# ASPJ Air & Space Power Journal

Vol. 33, Issue 4

Winter 2019

# ASPJ Air & Space Power Journal





*Air & Space Power Journal*
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Maxwell AFB AL 36112-6010
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VOL. 33 NO. 4 WINTER 2019

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SENIOR LEADER PERSPECTIVE

# Unfinished Business

## Refining the Air Component Structure

Gen Jeffrey L. Harrigian, USAF
Maj Gen Charles S. Corcoran, USAF
Col Edward T. Spinelli, USAF
Col John C. McClung, USAF

### Senior Leader Forward

*Today's environment requires the Air Component to operate at speed, delivering lethal capabilities to the Combatant Commands. To do this, reviewing our functions and how we are formed revealed opportunities to optimize our construct and better align ourselves with our Joint partners. Though change can be challenging, it drives us to improve how we operate and deliver for our nation.*

—Gen Jeffrey L. Harrigian
Commander, US Air Forces in Europe-Air Forces
Africa Command (USAFE-AFAFRICA)


Building upon initiatives taken by United States Air Forces Central Command (AFCENT) in 2016, USAFE-AFAFRICA has continued the evolution of the Air Component structure, merging the traditional Air Force Forces (AFFOR) staff with the 603rd Air Operations Center (AOC), to create an organization that seamlessly provides airpower to United States European Command (EUCOM) and United States Africa Command (AFRICOM) across all phases of joint operations. The realignment's foundation is the Strategy-Planning-Execution-Assessment process developed in the USAFE-AFAFRICA five-year

Air Component Support Plan (ACSP) "playbook." Armed with the ACSP, the optimized USAFE-AFAFRICA Air Component is well-postured to provide air, space, and cyber power to the joint and coalition team across both areas of responsibility (AOR).

## The Problem

To support the long war, the primary focus of USAFE-AFAFRICA's AFFOR staff became the preparation of assigned forces for deployments supporting the global violent extremist organizations fight. Meanwhile, the 603rd AOC, aligned under the 3rd Air Force, was almost wholly focused on preparations for full-scale armed conflict in the EUCOM AOR.[1] The resurgence of Russia and the release of the 2018 *National Defense Strategy* (*NDS*) exposed a significant gap in this construct. Specifically, there was little focus on operations, activities, and investments in the air domain required to assure our allies and deter potential adversaries across the EUCOM AOR. The command needed an overhaul to ensure that all assigned resources (AFFOR and the 603rd AOC) had the necessary and proper focus on "Phase 0" and "Phase I" activities to support competition short of conflict with the appropriate speed and stance. Step one was the placement of the 603rd AOC directly under Air, Space, and Information Operations (A3), removing the deliberate separation between the AFFOR staff and the AOC while also aligning the organization with the Napoleonic Unified Command structure. Step two was the optimization of the combined organization, merging redundant and duplicative functions. The result is a single voice from the wing-level forces through the Air Component to the combatant command with the ability to strategize, plan, execute, and assess across the entire spectrum of conflict with speed.

## Strategy to Execution to Assessment

The 2018 *NDS* identified the ability to conduct multidomain operations at the speed of relevance as a key to success in great-power competition.[2] From the Air Component perspective, the ability to conduct multidomain operations at the speed of relevance requires an organizational structure that facilitates a clear line-of-effort (LOE) from the joint force air component commander's (JFACC) strategic intent to the execution of day-to-day operations. Historically, the USAFE-AFAFRICA Plans, Programs, and Analyses Directorate (A589) focused on deliberate operational planning and strategy development for Phase II theater contingency plans. Simultaneously, the Operations, Strategic Deterrence, and Nuclear Integration Directorate (A3/10) focused on current operations and monitoring the preparation of assigned units for the entire spectrum of conflict while maintaining a secondary focus on operational planning and the execution of conventional deterrence in the USEUCOM AOR.[3] Meanwhile, an additional entity—the 603rd AOC—executed a doctrinally-driven, overlapping current operations role. As such, A589 plans and A3/10 and 603rd AOC operations were not synchronized to ensure effective execution, which resulted in the decoupling of the strategy-to-task model, redundant and duplicative execution, and difficulty in assessing actual effects.

To ensure a clear strategy to task line-of-guidance exists, USAFE-AFAFRICA created an ACSP, implementing a methodical planning and assessment framework into the battle rhythm. This framework allows USAFE-AFAFRICA to assess activities against the combatant commanders' desired end states, ensuring operational objectives are aligned with the combatant command's strategic LOEs.

The ACSP describes how the Air Component will synchronize operations, activities, and investments across the entire spectrum of conflict, which, in turn, ensures holistically planned, executed, and analyzed assurance and deterrence activities. It is informed by both EUCOM and AFRICOM theater campaign objectives and combatant command plans. Most importantly, through its measures of effectiveness, the ACSP provides a tangible road map to gauge achievement of operational objectives.

## Tying it all Together

*This Air Component Support Plan is USAFE-AFAFRICA's "playbook" for the next 5 years. It is our guide to synchronizing operations, activities, and investments vital to the success of USEUCOM and USAFRICOM theater campaigns.*

General Harrigian
*U-A Air Component Support Plan 2019*

The ACSP seamlessly integrates strategic and operational assessment and drives the Air Component's Strategy-Planning-Execution-Assessment battle rhythm as depicted in figure 1.

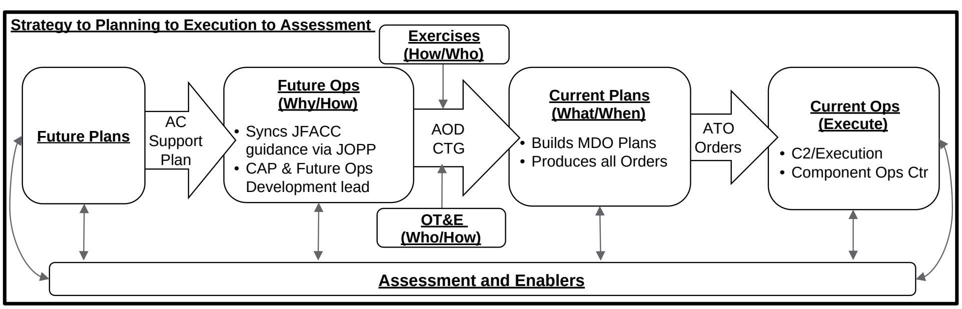


**Figure 1. Organizational Strategy-Planning-Execution-Assessment**

Within the A3/10, the Future Operations (A35) Division provides "the why" and "the how" to the rest of the Air Component. Additionally, Future Operations integrates with the Organize, Train, and Equip (OT&E) and Exercises Divisions to determine "who" is being directed. Future Operations also provides direction to the Current Plans (A36) Division via a myriad of products, such as the Air Operations Directive, which initiates the air tasking cycle and the creation of Command Training Guidance (CTG).[4] Next, Current Plans builds the plans and orders assigned forces to execute by providing "the what" and "the when." Finally, the Current Operations (A33) division commands and controls assigned forces and executes. Integrated throughout the entire process are force enablers, such as an Air Mobility (A34) and a Nonkinetic/Special Activities Operations (A39) division.

Finally, Future Operations codifies operational-level assessments, which, in turn, aids in producing updated air operations directives and CTG. Next, the Assessment Directorate (A9) leads the strategic assessment process for USAFE-AFAFRICA by measuring the command's effectiveness at achieving its operational objectives. These assessments are used to identify capability gaps and recommend adjustments to resourcing command priorities, weight-of-effort, or plans, including future ACSPs.[5]

## Refined Framework

*Past doctrinal distinctions between Air Force forces (AFFOR) and the AOC placed the Air Component at a disadvantage, or worst-case exclusion, when addressing COCOM and cross-component operational issues. Additionally, the distinct differences and separation of the AFFOR and AOC staffs previously articulated in Air Force doctrine and instructions have created confusion and dysfunction for operational elements both inside and outside the Air Component.*

Lt Gen CQ Brown Jr. and Lt Col Rick Fournier
"No Longer the Outlier: Updating the Air Component Structure"
*Air & Space Power Journal* 30, no. 1

## "No Longer the Outlier"

The USAFE-AFAFRICA A3/10 Directorate's optimized organizational structure was derived from AFCENT's framework and was heavily influenced by General Brown and Lieutenant Colonel Fournier's article, "No Longer the Outlier: Updating the Air Component Structure." USAFE-AFAFRICA removed the deliberate separation between the AFFOR staff and the AOC, aligning the organization with the Napoleonic Unified Command structure. The result is a single voice from the Air Component to the combatant command with the ability to strategize, plan, execute, and assess across the entire spectrum of conflict.

USAFE-AFAFRICA designed its Air Component structure based on the strategy, planning, execution, and assessment process described in the ACSP, as opposed to the traditional AOC/air tasking order (ATO) timeline paradigm. The revised structure flattens the organization by directly connecting the staff to the tactical point of execution, removing functional stovepipes, increasing transparency, and accelerating the speed of decision making. (see figure 2)

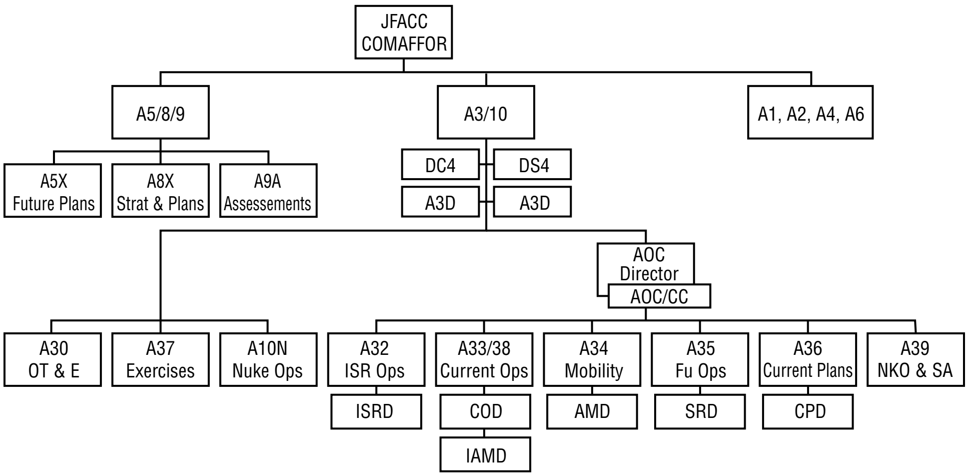


**Figure 2. Evolved air component structure**

Notes: The joint force air component commander (JFACC) has the discretion to assign any flag officer as the AOC director. During Phase 0/I operations, the A3/10 is the AOC director but has delegated the day-to-day operations down to the AOC commander.
The director of mobility forces is dual-hatted as the A34, DC4, and DS4 work directly for the JFACC and maintain a support relationship with the AOC.

Key: COMAFFOR: commander, Air Force Forces; A1: manpower, personnel and services; A2: intelligence, surveillance, and reconnaissance; A4: logistics; A5/8/9: plans programs and analyses; A6: communication; DC4: director of cyber forces: DS4: director of space forces; A3D: operations deputy; Fu Ops: future operations division; NKO and SA: nonkinetic operations and special activities; ISRD: intelligence, surveillance, and reconnaissance Division; COD: Combat Operations Division; IAMD: Integrated Air and Missile Defense; AMD: Air Mobility Division; SRD: Strategy Division; and CPD: Combat Plans Division.

- The A5X (Future Plans) develops the commander, USAFE-AFAFRICA (COMUSAFE-AFAFRICA) contingency and steady state plans by leading the Air Component through the joint planning process. In coordination with other directorates, the A5X develops the Air Component's operational approach and commander's intent, then relays it to the rest of the Air Component via the ACSP.
- The AOC commander is responsible for all traditional A3 COMAFFOR divisions and the traditional AOC roles, granting them the authority and responsibility to manage all phases of the A3 Strategy-Planning-Execution-Assessment process.
- The A35 (Future Operations) operationalizes ACSP guidance by providing linkages to the embedded objectives via an operational annex. This annex informs the Air Component by integrating/prioritizing multidomain operations and ex-

ercises. Using the ACSP annexes, the A35, in conjunction with the A30 (OT&E) and A37 (Exercises), produces the AOD and CTG.

• The USAFE-AFAFRICA A35 differs from the AFCENT model, as it includes the AOC's SRD. In AFCENT, the A35 is centered on the AOC's CPD. USAFE-AFAFRICA diverged from AFCENT's methodology because of the long timeline and inherent strategic nature of assurance and deterrence activities. This new concept falls outside the doctrinal 96-hour time horizon for the SRD, forcing a closer collaboration between the A35 and A5.[6] To facilitate this change, the traditional AFFOR Operations and Plans division and Global Force Management branch were integrated into the A35.

• The A36 builds detailed multidomain operations plans, informed by the guidance produced by the A35.[7] The A36 converts plans into tasks and assigns them via the ATO, planning documents, and orders.

• The A36 includes the AOC's CPD and is guided by the A35 products. In this optimized construct, the A36 must look beyond the doctrinal 72-hour ATO cycle.[8] To assist with this task, the A36 incorporated the AFFOR staff Current Operations branch.

• The A33/38 (Current Operations/IAMD) oversees execution of all EUCOM and AFRICOM air component operations and provides a single point of entry for higher headquarters and fielded units. The A33/38 is also the focal point for execution of IAMD and advises COMUSAFE-AFAFRICA in his/her role as the area air defense commander.

• The A-32 and A-34's roles as the Air Mobility Division and Intelligence, Surveillance, and Reconnaissance Division have not changed.

• Nonkinetic/Special Activities Operations provides operational-level command and control of space, electronic warfare, cyber, and information warfare operations. The A39 is matrixed across the Air Component. This ensures multidomain effects are integrated throughout the Strat-Task battle rhythm while maintaining a single chain of command.

• Strategic deterrence and nuclear integration (A10N) remains the focal point for nuclear operations, providing policy, guidance, and oversight for nuclear operations and command and control.

## Conclusion

USAFE-AFAFRICA's optimized Air Component structure improves the command's ability to support joint and coalition partners in the AFRICOM and EUCOM AORs across the spectrum of competition to conflict, but the evolution is not complete. Further analysis on the proper integration of intelligence, logistics, and nonkinetic operations, both within the A3/10 directorate and across the larger Air Component staff, must be accomplished. Additionally, we continue to review the role of the numbered Air Force in this optimized structure. Regardless of future evolution, the current realignment is producing positive results, providing four-star Air Component leadership with timely decision quality information, ensuring lethal airpower in the EUCOM and AFRICOM AORs. ✪

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General Harrigian (MA, Marshall Center; BS, United States Air Force Academy) is the commander of US Air Forces in Europe-US Air Forces Africa (USAFE-AFAFRICA), and Allied Air Command; and director of Joint Air Power Competence Centre. He is responsible for the air and missile defense of 29 North Atlantic Treaty Organization alliance member nations and commands US airpower across more than 19 million square miles.

**Maj Gen Charles S. Corcoran, USAF**

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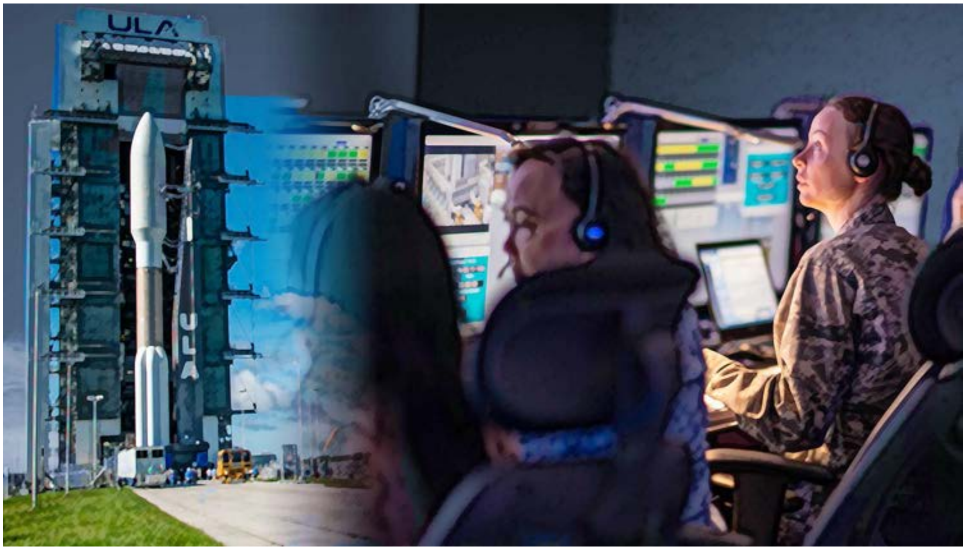
## Notes

1. Curtis E. LeMay Center for Doctrine Development and Education, "Appendix C: The Air Force Forces Staff," in *Annex 3-30, Command and Control*, 7 November 2014, 41, https://www.doctrine.af.mil/.
2. DOD, *National Defense Strategy* (Arlington, VA: Pentagon, 2018), 7, https://dod.defense.gov/.
3. U-A Instruction 10-1, *Concept of Operations for HQ USAFE-AFAFRICA,* 47, para. 5.1.
4. AFI 13-1AOC, vol. 3, *Operational Procedures—Air Operations Center* (*AOC*), 22, para. 3.1, https://static.e-publishing.af.mil/.
5. *U-A Air Component Support Plan 2019,* ii.
6. AFI 13-1AOC, vol. 3, *Operational Procedures*, 22, para. 3.1.
7. AFI 13-1AOC, vol. 3, *Operational Procedures,* 26.
8. AFI 13-1AOC, vol. 3, *Operational Procedures*, 29.

FEATURE

# Space Power and the Foundations of an Independent Space Force

LTC Brad Townsend, USA




Even though the debate over whether to establish a Space Force has moved on to the specific form it will eventually take, the debate over its creation has highlighted important arguments that need to be addressed for the new service to fully mature. Failing to address these concerns will lead to lingering issues that will negatively impact the Space Force's future development and interactions with the other services, particularly the Air Force. In *Organizing Space Power: Conditions for Creating a US Space Force*, the now-retired Lt Col Michael Martindale and Lt Gen David A. Deptula made one of the most cogently argued cases for a conditions-based approach to identifying the need for a separate space service.[1] They identified five conditions that must be met before the creation of a separate Space Force is justified. Three of these conditions are fully or partially met—political will, a societal view of the US as a space power, and the demonstrated ability of space power to fulfill peacetime roles. However, the authors also identified two conditions that they argued remain unmet—the development of a general theory of space power and the demonstrated capability to produce direct combat effects in and from space. This article will set a foundation to address the first concern by distilling three central space power principles from existing space power theories. It will also argue that the logic supporting the final condition is flawed and should not hinder the development of a space-focused service.

## Fundamental Elements of Space Power

The outlines of a space power theory are necessary since at sea, in the air, and on land, there are theories of war that influence policy and form the paradigm for strategic thought in these domains. These theories influence national policy by generating a functional theory of war that allows for the accurate assessment of military strategies. The shape of that theory does not have to be consciously present in the mind of the policy maker or military strategist. However, without that paradigm, the coherent formulation of policy and strategy lacks structure and direction. A sound space power theory allows for the controlled development and application of military power in space. Absent a controlling theory, warfare in space is nothing more than a contest to see which side can destroy or disable more enemy space assets. While a straightforward military objective, it begs the question: to what end? The form and function of military forces are a means to achieve specific goals in support of political ends. Structuring military space doctrine and acquisition around simplistic poorly understood concepts of dominance or control is only the beginning of the evolution of understanding war in space.

Military theory is not static; it is continually evolving. A new theory, or a reinterpretation of an existing theory, arises whenever the strategies derived from accepted theory fail the test of war or are challenged by the development of new technology. These new or reinterpreted theories form the basis of military strategy that attempt to apply theory to reality. Often, a supposedly new theory is nothing more than an old theory applied to new circumstances and technologies. Whether a new theory suited specifically to space is eventually formulated or an older theory is adapted to fit the newest war-fighting domain is unimportant. A coherent national military space strategy cannot exist without a broadly accepted theory of space power upon which to build upon or at least a set of guiding principles.

Before addressing the existing theories of space power, it is instructive to attempt to define the term itself. What is *space power*? There is no accepted definition of the term. Looking to US military doctrine for a description of space power seems the easiest and most straightforward way to determine a definitive *space power* definition. However, current US military doctrine does not include an independent definition of *space power*. The 2018 version of Joint Publication (JP) 3-14, *Space Operations*, includes *space power* in its glossary but lists "none, approved for removal from the DOD dictionary," as the definition.[2] No specific explanation is given for its removal, but in *US Air Force Doctrine Document 1* (AFDD-1) a possible explanation appears. In AFDD-1, the term *airpower* is not used separately from space power but instead used as a single term—*air and space power*—throughout the document.[3] The USAF controls the bulk of US military space assets, and at the time AFDD-1 was written, there were the beginnings of a significant movement to separate space functions from those assets. Therefore, this mashup of domains was probably a misguided attempt to conflate them for organizational reasons, further harming the development of an independent and useful space power theory.

It is possible to find a definition of *space power* in earlier official documents. The 2009 version of JP 3-14 defines *space power* as "the total strength of a nation's capabilities to conduct and influence activities to, in, through, and from space to achieve its objectives."[4] This definition seems to be broad enough to capture all elements of space power—military and civilian— and is similar to other earlier definitions *of space power*. Writing in 1988, David Lupton developed one of the earliest theories of space power. He advocated a policy of space control through force and described *space power* as "the ability of a nation to exploit the space environment in pursuit of national goals and purposes and includes the entire astronautical capabilities of the nation."[5] This definition is broadly echoed by a later RAND study that defined *space power* as "the pursuit of national objectives through the medium of space and the use of space capabilities."[6] These definitions also support the concept that *space power* is more than just the military aspects of the domain; it also includes the commercial and political aspects of space working in concert to achieve some national goal.

These definitions seem almost too broad to serve as a basis for a working theory of *space power*. Rather than focusing on several quantifiable aspects of *space power* as the basis upon which to build a useful theory, they attempt to capture all aspects of power in space. Despite this, some theorists would still call these definitions too specific. In *Developing National Power in Space,* Brent D. Ziarnick criticizes definitions such as the one in JP 3-14 as "descriptions of unique cases of applied space power."[7] He argues instead for the broadest possible definition derived from Brig Gen William Mitchell's description of *airpower* as "the ability to do something in the air." It becomes a definition of *space power* that simply replaces *air* with *space*.[8] In so doing, Ziarnick establishes the broadest possible definition and one that is elegant in its simplicity. What it lacks is a tie back to why space is relevant to military forces that allows for the construction of a useful contemporary military theory. The ability to accomplish things in space has little relevance unless those things support national objectives. Moreover, because national objectives are so often tied to where people live—on land, or at least on Earth—that is where the impact of space power must be measured to gain traction with a larger audience.

Alfred Thayer Mahan is an example of a military theorist who made a previously difficult to quantify military domain suddenly relevant. In his book, *The Influence of Sea Power upon History,* Mahan argued that the contribution of mastery of the sea to victory in warfare was severely underappreciated. He cleverly used a quote from George Washington to make his central point, "no land force can act decisively unless accompanied by a maritime superiority."[9] By demonstrating how actions at sea lead to success on land, Mahan allowed his readers to grasp the fundamental importance of sea power to nations. This seemingly simple realization, not entirely novel, as demonstrated by Washington's quote from a century earlier, forms the core of Mahan's theory. When supported by historical examples and fleshed out into a more comprehensive analysis, its impact was enormous.

While Mahan's target audience was American, he had a global impact that shaped history. German Kaiser Wilhelm stated that "I am… not reading but devouring Captain Mahan's book... it is on board all of my ships and constantly quoted by all of my captains and officers."[10] Germany and the other great nations latched onto Mahan's theory of sea power, and a naval arms race commenced between Britain and Germany in the years leading up to World War I. The suboptimal naval arms race that ensued and the larger build-up leading to World War I has become the subject of international relations research ever since.[11] The outsize influence that Mahan's book had demonstrates the impact that a military theory can have as a paradigm upon which nations build strategy and policy.

