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AIRMINDEDNESS WITHOUT AIRHEADEDNESS: A WAY AHEAD FOR AIRMEN TO LEAD DESIGN

by

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Biography

Lieutenant Colonel Reagan Schaupp is a U.S. Air Force space operations officer assigned to the Air War College, Air University, Maxwell AFB, AL. He graduated from Clemson University in 1991 with a Bachelor of Arts degree in Industrial Management, and the University of Montana in 1994 with a Masters of Management Information Systems. He completed 166 ICBM alerts in the 341st Missile Wing, Malmstrom AFB, MT. Since then, he has held a number of staff positions at Cheyenne Mountain AS, the Warrior Preparation Center, the 50th Space Wing, and the Curtis E. LeMay Center for Doctrine. His most recent assignment was to the faculty of the U.S. Naval War College, Newport, RI in the Joint Military Operations department.

ABSTRACT

Operational Design has emerged as a significant doctrinal change to military planning methodology, and most U.S. Air Force Airmen have not been well equipped to practice it, still less to lead it, for several reasons. First, Air Force culture focuses on platforms and technology rather than critical thinking and problem solving. Second, this focus leads to a cultural celebration of tactics and the tactical level of warfare, at the expense of operational art and the broad, comprehensive perspective required by Design. Third, officers often avoid sufficient exposure to joint planning and operations, preferring Service-centric assignments and thereby limiting their comprehension of means to solve "wicked" problems. Finally, professional military education (PME) is underutilized as a way of correcting deficiencies in Design-like thinking.

To remedy the situation, the Air Force must broaden its accessions beyond the science, technology, engineering, and mathematics fields. It must also promote broad, joint career exposure and maintain momentum in the ongoing PME curriculum shift toward design. Airmen individually must practice leveraging the strengths of airmindedness (while avoiding its pitfalls), and professionally prepare themselves through study. These measures will do much to prepare Airmen to practice and lead Design in a joint environment.

Introduction

In recent years, *Design* has emerged as "arguably the most significant change to [U.S. military] planning methodology in more than a generation," taking primacy in the Joint Operational Planning Process (JOPP).[1] The prime movers for design's rapid ascent have mostly been in the U.S. Army, though General James Mattis (USMC) was also instrumental as Commander, U.S. Joint Forces Command (JFCOM). All the Services have either climbed aboard or are in the process of doing so. Joint planning doctrine is flush with design, the joint operational community is practicing it in the field, and field grade professional military education (PME) schools are integrating it into their curriculums. Operational Design methodology has seized the spotlight of contingency planning, forcing commanders and staffs to reexamine long-held paradigms of planning and decision-making.[2] Design has arrived, and the joint force has adopted and fielded it.

In light of this, U.S. Air Force Airmen find themselves positioned relatively poorly. For a number of cultural and career path reasons, most Airmen (there are notable exceptions) are underequipped to add value to, still less to lead, Operational Design efforts in a joint planning endeavor. This is deeply troubling because of a double risk it poses. If Airmen cannot "do design" as well as the other Services, then air, space, and cyberspace contributions to joint operational missions may be marginal—and consequently marginalized. Further, a weak grasp of design may yield non-optimal courses of action, introducing increased risk to forces or mission.

The reasons many Airmen are unprepared for design merit careful attention, and an analysis of several factors is offered below. This analysis proposes that for Airmen to better contribute to, or lead, Operational Design requires a threefold effort. The Air Force must equip

Airmen professionally, Airmen must individually prepare themselves intellectually, and *both* must drive a cultural shift in Service mindset to prepare Airmen to master design. When those efforts mature, the risks above are reversed: the air component's contribution to joint[3] operations is more effective, the joint force incurs less risk, and mission accomplishment is more likely.

Design History and Overview

Operational Design (by that name) in U.S. military doctrine is relatively new. The term briefly appeared in 2002 in Joint Publication (JP) 5-00.1, *Joint Doctrine for Campaign Planning*,[4] but did not fully emerge in the doctrinal "mainstream" until 2006, with extensive treatment in Chapter 4 of the Army's Field Manual (FM) 3-24, *Counterinsurgency*.[5] Design's roots as a theory go back much further, depending where one marks its "beginning" or its initial elements. Milan Vego points to a rogues' gallery of "systems theory, Soviet operational art, French postmodern philosophy, social sciences, psychology, architecture and urban planning, and, more recently, ancient Chinese military thinking" as formative factors.[6] Others note collaborative urban planning efforts in the 1950s-60s as a conceptual catalyst. At that time, early systems theory held that *thinking critically about requirements* before proceeding to develop a solution was crucial. Some argue U.S. Secretary of Defense Robert McNamara and the "whiz kids" of the early 1960s discarded critical thinking and pursued systems analysis as a reductionist, deterministic process.[7] But Rittel and Webber contested such reductionism in a key 1973 article describing "wicked problems." These are ill-defined, exceedingly challenging scenarios that must be carefully and gradually defined. A solution, in fact, emerges only to the extent the problem is accurately defined and understood.[8]

