallows, "The Tragedy of the American Military," *The Atlantic*, January–February 2015, https://www.theatlantic.com/magazine/archive/2015/01/the-tragedy-of-the-american-military/383516/.

16. Edward Coffman, *The Regulars: The American Army, 1898–1941* (Cambridge: Harvard University Press, 2007), 280–87.

Capt Jeff Copeland, USAF

Captain Copeland (BA, Arizona State University; MA, University of Nevada–Reno) is an executive officer, assistant professor of history, and T-53A instructor pilot in the Powered Flight program at the US Air Force Academy where he teaches courses on military, world, and American history. He has published topics of race and religion and is coeditor of *The YMCA in Wartime*, forthcoming with *Lexington Books*.

Creating Shared Culture in Merged Organizations

CMSgt Jose A. LugoSantiago, USAF

The question is not whether we will have culture. The responsible question is, what type of culture do we want to have? That's why our actions must be deliberate in shaping outcomes into the culture we want to have.

—Maj Gen Bradley D. Spacy, USAF
Commander, Air Force Installation and Mission Support Center

Senior leaders and members of Air Force organizations do not have to be corporate scientists to realize the perils and opportunities that come with organizational mergers and centralizations. The Air Force has seen a few of them. For example, in 2012, the Air Force Materiel Command (AFMC) reorganized, merging 12 centers into 5, as part of its response to a Department of Defense challenge to find efficiencies and save tax dollars. Among several gains, operating efficiency for the command netted more than $109 million per year through reduced overhead alone.[1] In late 2014, the Air Force reorganized the Air Force Intelligence, Surveillance, and Reconnaissance Agency under the Air Combat Command (ACC) and additionally invested in the largest organizational change in more than 20 years by consolidating major installation and mission support functions into one center: the Air Force Installation and Mission Support Center (AFIMSC). This latest consolidation moreover merged 6 independently-led field operating agencies into the AFIMSC, eliminating more than 3,459 personnel in headquarters throughout the Air Force.[2]

The initiatives described above were massive, and the Air Force had the expectation to reap the benefits, not just in cost savings, but also in the potential development of unique synergies formed by the mergers. Merging organizations must seize opportunities in austere budgetary times. However, once the merger is finalized, that newly formed organization becomes a cluster of potentially mismatched cultures, such that, at times, clashes and dysfunctional silos are formed, inhibiting collaboration, innovation, and a sense of pride and belonging. One of the most significant things leaders must do is to create a *shared* culture in the newly-merged

organization. A shared culture makes that organization become alive, as it fuses the organization into one entity.

As General Spacy emphasizes in the quote above, culture will happen, but leaders have a choice to make: to either let culture happen and get whatever comes or build a shared culture that will bind the different parts of the organization together. The fact is that today many Air Force organizations do not have a shared culture; this problem is the hidden enemy and foe of potential gains in collaboration, innovation, unit cohesion, and mission effectiveness. Here, we begin an argument for shared culture by exploring the impact of culture in merged organizations. Next, we begin to build a framework for shared culture in organizations by composing a working definition and then moving to an exploratory view of shared culture. Having this clear understanding, we build a framework for organizational culture that aims at the creation of a shared culture.

Culture Defined

Scholars define culture in many ways. Organizational development experts Ken Hultman and Bill Gellerman wrote about culture as "the beliefs, values, and norms that shape 'the way we do things.' "[3] Organizational culture and leadership expert Edgar Schein described culture as "the foundation of the social order that we live in and of the rules we abide by."[4] Social order, he explained, is about learned behavior in the realms of perception, feelings, and actions toward others. Schein continued to note that social order is about what we have learned and rules are the mechanisms that aid in predicting human behavior. Others define culture as the "socially constructed attribute of organizations . . . the social glue that binds the organization together."[5] In simple terms, and for use within the context of this article, we will define culture in the following manner: Culture is what we collectively think and believe. Culture is what we repeatedly say and habitually do. Culture is also what members in an organization will collectively feel. In short, culture is the beliefs, habits, sense and feel of an organization.

Ignoring Culture is Abating Any Potential for Success

No senior leader today will deny that the current fiscal realities and the volatile global landscape are enough reasons to carefully think about the viability of their enterprises. In public and private sectors, the merger (and/or centralizations) has been a means from which companies have sought viability, a way to increase growth and accomplish target improvements in revenue.[6] Mergers, as the consolidation of two organizations into a single organization, have also been sought as a way to consolidate capabilities, improve effectiveness, generate cost savings and a broader access to technology, and make better use of capital investments.[7] Extensive work, brainpower, and careful analysis on a myriad of complex issues all happen as a result of a merger decision. A testimony to the complexities and enormous work effort that goes into a merger are the just-mentioned examples of the AFMC, AFIMSC, and ACC. Furthermore, there are the congressional processes that led to

the authorization to merge, the standup of the new organizations, and the subsequent years optimizing and accounting for the new organizations' progress.

Once the decision for a merger takes place, the typical inclination of leaders in both the private and public sectors is to begin a series of change-management initiatives. Leaders think, again in careful detail, how they will manage change, so the organization can meet the strategic objectives of the merger. Change experts Kim S. Cameron and Robert E. Quinn observed that total quality management (TQM), downsizing, and re-engineering initiatives were the most common organizational change initiatives implemented in the last two decades to manage integration and increase organizational effectiveness.[8] Although presently many see TQM as an outdated paradigm, its offshoots—for example, Six-Sigma's define, measure, analyze, improve, control (DMAIC), Lean Theory, and Theory of Constraints—have been deployed by managers with mixed results. Those initiatives seem as the logical next steps in the perfect management doctrine. The initiatives are also ingrained and studied as gospel in every master of business administration program in the nation and abroad. In short, then, they should work, right?

Despite the best analysis leading up to a merger, the merger itself, and the application of careful change management initiatives, mergers do not always meet the promised success. Mike Schrader and Dennis R. Self indicated that mergers and acquisitions research pointed to a range of failure that rests between 55 to 70 percent (companies not meeting their anticipated purpose).[9] Renounced examples of merger failures are the multibillion dollar merger between automobile giants Daimler–Benz and Chrysler,[10] and that of US Internet service providers AOL and Time Warner, whose stock traded at more than $70 per share premerger in 2000 and dropped to an unprecedented $12 per share postmerger in 2003.[11] In both previously mentioned examples, culture was named as a major factor for these failures.[12] Would this be any different in the Air Force? In 2002, several USAF leaders saw the Air Force grow into a "confederation of technical and specialized subcultures,"[13] and today those technical and specialized subcultures have grown into strong functional silos that continue to resist and oppose integration.

One could also think that if, after Herculean analysis and think-tank strategy the decision to merge organizations did not work, then fault could be found in how organizations implement the popular change management initiatives previously mentioned. Research performed about Fortune 500 companies—including 584 firms, spread over four industries, and more than 1,245 companies in Europe—suggested that despite the best efforts in those companies and industries, the lack of attention to culture (or leadership's inability to modify the organizational culture) was the key factor in the unsuccessful implementation of the initiatives.[14] Could any leader say that this would be different in the Air Force? One must go back to 1993 to see the effects of implementing Quality Air Force and recall how the program withered and died because of a culture that could not sustain it, and although Air Force Smart Operations for the twenty-first century did better, it struggled and was migrated into the more-known continuous process improvement, another great and needed initiative.[15]

Moving Toward Shared Culture

Can we fabricate culture? Viktor Frankl, a famous psychologist and survivor of the Nazi death camps in Germany during World War II, wrote about success in his book *Man's Search for Meaning*.[16] He wrote that success is not something one can aim at; the more one aims at it, the more one will miss it. That's because success—just like a flower—must ensue naturally as the almost unintended consequence of doing the right things; providing the plant a fertile ground, giving it the right exposure to sunlight, and giving it the right amount of water.

Growing a shared culture in an Air Force organization is the same way. Leaders lead themselves into doing what is right in thought, word, and conduct so they can have what the culture leaders want in an organization. When leaders lead themselves, they inaugurate acting in ways that match those beliefs and thought patterns. Even more so, the communication and language that leaders use follows as a natural execution of their personal inner leadership qualities, creating alignment among their thoughts, words, and actions—all the while growing an empowering trust in the organization. Collective norms will then begin to form as members of the organization see and learn those behaviors as the acceptable patterns of conduct, especially when such behaviors emerge from leaders (titular or nontitular leaders). Without much thinking, as those modes of being are rewarded and matched with memories of emotional events, members in the organization begin to form collective memories. They then begin to relive those memories, adapt and practice their values and habits until they become the normalized pattern of the organization. Gen Stanley McChrystal, et al., also termed this action-norms-culture evolution as shared consciousness, a collective, normative, and accepted pattern of acting in ways we deem right in the organization.[17]

> *Your actions speak so loud that I can't hear what you're saying.*
> —CMSgt David Popp, USAF, Retired

In this culture formation, as the product of a collection of people's inner thoughts and outward expressions, one must consider the dimension of values and beliefs. In 1998, as an instructor at the Airman Leadership School at Ramstein Air Base, Germany, one of our frequent guest speakers would come to talk to our students. He would sit down with the students to talk about the effects of values-driven leaders. Each of his lectures started with the quote above. There's so much truth in it. When leaders value something, their actions show it. For example, a leader who values people's feedback will most likely listen attentively to a subordinate's concerns. If in the leader's core, she respects her subordinate's feedback, the leader will most likely refrain from interrupting while the subordinate is speaking, and so forth.