Developing a theory of space power is made doubly difficult because, unlike the sea, space is an untested domain. Humanity lacks any empirical evidence on the nature of conflict within it. Of course, this is a condition worth preserving, but it does prevent any space power theory from gaining traction from historical examples as Mahan's did. This lack of domain-specific evidence leads would-be-Mahans to attempt to adapt existing theories of war to space. The most popular domains from which to adopt theories are the existing fluid domains, sea and air. Theories of sea power are particularly attractive as they revolve around actions in one domain indirectly influencing action in another. This interaction contrasts with most airpower theories as they focus on the benefits of direct application of kinetic effects from the air to contribute decisively to victory on the land or at sea. One of the more successful applications of an existing theory was John Klein's effort to adapt sea power theorist Julian Corbett's work to space.

Corbett was a near contemporary with Mahan, and his principal work of military theory, *Some Principles of Maritime Strategy*, was published just 20 years after Mahan's in 1911. While Mahan's thinking was an adaption of earlier work by one of Napoleon's generals, Antoine-Henri Jomini, Corbett's treatise on sea power was an adaption of the more nuanced work of the Prussian Gen Carl von Clausewitz to the sea. The central point of Corbett's theory of sea power argued that the "object of naval warfare is to control maritime communications."[12] This theory contrasted with Mahan's theory of sea power in that it strongly supported the construction of vessels adapted for the pursuit of commerce such as cruisers as well as a battlefleet, whereas Mahan argued that attempts to disrupt commerce were at best secondary to the construction of a battle fleet.[13] Klein adapted Corbett's central theory of sea power to space by modifying it to argue that "command of space entails the ability to ensure access and use of celestial lines of communications when needed to support the instruments of national power—diplomatic, economic, information, and military."[14]

Klein's theory argues for more than the control of space, rather he argues for the subtler concept, "command of space."[15] The command of space is achieved through presence, coercion, and force. The concept of presence highlights the fact that nations that have few or no assets in space have little influence on the domain. The degree of a nation's space presence allows it to shape international treaties, regulations, and customary practice. Today, the US has by far the largest space presence. Therefore, its actions and behavior set the baseline for other nations for better or worse. The second piece in achieving command of space is coercion. Coercion "occurs short of open hostilities but may be the result of the implicit or explicit threat of detrimental action."[16] Presence in space is a prerequisite for coercion and impacts the degree to which a nation can employ it. Coercion in space may take on diplomatic, economic, or informational forms. Coercion through diplomatic means comes in the form of international agreements and other forms of norm establishing. Economic coercion can involve denying launch services, satellite construction services, or vital space technology to another nation. Informational coercion relies upon the use of space-based communications to transmit a viewpoint in opposition to a state's adversary. The US transmission of the Voice of America (VOA) broadcast into Iran using satellites is an example of informational coercion. This method of coercion is seen as disruptive enough that Iran actively jams satellites carrying VOA broadcasts.[17]

According to Klein, the final aspect of the command of space is command through force. Command through force usually only occurs when a state of open conflict exists between two nations. Returning to the core argument of Klein's work, command through force is achieved by ensuring one's own celestial lines of communication while denying those same lines to the enemy. Since the primary value of space lies in its usefulness for transmitting and gathering information, it is the ability to preserve access to information or to deny it to an opponent that provides command through force. Klein's core concepts are sound though his

Corbett-derived celestial line of communications approach is just one method for describing space power.

Building upon his definition of *space power* discussed earlier, Ziarnick's work mentioned above attempts to create a structure for space power theory that echoes JFC Fuller's theoretical work in detail and scope. He borrows from Clausewitz's famous work *On War* the concept that space, like war, must have logic and grammar. He argues that space may have its own grammar but not its own logic. The specific grammar in his theory is a modification of Mahan's assertion that the basis of sea power lies in commerce, bases, and ships. He modifies this into a grammar for space power, the basis of which lies in production, shipping, and colonies centered on access. Ziarnick develops this theory further with a logic that relies on economic, military, and political power. Ziarnick's theory is complex and well-developed, but it suffers from being too anticipatory to truly be useful today, though it may very well stand the test of time. Much as Jomini dominated 19th-century thinking while his contemporary Clausewitz's work suffered from anonymity, Ziarnick's work will probably age well as military and commercial space activities expand beyond Earth's orbit.

Among the most recent publications dedicated to the formulation of comprehensive space strategy is the aptly named *Space Strategy* by Jean-Luc Lefebvre that was only recently translated into English. To Lefebvre, the key to space power is "acquiring the human and technical resources to increase one's freedom of action, while aiming to reduce an opponent's."[18] Toward this end, he identifies 12 principles of space warfare broken into three categories that he labels preliminary, cardinal, and complementary. The preliminary principles center on space situational awareness, investment, public engagement, and training.[19] The cardinal principles include ensuring technical and physical access to space, avoiding the generation of orbital debris, and stealth. Finally, his complementary principles are to: take advantage of the physical geography of space, promote and protect non-physical lines of communication, promote resilience, and ensure effects are designed to influence events on Earth. Lefebvre's language and descriptions are awkward and often esoteric, but the essential elements of a valid space power theory are present if poorly developed.

Former Air Force officer and National Aeronautics and Space Administration engineer Jim Oberg proposed a more conventional space power theory than Ziarnick or Lefebvre. He describes *space power* as including all aspects of civil, commercial and military space activity.[20] The primary characteristic of space systems in Oberg's theory is their ability to view the world from orbit. This characteristic enables the most strategically relevant aspect of these space assets that is their ability to transfer and gather information.[21] Moreover, since the commercial industry controls the vast majority of systems on orbit, it will be commercial platforms that transmit and gather the majority of information. Being the primary source of most information means that "it will be the commercial manufacturers, owners, operators, and users who will contribute the larger, if less clearly perceptible, aspects of space power."[22] Oberg cites the influence of the commercial industry as the largest complicating factor in determining a clear formula for developing a comprehensive theory of space power.

Further, Oberg argues that as commercial entities become increasingly internationalized and so available for purchase by anyone "that a common level of space support will soon be available to citizens of all nations, including their armies."[23] Since the time of his writing in 1999, this objective has largely been achieved. The level of detail and ease of availability of commercial imagery from tools like Google Earth and the ubiquitous embedding of the Global Positioning System in commercial devices brings a degree of space support to the average individual that even the US military was incapable of providing little more than a decade ago.

There are several additional tenets of Oberg's theory of space power that are worth considering. First, Oberg cautions that space power by itself "is insufficient to control the outcome of terrestrial conflict or ensure the attainment of terrestrial political objectives."[24] Oberg makes this point explicitly to avoid the mistakes made by early airpower theorists who consistently overpromised and underdelivered. In Oberg's opinion, the control of space is only important in relation to its ability to influence events on Earth. This is something that it can only do when working in conjunction with other elements of national power and only when a nation has adequate control of space.

This need for control leads to another tenet of Oberg's theory, that "control of space is the linchpin upon which a nation's space power depends."[25] Unlike Lupton's theory of space power mentioned earlier that argued for control of space "through the destruction of the enemy's space forces," Oberg takes a broader view.[26] Oberg argues that space control and, therefore, space power will accrue to the nation with the largest space presence. This again reinforces the importance of commercial systems since they increasingly represent the majority of systems on orbit. The nation with the most significant commercial space industrial base will have the largest presence on orbit and as a result, the greatest degree of space control and space power. The commercial aspect of space power emphasized by Oberg does not mean that military strategy is irrelevant in space; the objective remains preserving your own information flow while disrupting an opponent's information flow when necessary. It does mean that since the majority of information will flow over commercial satellites, any military strategy involving space must account for their presence. In the end, even with its more commercial focus, Oberg's theory has much in common with Klein's theory of space power.

Both Oberg's and Klein's theories of space power place the primacy of information at the core of their theories, and its importance is highlighted in Lefebvre's theory. Both Oberg's and Klein's theories also develop the idea that the degree of presence in space is a large part of what gives a nation power and control over it. Oberg draws the connection between on-orbit presence and commercial systems explicitly while Klein only hints at it in his work. These theories also share the idea that actions in space are dependent on and in support of other war-fighting domains. The degree of agreement between the two theories points to several ideas that, taken together, form an adequate foundation for a functioning theory of space power:

- Space power is directly proportional to a nation's presence in space.
- The strategic value of space in our current era lies in the ability to transfer information through it and to gather information from it.
- Space is a supporting domain that is only relevant to the degree that it influences terrestrial events.
- These three core principles have varied implications for the development of an independent Space Force and the future of US space power.

The most obvious application of the first of these principles is that it provides a direct and simple method for measuring the relative space power of the US. Currently, the US has the largest presence on orbit with more than 800 military and commercial satellites active on orbit today, more than twice as many as China and Russia combined.[27] With the advent of small satellite constellations, that number is set to rapidly expand in the next decade. While these satellites will be individually smaller and less capable than most existing satellites, their collective capabilities far exceed those of any existing individual satellite. Concerns that the large number of satellites present in constellations can skew calculations of space presence and so are not valid proxies for space power are challenged by the technical achievement they represent. Satellite constellations signal that a nation has the necessary industrial base to mass produce satellites and access to a launch infrastructure that makes putting them in orbit economically feasible. Having this necessary base demonstrates that other factors that could also be used to measure relative space power, such as the number of launches or expenditures on space related programs, are largely supporting measures that are relevant only to the degree that they assist in achieving the end state of space presence.[28]

Using presence as a method of measuring relative space power is useful, though a more important question is why presence equates to power and how it can be applied. Space presence allows a nation to shape regulations and customary practice in orbit largely independent of other measures of national power. For example, Russia has an economy that is equivalent to South Korea's economy, but Russia's extensive space presence makes its actions and behavior in space a matter of ongoing global concern. In contrast, South Korea's limited space presence makes it a bit player in space policy.[29] The US has successfully leveraged its space presence to establish norms for the mitigation of debris on orbit and the sharing of tracking data on space objects among more than 67 nations and organizations.[30] This has established the nucleus of a shared international tracking network and established standards for notifications and messages. Domestic US regulations on debris mitigation in space have also served to establish the baseline for international organizations.[31] Even the international organization that serves as a forum for establishing space debris guidelines—the Inter-Agency Space Debris Coordination Committee—exists as the result of US leadership.[32] These examples demonstrate how a national space presence creates a need for regulations and norms that, in turn, set global standards that reinforce a nation's space power. The US has failed to effectively use its dominant presence in space through pushing beyond basic regulations and toward the creation of international treaties governing behavior in space that conform with its national objectives.

Since the end of the Cold War era, the US has actively opposed the creation of additional space-related treaties. Most notably, the US has resisted the Chinese and Russian-supported "Treaty on the Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force Against Outer Space Objects" (PPWT). China and Russia have updated the PPWT several times in an effort to win more support, but the US has consistently opposed these efforts. Calling the original version of the treaty and subsequent updates as "fundamentally flawed," US officials argue that the treaty lacks an adequate verification mechanism as well as any restrictions on ground-based antisatellite weapons.[33] According to the US representative to the Geneva-based Conference on Disarmament, these shortcomings in the PPWT mean that a nation "could develop a readily deployable space-based weapons break-out capability" shortly after withdrawing from the treaty.[34] This US resistance has not stopped China from continuing to push for a treaty designed to prevent an arms race in space. In 2018, China's assistant foreign minister again called for a joint international effort to prevent an arms race in outer space.[35]

Whether the PPWT is a diplomatic effort by Russia and China to gain military advantage or a genuine effort to avoid an arms race in space is impossible to judge due to the lack of meaningful US counterproposals. A US counterproposal on arms control in space would test the sincerity of Russia and China to embrace arms control. Absent this proposal, the US is largely abandoning the diplomatic element of national power in space that is a consequence of its dominant space presence. Instead, the US is focused on the military and economic elements of components of space power. Recognition that space power has both hard and soft aspects is key to understanding the first foundational principle of space power articulated above and a key future role for any space-centered force.

The second foundational principle focuses on the primacy of space as an information-centric domain. It is the US military's unparalleled ability to transmit, gather, and leverage information that makes it the world's preeminent war-fighting force. Without it, US forces are severely handicapped at all levels to a degree that is not readily apparent. For the most part, the space linkages in US military systems are invisible to the user and so go underappreciated. Not so for potential US opponents. It is their recognition that US war-fighting capabilities are dependent on space systems that has spurred the current redefining of space as a war-fighting domain. No doubt the primary task for current and future space forces will be to develop methods for preserving these critical information nodes and links in the face of adversary interference or attack to preserve the US information advantage.

The third foundational principle, that space is a supporting domain, stems from the information-centric nature of military space described in the second principle.[36] Space is an enabling domain for terrestrial military operations. Actions that take place in space are relevant only to the degree that they impact events on Earth. Since it is information-centric, it makes little sense for military action in space to occur independent of terrestrial conflict. The destruction of an opponent's space assets while preserving your own is meaningless if the advantage that the resulting information dominance provides does not result in a desirable political outcome on Earth. Absent any other military action that capitalizes on the destruction of an opponent's space assets, no meaningful direct advantage has been gained by the attacker. Accepting the second principle, that the military utility of space is information-centric, inevitably leads to the conclusion that space remains primarily a supporting domain, albeit one where actions on the ground can also support its mission of preserving the advantages of information dominance.

## Reframing the Contribution to Victory

While recognition that space is an information-centric domain that supports terrestrial war fighting provides clarity of military purpose, it also creates difficulties for a separate Space Force. Martindale and Deptula's final unmet condition for a separate service—that it demonstrate the capability to produce direct combat effects in and from space—is based on the idea that airpower needed to demonstrate that direct combat effects in and from the air "significantly contributed to victory" in World War II.[37] Martindale and Deptula are not alone in hinging their argument against a separate Space Force on this point. This same line of argument is one of the fundamental points that the Air Force Association makes against a separate Space Force.[38] Their objections are understandable. The inability of current space forces to create direct combat effects harkens back to the earliest days of airpower when aircraft were only used for reconnaissance and seen as little more than toys. It was only after aircraft demonstrated that direct combat effects delivered from the air could directly contribute to victory that arguments for a separate Air Force gained traction. Relying on this paradigm for service creation, the opponents of a separate Space Force have a valid point. The difference is that modern military dominance is now nearly synonymous with information dominance, not only straightforward kinetic effects.

Information has always been vital to success in warfare. Accurate knowledge of the disposition of an opponent's forces has always been critical to a commander's ability to bring kinetic effects to the desired location in pursuit of victory. What has changed is that in modern warfare the true challenge is no longer placing a kinetic effect on a specific location; rather, it is determining the correct location to place the kinetic effect. Without space-enabled information, effective targeting on the modern battlefield is not impossible, just very difficult. Space might not directly create kinetic effects on the ground, but it does directly contribute to victory. If kinetic effects are no longer the only way to provide a critical contribution to victory, perhaps the metric that opponents of a Space Force are relying on is just misinterpreted.

The specific arguments that Martindale and Deptula make in support of establishing kinetic effects as a prerequisite for a separate service can be deconstructed into two pieces. The first is implicit, that a separate service must operate in a defined domain. The second part of the arguments is that a separate service must provide a key contribution to victory from that domain. Space clearly meets the first condition and has arguably achieved the second condition as well. Using this reframed version of their fifth condition as the case against a separate Space Force looks much weaker. In fact, using an information-centric approach to contribute to victory as a precondition for a separate service also supports the case for an independent Cyber Force as well, especially given the vital linkages between cyber dominance and the effective distribution of information gathered or transmitted by space systems. Establishing the principle that a service can significantly contribute to victory by gathering and distributing information that enable kinetic effects rather than delivering kinetic effects directly is the core idea that must be understood for a Space Force to gain equal footing with the other services.

## Conclusion

There are valid arguments for and against the creation of a separate Space Force that must be addressed even as the new force is in the process of creation. The two unmet conditions identified by Martindale and Deptula are representative of these arguments. Their concerns are also much closer to being met than it first appears. The first unmet condition—the lack of a general—theory of space power is edging closer to fulfillment. The reality is that an accepted and comprehensive space power theory is impossible given the paucity of real-world experience of conflict in space, though foundational principles discussed here provide a simple baseline for understanding the military utility of space in our current era. The second unmet condition—the inability to produce direct combat effects in and from space—is possible to reframe based on the fundamental logic that led to the development of the condition. Once reframed as the ability to materially contribute to victory, the case for a separate Space Force becomes much stronger. In a future where the degree of information dominance will determine victory or defeat, the contribution of information-centric domains must be taken as seriously as those that focus on providing kinetic effects. This is true even if information-centric domains remain in support of those domains that can provide kinetic effects. Recognition of this difference will allow a future Space Force to stand on even footing with its more traditionally kinetic peers. ✪

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**Notes**

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15. Klein, 60.

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19. The terms used here to summarize Lefebvre's are not literal from his work but rather the author's summary to remain concise. For instance, rather than simply using the term *engagement*, Lefebvre says: "elicit a sense of wonder turned toward the stars."

20. James E. Oberg, *Space Power Theory* (Colorado Springs, CO: US Air Force Academy Government Printing Office, 1999), 125.

21. Oberg, 125.

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23. Oberg, 126.

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28. An argument can be made that the supporting aspects of space presence such as ground and launch infrastructure/capability are direct rather than supporting measures of space presence. However, these are supporting measures only. For example, a nation with hundreds of ground stations but no satellites on orbit is irrelevant in the space domain and could not be described as having a space presence while a nation with hundreds of satellites, but only one or two ground stations, has a large space presence. It might be militarily vulnerable to losing access to its space assets, but it still has a large space presence.

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FEATURE

# Evaluating the Train-Advise-Assist Mission Impact on Engineering and Facilities Management in the Afghan Air Force

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## Problem Statement

The Afghan Air Force (AAF) continues to make significant strides toward becoming a professional, sustainable, and capable air force. In the spring of 2017, the coalition began planning efforts (known as AAF modernization) to increase the AAF's capacity. This increase led to the AAF doubling its current aircraft inventory and increasing its personnel from 8,000–12,000 people by 2023.[1] While much attention has been directed toward AAF flying and maintenance activities and their associated effects on the battlefield, many other AAF support functions receive similar attention from the US-led coalition in contract support and/or train, advise, and assist (TAA) activities.

The purpose of this article is to discuss the current state of engineering and facilities management within the AAF and the extent that TAA activities influence its development. We accomplish this in six parts. First, we provide a background and overview of the AAF and associated air advisor predeployment training. Next, we present a brief overview of the challenges affecting the Afghans' ability to manage, operate, and maintain their built infrastructure (buildings, roads, and utilities) as reported by the Special Inspector General for Afghan Reconstruction. This overview adds to the reader's context and serves as the basis for subsequent portions of this article. We then describe the Afghan and coalition's current execution methods for managing infrastructure at AAF installations coupled with the assessment methods used when evaluating the AAF engineers' progress. The fourth portion contains a brief overview of the engineering-specific TAA activities performed by air advisors to further develop AAF engineer capabilities. We then analyze the effect of current TAA activities via case study analysis of a recent engineering TAA efforts at Kabul Air Wing. Finally, we conclude with offering recommendations based on one year of field work in Afghanistan and working with the AAF civil engineers from March 2017–March 2018.

## AAF Background

The AAF's history, tracing back to the 1920s, can be characterized as an air force dependent on other nations for support and currently transitioning from a heavy Soviet influence to a US and coalition-based air force.[2] The AAF's creation began during King Amanullah Khan's reign when he began accepting aircraft from the British, Italians, and Soviets and sent pilots to Italy and the Soviet Union for training. Aircraft purchases increased in the 1930s as the AAF also began developing its maintenance capability on a limited number of aircraft. The AAF's capabilities dropped substantially after World War II due to challenging logistics issues and weakening support from partner nations that became more preoccupied with their survival. The AAF began rebuilding through the 1940s, largely through a revitalized relationship with the Soviet Union that resulted in additional Soviet aircraft such as MiG-17 and MiG-21 fighters, Mi-8 helicopters, Il-28 bombers, and other transport aircraft. The buildup continued in the 1970s with additional aircraft, including the Su-7 fighter, bringing the AAF's aircraft total to more than 500 aircraft by some estimates during the beginning of the Soviet-Afghan war. During the latter half of the 1980s when the Soviet withdrawal from Afghanistan became inevitable, the Soviets built up the AAF in hopes of it helping to stabilize the communist regime led by Dr. Mohammad Najibullah. However, the 1990s brought greater instability within Afghanistan as well as the rise of the Taliban, resulting in a greatly reduced AAF in terms of aircraft and capabilities.

It wasn't until 2005 and after the establishment of a US-friendly government in Kabul in 2002 that the AAF began to re-experience significant foreign investment.[3] At that time, US Secretary of Defense Donald Rumsfeld directed the creation of a presidential air wing. In 2007, the Combined Air Power Transition Force–Afghanistan (CAPTF-A) was formed to begin to "set the conditions for a fully independent and operationally capable" air corps.[4] At this point, the Afghan Air Corps consisted of only a couple dozen aircraft, but over time, additional countries like the United Arab Emirates, the Czech Republic, and Ukraine began donating An-32 aircraft and Mi-17 helicopters. In 2008, the Afghan Air Corps experienced further momentum by way of the US Air Force, institutionalizing the CAPTF-A mission via activating the 438th Air Expeditionary Wing (438th AEW). The Afghan Air Corps later moved to its new home in early 2009, a constructed cantonment area in the North Kabul International Airport area that was previously demined of thousands of unexploded ordnance devices, primarily from the 1980s. That same year, Afghan pilot candidates began English classes and follow-on undergraduate pilot training in the US. In 2010, the CAPTF-A mission was replaced with the North Atlantic Treaty Organization (NATO) Air Training Command–Afghanistan (NATC-A), and by 2011, almost 30 countries had contributed to rebuilding the Afghan air corps in this "train and advise" mission in Afghanistan.

From 2013–18, the AAF began the transition to multiple US-made aircraft; namely, the C-208, C-130, A-29 fixed-wing aircraft, and the MD-530 helicopter. The Mi-17 and Mi-35 have continued as reliable workhorses for the AAF but will eventually be phased out over time with the fielding of the UH-60 Black Hawk. The AAF operates from four primary locations: Kabul, Kandahar, Mazar-e-Sharif, and Shindand. With these aircraft, the AAF conducts light tactical airlift, troop transport and medium-lift, aerial assault, and close air attack in support of the Afghan National Army's (ANA) combat forces. The AAF has continued to develop its air capabilities further, adding airdrop to its mission portfolio in 2017 and of mission capabilities by successfully conducting its first successful aerial resupply mission.[5] The AAF's numerous accomplishments are due in part to the train, advise, and assist efforts of the 438th AEW, or Train, Advise, Assist–Command (TAAC)-Air, the name given the unit under its NATO mission for Operation Resolute Support. The unit's mission is to train, advise, and assist the AAF into a professional, sustainable, and capable air force.

In the summer of 2017, the 9th Air and Space Expeditionary Task Force (AETF)-Afghanistan, along with TAAC-Air, began the initial planning efforts to further modernize the AAF. The almost $7 billion, six-year program represents a significant investment by the US and its coalition partners that includes aircraft procurement, maintenance, training, and sustainment activities determined to further transition the AAF into a more professional, sustainable, and capable air force.[6] To facilitate this growth in aircraft capability, the 438th AEW work *Shona* *ba Shona* (Dari for "shoulder-to-shoulder") with the AAF to further build on its current capabilities, experience, and expertise.

## Air Advisor Predeployment Training

Airmen slated for air advisory duty at a deployed location like Afghanistan undergo approximately six weeks of predeployment training. The training consists of one week of evasion and conduct after capture at JB San Antonio–Lackland, Texas; three weeks of field training, designated "Field Craft Hostile" and "Field Craft CENTCOM" at JB McGuire-Dix-Lakehurst (JBMDL), New Jersey; and two weeks of academics at the Air Advisor Academy, also at JBMDL.