Military thinkers eventually considered Design, since they grapple with wicked problems: "military force has always been used in an environment of complexity, largely because warfare

is a human endeavor…which guarantees uncertainty."[9] Iraq, a prime example, came under close scrutiny in 2005, when a full-blown insurgency-*cum*-civil war emerged and coalition efforts did not seem likely to succeed.[10] The Army's Training and Doctrine Command (TRADOC) Futures branch examined Design theory, and the School of Advanced Military Studies (SAMS) informally partnered with an Israeli Defense Forces (IDF) military officer, General Shimon Naveh, to "road test" Design in the UNIFIED QUEST exercise series.[11] The Design-rich FM 3-24 was published in late 2006 largely as the brainchild of General David Petraeus, who applied its tenets leading the "surge" in Iraq the following year.

The School of Advanced Air and Space Studies (SAASS) had worked with SAMS on design, and thus a cadre of design-practiced Army *and* Air Force field grade officers began to emerge. Those officers and others published articles in periodicals like *Military Review, Small Wars Journal,* and *Joint Force Quarterly,* promoting design as a potent approach to planning for complex, adaptive problem sets. General Mattis provided his command's full backing and played a crucial role: he directed JFCOM's new joint doctrine toward Design, and rolled out the "Vision for a Joint Approach to Design" in October 2009.[12] FM 5-0, *The Operations Process* (Mar 2010), and JP 5-0, *Joint Operations Planning* (Aug 2011) were both heavy with Operational Design, and Army PME schools had incorporated Design into their curriculums. The Air War College (AWC) and Air Command and Staff College (ACSC) followed suit. Teaching teams made the rounds within Army circles to educate staff officers on the new methodology, and in the field, planners tried and documented Operational Design—with mixed results.[13]

Currently, all Services are expanding their fairly traditional, Service-specific planning methodologies—the Military Decision-Making Process (MDMP) in the Army, for example—to

incorporate Design as a *primary thinking tool* for planners and commanders. Despite caveats from its advocates after the initial fervor (a recent SAMS director adjusted expectations, making clear Design offers "useful tools…but not a panacea"), the methodology is now solidly integrated into doctrine, PME, and operational practice.[14] Debate has moved past *whether* Design should be used, and on to *how* to best conduct it.[15]

What is Design? Definitions abound, but a current, workable one is found in FM 5-0: "a methodology for applying critical and creative thinking to understand, visualize, and describe complex, ill-structured problems and develop approaches to solving them."[16] Design is superfluous for *well*-structured problems that lend themselves to systematic processes, such as matching aircraft and munitions to a target list in developing an Air Tasking Order (ATO).[17] (Note that *well-structured* does not mean *simple!*) Rather, Design offers utility to bring *some* structure to "wicked problems"—those with no complete formulation, no stopping rule, no "test runs" for solutions, no historical duplicates, no insulation from a host of connected problem sets, no "do-overs," and no forgiveness for error.[18] Design is not mandated, but offered to the commander and staff as *a* way to begin answering the questions, "What's going on?", "Why has this situation developed?", "What does it mean?", and "What might we do?"—followed by the real zinger, "What *should* we do?"[19] Design is a way to map the difference between the *observed state* and the *desired state*, and to think about what must happen to go from the one to the other.[20]

There is doctrinal reluctance to put too much structure on Design—quite rightly, since that could easily defeat its purpose. Humans' solution-oriented minds tend to turn *some* structure into *more* structure, or (better still!) a process, which may easily become a systematic, deterministic "checklist for success."[21] It would be artificial; with wicked problems, no such

guarantee exists. Thus, Design's advocates have carefully, and mostly successfully, kept it "broad, fluid, and open,"[22] while remaining well aware of the opposite pitfall: leaving the concept so structure-free that it lacks utility and invites floundering. Taking a middle ground, several "frameworks" are offered in doctrine and scholarship to provide utility without the promise implicit in a process.