Values and beliefs drive human behavior. They are as old as humankind; the Old Testament paints a picture of what we believe is fair and just: "You shall not bear false witness against your neighbor."[18] In organizations, the values of people shape organizational behavior and the very direction of those organizations. We all under-

stand that not everyone comes into a given organization with the same values and core beliefs, but, over time the normalization process mentioned previously (action-norms-culture evolution) takes place in some form. The challenge for leaders is to collectively act in ways that promote the normalization of the values and core beliefs they envision for their organizations. Research has highlighted that common values, as well as practices, were the instruments that held organizations together.[19] In relation to building a shared culture, having a core set of shared values and beliefs is a powerful force in the creation of a culture that makes mergers successful.[20] What values, then, should leaders pay attention to and emulate?

Alignment of Values to Strategic Intent: Creating the Culture Framework

Leaders must act as the architects of culture. As the architects, leaders must be guided by a clear strategic intent, demonstrating and eliciting behaviors in the members of the organization that reflect the values that make the strategic intent possible. In other words, leaders align themselves to the business strategic intent, not only in words but, more importantly, in action. Then, leaders construct the framework that produces behaviors reflecting their ideal organizational values. Leadership behavior in creating a shared culture is important because it is the most influential factor in institutionalizing ethics and values that later become part of the organization's culture.[21]

Here is an example that can better describe the point above. General Spacy, the AFIMSC commander, delineated the strategic intent for the organization. Next, the leader demonstrated and communicated the values inherent in the strategic intent, as you see in table 1. Once the values were understood, the leader created the culture framework that would provoke the behaviors, reflecting the values embedded in the strategic intent.

Leaders' Strategic Intent

- "I intend to help commanders produce overwhelming air, space, and cyber-space power for America. We will do this by using innovation to maximize limited resources and provide world-class Installation and Mission Support (I&MS) personnel and combat platforms. We will not compromise standards.

- "I intend for all AFIMSC personnel to be empowered to act commensurate with their position. This means everyone is responsible for being informed and active throughout the enterprise. Do not wait to be asked for your opinion–give it!

- "I intend for AFIMSC to be a leader in developing future operating concepts by using our unique enterprise-wide view and cross-functional perspective to create agile combat options. We will develop our enterprise and capability so that we can stand at the map and help design the plans that will keep America safe.

- "We will foster a culture where we live the war fighter ethos. We are war fighters supporting war fighters."[22]

Table 1. Values alignment to commander's mission, vision, and intent

Values	Behavior in the mission, vision, and commander's intent
Integrity	Will not compromise standards
Service	Help commanders produce air, space, and cyber space power; do not wait; informed and active in the enterprise; will keep America safe
Excellence and innovative thinking	Agile, using innovation, maximizing limited resources; providing world-class I&MS
Trust	Do not wait—give it! Provide combat power
Empowerment and courage	Empowered to act; stand at the map
Teamwork and collaboration	One team, networked, enterprise-wide view, Using cross-functional perspective
Responsibility	Be a leader in developing future operating concepts
Responsiveness	Help commanders produce overwhelming power; create agile combat options, deliver combat support culture where we live war fighter ethos
Warfighter ethos	We are war fighters

A culture framework can take several shapes, but we offer the following. Dr. Ira Levin developed a "Five Windows into Organization Culture" model that serves as both assessment and culture approach.[23] The model visits organizational culture through a view of five areas: leadership, norms and practices, stories and legends, traditions and rituals, and symbols, as displayed in table 2. The practitioner, by looking through those windows, can discover the culture of the organization. Those windows, when combined with the values alignment exercise, can also act as zones where leaders can work from, and begin movement toward, a shared culture. For example, a leader can begin the process by asking questions and assessing the responses in each of the zones. In window 1, what leadership actions can produce the behaviors that reflect the values' alignment to the strategic intent? In window 2, what norms and practices can best produce the behaviors that reflect the values' alignment to the strategic intent? The same exercise can be done for the other three windows.

Table 2. "The Five Windows": a map for directing cultural inquiry

Window	Examples of inquiry methods
Leadership	Founders, current leader, organizational history
Norms and practices	Unwritten rules of conduct, how decisions are made, what are the important policies
Stories and legends	Key stories/legends, crisis averted, the heroes and their attributes
Traditions and rituals	Ceremonies and what they convey, key rites and how they are conducted
Symbols	Organization charts/position titles, slogans, logos, office design

Source: Ira M. Levin, "Five Windows into Organizational Culture: An Assessment Framework and Approach," *Organization Development Journal* 18, no. 8 (2000), 86–91.
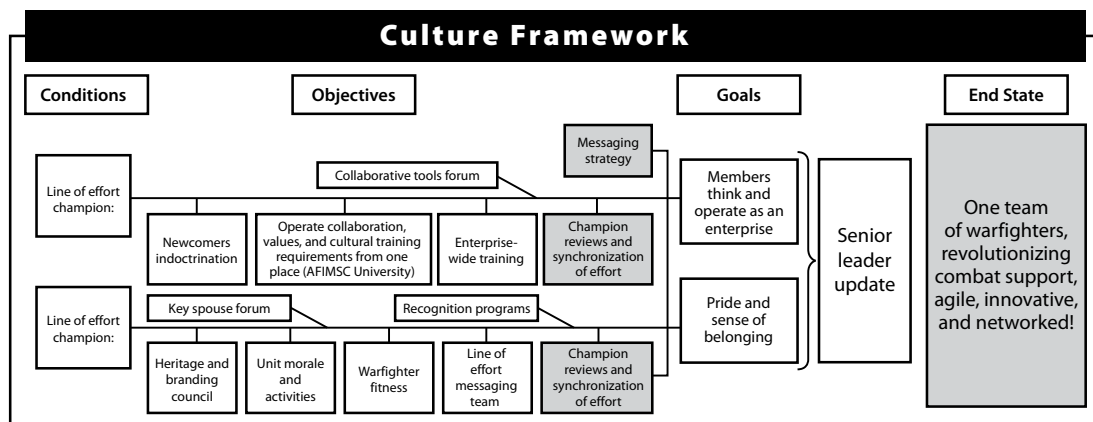
Dr. Levin's approach can be combined with a typical business operational approach to produce a more robust framework for culture. In an operational approach, strategic goals are decided, champions for each goal are selected, and activities that meet the strategic goals are aligned with each strategic goal creating lines of effort. Using this approach increases collaboration, gives leaders visibility over the organization's culture efforts and enforces culture-embedding mechanisms. Research has shown that embedding mechanisms (table 3) become the visible artifacts of the emergence of culture.[24] Embedding mechanisms are also the most powerful ways leaders can support and reinforce a collective message of what are the most important behaviors in the organization.

Table 3. Primary and secondary culture embedding mechanisms

Primary embedding mechanisms	Secondary embedding mechanisms
What leaders pay attention to, control, measure, and control on a regular basis	Organization design and structure
How leaders allocate resources	Rites and rituals of the organization
Deliberate role modeling, teaching, and coaching	Design of physical space, facades, and building
How leaders allocate rewards and status	Stories about important events and people
How leaders recruit, select, promote, and excommunicate	Formal statements of organizational philosophy, creeds, and charters

Source: Edgar E. Schein, *Organizational Culture and Leadership*, 4th ed., (San Francisco, CA: Jossey-Bass, 2010), 235–57.

The vehicle for those embedding mechanisms in the culture framework is the lines of effort, focused and tied to no more than four culture strategic goals. Champions for each line of effort would periodically update the most senior leaders. A communication strategy and feedback loop would allow the organization to understand what is happening in the enterprise regardless of where they are in the organization.

Figure. Culture framework using an operational approach

The figure depicts this framework, embedding some of the elements from Dr. Levin's approach, that is, the leadership window (senior leader update and champions), norms and practices window ("members think and operate as an enterprise"), symbols (branding), and so forth. This is not all encompassing but presents a good starting point for leaders who must become culture architects.

Conclusion

In the public and private sector, mergers have been a means from which companies have sought viability, a way to increase growth, and accomplish target improvements in revenue. In the Air Force, mergers and centralizations have been sought, among many reasons, as a means to find efficiencies, focus organizational core businesses, and save tax dollars. Nevertheless, neglecting culture will impede a newly-merged organization's path to success. Several comprehensive studies have cited the number one reason for failure in mergers and centralizations as a neglect of the organization's culture. Even proven and popular change management initiatives like re-engineering, downsizing, TQM principles, the DMAIC, or other more modern management change approaches cannot compensate for the neglect and the ensuing failures. Senior leaders must, therefore, understand, care, and build shared cultures in their organizations.

Although many definitions may exist, culture was defined to give the reader a deeper view of the elements involved in culture. Collective thinking, beliefs, what members in an organization repeatedly say and do, are all part of the organization. Then, culture becomes the beliefs, habits, sense, and feel of an organization. Shared culture is not an accident. It must ensue as the collective effort of the normalization of values, beliefs, and human behavior. Shared culture ensues when it is a deliberate effort from all members of an organization, with leaders at the helm, acting as the architects of the cultural effort. Leaders must be guided by a clear strategic intent, demonstrating and eliciting behaviors from the members of the organization that reflect the values that make the strategic intent possible. Then, leaders construct the framework that produces behaviors that reflect ideal organizational values.