The 438th AEW's TAA mission is not new to our Air Force as history contains multiple examples of air advising from Vietnam, Korea, Iraq, and more recently, Costa Rica.[7] Substantial demand in 2007 for a permanent predeployment training curriculum that focused on preparing deployers for the air advisor mission paved the way for today's Air Advisor Academy. The Air Advisor Course reached full operating capability in January 2013 and later realigned under the Air Force Expeditionary Center in 2015 and represents a key component of the air advisors' predeployment training regimen.[8]

The Air Advisor Academy provides the most tailored predeployment training and instruction for future air advisors. The two-week course leads students through lecture and guided discussions to better understand the five core functions of air advisors (train, advise, assist, equip, and assess) and other areas such as culture and organizational awareness, religious familiarization, cross-cultural negotiation strategies, conducting capabilities-based assessments, working with interpreters, conducting key leader engagements, and 30 hours of region-specific language training. Embedded within the language training portion, students interact with native-speaking instructors to not only learn basic language speaking and writing skills but also to engage in relevant cultural discussions. The course concludes with multiple role-playing scenarios of advisors interacting with fictional AAF counterparts, conversing through an interpreter, to begin applying learned skills from the course in scenarios quite similar to what they will encounter while deployed. With the numerous career fields that comprise the air advisor mission, the course focuses on developing the skill sets all advisors need and leaves tactical familiarization within specific mission sets to the deploying member to accomplish separately from the course.

## AAF Engineering Challenges

Many of the challenges facing the AAF engineers can be linked to the extremely difficult living and working conditions within Afghanistan. According to the *CIA World Fact Book*, Afghanistan ranks 193rd in unemployment (23.9 percent), 101st in total gross domestic product (approximately $69B), and 181st in industrial growth (-1.9 percent).[9] The World Bank ranks Afghanistan 183rd of 190 economies using the distance-to-frontier metric, which quantifies the ease of doing business in a particular country.[10] It is landlocked and remains highly dependent on foreign aid. Using these economic indicators for context, we now explore the AAF engineers' primary challenges. The challenges discussed in the preceding paragraphs are a lack of budgetary resources for discretionary spending, a cumbersome and difficult supply system, and further growing the project execution capacity within the Afghan Ministry of Defense's (MoD) Construction and Property Management Department (CPMD) for small and medium-sized infrastructure projects.

The lack of a discretionary budget remains the AAF engineers' most significant challenge. Without resources, engineers cannot purchase parts or materials to affect infrastructure repairs or conduct preventative/responsive maintenance work. The lack of resources greatly reduces, if not altogether nullifies, the ability to respond to emergency repairs that directly contribute to mission accomplishment. This also renders planning and budget forecasting irrelevant since without a discretionary budget, AAF engineering *kandaks* (the Dari term for squadrons) will respond slower (if at all) to infrastructure needs resulting in faster component and system failures that will eventually overwhelm the engineer's capacity to manage the installation's infrastructure without substantial external support. While the AAF engineering kandaks did not have a budget for discretionary spending per se, processes were in place to order parts and materials, which leads to the next significant challenge—operating within the Afghans' supply system.

All AAF kandaks submit supply and material requests using the Afghan MoD's Mod 14 process. The Afghan government has built into the process multiple controls, checks, and limits to ensure unit requests are validated in purpose and quantity to guard against theft and corruption. These extra controls and steps have resulted in greater delivery delays, and when materials do arrive, they can be of insufficient quantities or unacceptable substitutes with little, if any, explanation given for deviations existing between requested and delivered items. As frustrating as the supply process could be, it was an Afghan process and as a key tenant of advising, working within the Afghans' system and processes was typically viewed as the more sustainable approach.

Lacking a reliable project execution capability within the Afghan MoD via CPMD represents another significant challenge for the AAF engineers. CPMD's role within the Afghan MoD comprises of program management and execution of engineering requirements supporting Afghanistan's military. This challenge includes identifying, developing, prioritizing, and resourcing future engineering requirements that include supporting the engineering kandaks, much like any higher-headquarters organization even though they are beyond the kandaks' capabilities. CPMD has made some noticeable improvements, as demonstrated by their impressive response to affecting repairs to the Kabul National Military Hospital after an insurgent's attack in March 2017.[11] However, the organization still lacks the capacity and technical expertise needed to independently and fully execute engineering projects. This capability gap results in a greater dependence on coalition engineering forces to execute a wide range of engineering projects, discussed in greater detail in the following section.

## Installation Management in the AAF

Facilities and associated infrastructure at AAF bases are operated and maintained in one of three methods: coalition contract predominantly managed by Combined Security Transition Command–Afghanistan (CSTC-A), Afghan contract executed by the Afghan's MoD CPMD, and local troop labor within the AAF installation's engineering kandak (squadron). Electrical power is supplied to AAF bases via generators, connecting to the local city's electrical power grid, or a combination of the two. Overall, the primary objective remains guiding the Afghans toward developing a greater capacity within their own organizational structures for executing infrastructure management projects with little to no oversight from coalition forces. This capacity would include activities such as managing daily facility and infrastructure operation and maintenance; procuring repair parts and construction material; managing an engineering craftsman training program; identifying future infrastructure projects (new or repairs to existing) or transitioning their installations to more reliable power systems (e.g., upgrading from generator power to executing electrical grid connection projects).

Before further delving into these methods of execution, it's important to understand the funding of AAF facility maintenance. Facility operation, maintenance, and repair activities are funded via Afghan Security Forces Funds (ASFF) or the NATO Trust Fund Organization (NATFO). Within ASFF, program execution is described as on-budget (Afghan executed) or off-budget (CSTC-A executed). Currently, infrastructure operation and maintenance (O&M) activities deemed critical to mission success ("too big to fail") are funded as off-budget projects. These project types include: electrical grid connections, medical facilities construction, projects supporting the women participation program (e.g., dormitories), power plant generator repair and overhaul, wastewater treatment plant construction and O&M, and large infrastructure projects associated with the rapid buildup of the AAF and Afghan Special Forces (e.g., pre-engineered buildings, water and wastewater distribution systems, permanent dormitories, etc.). Conversely, on-budget projects are executed by the Afghans, largely through CPMD or the local AAF engineering kandaks. These types of projects include power plant generator O&M and minor facility repair and upkeep.

The difference in on- and off-budget program execution can also be used as a metric of performance when assessing the Afghans' ability to execute engineering work independently. Essentially, the greater the percentage of on-budget execution, the greater the Afghans' ability to independently complete engineering projects. Figure 1 illustrates two graphs representing the FY 17 (FY 1396 of the Afghans' fiscal calendar) ASFF Engineering Budget (left) and ANA Off-Budget (right). Note that the total ANA off-budget amount of $99.2M illustrated in the FY 17 ASFF Engineering Budget graph only consists of infrastructure ($79.9M) and sustainment ($19.3M) expenditures. Training ($5.5M) and equipment ($3.4M) funds were derived from different funding sources and are therefore included in the ANA off-budget graph. For discussion purposes, we will only consider ANA on- and off-budget execution since that is how AAF projects are funded.

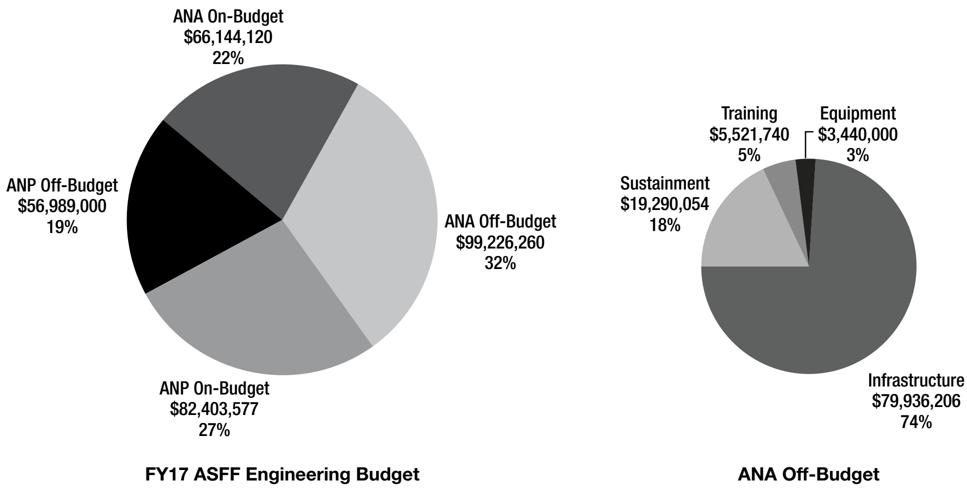


**Figure. FY 17 ASFF engineering and ANA off-budgets**

In FY 17, the ASFF engineering budget of almost $305M consisted of $165M applied toward ANA projects ($99M—off-budget and $82M on-budget). The ANA off-budget may be further divided into infrastructure ($80M, 74 percent) and sustainment ($19M, 18 percent), while training ($5.5M, 5 percent) and equipment ($3M, 3 percent) were funded through other resource streams. Within ANA projects, 60 percent were executed via off-budget (i.e., CSTC-A or coalition), while 40 percent were executed via Afghan execution. When compared to the FY 18 budget ($301M), the ratio of on- to off-budget execution remained roughly the same (61 percent off-budget, 39 percent on-budget). The percentage and change over time of on-budget execution can be used as a direct indicator of the Afghan's ability to directly program, plan, and execute the construction of new infrastructure projects. From the coalition's perspective, we want that percentage to increase over time. In addition, tracking the types and amounts of on-budget execution can also be used as a performance metric to gauge the Afghans' progress toward more autonomy. The detailed information for on-budget execution wasn't readily available and therefore, not included in this article.

One approach to increasing the Afghans' capacity to execute engineering projects was by intentionally reducing the amount of coalition support on projects the Afghans deemed high priority yet were still within their capability from a technical and constructability standpoint. The T-wall barrier placement to address force protection concerns was a prime example of this whereby the coalition adopted a much larger advisory role to the Afghans rather than simply performing the task themselves for the sake of expediency—a common pitfall for all air advisors, not just engineer advisors. The Afghan engineering kandaks possess limited engineering capabilities but have been observed to be quite resourceful and capable, as noted earlier in responding to the March 2017 insurgent attack on the Kabul National Military Hospital.[12] Measuring the impact of this policy stance was difficult due to turnover but nonetheless tapped into another essential part of any TAA effort: the circumstances surrounding a TAA effort should lead the Afghans to believe it's in their best short- and long-termed interest to internalize what is being trained or taught to the point of self-sufficiency.

With this background and familiarization in mind, the following sections turn the reader's attention to the engineer advisors' work with their AAF counterparts.

## TAA Activities

Engineering TAA activities with the AAF engineers consisted of primarily two areas: facility engineering and fire and crash rescue. How our team accomplished TAA depended on the situation and the resources available. This section explains the methods used, the associated benefits and challenges of each, and the relative effectiveness from the author's perspective.

## Train

Fire and crash rescue reflect the best training example within the engineering TAA spectrum. All AAF firemen at Kabul Air Wing (AW) received hands-on training from the TAAC-Air fire trainers and advisors. Due to a lack of resources, the team acquired metal connex storage containers and repurposed them into a live-fire training complex whereby AAF firemen would practice the basics of conducting offensive fire operations, search and rescue, and command and control, all under the close supervision and guidance of the fire trainers. The advantages of the live-fire trainer were many: it provided a realistic training environment at near-zero operation and maintenance costs for Afghan firemen to train and become more familiar with their personal protective equipment and gear. Despite our focus on training, equipment maintenance remained the greatest challenge.

Facility engineering training focused primarily on areas of procurement, work prioritization, and facility manager training. Due to the significant challenges of acquiring engineering parts and materials, the team heavily focused on procurement with limited success. The Afghan procurement process (Mod-14) is quite cumbersome and difficult to navigate within. This problem was partially due to an initial unfamiliarity with the Afghans' process but also to a number of process controls and checks embedded within the system intended to guard against potential corruption. Procurement is a vital element of any support organization, whether it's engineering, aircraft maintenance, supply, or logistics. Without a robust, reliable, and dependable supply and distribution system, the AAF engineers resorted to other means to create their bench stock of parts and materials. Their bench stock consisted of abandoned items from past military unit retrogrades or delayed supply deliveries that either arrived late to need, no longer served its original purpose, or just became a casualty of rotation amnesia. It was a byproduct of an inadequate supply system coupled with the uncertainty of the coalition presence duration and associated support.

Working with the Afghans to make them more proficient in procurement improved their capabilities by going beyond their own accumulated, albeit resourceful, inventory. Leadership buy-in, particularly with the AAF, was essential in making this training line-of-effort successful.

Craftsman training (plumbing, welding, structures, etc.) was accomplished via sending Afghan soldiers and airmen to an engineering school, created and maintained by a coalition contract, located at Camp Sheehan. Our primary goal in this line-of-effort was to work with the Afghans through our advisory role to send soldiers and airmen to this training. The training was necessary, but results were lacking largely due to poor attendance across all Afghan military branches of service. It was difficult to determine the overall root cause(s) of the observed low attendance, but it was clear that the same drivers and incentives for training that exist in other militaries simply didn't exist in the AAF. Apparently, mobile training teams had been tried in the past but were discontinued in favor of centralizing the training for greater efficiencies and economies of scale. This centralization was a significant challenge that frustrated the headquarters staff and engineer advisors alike. Within our advising sessions regarding this topic, it was not abundantly clear how training documentation occurred to understand better who really needed the training. At one point, the lead engineer for the training contract threatened to discontinue the contract if training quota fill rates did not improve. In turn, we made this a greater priority in our advising sessions and over time, we were able to see improvement in this area. But it was difficult to assess this training gap's impact on the AAF engineers' capabilities mainly due to the larger problem of a lack of funding and overall budget to establish a bench stock of repair parts within a very challenging supply system.

Work order review board training focused on work prioritization by approaching facility repair from an installation perspective, similar to how engineering work orders are accomplished in our own Air Force. This effort was not nearly as successful, as it very quickly highlighted the limitations of the engineering kandak as well as the engineering supply system to the point where meetings yielded little value and were eventually discontinued. On the one hand, the initial meetings were encouraging in that they forced our counterparts to work with other entities within the AAF and to discuss engineering requirements in an open forum that could generate positive results. Conversely, this approach perhaps incorrectly assumed that a western approach would be openly received and adopted. The Headquarters AAF engineer (to whom the author served as advisor) led these work order review boards and increasingly placed blame on the higher echelon CPMD organization for any work request made during the forum. While partially true, it also largely stymied initiative or innovation. The Afghans utilized a simpler model that focused more on informal request and coordination that was largely accomplished outside of the advisors' purview. They had a method for getting work accomplished, and we were just unfamiliar with it. This cultural difference is another common challenge that comes with advising. It's very natural to think western methods can be used as a valid model for our TAA efforts, but advisors must be keen on knowing when an approach isn't working and have the adaptability and agility to restructure training methods that are more likely to be adopted by our counterparts and therefore have potentially longer-lasting impacts.

Facility manager training began as the result of our team recognizing the need for more emphasis in basic facility maintenance. Seeing this need, one of our contractor trainers developed and implemented a facility manager course. The course consisted of weekly classroom lessons, whereby the basic concepts of facility manager responsibilities were taught. The AAF engineering operations chief was a tremendous benefit to the course as not only a show of presence to validate the effort, but also the chief was visibly proactive in conversing with newly appointed facility managers in training them how to report and affect building repairs—a key component to any facility manager program. As with other TAA efforts, obtaining early leadership buy-in, particularly in this case, to obtain AAF volunteers to serve as facility managers, was a key step in making this a successful training endeavor.

## Advise

Frequent meetings with our counterparts, often served with chai, was the prevalent method for advising. Our meetings contained multiple recurring topics: dealing with base electrical power shortages, restructuring the Tashkill (manning and equipment) document, or other general leadership issues. But the advising sessions were also the greatest contributors toward relationship building. Over time, the team would gather a feel for the extent to which our advising sessions could contribute to relationship building as opposed to discussing mission-related issues. The portion of our advising sessions spent on relationship building varied, but the greatest contributor to relationship building was a frequency in visits. For our team, the main challenges associated with the advising sessions were understanding how to structure our overall advising approach to achieve our set objectives. Ultimately, with everything we did, our advising sessions would focus on bringing the conversation back to the central premise of how *they* would solve the task at hand. It was not uncommon, especially early in the advisor's tenure, to be "tested" by our respective counterparts, usually consisting of being presented with a list of needs that (supposedly) exceeded our respective counterpart's ability to affect and therefore needed the advisor's assistance. A compelling strategy, for who wants to contribute to a rocky start with their counterpart when predeployment training places such emphasis on the importance of relationship building?

## Assist

Similar to the train and advise components of the TAA mission, assisting also took on different forms. It could be as simple as showing presence with our counterpart during a high-level meeting as a visible sign of support and solidarity, always mindful to ensure our counterpart was the primary focal point of addressing and solving an issue. Addressing issues in parallel through our respective chainsof-command and advisor network was another common assist approach that yielded favorable results. But this method also posed the risk of crossing the boundary into essentially doing a task or solving a particular problem for our counterparts. As a guiding principle to our advising efforts, the onus of responsibility had to be with our AAF counterparts. To do otherwise could encourage behaviors not conducive with establishing a professional and sustainable air force, capable of meeting its needs and addressing its own challenges. But exceptions did occur, usually resulting from a mission-based risk analysis that determined whether the cost of learning through failure was too great on mission achievement. The risk analyses were more art than science, generally relying on leadership's view of overall mission impact as a result of keeping problem resolution with the AAF. Assisting could also take the form of conducting engineer assessments in tandem and proved useful in time-sensitive situations as will be discussed in the next section regarding the restoration of the AAF dormitory buildings.

This next section examines one of the engineer advisors' primary efforts of advising the AAF: affecting winterization repairs to the Afghans' dormitories at Kabul AW. We use this effort as a case study to further examine the advise-and-assist elements of our TAA mission. This case study analyzes a dorm winterization project at Kabul AW located adjacent to Hamid Karzai International Airport in Kabul, Afghanistan. The project activities included restoring heat and hot water to the AAF dormitory facilities that had reportedly been without these amenities for the last three years.

## Dormitory Repairs

Kabul AW contains 10 two-story dormitory buildings. The dormitories were constructed in approximately 2008 and consist of open-bay layouts for lower-ranking members (soldiers) and separate room configurations for noncommissioned officers (NCO) and officers. In March 2017, the coalition began directing more attention toward the deteriorating condition of the AAF dormitory buildings largely due to maintenance neglect and a lack of leadership emphasis. Problems included a lack of hot water and heating, leaking water pipes, cracked or broken windows, and general cleanliness in the facilities' latrines. While Kabul AW enjoys a mild climate during most of the year, below-freezing temperatures in the winter exacerbate occupants' lack of heat and hot water. According to the Afghan airmen and soldiers living in these dormitories, the facilities had been without heat and hot water for the past three years. This problem resulted in occupants having to rely on their means for providing heat during the winter months. For example, some soldiers and NCOs would combine their earned wages to rent off-base housing with heating amenities. Others would bring burning embers from the nearby AAF fire training area to their dorm room/bay.

The coalition viewed the dorms' neglected condition as a lack of Afghan leadership and proper care for their younger troops and thus made it a high priority to address. Beyond the common leadership principle of providing for the troops' well-being, addressing the condition of the dorms became a significant line-of-effort with strategic implications for three additional reasons. First, improving the dorms' condition would provide soldiers with a higher quality of life that could subsequently help with not only retention but also future AAF recruitment as well. Second, we didn't want the degraded dorms' condition to be a situation for the Taliban or other hostile group to the Afghan government to exploit for propaganda purposes. Third, improving the dorms' condition hinged on providing reliable power and thus brought welcomed attention to Kabul AW's degrading electrical power situation.

The dormitory repairs quickly became a TAA activity with our Afghan engineer counterparts. Much like the capstone project of an engineering class, this TAA activity encompassed many of the desired skills we had been working toward with our AAF engineer counterparts. The project consisted of planning; building a schedule containing the necessary steps to identify, procure, and install parts to complete repairs to the damaged dormitories; the execution of repairs using the Afghan engineers as the sole labor force; and collaboration with other Afghan organizations such as logistics, finance, and CPMD to ensure a unity-of-effort to successfully complete this planned effort.

From start to finish, the project's schedule developed by the advisors and AAF engineers contained 11 steps. Within the "tasks" rows, each activity is named along with the organization responsible for completing the activity in parentheses. Each activity contains two subrows. The first row depicts the planned activity duration, while the second row indicates the actual duration for comparison.

The schedule was developed utilizing the Afghan's Mod-14 procurement process. Keeping this project within the domain of the Afghans' processes and capabilities was important from the outset. The coalition could have easily switched the project to coalition-executed and likely would have completed the work in less time and with a greater overall quality. But both leadership elements within TAAC-Air and its parent organization, the 9th AETF, recognized the importance of keeping the burden and responsibility of project ownership with the Afghans. To have done otherwise would have squandered an opportunity for the Afghans to demonstrate basic leadership and proficiency in caring for their troops. It also assumed the risk of adding to the Afghans' dependence on the coalition for solutions and implementing the means to achieve those solutions.

The schedule also proved to be a useful communication tool with leadership as well as maintaining a unity-of-effort among the advisors in advising our counterparts. Identifying areas for needed support and engagement from higher-headquarters advisors to facilitate subsequent, critical-path activities were critical to keeping the project on schedule. The schedule also helped manage expectations. Working within the Afghan supply chain was very challenging. As winter drew closer, we received more questions from all levels concerning the status of the dorm repairs. Taking the time to better understand the Afghans' procurement process not only allowed us to build a more realistic and reliable schedule, but it also enabled us to better advise and work with our Afghan counterparts. As the schedule illustrates, the repair parts and materials were eventually identified, procured, delivered, and installed by the Afghan engineers. The dormitory occupants were grateful and overall, we viewed this as a significant accomplishment for our engineer counterparts and the AAF.

But the large degree of oversight and necessary engagement conducted by both the advisors and higher levels of coalition leadership reflect a less positive assessment from a different perspective. This assessment was most evident on two different occasions. In the first instance, CPMD's action to "verify parts and create Mod 14s" only took one week as opposed to the estimated four weeks. We based this activity duration estimate from the previous summer's attempt to acquire the same materials in lesser quantities that CPMD later approved only one-fourth of the request. But it only took one week during this scenario, and 100 percent of the request was approved. What was the difference? Significant leadership engagement from both the coalition and the AAF convinced CPMD to bypass the usual verification step and approve the AAF's parts and material request in total. From the project's standpoint, it was an effective move that accelerated the overall schedule to meet the intended outcomes. However, from the larger perspective of working toward a sustainable AAF that could independently achieve facility repairs within its supply distribution system within a specific timeline, areas of improvement still exist.

The second instance occurred when the initial supply request exceeded the inventory amount contained within the Central Supply Depot and a purchase from a local vendor to procure the remaining items was planned. During this time, the AAF commander was to have at his disposal the resources necessary to procure the dormitory repair parts and materials as part of a larger initiative to supply the Afghan military corps with discretionary funding on a monthly basis. The AAF's continued work toward becoming a secondary budget unit appeared to make them eligible for this new monetary policy. However, when it came time to actually procure the parts and materials, the overall funding apparatus wasn't complete and caused the coalition deciding to intercede. Item procurement continued without immediate payment to expedite the delivery of parts and materials to the supply kandak. Again, this move was helpful toward the AAF engineers meeting their schedule milestones but was still largely enabled by coalition intervention. In essence, Activity 9 was only completed to the extent that enabled the AAF engineers to complete the dormitory repairs. Our TAAC-Air/CJ-8 advisors were left with the task of slogging through the nonpayment issues that took months to resolve.

In the final assessment of this effort, the Afghan engineers demonstrated an ability to successfully execute the repairs to provide a greater quality of life for its dorm occupants. But it was also clear that significant coalition intervention was needed particularly during the procurement phase. Building a reliable and robust supply chain was and continues to be one of the most significant challenges facing the Afghans. Its challenges impact not only the AAF but also all Afghan ministries and organizations.

It should be noted, however, that during the following rotation, the coalition accomplished an off-budget (coalition managed and executed) dorm repair project resulting in more robust repairs to the Afghan dorms. It's quite possible the repairs made during our rotation were short-lived. Rather than forcing a potentially compounding issue with the Afghans during the next winter season, the completed off-budget project would free the coalition to focus on issues that were deemed a higher priority.

## Conclusion

In conclusion and based on our advisor team's experiences, we offer the following recommendations. While they are developed from our engineer-centric experiences, they are written to help any mission support-related advisor mission.

Work to establish a strategic unity-of-effort along organizational and functional lines-of-effort. The unity-of-effort principle applies to all military endeavors, and the air advisor mission is no exception. The principle was evident during the dormitory repair project that required constant coordination between advisors of various Afghan organizations and within TAAC-Air.

Pursue TAA activities that involve and overlap with other functions. This will drive a greater collaboration among your counterparts and can yield synergistic effects. It will also broaden your knowledge base as an advisor and improve your perspective of how your advising contributes to the larger campaign.

Understand your counterpart's organizational structure, processes, and culture (for instance, less desire for open-forum discussions). Knowing the structure can better inform you on how to best advise your counterpart. Document that knowledge, and make sure it survives deployment turnover with your successor to limit unnecessary "rediscoveries."

Be flexible in your TAA approach and willing to adopt a different approach or method that better suits the situation and personalities of those you advise. The Air Advisor Course provides deploying advisors with multiple techniques and strategies that can be used as situation-dependent. An advisor must constantly assess not only the progress of the individual or organization he/she advises but also the techniques and strategies used while advising. This assessment requires a better understanding of the individuals being advised: (1) What are their drivers and motivations? (2) What are their strengths and weaknesses? (3) How do you evaluate their potential for continued service?

Be mindful of keeping the burden of task completion with your counterpart. A time-tested principle to always be mindful of when advising is T. E. Lawrence's Principle Number 15: "Do not try to do too much with your own hands. Better the Arabs do it tolerably than you do it perfectly. . ."[13]

This next recommendation is specific to engineers. Standard-building designs that minimize future repairs and the skill level required to complete those repairs should be adopted. Subsequent maintenance problems experienced from those constructed facilities using standard designs should inform future design enhancements for future projects. The US Army Corps of Engineers has developed a significant portfolio of standard-building designs that were useful during our rotation and will likely continue to improve with time.

When possible, consider enduring quantitative assessment methods or metrics that can be used to measure the progress that span multiple advisor rotations. In this article, we examined the percentage of on-budget execution (Afghan-led) as one progress indicator. Another example, not mentioned in this article but observed during our rotation, included not only monitoring the number of engineering projects successfully awarded and executed but also the completion of the milestones leading to an award and the completion of projects. Because of the challenging nature of advising, it is important to select the metrics and measures of success that can transcend and survive the challenges associated with multiple deployment rotations and changes in leadership.

The Air Advisor Course plays a large role in preparing deploying airmen for advisor duty. The course, like all professional military education, must continue to play an active role in maintaining a positive feedback loop that seeks feedback from air advisors and uses that feedback in subsequent iterations of content refinement. During our rotation, Air Advisor Academy faculty visited us in Kabul to interview advisors and collect detailed information regarding our responsibilities and skill sets needed to achieve our mission. The course's role-playing activities were exceptional portions of the course and on reflection, played the most significant role in preparing as an advisor.

Developing and strengthening the AAF remains a critical part of the overall Afghanistan strategy. The air advisor mission serves as a critical component of achieving that mission. To achieve that mission, advisors must immerse themselves into their mission, develop strong relationships with their counterparts, and have the nimbleness to adjust advising strategies and techniques that are better suited to the culture, counterpart, and situation. ✪

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FEATURE

# Leadership and Ethics across the Continuum of Learning

## The Ethical Leadership Framework

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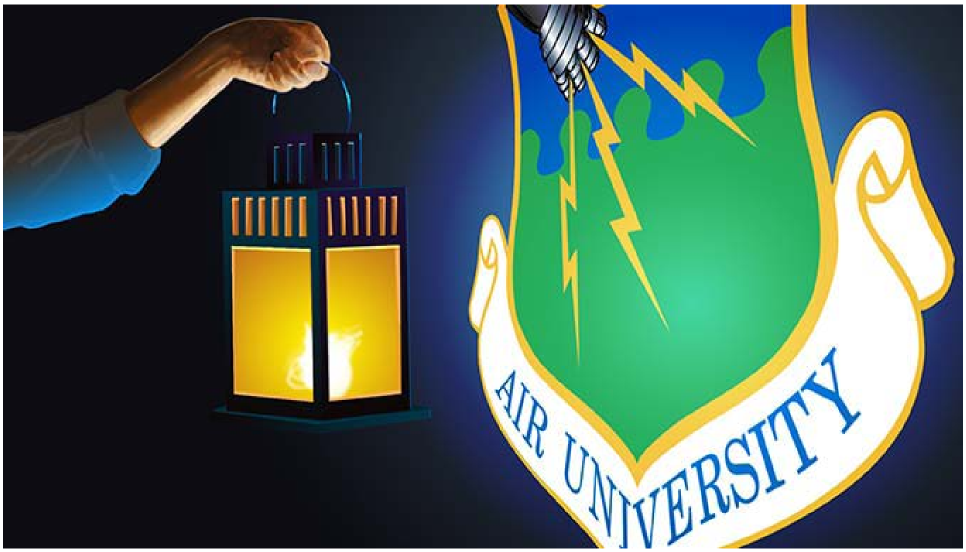
*For the things we have to learn before we can do them, we learn by doing them.*
Aristotle, *Nichomachean Ethics*




When broaching the subject of ethics, Airmen tend to hone in on the lapses of sound ethical judgment that often result in public and embarrassing behaviors.[1] The Air Force's nuclear cheating scandal and basic military training instructor abuses stand as stark reminders of the damage unethical behavior can have on individuals' safety and well-being, unit morale, and mission effectiveness.[2] Military ethical failures and lapses concerning sexual harassment and violence, in addition to increased awareness of notions of gender and gender roles, have led to an increase in public investment and awareness of military operations.[3] The Air Force Core Values—*integrity first, service before self, and excellence in all we do*—provide a clear expectation of the institutional values and norms

Airmen should live by, yet these negative events can generate a significant loss of trust between the Air Force and its nation's citizens and civilian leadership. As foundational and critical as these principles of conduct are for Airmen, it is important to recognize that ethics goes beyond preventing acts of ethical turpitude and reinforcing the seemingly obvious choices between known rights and wrongs.

According to the *Summary of the 2018 National Defense Strategy of the United States*, "the increasingly complex security environment is defined by rapid technological change, challenges from adversaries in every operating domain, and the impact on readiness from the longest continuous stretch of armed conflict in our Nation's history."[4] Additionally, academic literature recognizes military organizations face several ethical dilemmas due to the increasing complexity of warfare; increased use of unmanned aerial vehicles (UAV); blurred lines between civilian and combatant; and, often, a lack of clearly defined combat zones.[5] Leaders must be prepared to make ethically-sound decisions in a volatile, uncertain, complex and ambiguous environment.[6] Thus, ethical leadership requires Airmen to do more than not be "unethical;" it requires them to deliberately lead others, navigate situations, and execute daily missions guided by ethical decision making.

Air University (AU) is utilizing its quality enhancement plan, *Leadership and Ethics across the Continuum of Learning*, to pursue efforts that will help create a more deliberate, coherent, and comprehensive approach to leadership development. Informed by the research and theoretical underpinnings of leadership development, this article introduces the Ethical Leadership Framework (ELF). AU has developed and is implementing the ELF framework to guide its deliberate efforts to improve strategic, ethical decision making across Air Force educational programs. In the past, ethical leadership and ethical thinking frameworks have been treated as separate from overall leadership development. In the ELF, all leadership is viewed and framed within an ethical context. Given the unique global perspective and context Airmen operate within, the framework focuses on three specific strategic capacities (behaviors)—absorptive capacity, adaptive capacity, and decision-making capacity—which are foundational traits and the skills necessary to create ethical leaders who think and act strategically.[7]

## Ethical Leadership Review

Current literature in the context of military leader development focuses on the need to increase ethical development in military personnel and provide general conclusions for leadership development.[8] First, ethical leadership occurs in two continuums: sociocognitive and interpersonal.[9] Previous research on ethical leadership development focused almost exclusively on developing ethical individuals; this heavily influenced existing military tendencies to train and develop ethics exclusively at the individual level.[10] Much of the instruction at the individual level has been taught through the lens of virtue ethics or ethics that reflect an individual's virtues of mind and character. Through the lens of virtue ethics, values vary across individuals and cannot be forced upon individuals in the learning process.[11] Literature suggests the development of leadership, ethics, and values at the organizational level is needed to foster a culture of ethics within organizations.[12] In addition to virtue ethics, ethical leadership development education should address the interpersonal continuum and focus on follower internalization of norms and behaviors through relationships.[13]

## Strategic Leader Review

The Air Force's mission is to "fly, fight, and win in air, space, and cyberspace," and Airmen bring a unique global and strategic perspective to the joint warfighting efforts.[14] To develop strategic leaders, deliberate development must occur holistically across an Airman's entire career. A leader must begin developing and exercising the foundational traits and skills of a strategic leader, cognitively, behaviorally, and socially at the beginning of a career, not upon entry into the upper echelons of an organization.[15] Air Force leaders must have the ability to continue to learn and adapt to the evolutions of global, social, and cultural context.[16] Through these complexities, an emerging leader develops skills in critical thinking and decision making; interpersonal and public communication; personal competencies and capabilities; organizational structures, processes, and controls; interpersonal, group, and organizational relationship management; identifying, selecting and developing future leaders; creating and managing organizational culture; and infusing an ethical and values system.[17]

To develop ethical leaders within the context of the Air Force environment, the ELF focuses on three specific strategic capacities. These three capacities—absorptive capacity, adaptive capacity, and decision-making capacity—are integral to the development and maturation of Air Force leaders and an ethical Air Force organizational culture.

### *Absorptive capacity*

*Absorptive capacity* is the individual's ability to learn through directed and self-directed learning and to apply the knowledge to specific contexts.[18] Development in the absorptive capacity includes the individual or organization's ability to seek out applicable external knowledge and use that knowledge in a transformative way.[19] As the commander, Air Education and Training Command, Lt Gen Steven L. Kwast, reminded Airmen: "A warrior's ability to assimilate vast quantities of information, make meaning out of that input, act decisively, and almost simultaneously evaluate effects to influence subsequent action, constitutes the intellectual warfighting acumen that has prevailed in every age and in every challenge."[20] An individual's absorptive capacity is dependent on the procedures of an organization, including their policies, degree of socialization, and quality of relationships within an organization.[21]

### *Adaptive capacity*

*Adaptive capacity* is the individual's ability to change or adapt in moments of incongruence, complexity, and changing environments.[22] Development in the adaptive capacity requires creativity and innovation and the ability to seek out new solutions or options to conflict. Adaptive capacity requires input from all members of an organization because this capacity is reliant on the cognitive, behavioral, and adaptability abilities of each member of the group as well as the adaptability of the group as a single entity.[23] The *2018 National Defense Strategy* outlines the need for the joint force to "out-think, out-maneuver, out-partner, and out-innovate" threats to national defense.[24] Air Force Chief of Staff Gen David L. Goldfein and Chief Master Sergeant of the Air Force Kaleth O. Wright articulated this need when they told command teams: "The game-changing idea that will alter the course of history is in the mind of one of our Airmen today. . . our job is to nurture the environment that unleashes this brilliance and allows the idea to make it to a decision-maker who can act."[25]

### *Decision-Making Capacity*

The *decision-making capacity* of an individual is the ability to understand individual and organizational actors, individual and organizational relationships, and how to make decisions at the appropriate time while creating and maintaining relationships.[26] The AU commander and president, Lt Gen Anthony J. Cotton, outlined that to meet the rapidly shifting global security environment, education must recognize "a competitive battlespace will require a joint force that has the habits of mind and practice to act boldly upon commander's intent."[27] This tenet of strategic leadership relies on the social intelligence of the individual, the ability to leverage relationships to gain multiple perspectives on the complex situations leaders face, and the ability to make the right decision at the right time.

## Conceptual Framework

The ELF seeks to address development across all domains and ranks to provide a more holistic approach to the development of ethical, strategic Air Force leaders. The ELF directs leadership development at the three levels integral to leadership development: the individual, team, and organization. In the context of the military, leader development often addressed each element of leadership development separately. Development in each individual domain is important for the overall ethical leadership development of an organization yet neglects to acknowledge the value of considering how each element of leadership must work together to create a holistic view.

Informed by the research and theoretical underpinnings of leadership development such as Leader-Member Exchange theory, Vertical Leadership, the Full-Range Leadership Model, and Meta-Leadership, the ELF seeks to address the growing ethical dilemmas military personnel face through the deliberate development of ethical leaders.[28] The authors define ethical leadership in the Air Force context as individuals who behave ethically in their personal and professional lives, and "actively influenc[e] employees to be conscientious of ethics and encourag[e] them to act."[29] An ethical leader demonstrates ethical leadership through accountability, "communication, discipline, and the effects of role modeling."[30] Specifically, the conceptual framework integrates the intersection of ethical leadership and strategic leadership focusing on the development of the three domains integral to leadership development.

Depicted visually in figure 1, the framework conveys a relationship between an individual's understandings of "self," their ability as a "team" leader to create an environment that fosters subordinates' individual development, and the capacity to foster a culture/climate in the Air Force as the organization. This recognizes the dyadic relationship of influence between Airmen, the teams they lead, and the Air Force as a broader organization. Air Force programs and development efforts must ensure that Airmen are deliberately developed in these capacities across a continuum of their learning, from introductory concepts during accessions and early stages of their careers to more advanced concepts and applications as they mature in their experiences and levels of responsibility.

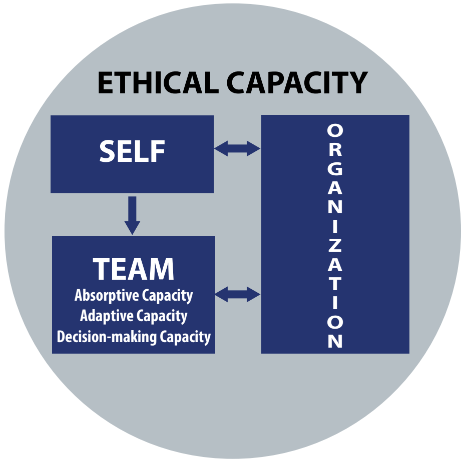



**Figure 1. Ethical leadership framework**

Figure 2 is a visual representation of the ELF in the context of the Air Force. This leadership development process proceeds horizontally and vertically; Airmen develop as leaders with increasing roles and responsibilities and develop in each domain, deepening their skills as a part of the development process.


**Figure 2. Ethical leadership framework in Air Force organization context**

The following section provides an overview of the three domains of the ELF conceptual framework, with a specific focus on ethical development.

**Individual**. The foundation of ethical development begins with the development of the ethical self where one identifies ethical beliefs and values and is able to act on those internal beliefs through ethical reasoning and decision making.[31] Ethical traits include honesty, courage, responsibility, agreeableness, respect, duty, loyalty, conscientiousness, and empathy.[32] The key focus of development at the individual level is to provide the opportunity to identify and reflect on one's internal beliefs and connect individual ethical values to USAF values, so that individual Airmen see their beliefs as aligned with the Air Force as an organization; in short, their internal beliefs align with organizational ethical beliefs.[33]

Indoctrination and mass briefings are not enough to ensure ethical behavior.[34] While behavior reinforces value identification, and values are reinforced by practice, simply behaving ethically is not enough to ensure ethical behavior and ethical leadership in peers and subordinates. In leadership development curriculum, traditional ethical theory is especially relevant in this development process. For example, Schulzke applied Kant's moral theory to military operations, specifically to drone use to help Airmen consider ethical ramifications of UAV use.[35] Through the use of ethical theories, Airmen should see ethics in everything, and ethical decisions should be habitual by developing an automatic trigger of ethical schemas.[36]

Development at the individual level is facilitated by opportunities to apply ethical decision making in real-world settings with real-world rewards and punishments.[37] Airmen should be encouraged to act ethically through an equitably applied system of rewards and punishments, and they should also be encouraged to report ethical violations. This is important to reinforce individual ethical development and demonstrate how individual ethical beliefs align with organizational beliefs.[38] Research suggested ethical individuals are more likely to behave ethically even in the presence of unethical leadership.[39]

In the ELF, development in the individual domain seeks to guide Airmen to develop an ethical foundation and act in accordance in their personal lives. The measurable outcomes for Airmen in this domain include the ability to: identify personal values as they align with Air Force values of integrity, service, and excellence; demonstrate ethical traits; identify the values of others; recognize the ethical dimension of a situation and the values at stake; judge an ethical question or dilemma and communicate this judgment; act in accordance with judgment in an ethically responsible manner; and be held accountable for actions and decisions.

**Team**. Within the team domain, ethical leadership training and development focuses on creating an environment that fosters a subordinate's individual ethical development while building, reinforcing, and enforcing the Air Force as an ethical organization. Prior research suggests low levels of training and poor unit discipline are indicators of misconduct, and high levels of stress lead to an increased likelihood of unethical behavior.[40] Additionally, subordinates are more likely to engage in unethical behavior when following orders and are reluctant to report ethical violations for members of their unit, which is a key consideration in addressing sexual violence and harassment.[41] These findings are in contrast to the suggestion that ethical lapses are individual; organizational culture, leader characteristics, and environment all contribute to the ethical behavior of subordinates. Research suggests leaders cannot assume Airmen know what is right and will behave ethically, as is typical in a laissez-faire leadership model.[42] Ethical behavior is developed through constant and consistent attention to ethics.

At the team level, leaders must continue to behave ethically at the individual level and create an ethical culture for those they are responsible for. A leader must discipline ethical violations equitably without regard to differences in rank and must reward ethical decisions, reinforcing both the ethics of obligation and the ethics of aspiration.[43] Leaders need to model ethical behavior, connect with subordinates by showing respect equally, regardless of rank, and know subordinates as individuals.[44] Additionally, it is important that leaders foster conversations about ethics and provide opportunities for discussion and reflection, especially in cases where the ethical decision is not clear.[45] This is a key aspect of engaged leadership, where direct leader involvement creates a culture where they are not the only one holding Airmen responsible for ethical decisions, but Airmen hold each other accountable as well.[46] An ethical leader at the team level is responsible for determining the key areas that support the Air Force mission and values by creating systems of checks and balances that communicate those values to Airmen and hold them accountable.[47] Finally, leaders need to create an environment that is, as much as possible given the constraints of the field, stress-free, supportive, and meets the basic needs of the Airman.[48]

In the team domain, development seeks to help Airmen to learn how to practice ethical management and influence subordinates to make ethical decisions. The measurable outcomes for Airmen in this domain include the ability to: model ethical behavior, develop ethical behavior in subordinates, reward ethical behavior in subordinates (ethics of aspiration), punish unethical violations equitably (ethics of obligation), and foster an environment that supports ethical behavior (e.g., safe, secure, and stable within the constraints of the field).[49]

**Organization**. Ethical behavior should be an institutional norm and should occur in an ethical organization.[50] This can be achieved by creating and reinforcing structures that punish ethical lapses equitably, providing channels for dissent that do not interfere with the larger mission of the Air Force, and reinforcing ethical norms.[51] As such, leaders need to facilitate organizational conditions that allow individuals to ask questions, dissent, and report violations without fear of repercussion.[52] Further, there needs to be an implementation of checks and balances both intrateam and intergroup where senior leaders are similarly held accountable for their behaviors just as subordinates are.[53] Finally, it is key that senior leaders build and communicate a shared vision to subordinates.[54]

The development of emerging leaders individually supports the collective development of a team of emerging leaders. The development of the individual and collective, in turn, facilitates emerging leaders across the continuum of a career to support leaders across their respective continuums of learning and development. Fostering an environment that continually develops and supports emerging ethical leaders helps create an ethically sustainable environment. Incorporating the development of ethical behavior in this domain should lead to the long-term success of the Air Force organization.

In the organization domain, instruction seeks to help Airmen to develop and promote an ethical organizational structure. The measurable outcomes for Airmen in this domain include the ability to: reinforce organizational ethical values through modeling, open conversations, rewarding ethical behavior and enforcing punishment equally for violations; create a shared vision; implement checks and balances for personal leadership roles; and provide opportunities for dissent (e.g., dissent channels).[55]

The ELF purposefully integrates the areas of ethical and strategic leadership to provide Airmen a pragmatic construct and model to bring the essence of leadership and ethics to the forefront of all the Air Force does and to wholly-assimilate ethical leadership into the psyche of Airmen.[56] By addressing all three interpersonal development domains—individual, team, and organization—with a specific focus on the three capacities—absorptive, adaptive, and decision making—the framework provides a construct that will promote a deliberate and methodical way to analyze, evaluate, develop and assess existing and future leadership development programs across AU.[57]

## Conclusion

In a February 2019 memorandum to all DOD personnel, Acting Secretary of Defense Patrick Shanahan stated:

> Congress and the Nation have placed their trust in us—trust that we will deliver high performance results and remain accountable to the American people as good stewards of their tax dollars. As we continue translating strategy into action, we must demonstrate our commitment as leaders in carrying this trust forward. A key component of leadership is reinforcing ethical behavior across the full spectrum of our work and recognizing ethics principles as the foundation upon which we make sound, informed decisions.[58]

In support of the Air Force's fourth strategic priority to "develop exceptional leaders. . . to lead the world's most powerful teams," AU is reinvigorating and focusing on the development of leaders in the profession of arms.[59] As *the Intellec-*

*tual and Leadership Development Center of the Air Force*, leadership development is an AU-wide endeavor and occurs across all centers, schools and major programs. In turn, AU programs reach virtually every Airman across the Total Force, whether officer, enlisted or civilian. AU is dedicated to providing leader development opportunities that are cutting-edge, relevant, and impactful; opportunities that are coherent and cohesive for our Air Force as an organization, while meeting the unique needs for every Airman's individual development. AU is using the ELF to help create a more deliberate approach to leadership development, focusing on the fusion of ethical and strategic leadership to create a more cohesive experience for individual Airmen that spans the educational opportunities throughout an individual's career, and to build cohesion across the Air Force, creating common frameworks, language, and experiences for officer, enlisted and civilian development. The ELF will guide concerted efforts to develop and improve strategic, ethical decision making across all leaders in the Air Force.

The creation and implementation of the ELF seeks to reframe the idea of ethics for Airmen and to better develop the ethical-strategic decision-making competencies for Air Force leaders. Drawing increased efforts and resources to the ethical development of military leaders is a step toward fostering a culture and organization that inherently values ethics in all areas of leadership, rather than a focus on limited sets of right/wrong scenarios. Though created within the context of the Air Force, the ELF has practical implications for other military branches and organizations to develop the ethical decision-making skills of leaders. ✪

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## Notes

1. The authors acknowledge that morals (morality) and ethics (ethical) are related and unfortunately frequently interchanged. Morality is used as both a descriptive concept and a normative concept. In the descriptive sense, *morality* is used to describe or refer to certain specified codes of conduct established by a group or society (e.g., the "moral" codes found within the five major world religions) or as an internalized code embraced by an individual. In the normative sense, *morality* refers to a code of conduct or behaviors that, given specified conditions, would be followed by a rational person. The definition of *morality* in either sense frames the development of an ethical theory and in turn, the definitions of *ethics* and *ethical*. The descriptive use of morality is reflected in the ethical codes of professions. It reflects the identification of behaviors that are considered right or wrong for an individual in that profession. The ethics or ethical behavior is thus a social construct of rules of conduct and in some cases, an implied social contract. For the authors' purposes, the Air Force's core values, the profession of arms, rules of engagement, and so forth, convey a descriptive view of the underlying moral and imply an ethical code of conduct. This view creates morals as the philosophical underpinning and ethics as the guiding principles/standards/expectations for behavior.