A working framework for developing shared culture is the intersection between a business operational approach and Dr. Levin's Five Windows model. This new structure aligns behaviors to the business strategic intent. It also pays attention and enforces culture-embedding mechanisms using lines of effort that are tied to culture strategic goals, and furthermore driven by champions who can assess the activities' alignment to the Five Windows and contribution to strategic goals. This article presented a culture roadmap; it is not all inclusive but comprehensive nevertheless. It leads us toward a common construct wherein organizational leaders become architects of success for their organizations and their people. ✪

Notes

1. "AFMC ready to transition to 5-Center Construct," *Air Force Material Command News*, 18 June 2012, http://www.afmc.af.mil/News/Article-Display/Article/153631/afmc-ready-to-transition-to-5-center-construct/; and "AFMC 5-center Construct Reached Full Operational Capability," *US Air Force News*, 22 October 2013, http://www.af.mil/News/Article-Display/Article/467334/afmc-5-center-construct-reaches-full-operational-capability/.

2. *US Department of Defense (DOD) News* Press Operations, Release No: NR-370-14, "Air Force Announces Changes to Headquarters Organization," *US DOD News*, 14 July 2014, http://www.defense.gov/News/News-Releases/News-Release-View/Article/605080/air-force-announces-changes-to-headquarters-organization.

3. Ken Hultman and Bill Gellerman, *Balancing Individual and Organizational Values: Walking the Tightrope to Success* (New York: NY: Jossey-Bass/Pfeiffer, 2002), 70.

4. Edgar E. Schein, *Organizational Culture and Leadership*, 4th ed., (San Francisco, CA: Jossey-Bass, 2010), 3.

5. Kim. S. Cameron and Robert E. Quinn, *Diagnosing and Changing Organizational Culture: Based on the Competing Values Framework*, 3rd ed., (San Francisco, CA: Jossey-Bass, 2011), 18.

6. Mahak Pervaiz and F. Zafar, "Strategic Management Approach to Deal with Mergers in the Era of Globalization," *International Journal of Information, Business and Management* 6, no. 3 (2014), 170.

7. Mike Schraeder and Dennis R. Self, "Enhancing the Success of Mergers and Acquisitions: An Organizational Culture Perspective," *Management Decision* 41, no. 5 (2003), 511.

8. Cameron and Quinn, *Diagnosing and Changing*, 11.

9. Schraeder and Self, "Enhancing the Success," 511–22.

10. Pervaiz and Zafar, "Strategic Management Approach," 174–75.

11. Geoffrey Colvin, G. "Time Warner, Don't Blame Steve Case," *Fortune* 147, no. 2 (3 February 2003), 35.

12. Jerry Want, "When Worlds Collide: Culture Clash, Corporate Culture—Illuminating the Black Hole," *Journal of Business Strategy* 24, no. 4 (2003), 14–21; Steven H. Appelbaum, Frederic Lefrancois, Roberto Tonna, and Barbara T. Shapiro, "Mergers 101 (part two): Training Managers for Culture, Stress, and Change Challenges," *Industrial and Commercial Training* 39, no. 4 (2007), 191–200; and Rita G. McGrath, "15 Years Later, Lessons from the Failed AOL-Time Warner Merger," *Fortune*, 15 January 2015, http://fortune.com/2015/01/10/15-years-later-lessons-from-the-failed-aol-time-warner-merger/.

13. Bradley D. Spacy and Michael Trapp, "Train Like We Fight, Fight Like We Train: Establish the Air and Space Expeditionary Force Training Center," *Air & Space Power Journal* (*ASPJ*) 16, no. 4, Winter 2002, http://www.au.af.mil/au/afri/aspj/airchronicles/apj/apj02/win02/spacy.html.

14. Cameron and Quinn, *Diagnosing and Changing*, 11–13.

15. A. J. Briding, "Matrix Wings: Continuous Process Improvement an Operator Can Love," *ASPJ* 30, no. 3 (Fall 2016), 9–11, http://www.au.af.mil/au/afri/aspj/article.asp?id=335.

16. Viktor E. Frankl, *Man's Search for Meaning* (New York, NY: Washington Square Press, 1984), 17.

17. Stanley McChrystal, Tantum Collins, and Chris Fussell, *Team of Teams: New Rules of Engagement for a Complex World* (New York, NY: Penguin Random House, 2015), 20.

18. Exodus 20:16 (English Standard Version).

19. Gary L. Evans, "A Mega Review of Cultural Studies: Linking Leadership to Corporate Governance," *The Poznan University of Economics Review* 14, no. 1 (2014): 76–126.

20. Sally S. Riad, "Of Mergers and Cultures: 'What happened to Shared Values and Joint Assumptions?,'" *Journal of Organizational Change Management* 20, no. 1 (2007), 26–43.

21. Blake E. Ashforth and Vikas Anand, "The Normalization of Corruption in Organizations." *Research in Organizational Behavior: An Annual Series of Analytical Essays and Critical Reviews* 25, (203): 1–52.

22. Maj Gen Bradley D. Spacy, interview with the author, 14 July 2016.

23. Ira M. Levin, "Five Windows into Organizational Culture: An Assessment Framework and Approach," *Organization Development Journal* 18, no. 8 (2000), 83–94.

24. Edgar E. Schein, *Organizational Culture and Leadership*, 4th ed., (San Francisco, CA: Jossey-Bass, 2010), 235–57.

CMSgt Jose A. LugoSantiago, USAF

Chief Master Sergeant LugoSantiago is the command chief master sergeant for the Air Force Installation and Mission Support Center, headquartered at Joint Base San Antonio–Lackland, Texas. He is the principal leader and overseer of an enlisted force assigned to a management headquarters and its geographically dispersed elements in the continental United States and overseas. Chief Master Sergeant LugoSantiago ensures training, utilization, human capital strategies, readiness, and professional development prepares the workforce to meet the commander's and the center's mission to sustain Air Force bases and war fighters Air Force–wide. He also helps formulate and shape strategies to centralize common installation and mission support capabilities previously performed at 10 major commands, 2 direct reporting units, and 6 field operating agencies into a single center headquarters. He has served in the Air Force for more than 26 years in various continental United States and overseas assignments to include deploying in support of Operations Iraqi and Enduring Freedom and Combined Joint Task Force Horn of Africa. He is also an avid writer and the author of two books on leadership: *Lead Me Really! Transforming Heart and Mind to Produce Authentic Leadership*, and *On the Leadership Journey: 30 Conversations about Leading Yourself and Others*.

A Duty to Warn

How to Help America Fight Back against Russian Disinformation

Maj William Giannetti, USAFR

An unclassified Intelligence Community Assessment released in January 2017 by the National Intelligence Council (NIC) claimed Russia interfered with the US presidential election. This interference operation was directed by President Vladimir Putin and carried out by Russia's civilian and military intelligence services: the Federal Security Service and the Main Intelligence Directorate. The NIC report followed a US intelligence community investigation into e-mails stolen from the Democratic National Committee in 2016. The e-mails contained sensitive communications between leaders of the Democratic Party, senior staff members, and the party's candidate for president, which once exposed, served to embarrass and discredit them all. The NIC assessed that these e-mails were stolen by Russian hackers associated with the aforementioned organizations. The hackers deliberately handed the e-mails to WikiLeaks, an antigovernment secrecy group, who promptly released all their compromising details to the news media. The Russian stunt was part of a plan to "denigrate" the Democratic Party candidate to sway American public opinion away from her and toward her Republican opponent.[1]

The assessment—if true—details one of the most elaborate cyber operations ever committed by a nation-state against the United States and its political process. To denigrate the candidate, online agitators—known as trolls—published disinformation that claimed that she suffered from various, fictitious maladies and poor mental health. English-speaking Russian state media outlets, like *Russia Today* (*RT*) and the online *Sputnik*, ran stories that excoriated the candidate while casting her opponent as the target of unfair media coverage by traditional news outlets that were "subservient to a corrupt political establishment."[2] Up to this point, hostile cyber operations have arguably been synonymous with spear-phishing, which ensnares unsuspecting victims into disclosing access codes, or with the denial of service attacks that can disrupt or degrade computing systems. Nonetheless, if executed skillfully by their perpetrators, cyber operators can also manipulate information—that most intangible, but precious commodity that Winn Schwartau presciently wrote about more than 20 years ago—to misinform, confuse, and disorient an entire electorate.[3]

What can the Air Force do about a sophisticated attack of this nature that uses cyberspace as a delivery vehicle? It has a cyberspace operations doctrine that mainly focuses on protecting web-based government and military information technology infrastructure from catastrophic attacks and suggests common-sense approaches to defense of same, such as maintaining firewalls or installing antivirus software to protect against intrusions.[4] But, how can we "go on the offensive" and protect the nation from disinformation campaigns like the one outlined in the IC's report? It may not take computer logic or code; rather, it will probably take a concerted, combined effort undertaken by law enforcement, intelligence, and cyber professionals alike to combat the problem. European countries, such as the Czech Republic, are preparing to defend themselves by examining web content for disinformation and building its public's awareness to it.[5] Undeniably, protecting government and military computing systems is important work; if it is in jeopardy from a threat borne out of cyberspace, then the Air Force's premier cyberspace warriors have a duty to warn of its imminent collapse. So, do we have a duty to warn when disinformation hits our shores and threatens to subvert or derail our political process?

The Beginning of a New Era

In 2005, the Air Force avowed itself to fly, fight, and win in air, space, and cyberspace. This was a bold statement because it marked the first time any service—anywhere—named cyberspace as a domain to be conquered in a presumably wartime situation. That same year, the World Wide Web had evolved to its current state: Web 2.0. Gone were the days of the 1990s when websites and their content were static and cumbersome. In today's Web 2.0 world, everything—all content—is dynamic and user-defined. It almost goes without saying that this was a revolution in terms of how we communicate with each other, from an individual level, all the way to the highest corridors of power at the national level. One year later, a fascinating thing occurred. In 2006, technicians at the Idaho National Laboratory conducted a test on an industrial, diesel generator with the purpose of hacking into its control systems and disabling it from afar. The technicians established a base of operations 100 miles away and exploited vulnerability in the machine's control code.[6] Their interference caused the 1–ton machine's power converters to cycle on and off in such rapid succession that it began to shudder, overheat, and eventually self-destruct in a cloud of smoke.[7] The powerful images, when they were broadcast on television, were a preview of the mayhem that might await us. What this example also demonstrated was that, in a sense, the machines that provide us with power and light were almost as connected as human beings were becoming on an individual level. It showed that a generator could be disabled using remotely deployed malicious code and that our worst fears about the vulnerability of our critical infrastructure in this new age of interconnectivity could be realized. This new reality became most palpable to the tiny Baltic nation of Estonia in 2007.

That year Estonia—at 95 percent connectivity—was reputedly the world's most wired nation. In April, it was decided that a Soviet-era memorial to the Russian soldiers who died during the Second World War would be moved from the center of its

capitol city Tallinn to the outskirts of the city. Russian-speaking Estonians took to the streets that month in a massive protest. What followed was even more concerning: a rush of distributed denial of service attacks using a sophisticated botnet of an estimated 85,000 computers caused an abrupt slowdown of the nation's communications and banking infrastructure.

Estonia withstood the attacks through the Russian Victory Day holiday that May—which commemorated the Soviet's victory over Nazi Germany—when 58 websites were brought down at once, and services from its largest financial institution were unavailable for 90 minutes. The outages continued until late May and, although the political, social, and economic damage was noticeable, the physical damage was "minor."[8] Naturally, the source of the attacks could not be localized and, while all fingers pointed toward Russia, Moscow completely disavowed any involvement in the attacks. Initially, evidence brought by the Estonian authorities pointed the origination of the attacks to Russian Internet protocol (IP) addresses. The Estonians retracted this statement later as the evidence was determined to be inconclusive.

Other attacks of this sort would follow. In December 2016 in the Ivano–Frankivsk region of Ukraine, a power plant technician reportedly witnessed his terminal's cursor leap to life and, in a very deliberate fashion, begin to shut down the breakers of his substation, plunging approximately 230,000 people into darkness. The outage lasted between one and six hours and, fortunately, Ukrainian power companies harmed by the incident had enough data logged by their firewalls to reconstruct how the breach occurred. The preparatory phases of the attack began with a classic, mid-1990's style, spear-phishing campaign that targeted power plant workers using a Microsoft Word document enclosed in an e-mail. To download the document and the malware inside, a user would have to click on a prompt, which would enable macros inside it. Once enabled, a short script in Visual Basic would command the computer to seek out and record log-in credentials. After the attackers gathered enough user name and password information, they accessed the power company's Windows domain controllers, where more user names and passwords were kept, until they found credentials for workers who used virtual private networks to log in remotely to the power companies Supervisory Control and Data Acquisition network. From there, the hackers remotely took control of the Ukrainian power station virtually unopposed.[9] The virus was still as effective in 2016 as it was 20 years ago, although its code and means of dissemination lacked for originality.[10]

Cyber Warfare or Political Warfare?

Looking simply at these incidents alone, one could conclude that what happens in faraway Estonia or Ukraine could conceivably happen here at home, so the Air Force's focus on protecting itself and the Department of Defense (DOD) network infrastructure from intrusions certainly seems justifiable enough. It has an implicit interest in protecting publicly networked systems external to it as well because doing so enables "force deployment, training, transportation, and normal operations."[11] Routine updates to antimalware software should be conducted so all the latest vul-

nerabilities are patched, and the passwords to control systems must be strong enough to mitigate the possibility they might be easily cracked.

But when we are talking about DOD networks or public networks, there are almost no safeguards to prevent the spread of disinformation, especially the likes of which the NIC published in glaring detail. The discussion about enacting said safeguards has turned inevitably to questions like, "Was our election hacked?" or "Was this the cyber Pearl Harbor that people have envisioned for so many years?"[12] The answer to both questions is, emphatically, "no." The truth of the matter is what the Russians unleashed is not cyber war—at least not according to our classic understanding of it as the brief case studies above illustrate. Rather, this is political warfare, the kind that uses cyberspace as a medium to deliver what Russian intelligence officers might call *disinformatsiya* and *kompramat*, or politically damaging information.[13] On a semifrequent basis, the Department of Homeland Security (DHS) publishes bulletins regarding the spread of malicious code and responsibly tells citizens and their businesses how to defend themselves against it. What made the ICA so special, however, was it was the first report of its kind to alert the public about Russia's disinformation campaign, which was designed to force an outcome ostensibly in its favor.

For that matter, the United States is no stranger to foreign powers' disinformation operations. One of the modern era's first, and arguably most successful, attack was perpetrated, not by Russia, but by the United Kingdom's British Security Coordination (BSC). In her book *The Irregulars*, Jennet Conant tells the story of the BSC, which ran its spy ring out of Washington, DC and Rockefeller Center in New York City. The BSC's general purpose at the time was to snap the nation out of its "America First" mentality, to spur a change in its isolationist policy of nonintervention during the Second World War, and cause it to throw its material support behind Europe. In an ingeniously deceptive plan, the BSC's chief, a Canadian citizen named William Stephenson, led the production of a forged German map depicting safe houses in southern Cuba, where equipment caches were located, radio sites to signal German U-boats, and a postwar plan to carve up North Atlantic territories into Nazi protectorates. Ivar Brice, a British agent who worked for the BSC at the time, said Stephenson tipped off his Federal Bureau of Investigation (FBI) contacts of the map's existence and the safe house where it could be found. The map would sound the alarm in America that the Nazi threat was closer to her shores than previously thought. "Were a German map of this kind be discovered or captured from enemy hands," he wrote, "and publicized. . . among the "America Firsters" with their belief that America could get along with Hitler, what a commotion would be caused."[14]

The forgery was found by the FBI and delivered to Stephenson, who passed it to the head of the Office of Strategic Services, Gen William Donovan, who, in turn, delivered it to President Franklin D. Roosevelt. In reaction, the president took to the airwaves, and in March 1941 he delivered a radio address to the nation revealing that he had in his possession a "secret map" which outlined the contrived Nazi plan and included what he called "our great lifeline" to the Pacific—the Panama Canal. "That map, my friends," said the president, "makes clear the Nazi design, not only against South America, but against the United States as well." President Roosevelt

went on to promise America would now "pull its oar" in Europe's struggle against fascism and Germany.[15]

In the 1960s and 1970s, before the Internet age, Russian propaganda and disinformation made its way into books published by authors who were paid to take part in then-Committee for State Security (KGB) operations in the United States called "active measures." The KGB funded and used Communist agents like Italian-born Carl Aldo Marzani, whose publishing houses, the Liberty Book Club and the Prometheus Book Club, were among the first to shed doubt on the Warren Commission's finding that Lee Harvey Oswald acted alone during President John F. Kennedy's assassination. Writers in Marzani's employ, like Joachim Josten, who were funded by grants from the Communist Party of the Soviet Union, wrote books that accused Oswald of being "an FBI agent provocateur with a CIA [Central Intelligence Agency] background."[16] Doing so, according to KGB archivist and dissident Vasili Mitrokhin, established two of the most enduring falsehoods in Kennedy assassination lore: that there was a government conspiracy to kill the president, and the CIA was involved.