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VIEW

# Consolidating and Automating Social Media Impacts to Risk

Maj John P. Biszko, USAF

The military has an emerging requirement for software that links two existing types of platforms: those that track blue force movements and those that display social media activity. If this requirement is adequately articulated, funded, and developed, it will represent a major leap forward in force protection, intelligence, and counterintelligence. This short article examines the shared interests of military leaders and social media users and uses an Air Force flight tracking example to illustrate the force protection concerns emerging from this shared interest. It also provides background on mission planning and social media exploitation software suites, articulates a general technical solution to a defined problem, and ends by defining major impact touch points and suggesting future developments.

First, one feature of the military's information environment is a mutually implicative shared interest with social media users all over the world.[1] Military decision makers desire high-fidelity awareness of the location of their forces. Social media users also desire high-fidelity awareness of the location of military forces.[2] As social media users observe aircraft, ships, and land forces, they communicate about those forces.[3] That communication may be speculation about capabilities, the intent behind missions, the will of military decision makers, or perceived opportunities in the operational environment.[4] Since the social media users may also coordinate activities, the actions and reactions of users to an observation of assets or personnel constitute a concern in three major areas. Those areas are (1) force protection, since operational security may be compromised; (2) intelligence, since foreign adversaries may use social media information and platforms to collaborate to one's disadvantage; and (3) counterintelligence, since foreign intelligence and domestic threats may also use social media information and platforms to one's disadvantage.[5]

The flight-tracking of Air Force assets is a sound operational example of this interest convergence and the resultant force protection concerns: A flight takes off and heads toward a sensitive location, and that sensitive location information is shared by an actor on social media, incidentally to the service's relative surprise and disadvantage. Here are three preponderant questions for the Joint Force to process:

1. How does the Joint Force integrate the resulting change in emerging warning intelligence and risk in near real-time?[6]

2. How does the Joint Force do this for all flights automatically without increasing Air Force end strength to ease implementation?[7]
3. In addition to adjusting the risk characterization for risk to the flight mission or risk to Air Force forces, how does the Joint Force adjust the risk for ground and naval forces to compensate for the compromise of Air Force assets' locations by a social media user and make that adjustment using computers at a near-neutral cost?

It is useful to look at blue force tracking and social media exploitation separately and then combine the two after having noted the flight tracking example. First, the Joint Force is generally accustomed to preplanned routes. The data for such routes are stored digitally. While there may be last-minute changes after traditional mission or force deployment planning, the services do, for the most part, store data in advance of a force deployment regarding what the geographic location of the assets or personnel will be at each phase of the mission. The planning cell does not always display the data in that raw a manner: the user sees a flight, voyage, or deployment duration and a route; however, the mission planning software draws from a server that stores roughly at what time the assets or personnel will be over each point in time and space, which is how it is able to generate and display the duration and path.[8]

In addition to planning points in time and space, the services also contract with social media exploitation services for force protection, intelligence, and counterintelligence. In their various versions, the so-called Publicly Available Information (PAI) Toolkits allow military professionals to access social media posts within a user-defined geographic- and time-bounded area. Such toolkits do not actually allow the user to scrape social media in real-time. Instead, contract companies establish user agreements with proprietary social media companies, such as Facebook, Twitter, and the foreign versions of such programs. The contract companies have user agreements that allow them to ingest a certain percentage of data from social media users in a hybrid of cooperatively and noncooperatively accessible PAI. The contract companies then allow the services to buy licenses, which, in turn, allow professionals to search for threats in the proprietary data pool; however, the military user typically manually sets the "target"—the keyword, time boundary, or geographic boundary, which will initiate the simple search. The contract companies providing the licenses usually combine language translation software with their search software, allowing the user to overcome a small part of the socio- or cultural-linguistic barrier.[9]

After describing the problem in broad terms and providing an example, here is a three-part solution:

1. Augment the existing social media access strategy with a collection strategy—meaning that in addition to paying proprietary companies money to allow service professionals to access a limited amount of social media content, the services work with other government agencies to also collect the data from foreign areas or entities—cooperatively or noncooperatively. At this point, the data is not just accessed but also collected, which would necessitate the services working with outside agencies to assign personnel with the appropriate training, certification, mission, and authority to collect.[10]
2. Replicate the data that is accessible through the contract companies, as well as the data that is collected through the appropriate intelligence sources and methods, in a data repository where the coding is compatible with the data from the mission planning and force deployment software suites. The accessed data, which the services pay for, would be siphoned up to a system with a higher classification and stored alongside the collected data.
3. Write the code, and install the corresponding software that would compare the time and geography stamps associated with each social media entry in the main repository with the time and geography stamps of each force movement in the mission planning data set.

For the Air Force operational example, the result would appear thus: a mission planner prepares the flight route. Along with other intelligence injects, he or she receives a preview of the social media landscape surrounding the flight with an emphasis on aircraft recognition or threats. While the software compares the mission planning data with the social media repository data, it would search for any social media post near the planned flight route in the previous five days that references an aircraft or any term indicating an intent to harm. That report would be generated automatically for the mission planner, which the information operations cell would caveat appropriately to compensate for fake or uncorroborated post content.

Second, the program would follow the aircraft in flight while also searching the social media information that is continuously updated in the repository. As it identifies a potential threat indicator, the program would alert intelligence and cyber professionals of either a potential threat indicator or an attempt by an adversary to use bots on social media to deceive the Air Force into altering the flight path—either way, a good insight into grey or red actors' intentions. Third, the program would automatically generate a report on what activity occurred in social media during the flight, which it assesses, was also potentially related to the flight according to preset parameters, and that social media impact report would be paired with the mission report (MISREP). Both the social media report and the MISREP would be available to the parent combatant command, along with the naval and ground forces reports that the software is generating for other types of force movements.

Such an automation would innovate in several important ways. First, it would begin to allow the services to use social media exploitation software faster than where the speed of human triage is now. Computer software would deliver data-driven analysis. The real limit, paired with artificial intelligence, would become how much foreign user data the Joint Force could realistically access and store, along with how to cope with what would almost surely become a massive denial and deception effort; however, the services are well-armed for tackling such deception using traditional analytic tradecraft. The future would become a game of attempting to corroborate threat information, seemingly apparent in the social media landscape, with other sources and methods, thus driving an even higher-fidelity understanding of enemy capability and intent.

Second, the commander's acceptable level of risk would be much better informed than it is now, since only a minute percentage of all of the social media posts in the world discussing or indicating a threat to US assets and personnel are likely accounted for.[11] Third, data science would allow the services to use the same system to model and predict threat—not just read about it in social media posts.[12] For example, after something happens—after a base attack or an Air Defense Identification Zone penetration—any event of interest—the program can go back in time and freeze what was happening in social media. Thus, after a couple of iterations of the same type of event, the computer can model what the social media landscape typically features right before such an event occurs, thus introducing a pioneer kind of emerging warning intelligence: an unconscientious public warning based in crowd wisdom.[13] ✪

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VIEW

# On Critical Thinking

## It Takes Habits of Mind and Patterns of Inquiry*

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The traditional views of critical thinking focus on activities versus the development of critical thinkers under the premise that task familiarity equals competency. In this article, I argue that critical thinking is a journey, not a destination, and it demands that its travelers develop the habits of mind and patterns of inquiry required of one who aspires to the appellation of a critical thinker. However, the title is not important; rather, it is the ability to solve the most challenging issues that give purpose to those we think of as our critical thinkers. So, our quest here is to discuss how to find and prepare potential critical thinkers. Let's start with why this mission is so important.

This issue is critical to every discipline, yet none more so than the Air Force Airmen (and our joint team members) engaged in applying violence in deadly circumstances to achieve national objectives. The United States Air Force Academy lists critical thinking as the first of its nine outcomes for its graduates.[1] In its *2015 Future Operating Concept*, the Air Force highlighted critical thinking as an important skill 12 times throughout the document. The authors of this document noted that these concepts relied upon "Airmen who display critical thinking in complex situations, are educated and trained appropriately, and ultimately are empowered and entrusted to execute."[2] In a speech given at the Brookings Insti-

* The author borrowed this phrase from his colleague, Dr. Thomas A. Hughes, and thanks him for his insight into thinking and how we teach others.

tution, Air Force Chief of Staff Gen David Goldfein observed that in the development of commanders, education "is about the journey... about the campaign of learning, and lighting a spark."[3] Although his focus was on educating commanders, General Goldfein's commentary applies equally well to those we want as our critical thinkers, some of whom may very well be those commanders the chief of staff comments on.

Often people ask the question, "What do I have to do to be a critical thinker?" Or they might ask the complementary question, "How can I tell if someone is a critical thinker?" These questions are interesting and important because most people focus on activity versus thinking. For example, if you are an officer in the military, you do not start a task from your boss with the statement, "Let me think about that issue, and I'll get back to you." Most of us simply need to know a suspense date and any constraints or restraints; in other words, as I learned as a lieutenant—how high to jump and for how long. If you rely on the former approach, it is not likely to endear you to your boss. The problem, I suggest, is one of focus—an over-focus on "doing"—often in response to a boss who yells, "Don't just stand there... do something... anything!" In short, we often opt for action versus reflection.

What might account for such a focus on activity versus thinking? I will go out on a limb and suggest that for most of us, it's in our DNA; it's who we are. Most of us are science, technology, engineering, or mathematics (STEM) graduates—associate's, bachelor's degrees, or higher—and we tend to have Type A personalities. Usually, we are high-speed linear thinkers who move big rocks up big hills. We get things done. We are not the abstract thinkers to ask, "Why this rock?," "Why this hill?," or even better, "Can't we just go around the hill?"[4] No, we are the "Move, follow, or get the hell out of the way" action figures. The military requires many action-oriented people, especially in its junior ranks; however, it needs leaders with reflective, even abstract-thinking minds in its senior ranks where almost all problems have no single best solution.

As an example, I recall a trip in the early 1990s to participate with an operational planning group as the Ninth Air Force team packed for another crisis response to actions by Saddam Hussein in Iraq. Our task was to develop the first three days of an air tasking order designed to stop the Iraqis from moving south into Saudi Arabia. I joined officer alums from what was at that time called the School of Advanced Airpower Studies, now known as the School of Advanced Air and Space Studies (SAASS), as well as USAF graduates from the Army's School of Advanced Military Studies as part of the planning team. Since no one issued us context or clear "what to do and why to do it" guidance, we started with the problem handed to us but also went back a step to examine the regional, US, allies and partner viewpoints and inferred goals before we started to outline a plan and develop an air tasking order (ATO). A couple of hours into the process, a Ninth Air Force officer popped in to check our process and found us outlining the context and problem analysis for a strategy. With a colorful expression, he asked us what we were doing. We answered, and his response, delivered with expletives and high volume, was something like, "We don't need an (expletive deleted) strategy! We need an ATO!" As I said, we get to a solution, so we can get things done, but we do not always determine just what our problem is and in what context before settling on an answer. So, how do we become critical thinkers *and* energetic doers?

I wish there were a course or a test to identify those of us who should be or could become critical thinkers. Unfortunately, there are many places, which can be found in a simple online search, that offer courses or test products promising to do just that. I found more than 95 million in less than a second (although some might be repeat hits). There are those who characterize critical thinking and do so in similar ways, as shown in table 1.[5] Each of these definitions characterizes critical thinking as a skill or ability *emphasizing things to do versus ways to develop the ability to think critically*.

**Table 1. Selected critical thinking definitions**

| *Thinker Academy* | *Foundation for Critical Thinking* | *Wall Street Journal article* |
|---|---|---|
| Critical thinking is simply a deliberative thought process. During the process, you use a set of critical thinking skills to consider an issue. At the conclusion, you make a judgment about what to believe or a decision about what to do.<br>There are a number of critical thinking skills. A core set includes the following:<br>• suspending judgment to check the validity of a proposition or action;<br>• taking into consideration multiple perspectives;<br>• examining the implications and consequences of a belief or action;<br>• using reason and evidence to resolve disagreements;<br>• re-evaluating a point of view in light of new information | A definition:<br>Critical thinking is the art of analyzing and evaluating thinking with a view to improving it.<br>The result:<br>A well-cultivated critical thinker:<br>• raises vital questions and problems, formulating them clearly and precisely;<br>• gathers and assesses relevant information, using abstract ideas to interpret it effectively;<br>• comes to well-reasoned conclusions and solutions, testing them against relevant criteria and standards;<br>• thinks open-mindedly within alternative systems of thought, recognizing and assessing, as need be, their assumptions, implications, and practical consequence<br>• communicates effectively with others in figuring out solutions to complex problems | • "The ability to cross-examine evidence and logical argument. To sift through all the noise."<br>*–Richard Arum, New York University sociology professor*<br>• "Thinking about your thinking, while you're thinking, in order to improve your thinking."<br>*–Linda Elder, educational psychologist; president, Foundation for Critical Thinking*<br>• "Do they make use of information that's available in their journey to arrive at a conclusion or decision? How do they make use of that?"<br>*–Michael Desmarais, global head of recruiting, Goldman Sachs Group* |

*Sources: Thinker Academy, https://criticalthinkeracademy.com, The Foundation for Critical Thinking, https://www.criticalthinking.org, and Wall Street Journal, https://www.wsj.com/*

A new trend in this discussion is the idea that we need strategic thinkers with specific skills. Table 2 offers three examples of desired skill sets. However, each of these descriptions focuses on "required/desired" skills for the critical thinker yet provides little to tell us how one acquires these skills. I find critical thinking tests even more problematic.

**Table 2. Ideas as to selected critical/strategic thinking skills**

| *Center for Simplified Strategic Planning, Inc.* | *Harvard Business Review* | *US Army War College* |
|---|---|---|
| The abilities to:<br>• use the left and right brain<br>• develop a clearly defined vision<br>• clearly define objectives and develop a strategic plan<br>• design flexibility into a plan<br>• be aware and perceptive<br>• be lifelong learners<br>• take time for oneself<br>• seek advice from others<br>• balance creativity with realism<br>• be nonjudgmental<br>• be patient | Four ways to improve strategic thinking skills:<br>• Know: observe and seek trends.<br>• Think: ask tough questions.<br>• Speak: sound strategic.<br>• Act: make time for thinking<br>• and embrace conflict. | To develop strategic thinking (ST) leaders:<br>• Learn the fundamental framework for ST (basic)<br>• 10 three-hour blocks for practical application (intermediate).<br>• Incorporate practical exercises to address problems faced at the three and four-star general level. |

Critical thinking tests examine a range of the skills experts think that critical thinkers *should do*. For example, the Watson-Glaser Test examines five areas looking first at inference abilities, then recognition of assumptions, followed by deduction capability, then interpretation abilities, and finally talents in an evaluation of arguments.[6] The California Critical Thinking Skills Test uses a similar framework; however, its developers first examine analysis abilities, then those pertaining to evaluation, followed by inference, then deduction, and finally the capabilities of overall reasoning skills. There are other such exams, but they are variations on the theme for the two examples discussed here. The question for us to ask is, "What do these standardized tests tell us?"

In the early 2000s, the Air University faculty and students had the opportunity to participate in a critical thinking workshop using the Paul and Elder program from their Foundation for Critical Thinking Methodology program and then take the California Critical Thinking Skills Test.[7] The data from this exercise did not show statistically significant differences in results from various student groups (early/mid/senior career personnel) or the faculty. While the data puzzled us, the pressure of "next on the academic calendar" prevented the faculty from conducting a deeper analytical examination of the results.

During the 2015–16 academic year, an Air War College (AWC) student sought to reprise the study of critical thinking skills analysis in his thesis research project. His work focused on a representative group of active duty officers attending the AWC, Air Command and Staff College (ACSC), and the SAASS.[8] This researcher, Col Adam Stone, published his work in *Air & Space Power Journal* in an article titled, "Critical Thinking Skills in USAF Developmental Education."[9] While I do not take issue with his methodology, I do take issue with the implications he draws from an admittedly small sample size delivered without the benefit of test preparation.

Stone used the Watson-Glaser Critical Thinking Appraisal (WGCTA) to assess active duty Air Force student respondents from three groups: the ACSC, SAASS, and AWC—the top 20 percent of their peer group. He concluded that there were no statistically significant differences in scores between ACSC and AWC participants and only a minor variation between the SAASS and ACSC students, observing an average score in the 36th percentile, "compared to the graduate degree normative group."[10] His implications infer that the USAF and DOD now have a method to measure critical thinking (CT) and that a trained faculty could transfer CT skills to students through recurring instruction during the academic year. In assessing these conclusions and implications, let's first start with a question: "How would any of us fare if we took the Scholastic Aptitude Test, American College Test, or the Graduate Record Examinations without preparing for the exam?"

Like the exams in the question above, the WGCTA is a standardized test with all the strengths and limitations of such an exam. I was not surprised that USAF officers taking the course without preparation scored as they did. As I examined the underlying logic of this test, I found I would have answered about half the questions in accordance with the test designers' logic, but I would never correctly answer the other half. Why? Because I do not natively think with the same logic of the test designers. If one wants to score higher on a standardized test, then you must study the logic of the exam design, whether for a college entrance or critical thinking test.

In the over 15 years I have taught or been responsible for the education of well more than 1,000 students, I have watched them read the same material, have discussions together in seminar, and received the same essay questions, yet I have never seen the same answer twice.[11] My conclusion: we all think differently. At SAASS each year, we see the CT skills of students reach new plateaus in their analytical talents measured from their first essay efforts to the thesis product each officer defends to two examiners at academic year's end. So, let's change the initial questions about CT from the "skills of doing CT" to one that asks, "What are we looking for that would indicate the potential to become a critical thinker?"

In traditional teacher fashion, I would answer, "It depends." Are you looking for the critical thinkers for the world of perhaps SpaceX or strategists for the USAF and the nation (the SAASS objective)? In his book titled *Elon Musk*, author Ashlee Vance offers the following insights into the SpaceX hiring model. The company wants college engineering graduates from top schools, top marks, and Type A personalities. But they don't stop with looking for well-educated engineers who have a "get things done" personality. They dig deeper to find the person who excelled in robot-building competitions, hobbyists in anything mechanical, passionate yet able to be a team member, and "real-world experience bending metal."[12] At the risk of a bit of reductionism, I offer that SpaceX looks for people who grew up trying to apply creative solutions to mechanical challenges. In the engineering "world," I opine that companies seek these people to become the innovative critical thinkers for their futures.

So, how do "we" find such individuals we could develop into critical thinkers as strategists? The USAF has a well-developed list of skills it wants its officers to possess or grow into during their careers. I suggest such an approach helps the USAF find the people to "do things"; however, I do not find this approach helps locate those who might be future innovative critical thinkers. Instead, I look for people with wide-ranging interests in the world around them. In short, I look for those who are insatiably curious. I like to ask prospective critical thinkers about their music interests, hobbies, and reading habits (magazines, journals, and books). What looks great for a prospective critical thinker? The person with an eclectic taste in music, hobbies they substantially invest themselves in, and a wide range of reading choices. What does not look so good? These are the people who like both kinds of music—country and western, have limited outside interests, and only read the funny pages.[13] I want to find those who are insatiably curious. These are the people the Air Force should search for in both recruitment and future promotion.

At our small school, we work to help our students develop habits of mind and capture the patterns of inquiry from the books and articles read during the academic year. One way we instill habits of mind is in the formal courses we offer, which organize material into what we hope is a coherent series of learning. The habit develops and manifests itself, at least initially, in the thesis project that each student designs, develops, and delivers during the year with us. We challenge our students to find the patterns of inquiry each author(s) used to solve the difficult question or problem found within each book or reading and encourage them to gather up these "patterns" and keep them available for the challenges they will face in the future. Now, we do not expect any "pattern" studied at SAASS to be the right answer for a future problem, but we do expect our graduates to use their developing habits of inquiry to produce their own lines of inquiry to develop innovative methods to solve the difficult challenges we know will come their way. The continued feeding of the mind—the habit—in a disciplined manner that collects the patterns of inquiry from each book or article read is the kind of critical thinker we look for in a future strategist.

The Air Force could "test" for its critical thinkers, but I suggest it would fall short of its desired goal to find and produce an officer corps that can innovatively think critically about the challenges of the day. While a standardized test could provide a baseline, the only way to improve scores on such an exam is to conduct a preparation course for such a test. While I offered a way to look for potential to think critically and innovatively, I would never say we produce critical thinkers. Rather, we produce officer graduates who can pursue knowledge in disciplined ways using their habits of mind and seek ways to solve great challenges with innovative patterns of inquiry. But at SAASS, we only place our graduates on the path to become critical thinking strategists. To stay on the path, they must continually develop the mind and sharpen the patterns that lead to innovative solutions to the most challenging tasks. They leave us with their insatiable curiosities enhanced with habits of mind and patterns of inquiry. These abilities mark the critical thinkers in the work of creating strategies to solve the most difficult challenges.

SAASS is not alone in this effort; most graduate schools strive to produce critical thinkers, whether in history, political science, engineering, or another endeavor. While there is value in learning "what" critical thinkers do, I suggest it is more important to find the insatiably curious and develop their habits of disciplined study so they can take the patterns of inquiry and apply them—most likely recombinate them—in innovative ways to solve the most difficult challenges facing our Air Force and the nation. At SAASS, we know we are but a way station helping to develop critical thinkers, knowing that critical thinking is not a destination but a way of life requiring a lifetime of dedication to stay on its path. If we cease to develop our minds or lose sight of those patterns of inquiry, then we leave the path of the critical thinker. Our hope, of course, is that every Air Force member would aspire to the path and become the innovative critical thinker our service and nation will need in the future.

If the Air Force wants to recruit and develop critical thinkers, it should recalibrate its perspectives on recruitment and evaluation. Recruitment should include more than a STEM degree and a good score on the Air Force Officer Qualifying Test (AFOQT). Like the folks at SpaceX or in our search for strategists, the Air Force needs to look for the insatiably curious, and that is more of an interview process than a standardized test (yes, the AFOQT is a standardized test). Regarding an evaluation of human capital, we need to get beyond performance reporting focused solely on past activities and begin to search for evidence of insatiable curiosity. Searching for the former and documenting the latter should give the Air Force the inside track to find and hopefully develop critical thinkers with the ability to guide their own journeys with their own habits of mind and patterns of inquiry. ✪

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**Notes**

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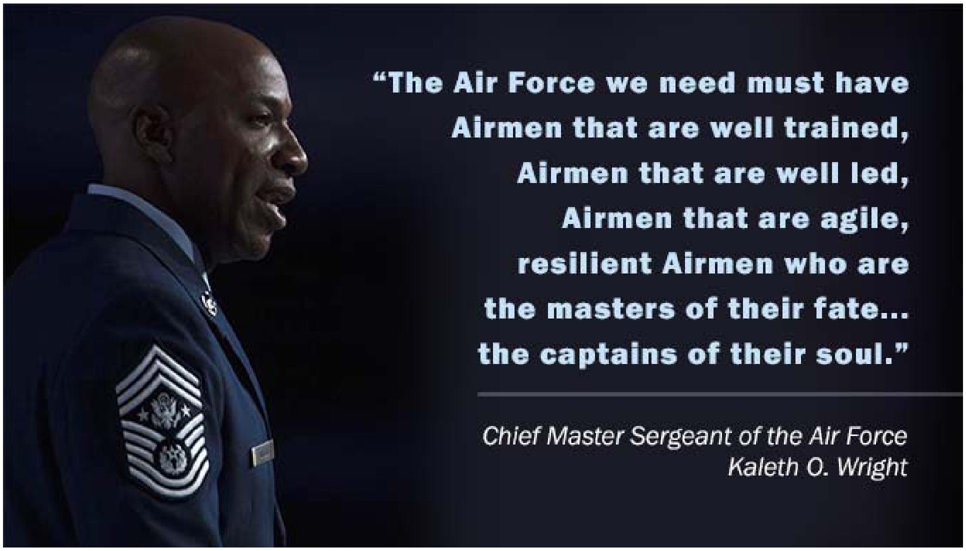
13. Please know that I use country and western music as a foil and mean no disrespect to a musical art form I enjoy listening to.