Of all the agents who brought ignominy to the CIA's doorstep in the 1970s, none was more damaging that Philip Agee. Agee was the Edward Snowden of his day, a man who wrote three books that detailed CIA clandestine operations around the world and exposed an estimated 2,000 CIA officers. Agee, according to Mitrokhin, was summarily fired from the CIA in 1968 because of his poor financial habits and excessive drinking. In his disgust, he first attempted to defect with a trove of classified documents to the KGB resident office in Mexico City. The officer in charge of the Mexico City office at the time was Oleg Kalugin.[17] Kalugin, sensing a trap, turned Agee away. Still, Agee found a willing audience eventually in Cuba, whose intelligence service shared the stolen intelligence with the Russians anyway. The KGB, when Agee's first memoir, *Inside the Company*, was published in 1975, bore no compunction about taking credit for helping the author and the Cubans prepare it. It is unclear, though, how much preparation or work the KGB actually put into Agee's book, but the would-be defector did acknowledge later that the Communist Party of Cuba, and the Cuban intelligence service, "gave important encouragement at a time when I doubted I would be able to find the additional information I needed." The CIA, in its *Studies in Intelligence* journal, according to Mitrokhin, admitted Agee's work was a "severe body blow" to the agency.[18]

The book met with critical acclaim around the world while Agee lived in exile in London. Soon, he faced deportation and, as his reputation as a whistle-blower grew, prominent politicians from England and the United States (including one former US attorney general) came out in defense of his actions. Mitrokhin recounts in Agee's KGB file, support campaigns for his *cause celebre* were initiated in nine nations. He was eventually forced to leave London for Holland in 1977, but the KGB was "jubilant" at the chaos the entire affair had caused, and the embarrassment the CIA suffered.[19]

Making the Russian Connection

At this point, after examining some of the technical intricacies within Russia's cyber operations and methods of political warfare, we now turn to a brief exploration

into Moscow's motivations. What is its purpose? There are a couple of theories. One theory is that the intrusion upon the Democratic Party was retribution for embarrassing economic sanctions placed on Moscow, its defense industries, and financial institutions following human rights abuses it committed during its combined campaign with Iran against Islamic State militants in Syria. Economic sanctions were also levied against Russia following the invasion of Ukraine and annexation of Crimea. These things, in its view, were part of a deliberate US-led campaign to bring disgrace upon the Russian military which would, therefore, turn public opinion against it.[20] Sanctions also push Russia toward pariah status by degrading its prestige in world politics and, more importantly, the international arms market. They devalue its weapons manufacturing businesses, and potentially undercut the profits of the oligarchs who run them.

Another vastly interesting theory is President Putin commands a government with intelligence services comprised of disruptive forces who thrive on chaos. In a mid-December interview, shortly after the ICA's release, Gleb Pavlovsky, a former advisor of the Russian president, remarked: "Of course the Kremlin likes the fact of such an atmosphere of chaos. Because we are traders of chaos. We sell it, and the more chaos there is in the world, the better it is for the Kremlin."[21] Indeed, this theme of chaos harkens back to the Agee case. Chaos, in Moscow's view, causes Russia's adversaries to react hysterically and make seemingly unfounded allegations that, according to Putin, "distract the attention of the American people from the substance of what the hackers had put out."[22] This statement, oddly enough, presumes that the stolen e-mails, in all their scurrilousness, might somehow shed light on American political deliberations that would otherwise be hidden from public view, and that the former KGB officer is some sort of free media advocate. In any case, the United States, according to his rationale, is deflecting the blame for its political process' shortcomings—and the source of its scandals—upon Russia. Alternately, allegations of election tampering have the opposite effect of making President Putin appear to be an altogether cunning and provocative operator who drives his enemies to distraction as they attempt to find the source of the intrusions.

Time to Try Something Different

In any event, now that we know Russia's motivations and the purpose of its actions, how do we defend against them? Leaders of the US IC—former director of National Intelligence James Clapper and Adm Mike Rogers, commander of US Cyber Command—previewed the findings of the ICA during Senate testimony on 5 January 2017. Director Clapper said the IC ought to undertake a counterpropaganda initiative to prevent any future meddling in the United States' electoral process. One recommendation he made was to revive the US Information Agency (USIA), a Cold War–era organization that for a time led our public diplomacy abroad, and credibly communicated the country's values, official positions, and policies to counter Communist disinformation.[23] During questioning, senators asked why the USIA's charter had not been renewed yet. Admiral Rogers said, "I do not think we have come yet to a full recognition of the idea that we are going to have to try to do something fun-

damentally different."[24] The admiral, who is also director of the National Security Agency, added, "I think we still continue to try to do some of the same traditional things we've done and expecting to do the same thing over and over again, yet achieve a different result."[25] By the early 1990s, the USIA had outlived its usefulness and fell into disrepute after the fall of the Soviet Union. The organization's material lost its persuasiveness and no longer seemed relevant, given the dissolution of its ideological reason for being.

Confronting and combatting Russian disinformation in the United States will not necessarily take hauling out agencies past, or will it take an entirely novel approach. In fact, our cyberspace operations doctrine is premised upon a tried and true guiding principle: the best offense is a good defense. Former Air Force Chief of Staff Gen Norton A. Schwartz recommended common-sense measures for USAF and DOD systems in November 2011 that could conceivably apply to public and private sector networks which are also vulnerable to cyberattack. To deny an adversary the freedom of maneuverability in cyberspace, a defender must bar access to sensitive information and systems. The import of General Schwartz's words is that one must build an awareness of malicious code and the malign actors who seek to find ways to implant it into our computers at work and at home. Keeping unauthorized software and peripheral devices—like thumb drives—away from our computers is one means people could use to prevent the spread of viruses, worms, or botnets. Using protective antivirus software is another. Ignoring e-mails that are not signed digitally, or that contain attachments with executable macros and hyperlinks from unverifiable sources, is a more common but effective means of a sound cyber defense.[26] These measures seem commonplace today, but they were built upon the experiences and hard lessons learned about the sources of intrusions since 2005.

When it comes to protecting Air Force, DOD, or public networks from the pernicious effects of disinformation, the solutions are neither technical, nor clear. A case study from the Czech Republic, however, is instructive because it provides a viable, minimally invasive, and thus reasonable alternative. There, a small unit of 15 social media analysts actively monitor Twitter, Facebook, *Sputnik*, and pro-Russia Czech language news sites inhabited by online agitators who purvey disinformation. The group, which is headed by Benedikt Vangeli, was established to ferret out so-called "fake news" that flummoxed Czechs by harshly disparaging pro-NATO or European Union politicians before their parliamentary elections in October. Taking to Twitter, the unit will simply flag questionable news sources and alert the public of their inauthenticity. "We just tweet them to the public as false reports," Vangeli says. "That's how we fight back. We don't take them down. We don't censor." Similar groups of this sort have been set up in Germany and Finland, and could reasonably be established in the United States as well.[27]

At its heart, Vangeli's approach of a prudent public awareness campaign, which—like General Schwartz's recommendations—is based on common sense and a duty to simply warn the public. Now, a cynic might say that the military (the Air Force in this case) should not tell the public it works for what to read or what to think. Doing so in the United States, where freedom of speech is guaranteed in its Constitution, would mean its citizenry watching all their Orwellian nightmares about government intervention into matters of free speech and thought come true. Preempting

harmful messages online might also impinge upon citizens' expectations of privacy and their freedom of choice as they browse the Internet, or potentially constitute an illegal search if the proper legal authorities are not in place first. Air Force instructions do, however, state that subject to DOD regulations, Airmen can cooperate with and assist law enforcement during investigations that protect against "clandestine activities" against the United States (like the Russian plot recounted here), and protect the department's "employees, information, property, or facilities."[28] Presuming that they are already monitoring the web for disinformation, it is entirely possible that federal law enforcement agencies who are endowed with the proper statutory authorities will have to identify anomalies first, then notify their military counterparts to summon their expertise in winnowing down the exact source of the offending information down to the IP address. The pooling of resources, nevertheless, will be critical, and the stakes are high. The negative consequences for failing to warn the public about disinformation will be grave; the nation's faith in its governing institutions could be irreparably damaged, and worse yet, its collective consciousness perpetually poisoned.

Since 9/11, our government and military have learned the values of collaboration and cooperation—that our collective manpower and know-how will triumph over the parochialism that stifled information sharing and innovation before that terrible day. In short, law enforcement organizations, like the FBI, which has sole authority to conduct counterintelligence operations in the United States, and the Air Force Office of Special Investigations (AFOSI), should partner and lead a joint counterdisinformation task force. This task force could be small like the Czechs' or emulate the FBI's larger joint terrorism task forces (JTTF). With more than 100 across the country, JTTFs are the nation's premier mechanism for counterterrorism collaboration with a variety of local, state, and federal law enforcement agencies.[29]

The AFOSI could represent the DOD's counterintelligence equities, while the DHS Computer Emergency Readiness Team can employ its know-how with identifying the sources of cyber disinformation, the subtleties of their coding, and the networks of individuals who propagate it.[30] Undoubtedly, fighting back against disinformation will require a partnership with the country's private sector. The FBI is the leader of InfraGard: a consortium of more than 30,000 subject matter experts in a variety of fields, such as computer engineering, technology, and security. Finally, with a proper mandate from the Air Force's director of intelligence, our Airmen in the cyber and intelligence career fields can come off the bench and become active participants in a new endeavor that could very well unmask future Russian propagandists, expose the truth behind their activities, and protect our nation against political warfare's corrosive effect. ✪

Notes

1. National Intelligence Council, *Assessing Russian Activities and Intentions in Recent U.S. Elections* (Washington, DC: Intelligence Community Assessment, 6 January 2017), 2, https://www.dni.gov/files/documents/ICA_2017_01.pdf.
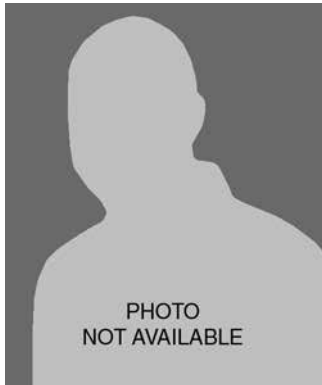
2. Ibid., National Intelligence Council, 4.

3. Winn Schwartau, *Information Warfare–Cyberterrorism: Protecting Your Personal Security in the Electronic Age* (New York: Thunder's Mouth Press, 1996, 2nd ed.), 35, 638.