VIEW

# The US Air Force Suicide Prevention Program and Our Airmen Today

## How Transformational Leadership Can Create More Resilient Airmen

2nd Lt Ryan McKnight, USAF




In 1996, the US Air Force launched its Air Force Suicide Prevention Program (AFSSP) in Air Force Instruction (AFI) 90-505 after its leadership noted an increase in suicide rates in the Air Force and DOD. Since the AFSSP's inception 22 years ago, the USAF and its personnel have faced numerous challenges spanning from the end of the Cold War to the start of the War on Terrorism, budgetary constraints and sequestrations, technological innovations and espionage, and the lowest total force in the USAF's history. The ever-increasing mission sets, work-related stress, and outside stressors culminated in a breaking point for some Airmen. In 2018 alone, the Air Force suffered more than 100 total force suicides and 11 suicides in January 2019, prompting Secretary of the Air Force Heather Wilson to disseminate a total force memorandum advocating for a continued culture shift to one thriving in resiliency.[1] Chief Master Sergeant of the Air Force Kaleth O. Wright led this charge for a well-trained, well-led, and most importantly, a resilient force defined by one's ability to overcome hardships and pain.[2] Similarly, the AFSSP focuses on educating, developing, and emboldening adaptive, confident, and resilient Airmen who not only solve problems but also become stronger men and women through their experiences.[3] The purpose of this article is to examine transformational leadership and its potential impact on squadron-level leadership and intertwined effects on unit morale, cohesion, resiliency, and most importantly, suicide prevention.

In 2016, Gen David L. Goldfein, USAF chief of staff (CSAF), highlighted his vision to "revitalize the squadron," the core building block of the Air Force. He pushed for clarity of purpose, purposeful leadership, rejuvenation of the esprit de corps, and set guidelines for verifiable mission success. Today, in the wake of America's longest war, Air Force leaders can aid in mission success by constructing an environment built by their example. The environment must foster mission effectiveness and hold Airmen accountable while at the same time, mentor, coach, and enable an open forum for these future leaders to become resilient, creative, and better wingmen. This environment fosters squadron unity while engendering camaraderie, unity, and fellowship.

In recent years, transformational leadership has come to the forefront as an example of motivational, influential, and servant leadership. For this article, I will define *transformational leadership* in the leaders who inspire and influence their followers to carry out a goal or task through shared values and morals, guided by the leader's vision, personalized relationship, authenticity, and self-example.[4] Transformational leaders reframe problems and encourage their followers to envision new, brighter futures in line with the followers', leader's, and the organization's values. In doing so, followers choose to participate actively and contribute to a team and unit that looks out for and supports their greater good.

Just like personalities, leaders use and may prefer varying leadership models and styles (transactional, laissez-faire, etc.) to motivate their Airmen to accomplish their wide-ranging missions. This article will first provide insight into recent suicide trends in the Air Force and how the AFSSP sets guidelines to reduce these numbers. It will then analyze squadron revitalization and transformational leadership's role in fostering comradery and morale, and removing the stigma associated with talking about stressors, mental health, and suicidal ideations. Finally, it will synthesize transformational leadership's impact on encouraging and promoting a "wingman-based" culture that inspires and encourages adaptive and resilient behavior. In doing so, one can hope it will reduce the number of suicides the Air Force faces each year.

## Suicide Trends in the Air Force

From 1990–2004, the active duty Air Force (ADAF) experienced 642 suicides (42.8 percent annual average) with 95 percent of deaths comprised of enlisted

Airmen.[5] From 2012 until the third quarter of 2018, the ADAF experienced 387 suicides (55.3 percent annual average).[6] In 2011, researchers conducted a study of risk factors communicated by Airmen both verbally and in writing before and after suicides between 1996–2006.[7] They reviewed 237 case files from the Air Force Office of Special Investigations (AFOSI) death investigations, 98 of whom left suicide notes.[8] The AFOSI noted that the majority of those who left a note were enlisted personnel (85.7 percent, 84 members).[9] From the study, 13 known risk factors for suicide were identified: (1) agitation, (2) anger, (3) hopelessness, (4) loneliness, (5) loss of job satisfaction, (6) loss of status (rank), (7) missed friends, (8) perceived burdensomeness, (9) rejection, (10) revenge, (11) shame, (12) self-hate, and (13) thwarted belongingness (an inability to feel a sense of belonging).[10] Four of the most communicated risk factors were thwarted belongingness, a loss of job satisfaction (in the workplace), hopelessness (no hope for the future), and missed friends once had.[11] However, the problem of suicide in the Air Force not only entails the number of acts committed by Airmen but also encapsulates attempts of self-harm and ideations.

A secondary study by researchers comprised of a 2006 online survey of 52,780 active duty members to determine suicidal ideations and suicide attempts in the Air Force and related demographic risk factors.[12] The survey concluded that 3 percent of men, and 5.5 percent of women reported significant suicidal ideation the year before and 8.7 percent of those with suicidal ideations attempted suicide at least once.[13] Furthermore, the study found those most at risk include non-Christians, low-ranking military personnel, and Hispanic females; however, religious teachings and marriage have been found to mitigate those most at risk.[14] These groups pose a higher risk for suicide based upon a lack of religious beliefs related to suicide, empowerment or perceived power, and sociocultural values.[15] The dearth of reported data also affects the deployed population. Roughly 30 percent of deployed members return with enough psychological stressors meriting medical assistance, yet do not choose to receive it.[16] Repeated reviews of risk factors, embracing wingmanship, and community-level efforts by commanders and frontline supervisors can reduce these risks.[17] However, before explaining the impact of leadership in suicide prevention, one must first review the Air Force Suicide Prevention Plan.

## Air Force Suicide Prevention Program

Throughout the 1980s and 1990s, Airmen experienced the proxy wars and subsequent fall of the Soviet Union but were soon embroiled in conflict in the Gulf War, Bosnian War, and the bombings of the Khobar Towers and the World Trade Centers. Today, Airmen enter the Air Force during the longest war in US history.

As men and women died serving the country, suicide took its toll and became the second leading cause of death of Airmen, especially among enlisted males, with only a third of them receiving any form of mental health services during the early 1980s and 90s.[18] Air Force leadership identified the increased number of suicides, reaching almost 100 in 1989, and the high-profile suicide of Adm Jeremy M. Boorda led Gen Thomas S. Moorman Jr., then vice chief of staff, to push for the creation of the Air Force Suicide Prevention Integrated Product Team (IPT).[19]

The team, consisting of 75 members, identified three major problems: 1) Airmen's fear of losing their jobs from mental health issues, 2) the stigmatization of mental health-related issues by commanders, and 3) the perception that the Air Force no longer took care of their people.[20] Furthermore, they initiated a policy in following a subject interview related to an ongoing investigation, the first sergeant, commander, or supervisor must accompany the member and assess whether the member is at risk of suicide. These means proved to be effective in reducing the overall number of suicides within the Air Force: by 1999, the USAF had just under 20 suicides, and leadership looked to reduce the stigmatization toward mental health and create awareness for suicide prevention. Furthermore, since the AFSPP's inception and up until 2008, the number of Airmen receiving mental health care increased from 9.5 percent in 1998 to 13.3 percent in 2005, with 97 percent of those seeking treatment not experiencing negative impacts to their careers.[21] Moreover, studies found that since the AFSPP's creation, the number of suicides in the service has declined when leaders implement the AFSPP continuously and appropriately.[22]

Today, the AFSPP takes the lessons learned from the IPT and establishes levels of responsibility throughout the chain of command related to suicide prevention and conducts annual reviews to ensure compliance. Part of the annual review process includes the identification of risk factors related to legal, financial, and relationship stress, powerlessness, negative social interactions, being a burden on others, severe stress, and significant life transitions.[23] The AFSPP outlines the role of the squadron and unit commander to "promote an environment of healthy and adaptive behaviors, foster the wingman culture, and encourage responsible help-seeking and not tolerate any actions (hazing, belittling, humiliating, etc.) that prevents Airmen from responsibly seeking help or professional care."[24] Similarly, frontline supervisors must also develop a trust-based relationship with their subordinates and provide them with the tools to identify distress signals and ways of seeking appropriate care. As a result, through their leadership and computer-based training, Airmen are expected to know the suicide risk factors and signs and provide guidance and support for their Airmen in times of need.[25] The AFSPP model places a tremendous responsibility on the Air Force leadership's role—specifically the squadron and unit commanders—to develop healthy, resilient, and adaptive cultures. As such, squadron leadership must next be examined.

## Squadron-Level Revitalization

General Goldfein described the squadron as the beating heart of the Air Force, which upholds the USAF culture, trains and builds Airmen, and creates a lasting impact on the Airmen these leaders are fortunate to lead.[26] However, as the Air Force continues to ensure global vigilance, reach, and power, Airmen are tasked with more additional duties with less human resources. During an Air Force readiness hearing, Secretary Wilson indicated increased personnel ranging from maintainers to pilots, higher Airmen retention, and an enhanced squadron size to 386 squadrons by 2030 as paramount for USAF readiness.[27] As the Air Force works to achieve appropriate personnel levels for the increased mission set and readiness, senior leadership will rely on squadrons to carry out their missions and excel despite decreased personnel.

Since entering his position as CSAF, General Goldfein has relentlessly pursued squadron revitalization and empowerment, in line with the *National Defense Strategy*, to restore the readiness of forces following the government sequestration.[28] The components of revitalization include using the clarity of purpose to enhance purposeful leadership, esprit de corps, and establishing verifiable mission success. The figure demonstrates the interconnectedness between squadron vitality and mission effectiveness. Put simply, the clarity of purpose puts into perspective Airmen's daily operations and how they contribute to the Air Force's strategic vision and lethality. Purposeful leadership reinvigorates the leadership mindset of "taking care of our own," producing an environment of high morale, creativity, and cohesiveness. The esprit de corps engenders shared loyalty among team members and builds a shared sense of belongingness and a feeling that Airmen are completing meaningful and purposeful work.[29] Combining clarity of purpose, purposeful leadership, and esprit de corps creates a highly capable, mission-effective team that possesses the readiness and effectiveness to produce lethality in all domains and locations at any given moment. To discuss this in detail, one must look at how this model ties to currently effective squadrons.

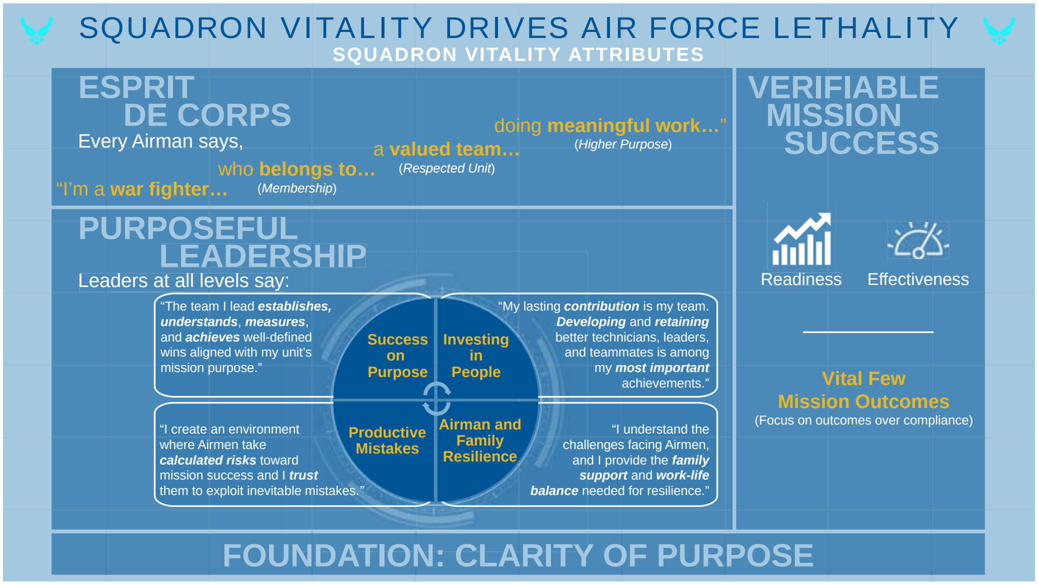



**Figure. Squadron Revitalization Model**

## Transformational Leadership and the Squadron

A recent study reviewed key attributes exhibited by effective squadron commanders. The researchers interviewed 30 squadron commanders who recently graduated Air Command and Staff College and discovered transparency had the most substantial impact upon communication, leadership, performance improvement, and change management.[30] Additionally, these commanders experienced added success through regular and consistent communication, being viewed as approachable, building trust-based relationships, and effectively using awards and social activities to increase the morale and internal cohesiveness within the unit.[31] They also built a culture of respect and reviewed climate surveys to have a pulse on their organization.[32]

All these actions created purposeful leadership focused on subordinate success, upheld a culture where Airmen felt a sense of belonging and unity and created a leadership model and esprit de corps in line with General Goldfein's tenets. Purposeful leadership must look at how leaders influence and motivate their people to succeed, form healthy, adaptative skills, and foster camaraderie in the unit.

Transformational leadership requires leaders to build personal relationships with their followers while continually developing and training them to prepare these next-generation leaders for the challenges of war. Transformational leadership consists of four main attributes: individual consideration (IC), intellectual stimulation (IS), inspirational motivation (IM), and idealized influence (II), each dependent upon the followers and situation.[33] Leaders who exhibit idealized influence display characteristics of servant leadership, place their followers before themselves, and set the example for their peers and subordinates; so much so, these followers want to follow their lead.[34] Inspirational motivation advances the ideology of the esprit de corps by pushing their Airmen to achieve what they thought impossible through optimism, motivation, and attitude.[35] Intellectual stimulation challenges followers to question the status quo and traditional methods and find new innovative ways for solving complex and dynamic tasks.[36] Finally, through individual consideration, leaders build relationships with their followers not solely as leaders, but as teachers, coaches, mentors, and counselors. These leaders provide the tools to create a well-rounded and resilient follower who continually pursues personal growth.[37]

Transformational leadership has been proven to assist coping—how one responds to and interacts with a perceived stressor—among Air Force officers as well. Coping can further be broken down into problem-focused and emotion-focused coping.[38] Problem-focused coping occurs when one assumes control over the situation and works to change that stressor, whereas emotion-focused coping addresses the stress-based emotions. Air Force leaders today face a wide range of stressors that require different approaches for effective coping. A study of 338 USAF active duty captains found that those who exhibited transformational leadership through inspirational motivation aided rather than disengaged from problem-focused coping.[39] Additionally, problem-focused coping helped leaders positively reframe emotion-focused problems.[40] Thus, leaders who effectively practice transformational leadership are more likely to appropriately handle stressful situations, ensure they continue to support their people rather than disengage from the situation, and continue to build morale within in the unit.[41] By staying engaged, leaders can set an example for their people while using their self-example to show resiliency. In short, the most effective means of educating Airmen is leading and teaching through example.

## Discussion

To establish a more lethal force, General Goldfein laid out his priorities, which directly correlate to suicide prevention. As mentioned previously, a majority of suicides stem from thwarted belongingness, a loss of job satisfaction, hopelessness, and missed friends. General Goldfein made a remark at the USAFA in which he described his first experience at the basic military training graduation. At graduation, he looked into these Airmen's eyes and saw unlimited hope. However, this led to a separate question, "How do so many of these incredible Airmen, who start with hope, transition on our watch to hopeless?"[42] He continues, "and yet we are losing too many [Airmen] on our watch... leadership is a gift that's given to us by those we're privileged to lead."[43] This gift requires commanders to take the words *adaptive*, *resilient*, and *healthy* and transform them into an everyday lifestyle that is tangible and felt by all members of the community. To create this environment, it requires transformational leadership that inspires and influences Airmen to work as a team; furthermore, it creates a culture where Airmen can go to leadership with their problems and challenges and receive the mentorship and coaching that will make them stronger and more capable.

The Air Force has continued to look for ways to improve the AFSSP since its inception to achieve the objective of zero total force suicides through a continuous commitment to its people and providing the necessary training, awareness, and environment that promotes, rather than stigmatizes, mental health treatment. Airmen today look to their leadership to lead, coach, and build them into stronger men and women who can handle the stressors inside and outside of work.

Today, Squadron Officer School captains learn the four behaviors of transformational leadership (IC, IM, IS, and II) and receive a general awareness of how they lead and implement these behaviors.[44] However, to instill these behaviors, the leadership must work to foster an environment that is conducive for the practice and internalization of these core tenets. By promoting these behaviors, Air Force leadership will invest not only in its people but also in the Air Force's long-term health as an organization.

The American people trust the Air Force's leaders to protect their sons and daughters, bring them home safe, and after their time in service concluded, have them leave the service better than when they entered. However, active duty and veteran suicides subvert this trust and expectation. A 1993 study found that almost half of the suicides during the year could have been prevented had the members received mental health treatment.[45] Despite the programs in place and resources available to Airmen today, the stigma of mental health treatment, fear of repercussions, and perception of losing their security clearances still exists today.

Through constant communication, trust-based personalized relationships, and transparency, leaders today can put into perspective the role of mental health for the Air Force's Airmen. Airmen are encouraged to seek mental health treatment, changing the perception that it might be potentially detrimental to their careers. Furthermore, mental health treatment can improve performance and growth.[46] As commanders who exhibit qualities of transformational leadership continue to influence and inspire their people, these ideas will trickle down to the lowest levels of the squadron. Furthermore, during times of stress and difficulties, how a commander responds—whether positively or negatively—will also carry over into what Airmen view as acceptable coping measures.

Following a transformational leadership style and using it for a positive reinterpretation of problems can mitigate the stigma associated with seeking mental health. Over time, the culture will shift, and Airmen will look to their wingmen and leadership for mentorship and coaching to solve the more personal and difficult questions they face daily, whether financial or marital. This shift, in turn, builds an environment where Airmen and supervisors look out for one another and create a community. As Airmen seek refuge in one another, they will gain more friends rather than lose them, feel more satisfied rather than dissatisfied, and look toward the future with optimism. They look toward the future because their leaders know them as a person, influence them to become the best version of themselves, know the actions behind their leadership's decisions, and know they have the support network to overcome any obstacle in their way. This environment makes Airmen resilient, creating survivors rather than statistics. ✪

**Notes**

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VIEW

# A Case for Open Mission Systems in DOD Aircraft Avionics

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Jonathan Ritschel, PhD

## Background

Leaders within the DOD are challenged to maintain global military supremacy while they simultaneously confront the competing goals of cost efficiency and technological superiority. Without a deliberate strategy designed to maximize efficiency within the Defense Acquisition System, neither goal can be met without compromising the other. If a policy could be implemented that simultaneously reduced costs and encouraged the development of cutting-edge technology, leaders within the DOD could ensure that global superiority is met at an acceptable price to the American taxpayer. The open systems architecture (OSA) concept is intended to meet this challenge.

Given the rapidly changing nature of technology, an acquisition approach that incorporates the ability to upgrade a component without upgrading the entire system is crucial. In essence, this approach encapsulates the intent of OSA—[1] a systems engineering approach focused on employing modular designs, hardware interface standards, and common software and software reuse to ensure openness and component interoperability.[2]

Open mission systems (OMS) is a subset of the OSA approach specifically designed for the military aviation environment. Adopted after two years of collaboration between the DOD and the industry, OMS seek to leverage competition by requiring prime contractors to use DOD-owned and controlled open standards for their avionics suite. The suite enables other companies to produce components that will work on the prime contractor's platform.[3] This requirement is similar to what Apple has done to allow programmers to develop applications that work on the OS operating system. This approach aims to avoid dependency on sole-source providers and reduce monopoly power by allowing avionics systems to be upgraded modularly by several contractors. In theory, the approach effectively leverages competition to reduce the schedule and cost of an avionics upgrade. Since the DOD and industry have agreed on the OMS standards, the costly redesign of the entire avionics suite due to the former proprietary nature of the integration of components is theoretically avoided.

While the OSA is commonplace in commercial industry as demonstrated by Apple, Android, Microsoft, and others, incorporating the principles into DOD aircraft avionics systems is inherently more complicated due to the nature of the product—a fighter aircraft is fundamentally more complex than a cell phone. Nevertheless, the benefits of an open approach have not been overlooked within the DOD. Although the complexity of avionics systems has made the successful adoption of an OMS, or an OMS-like, avionics suite extremely difficult, the DOD has been working toward this goal since the PAVE PILLAR program—a third-generation avionics suite designed for advanced tactical fighter aircraft like the F-22 in the late 1980s. Third-generation avionics architectures were the first to provide a standardized architecture. Similar to OSA in conceptual form, third-generation avionics architectures incorporated a modular approach that allows the replacement of individual modules without replacing the entire avionics system. The third-generation avionics architectures used common hardware and software with a goal of decreasing life-cycle costs for upgrades and repair. They used common data processors that integrated sensor information providing enhanced capabilities to the user. While these practices were successful and a step in the right direction, third-generation architectures were still proprietary and closed, forcing reliance on an obsolete processor that limited upgrade potential.[4] Although third-generation avionics incorporate common standards and a modular approach, the design prevents rapid evolution and competition within the industry due to the closed nature of the architecture. Commercially based hardware and software could not be leveraged, forcing reliance on proprietary hardware and software for any maintenance or upgrade.[5]

The recent collaboration between the DOD and industry to establish OMS is a result of the failed attempts in the past to produce a truly open and modular design. While it took the better part of two decades to come to fruition, OMS was formally adopted on 30 April 2014 and has been successfully implemented and demonstrated on a small scale much to the pleasure of key leaders within the DOD.[6] Successful implementation, however, does not address the other theoretical OMS benefit of reduced costs and schedule. Thus, the purpose of this analysis is to examine data from historical non-OMS aircraft avionics that are analogous to the OMS-enabled demonstration platform to determine whether software development and test costs and the associated schedule decrease with the OMS approach.

## Data

A limited number of tests and demonstrations of the OMS concept have been conducted. As of July 2015, Lockheed Martin successfully integrated and flight-tested seven payloads adhering to OMS standards on the U-2 Dragon Lady.[7]

Northrop Grumman has also conducted OMS-related tests on the RQ-4 Global Hawk.[8] While the reception from the various tests has been positive, access to data to examine the claims that OMS will reduce the costs and schedule of upgrades in DOD avionics systems is extremely limited. Currently, the full data set required to conduct the analysis (integration cost and schedule data, as well as associated source lines of code) is limited to only one OMS-enabled aircraft platform. As a result, this analysis is exploratory in nature. Nevertheless, available data are enough to garner preliminary insight as to whether or not the OMS approach is a promising method for avionics upgrades in the future.

To conduct the comparative analysis, data are needed on both OMS and the analogous non-OMS avionics upgrade programs.[9] Source documents for the non-OMS analogous avionics upgrade programs include Software Resources Data Reports (SRDR) and Cost Analysis Requirements Documents (CARD) to match the costs of selected historical avionics modernization programs with specific software coding effort measured in source lines of code (SLOC). Data pertaining to the sole OMS-enabled demonstration platform was provided by a Secretary of the Air Force-level cost agency.

The comparison data set consists of 16 historical avionics upgrade programs that were deemed analogous by Secretary of the Air Force subject matter experts to the avionics components replaced in the OMS demonstration platform. Of the 16 historical programs, several were achieving an upgrade for the same platform and were therefore combined. After the appropriate programs were combined, 13 programs remain to compare against the OMS demonstration platform. The data set also contains cost data for the initialization of the OMS demonstration platform and a subsequent OMS upgrade for the platform.

Between the data set—SRDRs, and CARDs—the costs and software fall into two general categories: (1) mission processor software (including Operational Flight Program [OFP] and associated costs; and (2) platform integration software (including application interfaces [API] to avionics applications) and associated costs.

Of the 13 historical programs, eight contain both cost and SLOC data for Category 1, 10 contain both cost and SLOC data for Category 2, and six contain complete data for both categories. One program in the data set contains data for SLOC and research and development (R&D) months but no cost data for either category. Table 1 summarizes the availability of the OMS demonstration platform data and the historical programs' data.

**Table 1. Data on analogous programs and OMS demonstration platform**

| *Asset* | *Cat 1: Mission Processor/OFP Costs* | *Cat II: Platform Integration/API Costs* | *Cat I: Mission Processor/OFP SLOC* | *Cat II: Platform Integration/API SLOC* | *Research and Development Months* |
|---|---|---|---|---|---|
| *Historical Program 1* | X | X | X | X | X |
| *Historical Program 2* | | X | X | X | X |
| *Historical Program 3* | X | X | X | X | X |
| *Historical Program 4* | X | X | X | X | |
| *Historical Program 5* | | X | X | X | X |
| *Historical Program 6* | X | X | X | X | X |
| *Historical Program 7* | X | X | X | X | X |
| *Historical Program 8* | X | X | X | X | |
| *Historical Program 9* | | X | | X | X |
| *Historical Program 10* | | | | X | X |
| *Historical Program 11* | | X | X | X | X |
| *Historical Program 12* | X | | X | | X |
| *Historical Program 13* | X | | X | | X |
| *OMS Demo* | X | X | X | X | X |
| *OMS Demo Upgrade* | X | X | X | X | X |

## Data Analysis Results

To compare the OMS-enabled asset to the historical programs, the data are normalized to mitigate the differences in scope and functional complexity between the programs. All SLOC counts are normalized to equivalent SLOC (ESLOC) using a formula provided by a Secretary of the Air Force cost agency through their previous analyses of SRDRs and historical data.[10]

Estimators use ESLOC to determine the effort needed to complete a program. The implicit assumption is that costs increase as ESLOC increases because greater ESLOC should be indicative of greater effort. This relationship is tested in our data set through regression analysis. Specifically, we examine the relationship between the cost data of the historical programs and the corresponding ESLOC of the programs. The results indicate a moderate positive relationship.[11] This lends statistical backing to the belief that as software coding efforts increase (as measured by ESLOC), costs also increase.

With the relationship between cost and ESLOC demonstrated, the next step is comparative analysis. The basic question to answer is: Which approach is more cost effective? We begin by comparing the upgrade costs of the two approaches. The upgrade cost per ESLOC of the OMS demonstration platform for mission processor software and application interface/platform integration software is compared against lower and upper bounds from the upgrade costs of the historical non-OMS aircraft to determine if the OMS costs are indeed lower as theory suggests.[12] If it is found that the OMS costs are *outside* the bounds (more specifically, below the lowest value), there is reason for optimism that the OMS approach will result in lower costs. Each software category (Category 1 and 2) is analyzed independently, and then analyzed together (both categories combined). This is done deliberately as only six of the historical programs contain data for both categories of software. Table 2 summarizes the results.

**Table 2. Cost per ESLOC comparison**

| *Category* | *OMS Cost* | *Historical (non-OMS) Lowest Value* | *Historical (non-OMS) Mean* | *Historical (non-OMS) Highest Value* |
|---|---|---|---|---|
| *Cat 1: Mission Processor* | **$30.78** | $51.36 | $278.52 | $667.40 |
| *Cat 2: Application Interface/Platform Integration* | **$88.54** | $152.61 | $949.45 | $2,874.20 |
| *Cat 1–2 Combined* | **$62.65** | $106.74 | $421.36 | $1,017.92 |

Table 2 shows that the OMS demonstration platform is less expensive than the analogous non-OMS historical programs. For Category 1 (mission processor), the non-OMS historical programs have a mean cost of $278.52 per ESLOC with lower and upper bounds of $51.36–$667.40. The associated cost per ESLOC for the OMS program, however, falls far outside the lowest value at only $30.78. The same result (OMS falls well below the lower bound) is true for the Category 2 analysis and the combined Category 1 and 2 analysis. These findings are promising, but we again caution the reader that they should be considered preliminary due to the small data set analyzed.[13]

While the analysis from table 2 is favorable to OMS, it only captures the cost *per unit* of ESLOC. The cost per ESLOC is important, but the *total cost* to upgrade an asset depends not only on the cost per ESLOC, but on the *total quantity* of ESLOC required as well. For example, consider a program where the traditional approach costs $10 per line of code and requires 100 lines ($10 * 100 = $1,000) while the OMS approach costs $9 per line of code and requires 200 lines ($9 * 200 = $1,800). In this example, despite OMS being cheaper on a per unit basis ($9 vs. $10), the overall cost of the OMS approach is more expensive ($1,800 vs $1,000). The key component is the total ESLOC used by the two approaches. As shown in the example, if OMS requires more ESLOC than the historical proprietary systems then it may be more expensive from a total cost aspect. To investigate this, the required total quantity of ESLOC in the OMS demonstration platform is examined against lower and upper bounds[14] for the required ESLOC in the historical non-OMS programs. Table 3 summarizes the result.

**Table 3. Total ESLOC Lines Comparison**

| *Category* | *OMS Count* | *Historical (non-OMS) Lowest Value* | *Historical (non-OMS) Mean* | *Historical (non-OMS) Highest Value* |
|---|---|---|---|---|
| *ESLOC* | 37,657 | 77,762 | 544,189 | 1,687,489 |

Not only did the OMS approach reduce the cost per line of ESLOC as previously shown in table 2, but as shown in table 3 the amount of ESLOC required to upgrade the asset was also significantly lower than the historical proprietary programs. The OMS ESLOC count of 37,657 falls well below the lowest value (77,762) for the historical programs. Based on the results of this analysis, it appears that OMS is the better approach in cost per line and at the same time is likely to require *less* coding effort (as measured in lines of code counts). In other words, it is *unlikely* that any OMS cost per ESLOC savings would be offset by vast increases in the quantity of ESLOC required in the OMS approach. The bottom-line is that the evidence in this exploratory analysis suggests the OMS approach should result in reduced costs through *both* lower cost per ESLOC and lower lines of code counts.

But what about initial investment costs to make the asset "OMS ready" in the first place? The above discussion compared costs of the upgrades themselves. One could argue that there is a barrier to entry cost (an initial investment) that may make OMS too expensive. Take personal computers circa 1990s as an analogy. At that time, Apple computer owners were required to buy everything from Apple. Any monitor, printer, or mouse had to be designed and built by Apple to work with Apple's interfaces and operating system. As competition entered the market and HP, Dell, Gateway, Compaq, and countless others started making computer printers and other peripherals, the Apple owners missed out on all the savings of market competition. But for a one-time cost, they could abandon Apple and switch to Windows. For the remainder of the life of their machine, they could reap the benefits of competition and save money on their upgrades. In the same manner, the OMS comparison above is like updating to a different computer and operating system. Before upgrades can happen, the asset needs to be an "open system" or OMS ready. If the asset was designed from conception as an open system utilizing the OMS standards, this is a non-issue. But if it was not, then there is a cost to make it an open system. This is a one-time nonrecurring cost covering the useful life of the asset.

Thus, to complete the cost analysis, we consider the initialization cost in addition to the previously discussed upgrade costs. The initial investment cost to make the asset OMS ready was $5.4M. We compare this to the savings projected from the most optimistic scenario from the historical proprietary system upgrades. If the proprietary upgrade is assumed to require only 77,762 ESLOC (the lower bound table 3) at a cost per ESLOC of $106.74 (the lower bound from table 2) the proprietary upgrade would still exceed the cost of an OMS upgrade by over $5.9M. This means the OMS approach remains $0.5M cheaper ($5.9M- $5.4M = $0.5) when including both the one-time nonrecurring investment cost and the recurring cost of the upgrade itself. It is important to note that this scenario only assumes one upgrade in the life of the asset. If more than one upgrade occurred, the savings from the OMS approach would be even larger. Under the same conservative assumptions, a second upgrade would realize the full $5.9M in savings for the OMS approach plus the previous $0.5M for a total of $6.4M. All subsequent upgrade instances would accrue an additional $5.9M savings in perpetuity until the end of the useful life of the asset under these assumptions. Again, these are tentative findings due to the limitation of the data, but they utilize the most conservative assumptions to give the historical proprietary approach as much credit as possible.

While the previous analyses focused on cost-efficiencies, schedule is also an important consideration. The length of time to complete an upgrade must be considered as it directly affects combat capability. Therefore, the Research and Development (R&D) integration time of the OMS demonstration platform is compared against lower and upper bounds of the R&D integration times of the historical programs. Table 4 summarizes the schedule results.

**Table 4. Schedule comparison**

| *Category* | *OMS Months* | *Historical (non-OMS) Lowest Value* | *Historical (non-OMS) Mean* | *Historical (non-OMS) Highest Value* |
|---|---|---|---|---|
| *Upgrade R&D Months* | 3 | 14 | 33.36 | 60 |

| *Category* | *OMS Months* | *Historical (non-OMS) Lowest Value* | *Historical (non-OMS) Mean* | *Historical (non-OMS) Highest Value* |
|---|---|---|---|---|
| *Initialization Months* | 9 | N/A | N/A | N/A |

The first row of table 4 is a direct comparison of the upgrade times. The OMS R&D integration time of three months was far below the historical proprietary programs lowest value of 14 months. While that is a direct comparison of upgrade times from the two approaches, what are the schedule impacts of first making an asset "OMS-ready" to conduct these upgrades? The second row of table 4 provides this information. The R&D time to make the OMS demonstration platform an open system was nine months. Combining the initialization time of nine months in conjunction with a three-month upgrade results in a total schedule of 12 months. This result is still below the historical proprietary programs' lower bound of 14 months. Similar to the initialization cost discussion, it is important to note that the nine months is a one-time event. The upgrades, however, may be numerous (i.e., recurring) throughout the life of the asset. The projected schedule savings for subsequent upgrade instances would be calculated with the data from row 1. These preliminary results, therefore, are favorable to the OMS approach even when the initialization schedule is included.

## Limitations

Despite the promising findings of this study, important limitations do exist. While this OMS aircraft platform provided insight into the OMS possibilities, the conclusions drawn in this article are from a single platform and should be considered exploratory. One can be optimistic about the prospects of OMS, but definitive conclusions cannot be drawn. More data must be made available as more platforms are OMS-enabled to conclude that OMS provides significant cost and schedule savings over proprietary platforms.

The dearth of OMS data at this time prohibited statistical testing. Sufficient data was available to develop confidence intervals for the historical proprietary programs. However, confidence intervals could not be developed for the OMS approach because it only contained one data point.

Additionally, an underlying premise of the analysis was that as software coding efforts increase, costs increase. The regression analysis found positive correlation. However, the relationship is only considered moderately strong (see note 11).

Furthermore, the historical programs deemed analogous to the OMS aircraft platform in this article might not be all encompassing. The data set only included USAF and US Navy Acquisition Category I programs. Different systems across the DOD and systems under a different acquisition category could be deemed analogous to the OMS aircraft platform upgrades and provide a broader data set from which to test the OMS aircraft platform data.

Despite these limitations, the OMS demonstration platform represents a real-world asset that has undergone the OMS transformation and experienced several component upgrades. While the conclusions cannot be deemed definitive, they provide a glimpse into the potential future of avionics acquisition.

## Conclusions

Although the data for OMS-enabled platforms are limited, early indications show that there are potential cost savings with OMS upgrades over the historical proprietary approach. The lower R&D times for OMS upgrades is also promising. Based on the findings in this exploratory analysis, OMS provide an avenue for rapid acquisition while they also lower the integration costs of upgrades on DOD platforms.

The implications for practitioners in the field are clear. With top-level support, practitioners can strive to develop more avionics upgrades that embrace the OMS approach. Gathering additional data through these new OMS efforts is necessary to validate the preliminary results shown here. Finding consistently reduced cycle times and lower costs should translate to more capability in the field. The future of OMS in the DOD shows great promise. More needs to be done to validate this promise. Now is the time to employ OMS and through subsequent data analysis determine whether they should be the preferred approach to avionics upgrades. ✪

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**Notes**

1. Don C. Winter, "Open Systems Architecture—A Boeing Enterprise Perspective," Report 0704-0188 (Arlington, VA: Boeing Open Systems Architecture Phantom Works, 2002), 1–14, https://apps.dtic.mil/.

2. Office of the Deputy Assistant Secretary of Defense, Systems Engineering, "Modular Open Systems Approach," DOD.

3. Richard Whittle, "Lt. Gen Otto Commits Air Force To More Open Mission Systems," *Breaking Defense*, 26 October 2015, https://breakingdefense.com/.

4. Bill Filyner, "Open Systems Avionics Architectures Considerations," *IEEE AES Systems Magazine* 18, no. 9 (2003): 3–10.

5. Filyner, "Open Systems Avionics Architectures Considerations," 3–10.

6. Whittle, "Lt. Gen Otto Commits Air Force."

7. Lockheed Martin, "Lockheed Martin Completes Sixth Open Mission Systems Flight," *PR Newswire*, 22 July 2015, https://news.lockheedmartin.com/.

8. Whittle, "Lt. Gen Otto Commits Air Force."

9. All data were collected in raw form in a standard Work Breakdown Structure format (compliant with Appendix B of Mil-Std-881D), and all costs were normalized to Base Year 2014.

10. The equation is $\text{ESLOC} = \text{New}_{\text{SLOC}} + (.85 \times \text{Modified}_{\text{SLOC}}) + (.05 \times \text{Reused}_{\text{SLOC}})$.

11. Regression result found a statistically significant positive correlation of 0.665 at the 95-percent confidence level.

12. Table 2 shows the range and mean of the non-OMS platform data, along with the single OMS platform data point. Three additional analyses were conducted on this data. First, a 90-percent normally distributed confidence interval around the mean of the historical non-OMS upgrade costs was developed. The underlying assumption of normality in the historical data was tested and verified through the Shapiro-Wilk test and W/S test. The confidence interval bounds were $138.14–$418.89 for Category 1, $452.19–$1,446.17 for Category 2, and $146.77–$695.95 for both categories combined. The OMS cost was below the lower bound in all three of these instances. The second analysis constructed 95 percent prediction intervals on the non-OMS upgrades, utilizing each non-OMS upgrade as the X0. These prediction intervals were then compared to the OMS data point. Due to the small data set size and associated variability, the prediction intervals were very wide. The lower bound of the prediction interval crossed zero in all but one instance for Category 1, all but one instance for Category 2, and in all instances for both categories combined. The third analysis applied Chebyshev's Theorem, specifically examining the interval from -2 to 2 standard deviations from the mean. In Chebyshev's interval, this calculation is interpreted as at least 75 percent of the observations fall within the range. The interval for Category 1 was -$140.61–$697.64, -$768.19 –$2,665.09 for Category 2, and both categories combined were -$246.23–$1,088.94. The OMS cost was within the bounds in all three instances. These three analyses demonstrate the limits of statistical analysis with this very small data set.

13. We ran an additional analysis here, making use of recommendations from the *Joint Agency Cost Risk and Uncertainty Handbook*, 16 September 2014, 31–33, https://www.ncca.navy.mil/. Essentially, we ran Monte Carlo simulations (10,000 iterations), using triangular distributions on the historical data. The historic low values were set to the 0.08 fractile, the mean was set to 0.50, and the historic high values were set to the 0.77 fractile. The resulting cumulative distribution functions for the mission processor, interface/integration, and combination categories (OMS system actuals) were 1.36, 1.29, and 2.13 percent respectively. Again, with caveats related to our small

sample size in mind, we can interpret these percentages as very low probabilities that we would expect the cost of a system to be as low as the OMS actuals were. Details on this technique are available from the authors upon request.

14. Table 3 shows the range and mean of the non-OMS platform data, along with the single OMS platform data point. The same three analyses discussed in note 12 are conducted on the ESLOC data. Results mirror the findings of note 12, where the OMS ESLOC count falls outside the lower bound of the confidence interval but is contained within the prediction interval and Chebyshev's interval.

***The Girls Next Door: Bringing the Home Front to the Front Lines*** by Kara Dixon Vuic. Harvard University Press, 2019, 383 pp.

*The Girls Next Door* explores gender and sexuality issues in the military through the lens of the roles women played in the Red Cross, YMCA, USO, and other armed forces recreation and services programs. The book traces the history of women in these roles from World War I to the Iraq War. The reader gains insight into the women's thoughts and reflections through personal letters, memoirs, and other types of correspondence written before, during, and after the war. Through passages from official memorandum, DOD policy, and personal correspondence, readers also get glimpses into how the women were viewed by the leaders of the various service organizations, DOD, and male Soldiers. The book is very well-researched and does an excellent job of conveying the richness and complexity, not only of the women's experience but also of the wartime environment in which they served.

On the surface, this book will be interesting to students of military history who want a detailed look at the development of the recreational services programs. At another level, this book will be fascinating to those who have a keen interest in how sexual and gender norms, as understood particularly in the military, changed through the course of the twentieth century. Also, perhaps this book can be a resource for readers concerned with both describing and evaluating the ethical dimensions of how women have been used in the recreational services during wartime.

The book essentially revolves around the various ways the military tries to deal with a perennial problem in wartime, that is, how to manage the sexual appetite of its male Soldiers in a deployed environment. (The military does not seem to have equal concern for how women, such as Women Airforce Service Pilots or WASPs, nurses, female Soldiers in Iraq, or the women who served in the recreational services program, were supposed to deal with managing *their* sexual appetites.) As the book shows, successfully managing the male sexual appetite was an extremely important operational issue and occupied the attention of unit commanders, medical personnel, and top DOD and federal government officials. For example, venereal disease could wipe out significant percentages of the fighting force in particular areas. Some believed that the male sexual appetite could be sated through the sanctioning of prostitution, but only if the prostitutes had been "medically cleared." Other officials advocated for a more stoic view of the problem and advocated for abstinence. They insisted that if Soldiers could sublimate their sexual energy, they could use it to become more spirited and effective war fighters. Government officials had no clear solution to the problem but believed the use of women in the recreational services was one effective way to address the problem.

Ostensibly, the role of the women in the recreational services program was to staff "clubs" for Soldiers on leave or when they had time for rest and relaxation. During World War I and World War II, they also traveled in trucks and vans, serving coffee and donuts to men at the frontlines. The clubs were designed to be attractive alternatives to brothels and to entice men to socialize with American women in a "wholesome environment." Vuic points out that during World War I, recreational services women were sent out onto the streets of France—in pairs, at night, and in their uniforms—to intercept men on their way to finding prostitutes. Their job was to try to convince them to join them back at the club.

While staffing the clubs, women not only cooked, cleaned, and served food to the men; they also provided entertainment as well. Most women received specialized "training" in how to make conversation, how to play cards, games, and so forth. Their basic mission was to bring "the homefront" to the frontlines. Women were supposed to look and act in such a way that the Soldiers would be reminded of their mothers and sisters and the country back home for which they were fighting. It was almost with universal agreement that Soldiers' encounters with women were "good for morale" and made them a more effective fighting force.

While the encounters were thought good for the men and their morale, the effect on the women, Vuic points out, was decidedly mixed. Women were placed in a very complicated set of gender roles and expectations. They had to be attractive enough to lure men away from engaging with prostitutes, yet they had to present themselves as off limits for any such sexual activity. They had to engage in extended periods of conversation and go on trips as companions for officers. Yet at the same time, they had to develop a strong set of boundaries such that no intimate relationships would emerge. Efforts in establishing boundaries did not always work, unfortunately. Women reported that they had to get used to turning down frequent marriage proposals, protect themselves from being sexually propositioned, and, in some cases, recover from sexual assault and violence.

*The Girls Next Door* is an excellent window into gender and sexuality issues in wartime and explores the various ways the military has sought to deal with the male sexual appetite. The latter chapters of the book deal with the shifting role of the recreational services program as women became more integrated into armed forces as war fighters themselves. This section also shows how the gender and sexuality landscape was complicated even further. These latter chapters highlight that the military still struggles to find ways to deal with these issues in a mature fashion, especially in today's hypersexualized environment.

Every service member would do well to read this book and consider the assumptions about sex, sexuality, and gender stereotypes of both men and women that *The Girls Next Door* reveals and still exist today.

**Deonna D. Neal, PhD**

***AMARG: America's Military Aircraft Boneyard*** by Nicholas A. Veronico and Ron Strong. Specialty Press, 2010, 144 pp.

Nicholas A. Veronico and Ron Strong's narrative is a pictorial documentary of America's foremost aircraft boneyard or outdoor storage facility, located in the Arizona desert near Tucson. The 309th Aerospace Maintenance and Regeneration Group (AMARG) is a subset of the 309th Maintenance Wing assigned to the Ogden Air Logistics Complex in Ogden, Utah. The group has the distinct mission of storing, salvaging, or scrapping our country's excess aircraft. What began as one of several outdoor facilities to store excess aircraft after World War II has turned into America's preeminent aerospace regeneration facility with almost 4,000 aircraft stored or processed at any given time.

The coauthors are self-described aerospace enthusiasts employed with the National Aeronautics and Space Administration's (NASA) Stratospheric Observatory for Infrared Astronomy at NASA Ames. Veronico is also a science and technology writer authoring more than two dozen books on military and aviation subject, as well as the lead scriptwriter for a Discovery Channel documentary entitled "Scrapping Aircraft Giants." Strong harnesses his 40-year aviation photography experience to bring eye-catching detail to the aircraft at AMARG. He is a former Air Force member who served in weather reconnaissance and special operations aircraft units before he moved on to NASA. The authors' eye for detail is evident throughout the book.

The format for their story is unlike many. The authors present their narrative in only four chapters, each with brief introductions describing salient details. Each section is filled with pictures of varying aircraft, each captioned with explicit detail on the aircraft's last unit, tail number, AMARG inventory number, other interesting details, and the known disposition at the time of the book's writing. It is a unique method to tell AMARG's story. The book itself is laid out with captioned photographs comprising almost 98 percent of the pages; the rest are worded details that provide underlying context.

The book is organized chronologically, beginning with the origins of excess aircraft storage facilities following World War II and their subsequent consolidation into the AMARG facility of today. The narrative then discusses the four types of aircraft storage. It describes in detail from how the facility stores aircraft in a state ready for a return to active duty if called down to aircraft that have given up every useful part and are ready for recycling. As one quickly comes to expect, each storage category is explained in detail with excellent captioned pictures. The remaining two chapters provide a historical overview in photos of the nation's aircraft fleets during their drawdowns, eliminations, or long-term storage.

The authors take the reader down a photographic path of fleet drawdowns from World War II's B-17s, B-24s, and B-29s, on through the eras of F-105s and -106s, B-58s, B-52s, C-130s, A-10s C-5s and everything imaginable in-between. The anthology covers aircraft from all services, NASA, commercial airlines, and the like. With each aircraft drawdown, the authors offer context as to why the fleet was removed from service. Reasons range from obsolete aircraft, obsolete technology, and Strategic Arms Reduction Treaty requirements in terms of our strategic bombers, such as the B-52.

Throughout the narrative, the authors ensure readers understand the AMARG processes. These describe items such as aircraft cocooning, spare part reclamation, full-up return to service restoration, and depot-level maintenance activities. The narrative offers unique insights into a behind—the-scenes program supporting our nation's aerospace mission and pays homage to the men and women performing the work.

In the whole, the book is a good addition to anyone's aerospace reference collection and as a historical record of our country's aircraft reclamation efforts. It reads easily and is sure to keep one's attention with its numerous pictorial guides.