4. Curtis E. LeMay Center for Doctrine Development and Education, "Annex 3-12 *Cyberspace Operations*," 30 November 2011, 5, https://doctrine.af.mil/DTM/dtmcyberspaceops.htm. The Air Force in this passage of its doctrine implicitly acknowledges that is has a vested interest in protecting publicly networked systems because they enable things like "force deployment, training, transportation, and normal operations."

5. Anthony Faiola, "Czech Republic Enlists Unit to Combat Disinformation," *The Washington Post* (23 January 2017), A1, A10.

6. Thomas Rid, *Cyber War Will Not Take Place* (New York: Oxford University Press, 2013), 46.

7. For footage of the test, see: https://www.youtube.com/watch?v=fJyWngDco3g.

8. Ibid., 6.

9. Kim Zetter, "Inside the Cunning, Unprecedented Hack of Ukraine's Power Grid," *Wired.com*, 3 March 2016, https://www.wired.com/2016/03/inside-cunning-unprecedented-hack-ukraines-power-grid/.

10. Schwartau wrote that the Word for Windows Macro Virus was "the most prevalent virus around" in June 1996. At that time, he said it was "spreading at least 10 times faster than any other virus in history," and ibid., Schwartau, 21.

11. Curtis E. LeMay Center for Doctrine Development and Education, "Annex 3-12 Cyberspace Operations," 30 November 2011, 5, https://doctrine.af.mil/DTM/dtmcyberspaceops.htm.

12. In his book *Information Warfare,* Schwartau references his 1991 testimony to Congress. He warned the legislature of a future "electronic Pearl Harbor" because the government writ large was ill prepared to defend the country's increasingly interlinked computers against a catastrophic attack (see Schwartau, 43). See, also, Ralph Peters, "Washington Ignores Cyberattack Threats, Putting Us All at Peril," *Wired.com*, 23 August 2007, https://www.wired.com/2007/08/ff-estonia-america/amp/.

13. Peter B. Zwack, "Russia," in *Charting a Course: Strategic Choices for a New Administration*, ed., R.D. Hooker Jr., 238, Washington, DC: National Defense University, December 2016, http://ndupress.ndu.edu/Portals/68/Documents/Books/charting-a-course/charting-a-course.pdf?ver=2016-12-08-154300-120. See, also: "A Russian Word Americans Need to Know: Kompramat," *NPR*, 11 January 2017, http://www.npr.org/sections/parallels/2017/01/11/509305088/a-russian-word-americans-need-to-know-kompromat/.

14. Jennet Conant, *The Irregulars* (New York: Simon and Schuster, 2008), 94.

15. Ibid., Conant, 95.

16. Christopher Andrew and Vasili Mitrokhin, *The Mitrokhin Archive and the Secret History of the KGB* (New York: Basic Books, 2009), 226–27.

17. Oleg Kalugin retired from the KGB as a major general after 32 years of service. Today, he serves on the International Spy Museum's Advisory Board of Directors in Washington, DC. See: https://www.spymuseum.org/about/leadership/board-of-directors/.

18. Ibid., Andrew and Mitrokhin, 231.

19. Ibid., 232.

20. David Filipov, "Putin Uses the Soviet Defeat of Hitler to Show Why Russia Needs Him Today," *Washington Post*, 8 May 2017, https://www.washingtonpost.com/world/europe/putin-is-using-the-soviet-defeat-of-hitler-to-show-why-russia-needs-him-today/2017/05/07/1c390338-2e9e-11e7-a335-fa0ae1940305_story.html?utm_term=.10033df265ff.

21. David Filipov, "'Chaos' Theory Is Working for Putin," *Washington Post*, 15 December 2017, A-1, A-12.

22. Ibid., Filipov.

23. Statement of James Clapper, director of national intelligence, US Senate Committee on Armed Services in Senate, "Hearing to Receive Testimony on Foreign Cyber Threats to the United States," 5 January 2017, 112.

24. Statement of Admiral Mike Rogers, director of the National Security Agency, US Senate Committee on Armed Services in Senate, "Hearing to Receive Testimony on Foreign Cyber Threats to the United States," 5 January 2017, 112.

25. Ibid., Admiral Rogers' testimony.

26. Curtis E. LeMay Center for Doctrine Development and Education, "Annex 3-12 Cyberspace Operations, Appendix A: CSAF Remarks on Cyberspace," 41, (30 November 2011) from: https://doctrine.af.mil/DTM/dtmcyberspaceops.htm.

27. Ibid., Faiola, A10.

28. US Air Force Instruction 14-104, "Oversight of Intelligence Activities," *www.epublishing.af.mil.*, 5 November 2014. See, also: Department of Defense (DOD) Regulation 5240 1.R, *Procedures Governing the Activities of DOD Intelligence Components that Affect United States Persons*, and DOD Instruction 3025.21, *Defense Support of Civilian Law Enforcement Agencies*.

29. Former FBI Director Robert Muller oversaw the post-9/11 expansion of joint terrorism task forces (JTTF) to every field office in the nation. As of 2014, 71 JTTFs were created after the terrorist attacks. See, also, Bruce Hoffman, Edwin Meese, Tim Roemer et al., "The FBI: Protecting the Homeland in the 21st Century," FBI National Press Office (25 March 2015), https://www.fbi.gov/news/pressrel /press-releases/the-fbi-releases-final-report-of-the-9-11-review-commission.

30. The FBI and DHS, in cooperation with the Department of Homeland Security's Computer Emergency Readiness Team, released an unclassified report in December 2016 which broke down how Russia's intelligence services using a focused spear phishing campaign to gain access to senior Democratic Party staff members e-mails in spring 2015 and summer 2016. The report, which dubbed the Russians advanced persistent threats 28 and 29, said the actors "masqueraded as third parties, hiding behind false online personas designed to cause the victim to misattribute the source of the attack." Unlike the ICA, the FBI–DHS report does not go so far as to directly blame Russia president Vladimir Putin for the intrusion. See, also, the FBI–DHS Joint Analysis Report, *GRIZZLY STEPPE—Russian Malicious Cyber Activity* (Washington DC: 29 December 2016), https://www.us-cert.gov/sites/default/files/public ations/JAR_16-20296A_GRIZZLY%20STEPPE-2016-1229.pdf.

PHOTO
NOT AVAILABLE

Maj William Giannetti, USAFR

Major Giannetti (MS, St. Joseph's University) is an Air Force reservist assigned to the joint staff at the Pentagon, Washington, DC. His 20-year career spans time as a civil servant, Philadelphia police officer, and Department of Defense analyst. He was a staff member of the 9/11 Review Commission, which examined how the Federal Bureau of Investigation implemented the original commission's recommendations. Major Giannetti also served two tours in Afghanistan.

Enlisted RPA Pilots: The Path to Air Mission Command

Lt Col Dillon R. Patterson, Arizona Air National Guard

Introduction

Much has been written about whether the USAF should utilize enlisted Airmen as pilots within the remotely piloted aircraft (RPA) enterprise. What has been missing are ideas for how it might be accomplished if this concept is fully implemented. As such, the focus of this article is on *how* the Air Force should utilize enlisted RPA pilots, not whether this *should* be accomplished. A focus on the role of the officer compared to the enlisted Airmen is necessary before proposing how enlisted pilots may be incorporated into the current RPA systems. Next, a hypothetical future RPA operational model will be assumed to develop an end-state capability to pursue. Finally, a model for employing enlisted RPA pilots within the current MQ-9 community will be examined, with the goal of developing to the future capability—RPA air mission command.

Roles of Different Airmen

The fundamental difference between an officer and enlisted Airman must be identified with roles defined before making a major change within the USAF pilot community. Leaders must develop an appropriate construct within current and future RPA systems and avoid the trap of responding to demand without proper study. One could easily devote an entire work to this subject when comparing the military roles of the officer and enlisted warrior across different job types and services. Delineating the roles of the two respected offices for this discussion will be accomplished by making a simplified assertion: the commissioned officer must always retain ultimate *authority and accountability*.

With a commission as an officer in the USAF, one bears the legal authority to decide and act according to orders provided through the command chain. Those decisions involve risking life and treasure to complete a mission. Although enlisted Airmen can be delegated authority and are often trusted with immense responsibility, it is ultimately the commissioned officer who should be held accountable. Specifically, within aviation, decisions are made that involve elements of command on a daily basis. To allow enlisted Airmen to pilot RPAs in the current organizational construct means placing the burden of command authority on the shoulders of these men and women.

Georgetown University professor Dr. David Blair has argued against the idea of using enlisted Airmen to pilot RPAs as a matter of command authority. In a 2015 article, Blair noted that employing enlisted pilots alongside commissioned officers would be asking our talented enlisted men and women to do the same work, but without the same pay, authority, and honor granted to a commissioned officer. Additionally, situations involving command decision making may be problematic, as the lieutenant piloting one RPA may be able to make a decision that must be *made for* the technical sergeant flying an RPA in the adjacent control station.[1] Blair's perspective on the topic is not limited to his academic acumen as a professor; he is also an MQ-1 and MQ-9 pilot who has held instructor and evaluator pilot ratings. Blair's insight sheds light on an important concept that remains constant if any model for enlisted aviators is to be employed within the RPA enterprise; commander authority must shape mission activities, even when subordinates are capable of near-independent action.

A look at joint doctrine informs this perspective. Regarding the idea of mission command, JP 3-0 *Joint Operations*, states, "Commanders delegate decisions to subordinates whenever possible, which minimizes detailed control and empowers subordinates' initiatives to make decisions based on the commander's guidance rather than constant communication. Subordinates' understanding of the commander's intent at all levels of command is essential to mission command."[2] Thus when incorporating this doctrinal idea into a practical framework for RPA flight operations, it holds that enlisted Airmen may perform *highly skilled* roles, but commissioned officers must remain at the center for exerting *command auth*ority and *accepting accountability* for mission results.

Assuming an End State

Identifying roles and authorities an enlisted Airman may or may not wield is not enough to plunge into the task of developing an enlisted RPA pilot corps. Adding enlisted pilots to the RPA enterprise would constitute a major paradigm shift in both institutional and cultural norms. Developing a construct for the integration of these Airmen into the current system architecture without considering how immerging technology may change aviation is a recipe for waste and potential mission failure. Decision makers must understand how RPAs will evolve before forcing an organization as large as the Air Force to undertake significant institutional change.
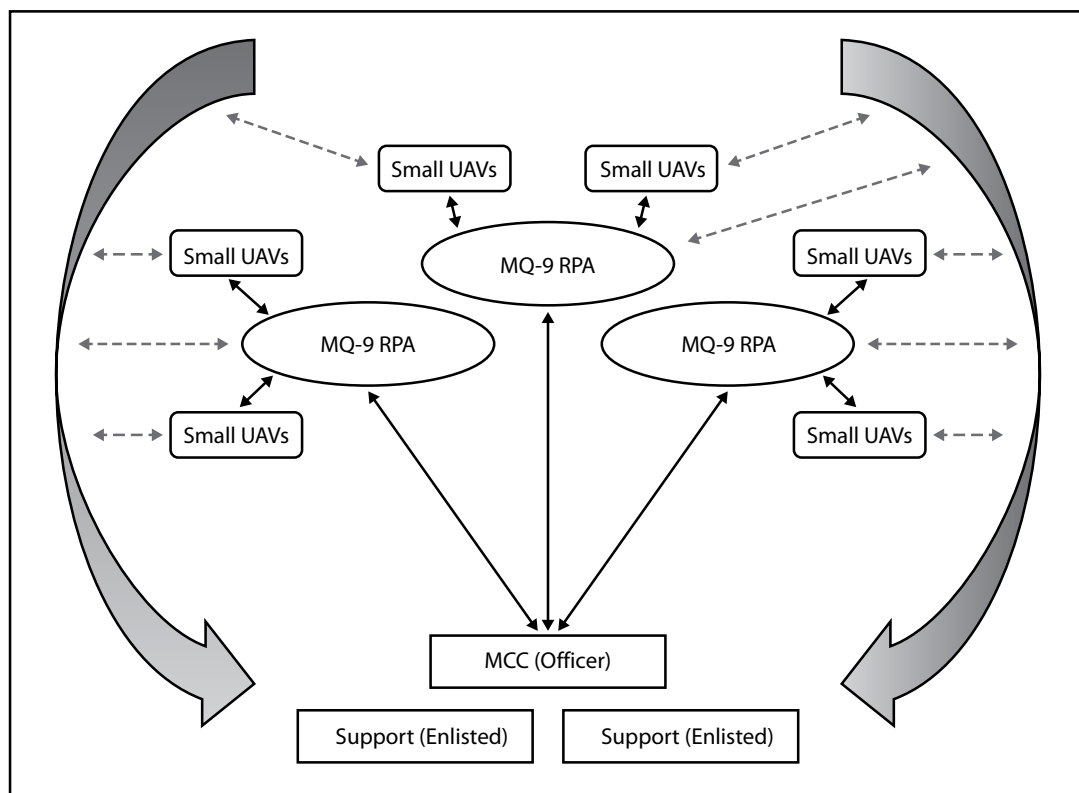
This evolution will be a combination of technological advancements and concepts of operations (CONOPS), creating capacity in the near future that could completely change the structure and operational paradigm of an Air Force RPA squadron. With a reasonable end state identified, leaders can work back from the target to affect organizational change that will ensure success in the future, then intelligently determine how an enlisted Airman fits into an RPA cockpit now.

A vision of the end state that the USAF may strive for is provided by defense researcher Paul Scharre in his 2014 report, "Robotics on the Battlefield Part II—The Coming Swarm." In his report, Scharre develops an image of how robotics and autonomous systems will perform increasing roles in future combat as technology drives militaries to depend on advanced systems. He envisions large "swarms" of low-cost systems being employed with advanced algorithms, allowing for coordinated attack options.[3] To employ the systems of the future, Scharre believes it will require, ". . . moving beyond existing paradigms where humans directly control a vehicle's movements to one where human controllers supervise the mission at the command level and uninhabited systems maneuver and perform various tasks on their own. Increased automation also has the potential to speed up the pace of warfare by helping to shorten decision cycles and, in some cases, remove humans from them entirely."[4]

Of course, it is debatable how technological advancements will shape RPA operations in the USAF. Scharre's vision is by no means absolute. However, it is reasonable to assume that automation will continue to take on an increased role in military operations, and that the USAF will need to change the construct of its current RPA enterprise to best utilize emerging technology. Transitioning from a *human **in**-the-loop* construct, to one using a *human **on**-the-loop* approach is likely a path already determined by developments in automation. Simply put, this means transitioning humans away from performing the tasks associated with flying an aircraft. Instead, aviators will inject their intent into an automated system and make critical decisions, such as when to employ weapons, while autonomy within the aircraft performs much of the piloting. Advanced automation will free tremendous amounts of human cognitive capacity by performing roles that can be captured and shaped into an algorithm. Combat systems will increasingly evolve such that *machines do tasks*, allowing warriors to focus on the *exertion of will*.

In translating the task (automation)/will (human) differentiation into a usable model for discussion, figure 1 is proposed to represent a possible, and arguably desirable, construct for how advanced technology and CONOPS could shape the Air Force's fleet of MQ-9 aircraft in the future. Pending a breakthrough in the hard sciences which might completely alter the engineering of aircraft, one can assume that the MQ-9 airframes will continue to fly well into the future, or something of similar design. Moreover, advancements in aviation-related technology as experienced in the last 20 years will likely continue. Thus, the MQ-9 flying 15–20 years from now should be equipped with advanced automation, sensors, weapons, and other *information-focused* capabilities not yet matured. In the model presented here, the MQ-9 is piloted almost completely autonomously.

Each MQ-9 in the model is assumed to be capable of deploying and recovering two or three small RPAs in-flight, controlled by the automation shared between the drone and its mothership MQ-9. At the heart of this swarm of aircraft is a USAF officer. The officer is not a pilot, as the aircraft pilots themselves. Rather, the officer is a MCC who exerts the supported commander's will through an aviation capability not yet captured into our doctrine. The officer has at his or her disposal weapon system capacity in the swarm, requiring enlisted Airmen in critical support roles. These Airmen are vital to ensuring the swarm is healthy: monitoring aircraft performance and systems, maintaining secure communications, attaining airspace clearances, moving new vehicles in and out of the swarm, and a host of other tasks relating to weapons and sensor systems.

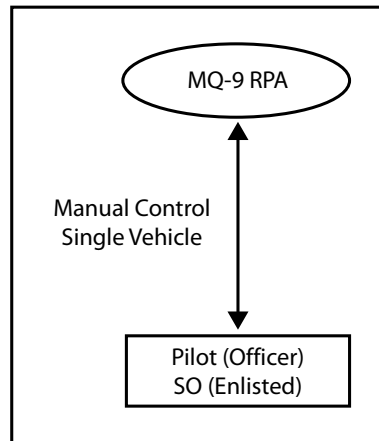**Figure 1. Air Force mission commander construct**

Although the model presented is fictitious, ignoring the vision will not make the idea go away. Competing nations and commercial enterprise are developing and fielding RPAs, automation systems, and artificial intelligence (AI) at an alarming pace. The conversation among defense leaders does not involve whether the United States should invest in automation and AI; the question is how do we do it right? Technology, combined with CONOPS, will change the essence of aviation from the

legacy one-pilot, one-plane paradigm, to a future where warriors employ multiple vehicles generating resilient, flexible, and overwhelming force. To be successful, the Air Force should consider new manpower structures *now* to facilitate the ways and means of leading the airpower evolution.