**Lt Col Kevin R. Nalette, USAF**

***Overcoming the Dark Side of Leadership: How to Become an Effective Leader by Confronting Potential Failures*** by Gary L. McIntosh and Samuel D. Rima. Baker Books, 2007, 256 pp.

Why do successful leaders allow themselves to fall into avoidable moral and ethical failings? Biola University's Dr. Gary McIntosh and Bethel Seminary's Dr. Samuel Rima address this question in *Overcoming the Dark Side of Leadership*. Writing from the perspective of academic leaders in Christian ministry, the authors utilize psychology and theology to explore leadership failures and the development of negative behaviors in otherwise effective leaders. Along the way, they incorporate a wide array of examples surrounding psychological development and historic leadership failures among Biblical characters, US Presidents, entrepreneurs, religious leaders, and other well-documented persons. This leadership self-help book seeks to prepare current and emerging leaders to realize self-awareness of their own "dark side." This self-realization will help them to better understand their motivations, recognize weaknesses associated with their personalities, and avoid potential pitfalls as they lead their organizations.

Prospective readers of *Overcoming the Dark Side of Leadership* should understand it is overtly religious and aimed primarily at an audience of leaders in Christian ministry. However, the authors' well-researched arguments are underpinned with psychology, the book is peppered with numerous secular examples and references, and readers are directed to multiple secular assessment tools, particularly in Appendix A. Military and government leaders, regardless of belief system, may draw parallels with some of the examples from ministry; being held to such a high standard that even a perceived moral failure could result in removal from their position, navigating competing interest among personnel, straining for resources to meet goals, and always having to "be on" as the public face of an organization, among other similarities.

McIntosh and Rima begin their argument with an assumption that all leaders suffer from some level of personal dysfunction, but many are unaware of their dysfunction or its roots. They assert certain forms of dysfunction can result in a drive to achieve, but those dysfunction-associated characteristics that propel an individual to leadership come with a shadow, or "dark side," that can lead to devastating failure if left unchecked. Therefore, if leaders identify and learn from their dysfunctions, they may address, prevent, or mitigate the negative tendencies associated with them. Finally, the authors assert the Bible is informative concerning the dark side of personalities and is useful to those leaders who seek to better understand themselves.

Opening with examples from their own leadership experiences, the authors devote the first chapters of their book to several examples of leaders whose experiences with their dark sides were evidenced by episodes ranging from emotional burnout to bizarre criminal behavior. Lest the reader feel invincible to the flaws that felled the likes of National Aeronautics and Space Administration's Lisa Nowak, ImClone System's Dr. Sam Waksal, or televangelist Jim Bakker, they are reminded that all leaders possess the raw materials necessary for such failings in some measure: self-deception, unrestrained pride, selfishness, and wrong motives.

Leaning heavily on Abraham Maslow's hierarchy of needs, McIntosh and Rima further a convincing argument concerning the potential for leaders to fail in unexpected ways. They proffer a four stage pattern of dark-side development that begins with the existence of unmet needs which are exacerbated during the formative years by traumatic experiences that threaten fulfillment of those needs. As adolescents, some individuals internalize an irrational responsibility for their own unmet needs, creating an "existential debt" to self the individual can never repay, often manifested as the subconscious need for ever greater achievement, career success and approval. The final stage of this process is the development of the dark side through the combined effects of unmet needs, traumatic experiences, and existential debts that have not been effectively addressed or resolved.

The authors illustrate this dark side in five leader types, and use examples of Biblical figures to frame discussions of compulsive, narcissistic, paranoid, codependent and passive-aggressive leaders. Each type is examined in detail with descriptions of associated behaviors and attitudes, and the reader is offered a self-assessment questionnaire with each to increase understanding of their own tendencies toward negative behaviors. The self-assessment tools accompanying the descriptions of these types, along with those found in Appendix E, are a point of concern. While they are constructed using a Likert scale and have similarities with widely accepted research tools, there is no associated reference to any academic validation of their effectiveness. If they have been validated and peer-reviewed, that information should be included in future revisions. If not, a disclaimer should accompany each. The final chapters describe a five-step process by which readers are encouraged to redeem their dark side. With each step the reader is offered a list of "applying insight" questions to assist their understanding of the corresponding step. Much emphasis is given to self-examination of one's personality, personal history, and expectations.

The strength of *Overcoming the Dark Side of Leadership* is its focus on sincere self-examination. While many works on leadership note the importance of knowing one's leadership style and motivations, this book calls the reader to explore the experiences and subconscious drivers that have brought them to a position of responsibility and affect their exercise of leadership. Leaders are adjured to embrace a level of humility necessary for honest self-examination and the identification of negative tendencies. By exploring the lives of flawed leaders who are still considered to be great successes alongside those considered to be abysmal failures, McIntosh and Rima drive home the point that the manner in which an individual addresses their dark side tendencies may determine their leadership legacy. Future revisions of the book could be improved with more diverse examples of leadership, including more examples of women leaders and leaders from ethnic or racial minorities. Although the book is somewhat dated, it would be a beneficial read for those who seek a unique and introspective consideration of leadership, and might enhance the spiritual wellness of those whose belief system aligns with the authors'.

**Lt Col James H. Popphan, USAF**

***Combat Talons in Vietnam: Recovering a Covert Special Ops Crew*** by John Gargus. Texas A&M University Press, 2017, 286 pp.

*Combat Talons in Vietnam: Recovering a Covert Special Ops Crew* is a historical and monographic narrative combining military education, Vietnam War analysis, international relations, and complex search, rescue, and recovery. This book takes the audience through a complete journey that includes Gargus' motivation to continuously attempt to obtain resolution with the central idea that is unique to the American military—every member returns home.

One of the great aspects of this book is that Gargus introduces the audience to S-01 crew members before their tragic demise on 29 December 1967. He does this, not by just naming these heroes, their backgrounds, and images, but vividly describing what bonded them as a crew and family in Nha Trang that was prepared and committed to any outcome of the clandestine operations they accepted. He perfectly transfers the pride and commitment with which this military family performed.

Any reader of *Combat Talons in Vietnam* will surely wonder why the recovery of the S-01 crew took 25 years to complete. The answer to that inquiry is given in great detail through two chapters that describe the process of recovery. While Gargus identifies some flaws in the bureaucracy of the time that resulted in delays in obtaining information, he does an excellent job of ensuring readers that the US military maintains a unique commitment to bringing its fallen heroes home, at costs and risks that no other military power is willing to accept. The spark that introduces a lead in the search comes in 1995. After identifying vague potential information about an aircraft loss, Gargus questions if the aircraft and crew loss was mentioned in a 1993 article from years earlier. He writes,

> Our aircraft tragedy represented the largest single aircraft loss of life in that war. It wasn't just "several Americans." Certainly, our C-130 aircraft's discovery would have warranted more than just one sentence. We were all wrong." This is a glimpse into the whirlwind of search effort that follows, illustrating the people who remained dedicated to providing closure for the families and friends of the S-01 crew.

Gargus also explains the difficulty of the Vietnam War well, including recruitment, preparation, and gains and losses of those military personnel participating. An example of this is when Gargus familiarizes the audience with the Tet Offensive of 1968. He also describes Nha Trang in vivid detail, including the acquisition of facilities, modification of living quarters, and the daily security risks, even the 25 November 1967 mortar attack that reinforced the reality of the Vietnam War.

An area of improvement in the book concerns the time immediately following the tragic crash of the S-01 crew in Vietnam in 1967. The crash happened on a night when there were deviations in normal operations. The S-01 crew contained substituted members, a new mission-planner, and a particularly difficult ingress and egress route. After losing contact with the S-01 crew however, those back in Nha Trang, the reaction of the family we had come to know through so much of the book, was only briefly mentioned. Moreover, readers are left wondering how the climate specifically changed in Nha Trang after that night. While it is apparent that this deployed unit continued on with the war, accepting that every man on that crew perished a hero, readers are left wondering how those left behind, particularly on that night, felt about the S-01 crew's mission, the war, and the lack of closure they received even after the war concluded. However, this is somewhat resolved near the end of the book, when Gargus explains the gap in communication that exists in notifying military units of loss of life, as compared to the communication that is required for a member's family alone.

*Combat Talons in Vietnam* is a worthwhile read for an audience seeking knowledge on the Vietnam War, the evolution of the C-130E(I) aircraft, and is particularly notable for those interested in recovery operations. It provides a comprehensive explanation of the process of recovery and the agencies involved with personnel recovery. It is a significant piece of information in the documentation of C-130E(I) history, as it consistently explains how the Special Operations mission evolved from the Vietnam era to the present. The heritage Gargus paints through *Combat Talons in Vietnam* is exceptional in providing context for the search and recovery operations in 1992–93. The audience is not just given a resolution but also presented with the long-lasting impacts of that resolution, such as the change of status from missing in action to killed in action for some crew members, and the final return of remains after a second excavation of the crash site.

Overall, *Combat Talons in Vietnam: Recovering a Covert Special Ops Crew* is an outstanding piece of work that takes an alternative to historical Vietnam War recollections. In it, Gargus finds a way to introduce an audience to military training, the C-130 aircraft, the joint Special Operations mission, and the tragedy that occurred on 29 December 1967. The focus of this book then gives a detailed account of the search and recovery process, which provides resolution for the audience in an educational and inspirational manner.

**Capt Donald Williams, USAF**

***Courage Alone: The Italian Air Force 1940–1943*** by Chris Dunning. Crecy Publishing Limited, 1998, 360 pp.

It was during World War II when the world learned of the importance air superiority had on the outcomes of battles. Aircraft were used in a variety of ways to achieve objectives on the battlefields and gain the upper hand. Various air missions were used from all nations involved in the war to seize the offense and advance their positions in the war. These missions included air-to-air operations, air-to-ground operations, bombing campaigns, and kamikaze missions.

The US, British, Japanese, and German air forces have been well-documented, with numerous books and documentaries written about those forces and shaping the understanding of how they fit into the outcome of the war. On the other hand, not as much was written and produced about Italy. This is probably because Italy had the smallest air force in the war fighting for the Axis powers. Despite the Italians being the smallest air force, much can be learned from their operation in World War II.

This is why Chris Dunning's work, *Courage Alone: The Italian Air Force 1940–1943*, is so vital. This book goes into great detail explaining all flying squadrons during that time and where those squadrons operated during the war. Mr. Dunning also describes the aircraft used by each squadron and the campaigns that each squadron was significantly involved in and how those particular battles impacted the war. There are sections detailing the training, rank structure, and aces who served. In addition to the rich historical details, there are pictures that show the aircraft used and the lifestyles of those on the front lines of the air campaign that make the war come to life from the Italian Royal Air Force's (IRAF) perspective. Lastly, the author includes many charts that detail the stats of the IRAF during World War II.

Nothing seems to be left uncovered about the IRAF during World War II. Mr. Dunning seemed to know that there was a need for people to understand that they made a significant contribution, despite being the smallest air force in the war. This book underpins the importance that airpower has on the outcomes of wars by showing that, even though a country may have a small force, they can have a large impact on the outcome of a war. Italy did this by strengthening the Germans in the European theater with their partnership in the Axis powers.

This book is a must-have for anyone who enjoys learning about the roles that different air forces have played in shaping the history of airpower, or for those who want to understand how nations, other than those mentioned who have been well-documented, impacted World War II.

**SSgt Seth Roese, USAF**

***Review of Joint Base Langley-Eustis*** by Mark A. Chambers. Arcadia Publishing, 2017, 96 pp.

*Review of Joint Base Langley-Eustis* is a pictorial history that Arcadia Publishing published in their Images of Modern America series. Mark A. Chambers is a contracted senior technical writer with the National Air and Space Administration (NASA) Langley Research Center, which is adjacent to the Langley portion of Joint Base Langley–Eustis in Hampton, Virginia. This book is one of four books focused on military installations to date in the publisher's series about modern America.

Chambers methodically addresses the history of the airfield named for an airpower pioneer, Dr. Samuel Pierpont Langley. Chambers begins with Dr. Langley's role in early aviation, then focuses on the establishment of the military installation in 1917, highlights the airfield's direct role in Brig Gen Billy Mitchell's provisional air brigade that bombed ships off the Atlantic Coast, reviews the major military conflicts of the twentieth century, and concludes with the airfield in the present day.

Chambers presents the history predominately through photographs with some text. In the four-page introduction, the author succinctly captures the history of Dr. Langley's contributions to airpower and then the history of airpower at what was originally Langley Field, later renamed Langley AFB, and recently renamed Joint Base Langley–Eustis. The book succeeds in reflecting a history founded on photographs with captions that give insightful context to each.

Of the 151 photographs, 56 (more than one-third) are in the first chapter covering from 1896–1941. The balance of photographs display people, facilities, and aircraft after 1941. Chambers was successful in reviewing key elements of the airfield and the military installation's significant contributions to airpower history with a few Langley-specific highlights of how NASA's predecessor organization, the National Aeronautics and Civil Administration, operated there. Langley is a historically significant site for US air history. The 99 pages do justice in summarizing Langley's contributions.

One disappointing element of this book is that the author failed to include the rich history of the portion of the joint base previously known as Fort Eustis. The book title logically leads the reader to expect that the author would address both portions of the joint base, not just the portion that was Langley AFB.

However, for readers who prefer photographs with brief context as a primary means of reviewing history, this book is worth the time.

**Lt Col Paul Guevin, USAF, Retired**

***Air Officer Commanding: Hugh Dowding, Architect of the Battle of Britain*** by John T. LaSaine Jr. ForeEdge, 2018, 272 pp.

The Battle of Britain marked a turning point in the path of World War II and in airpower history—an attempt to neutralize British military power in Europe, primarily conducted and contested from the air in the summer of 1940. The outcome of the battle rested heavily on the world's first integrated air defense system, an operational and technical innovation largely created, and later commanded by Air Chief Marshal Hugh Dowding. John T. LaSaine, Jr., an associate professor at the Air Command and Staff College, Air University, Maxwell AFB, Alabama, has written a concise, but comprehensive, biography of Dowding, and in the process, also complied an insightful account of the formative years of the Royal Air Force (RAF).

Commissioned into the Royal Artillery at the end of the nineteenth century, Dowding spent the first part of his career on the outposts of the British Empire—Gibraltar, Ceylon (Sri Lanka), Hong Kong, and India. As a major attending the Staff College, Dowding applied for the new Royal Flying Corps (RFC) pilot's course, not from an interest in flying but to become better acquainted with aviation technology as a means of reconnaissance and artillery spotting. After a brief return to the artillery, he was transferred back to the RFC upon the outbreak of World War I.

As part of the prewar RFC cadre, Dowding was rapidly thrust into combat, commanding squadrons, and later a wing. He was not shy with dissenting opinions, and friction with RFC commander Hugh "Boom" Trenchard relegated him to commanding training establishments during the last two years of the war. Between the wars, Dowding was deeply involved in the development of combat aviation technology and doctrine, and the eve of the Second World War found him literally designing the national air defense system from the ground up. Seniority did not mellow Dowding, though, and he often continued to find himself at odds with RAF and Air Ministry leadership. Far from a step up the ladder in the bomber-focused RAF or recognition of his expertise, Dowding's assignment to lead Fighter Command in 1936 was intended to ease him into retirement. Instead, the onset of war and the German air campaign against Britain launched him to the forefront of the British war effort.

The Battle of Britain validated many of Dowding's ideas but didn't eliminate conflicts with peers and superiors. After the battle, he was swiftly replaced and only saved from immediate retirement by Winston Churchill who sent him to the US to evaluate American aviation technology. On his return, despite a still raging world war, Dowding was swiftly retired and spent the rest of the war writing memoirs and exploring the spiritualism that dominated the last part of his life.

LaSaine's work concentrates on Dowding's military career— dedicating just 21 pages to his life after retirement from the RAF— primarily to place him in context with the Battle of Britain's evolution in popular history. But the author has written more than just a biography. He also provides an insightful, well-referenced picture of the developing RAF, service politics, and debates over doctrine, technology, and force structure that contrast with similar debates occurring in the US and other countries. As such, this work is of interest as a study of airpower leadership and of broader airpower development during the years leading up to the Second World War.

**Col Jamie Sculerati, USAF, Retired**

***Aviation Records in the Jet Age: The Planes and Technologies behind the Breakthroughs*** by Lt Col William A. Flanagan, USAF, Retired. Specialty Press, 2018, 192 pp.

Since man mastered the science and art of heavier-than-air flight, aviators have attempted to push the envelope of flight by flying faster, farther, and higher. Along the way, the *Fédération Aéronautique Internationale* (World Air Sports Fédération) acknowledged these accomplishments as world records.

As a former SR-71 Blackbird radar system operator, Lt Col William A. Flanagan certainly knows a few things about aviation records. In his book *Aviation Records in the Jet Age*, Flanagan takes readers on a flight through the record-breaking flights of jet aviation. To accomplish this, he starts his monograph with a brief history of the early days of flight. The author begins the journey through the record books of the Jet Age with a discussion of the basics of flight: the Wright Brothers and concepts of heavier-than-air flight. Once the Wright Brothers successfully took flight in 1903, the quest to go farther, faster, and higher began. Flanagan tells the story of the immerging global quest for flight and records. He spins his story by combining technical explanation, a concise history of aviation, and an engaging storyteller approach.

World War I brought a temporary halt to the recognition of world records as nations did not want to acknowledge their many advances in aviation. Once the war ended, the public quest for aviation records returned. To that point, Flanagan continues his narrative leading up to the Jet Age. Once again, a world war stopped the recording of aviation records. While nations made great advances in aviation, those accomplishments were kept secret from their adversaries and the world. The jet aircraft proved to be one of those significant advancements.

To effectively tell the story of record-breaking jet flight, Flanagan includes a detailed discussion of the German and Allied development of jet aircraft. He does an excellent job of explaining the development of the jet engine, as well as the difference between the German and Allied approaches to how their engines operated.

With the fielding of the jet engine and the end of World War II, aviation records often lasted only a month as aviators continued to push the limits of speed, altitude, and distance. For his discussions in the post-World War II Jet Age, Flanagan divided the era into four chapters (periods): "Breaking the Sound Barrier (1946–56)"; "Jet Airliners and Mach 2 Fighters (1954–62)"; "Mach 3 and Beyond: Supersonic Cruise (1962–76)"; and "The Digital Age: Efficiency Trumps Speed and Altitude (1976–96)."

Flying faster than the speed of sound initially provided the ultimate jet aviation record. Flanagan does an excellent job detailing the events leading up to then-Capt Chuck Yeager breaking the sound barrier while flying the Bell X-1. In a matter of two decades, the speed record for flight climbed from just above Mach 1 in October 1947 to an astonishing Mach 6.7 in October 1967. During that period, the author explains how a mixture of rocket-powered test aircraft and operational military jet aircraft routinely broke records as they pushed the envelope of flight.

Flanagan concludes his work by lamenting how the quest to set aviation records decreased after the Cold War. As the author points out, the commercial aviation industry is "cleaner and 'greener'" aviation, along with increased fuel efficiency. With the shift toward efficiency, civil jet aircraft have similar operational performance characteristics. The close nature of their performance capabilities does not lend itself to setting records. Most records focus on distances covered.

To assist in explaining the technical items throughout the book, Flanagan often uses inset articles to explain in greater detail the relevant aeronautical principle. These inset articles are also accompanied with well-appointed diagrams of the scientific principle or aeronautical advancement being discussed. Readers without a technical aviation background will benefit greatly from these insets.

The book is loaded with high-quality photographs of record-breaking aviators and aircraft. The images are also high-quality and always pertinent to the topic or event being discussed. The large crystal-clear images help to bring the record-flying events to life for the reader.

In summary, Flanagan's *Aviation Records in the Jet Age* is a fascinating easy read. The text is engaging, and the photography is high quality. While the book comes to an abrupt ending, readers interested in the cutting-edge of flight will find it a worthy read.

**Lt Col Dan Simonsen, USAF, Retired**

***Beyond the Beach: The Allied War Against France*** by Stephen Alan Bourque. Naval Institute Press, 376 pp.

*Beyond the Beach: The Allied War Against France* is a historical monograph that focuses on the Allied bombing campaigns carried out against German-occupied France with a particular emphasis on the months leading up to Operation Neptune in June 1944. The inspiration for this work struck author and retired Army officer Stephen Alan Bourque during his travels in France. There, he came across a marble plaque at the Metz train station memorializing hundreds of civilians killed in Allied air attacks. With his interest piqued, the author was surprised to find very little historiographical mention of the heavy toll that the Allied bombing raids took on the French civilian population—the sheer scale of the destruction and loss of life inflicted by the "good guys"

(p. xi). *Beyond the Beach* thus begins to fill in the details of the French civilian experience. However, as Bourque notes, this book is a survey, and as such, it is only able to alight briefly on various regions and bombing targets.

In the first chapter, Bourque acknowledges three different perspectives from which to view the Allied bombing campaign over France. The first of these, that of the American and British leaders directing the course of the war, has for decades occupied a prominent place in the academic literature of World War II. The second prevalent perspective is that of the aircrews and operators themselves. The third and most elusive story derives from the experience of the men and women who found themselves living in the shadow of the Allied bombardment. It is this experience that Bourque seeks to describe and place in its context, both enriching and expanding the Operation Overlord/Neptune narrative while reminding the reader of the true cost of war.

Chapter 2 sets the stage for the Allied campaign against France. The author briefly surveys French geography, history, infrastructure, and the national sentiment of the time. Chapter 3 deals with the bureaucratic and political maneuvering behind General Dwight D. Eisenhower's command of the Allied Expeditionary Forces and the development of the policy, strategy, operations, and tactics that were to dictate the air war against France. Bourque divided the following chapters by target type, including airfields and ports, German V-weapon operations, and finally even the towns themselves. The final chapter provides valuable commentary and a broader critical look, in retrospect, at the Allied bombing policies and their value in accomplishing Eisenhower's objectives.

The goals of this book are quite straightforward. The thesis is simple but not negatively so. The author noticed a gap in the historical record, and *Beyond the Beach* is the first step in filling that gap. He effectively and dispassionately places the French losses in their historical context through the excellent use of primary source material ranging from personal accounts to official records, to photographs. His endnotes are thorough if not embellished upon, and the bibliography further demonstrates the depth of his research. His use of visual aids is appropriate and particularly appreciated when wading into the muddy waters of the Allied chain of command.

The scope of this book, intentionally limited to a broad overview of the bombing campaign, is both one of its greatest strengths and one of its potential weaknesses. Without similar forays into the subject matter, an overview is a good place to start and a worthy contribution to the historiography of World War II. Such an overview, however, does not lend itself to the deeply personal or emotive history that would appeal to the casual reader. As a scholarly source, *Beyond the Beach* is highly commendable. Perhaps other scholars will be able to build on the foundation that Bourque has built and delved into the more quotidian aspects of the French experience.

Organizationally, the structure of the book is clear, and the thesis consistently reiterated and supported in each chapter. A similar criticism might be levied in that Bourque repeated the pattern of each chapter, which while driving home the thesis, also meant that each section tended toward predictability, accompanied by a touch of dryness. In the grand scheme of things, however, the topics covered were necessary, clearly pertinent to establishing and supporting the book's thesis. The author succeeds in keeping the drama to a minimum and allowing the historical record to speak largely for itself. The narrative is pleasantly objective, although one wishes that the author included more of the feelings of those involved in the bombings and not just their actions.

As mentioned above, this book is an excellent contribution to our understanding of the aerial bombing campaign over France in the months and weeks leading up to D-Day. Also, it exposes some hard questions involving the nature and principles of war itself, many of which have no easy answer.

**Capt Mallory E. Marlin, USAF**

# Gen Ira C. Eaker Award Winner

## Gregory D. Miller

*Air & Space Power Journal*

**Best Feature Article**

## 2019

**"Space Pirates, Geosynchronous Guerrillas, and Non-Terrestrial Terrorists: Non-State Threats in Space"**