Enlisted RPA Pilots as the Path

Reflecting on figure 1, the difference in the role of an officer (authority/accountability) and an enlisted Airman (skilled task execution) are easily separated. The MCC injects will into the battle, while the support Airmen assist to enable that will by working within the weapon system. However, the distinction between *skill* and *authority* is often confused when considering how one could employ enlisted Airmen to pilot the MQ-9 of today. Building a manpower construct within the RPA community that takes the enterprise forward by using enlisted Airmen as pilots should not violate the intentional distinction between the two offices. Rather, it should be viewed as an opportunity to develop an operational concept that will be necessary for the incorporation of advanced automation.
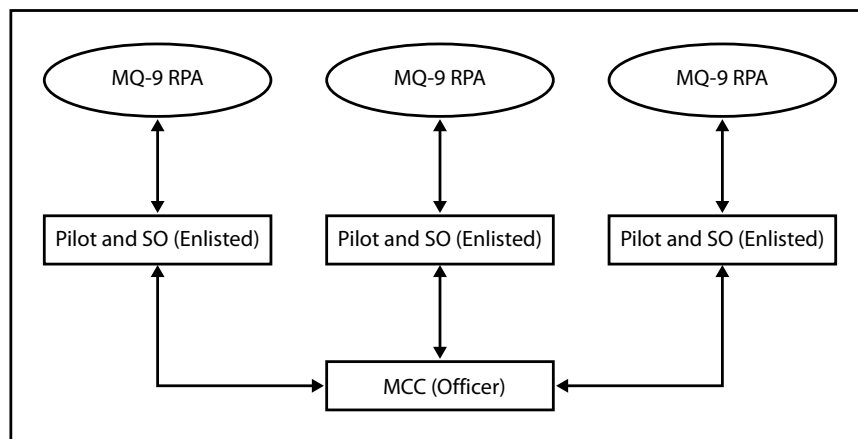
Figure 2 shows the simple relationship between a modern MQ-9 aircraft and the pilot inside a ground control station (GCS). The pilot, aided by the sensor operator (SO), manually operates the aircraft while exercising full authority for the aircraft and the mission.[5] By replacing the officer pilot with an enlisted pilot, the full weight of authority and accountability are now placed on the shoulders of the noncommissioned Airman. To avoid this position, the concept of *air mission command* within the RPA community needs to be central to any plan that puts enlisted Airmen in the pilot seat.

Figure 2. Current MQ-9 construct

An intentional structure must be developed that provides the necessary skills the enlisted pilot will need to fly the MQ-9. Included in the structure must be the guidance for obtaining mission intent and authority from the pilot's mission commander. A model of this relationship is provided in figure 3. This model is offered under the

following assumptions: (1) the enlisted pilots receive the same aviation training as current officer RPA pilots, (2) all RPA-rated officers will be trained as fully qualified MCCs, (3) enlisted pilots are the primary pool of pilot manpower (officers only fly enough to maintain proficiency), and (4) no hardware changes are required; this model can be implemented with only manpower and conceptual changes.[6]

Figure 3. MQ-9 construct with enlisted pilots

In attempting to apply this model, it would likely become apparent that officers who currently pilot are not prepared to take on the role of MCC. There is no doctrine providing tactics, techniques, and procedures for mission execution. There are no Air Force instructions identifying the roles and authorities of the RPA mission commander, or limiting the authority of the enlisted pilot from, "The Pilot in Command (PIC), regardless of rank, is responsible for, and is the final authority for the operation of the aircraft."[7] Successfully implementing this construct means the Air Force must allocate resources to fully develop this concept including war gaming and flight testing.

As the concept matures, air mission command will allow for expanded capacity as new concepts and technology are incorporated into the enterprise. As an example, assume that 5–10 years after implementing of the above proposed construct across the Air Force RPA community, commercial off-the-shelf technology (COTS) has allowed for MCCs at any RPA operations center to provide command duty for any crew in the RPA enterprise, regardless of the GCS location. Consequently, mission leadership could be assigned not based on the location of the crews, but based on mission intent.

Figure 4 below illustrates this point. In the diagram, aircrew are grouped into three squadrons based on the geographic location of their assigned units: A, B, and C. However, based on mission needs, one of Squadron A's MQ-9s has been tasked to support a line of effort (LOE) that is best commanded by the MCC from Squadron B. COTS technology, doctrine, and training allow the crew in GCS A3 to be tactically gained under MCC B to maximize mission effects.

Air mission command allows for flexibility in the fleet (fig. 5). The RPA wing(s) under an intentionally developed doctrine assign MCC tasks in the most effective manner for the day. The enlisted pilot is central to allowing the officer corps the space to develop the concept, doctrine, instruction, TTPs, and hardware requirements for effective mission command.
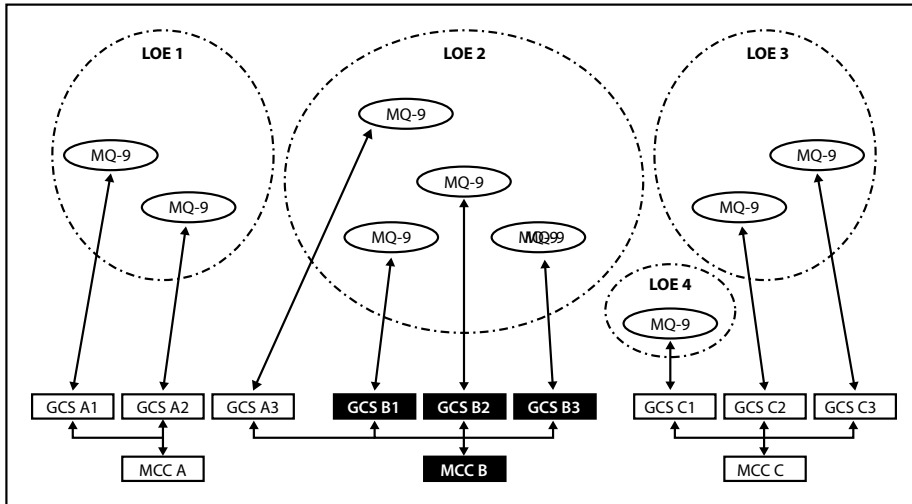

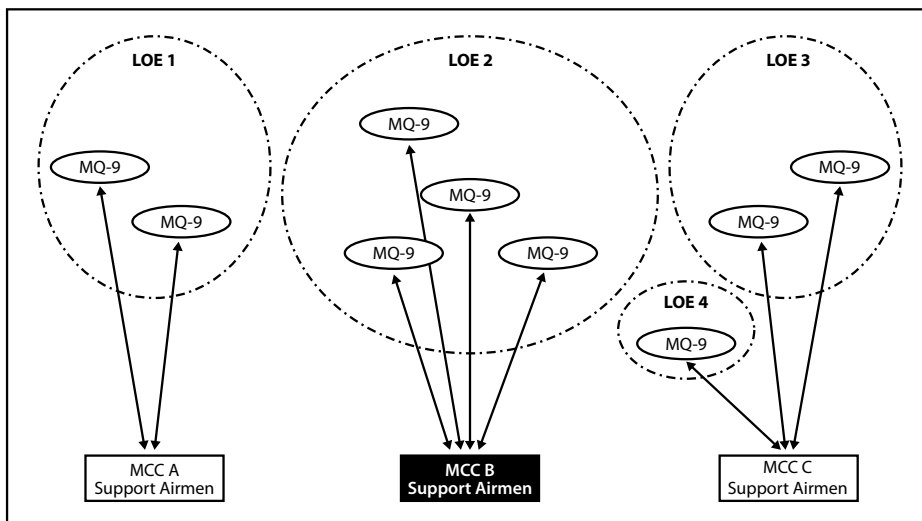**Figure 4. Enterprise-wide MQ-9 mission command**

Figure 5. Automation–enabled MQ-9 mission command

Summary

As stated in the beginning, this article is not intended to argue whether the USAF *should* utilize enlisted pilots. The focus is on *how* to best utilize our Airmen to maximize the capacity of the Air Force RPA enterprise to fulfill its mission. The argument made here is threefold: (1) command authority and accountability must remain with the commissioned officer, (2) the community must make a reasonable assumption of how the enterprise will fight in the future and develop toward that end, and (3) air mission command doctrine must be developed for the current RPA system architecture to maximize capacity now and enable the future. ✪

Notes

1. David Blair, "Stripes to Stars: Enlisted Airmen Deserve to Become Officers before They Become Pilots," 27 October 2015, http://warontherocks.com/2015/10/stripes-to-stars-enlisted-airmen-deserve-to-become-officers-before-they-become-pilots/.

2. Joint Publication 3-0, *Joint Operations*, 17 January 2017, II-2, http://www.dtic.mil/doctrine/new_pubs/jp3_0.pdf.

3. Paul Scharre, *Robotics on the Battlefield Part II: The Coming Swarm* (Washington, DC: Center for a New American Security, 2014), 5–7, accessed 7 March 2016, https://www.cnas.org/publications/reports/robotics-on-the-battlefield-part-ii-the-coming-swarm.

4. Scharre, *Robotics on the Battlefield*, 6.

5. Although there is some level of supervision by the current operations supervisor position within each RPA operations center, this is in no way the same thing as the mission commander (MCC) role proposed here. The supervisor fulfills an AFI 11-418 requirement for supervision, but the position is not doctrinally incorporated into the tactical operations of the RPA.

6. It is assumed that as the MCC position is developed over time, hardware solutions will increase the ability of an MCC to perform the role. For this discussion, the intent is to communicate that current operations center technology exists to provide sufficient situational awareness to perform the MCC role.

7. Department of the Air Force, Air Force instruction 11-202, 3: *General Flight Rules*, 10 August 2016, 7, http://static.e-publishing.af.mil/production/1/af_a3/publication/afi11-202v3/afi11-202v3.pdf.

Lt Col Dillon R. Patterson, ANG

Lieutenant Colonel Patterson (BS, Embry-Riddle Aeronautical University; MA, US Naval War College), Arizona Air National Guard, is a remotely piloted aircraft pilot with more than 3,000 hours of flight operations over Afghanistan, Iraq, and east Africa. He was a mission pilot of the RQ-170 Sentinel and an instructor/evaluator pilot of the MQ-1B Predator. He has also served on the National Guard Bureau staff and as a liaison officer to joint special operations task forces in Afghanistan and Iraq.