The framework found in JP 5-0 consists of four elements. First, planners must **understand the strategic direction** (strategic goals and supporting objectives). Second, they must **understand the operational environment** (the larger context that helps bound the problem). Third, they **define the problem** that the Design is intended to solve. Fourth, they use the foregoing to **support development of an operational approach**—*how*, in broad terms, a solution might look.[23] Key Design concepts include collaborative discourse, commander leadership (but not domination), visual and narrative products, iteration, framing and re-framing, critical analysis of higher headquarters guidance, and tendencies and potentials. There are dozens more Design concepts, all potentially valuable depending upon the problem set the planners face, none indispensible. Also, Design co-opted many familiar concepts from the pre-2011 JOPP, e.g. PMESII, center of gravity (COG), lines of effort, decisive points, and objectives.[24] To sum up, Design is a commander's and staff's purposeful, critical thought about a problem and its setting, using the most appropriate thinking tools for the situation. It occurs before and during planning, but continues throughout execution since new information or understanding can require a re-framing of the problem.

Faced with this sizable "menu" of thinking tools, among the Design leader's biggest challenges is *deciding which Design elements to leverage*—which thinking tools will be optimal? He must quickly sift such situation-unique factors as his commander's style and direction,

guidance from higher authority, operating environment, mission types likely to ensue, and level of expertise on the planning staff. A Design leader must have a broad, comprehensive view of the actors involved (joint forces, coalition partners, governmental agencies, non-governmental organizations (NGOs), the enemy, and so forth). He must have a solid working knowledge of each Service's capabilities, *based on experience*. He needs a "mental index" of historical Design efforts: their results, lessons, and potential pitfalls. Unfortunately, these necessary traits for leading Design are precisely where most Air Force staff officers will likely find they are unprepared and unequipped to succeed. Why?

An Airman's Unique Challenges With Design

U.S. Air Force officers *tend* to be characterized by certain career choices, habits of mind, and preferences.[25] While these may be beneficial—even crucial—in equipping Airmen for certain tasks the nation looks to its Air Force to perform, some of them make it more challenging for an Airman (than for, say, a Soldier) to practice or lead Operational Design in a joint setting. These factors, analyzed below, make many Airmen inherently less effective at Design than officers from other Services. This may call into question many Airmen's strategic thinking abilities and their value to joint planning efforts.

Platform and Technology Focus

One significant factor is the Air Force's emphasis on its particular *means* of war, at the expense of the *ways and ends.* Since its inception in 1947, the Service has consistently placed extremely high value on technology and platforms: aircraft (including unmanned), satellites, operations centers, networks, and associated mechanical and electronic wizardry. Tactical mastery of a weapon system—whether an F-15E, Global Positioning System satellite, C-17, computer network attack capability, or Minuteman III ICBM—is a junior officer's goal for a

surprising number of years into his career: *eleven*, according to the Headquarters USAF Directorate of Manpower.[26] Carl Builder reasoned the Air Force's "worship" at the "altar" of technology is partly a survival mechanism:

> If the Air Force is to have a future of expanding horizons, it will come only from understanding, nurturing, and applying technology. There is a circle of faith here: If the Air Force fosters technology, then that inexhaustible fountain of technology will ensure an open-ended future for flight (in airplanes or spacecraft); that, in turn, will ensure the future of the Air Force.[27]

As a 2010 SAMS monograph points out, the Air Force's recruiting push, exemplified by a website crammed with cutting-edge platforms, "holographic images...remotely piloted aircraft, and robots" is a dead giveaway that "technology is the centerpiece of the recruiting effort."[28] A retired Army general and senior mentor recently remarked to his Air Force counterpart that "in the Army, we equip the man. In the Air Force, you man the equipment."[29] The friendly barb is accurate and insightful.

To be fair, a high value on technology is not misplaced; hi-tech platforms are heroically effective in a multitude of tasks across the range of military operations. However, sustained focus on platforms and technology *does* shape Airmen's thinking, making them liable to tune out broader intellectual skills they will eventually require. "The Air Force is under assault," write Bethel et al., "for not doing enough to support other Services in the current fight and for seeming to be wedded to technology and 'toys' when the civilian leadership directs it to consider alternatives."[30] Retired Air Force Generals Charles Boyd and Michael Dugan framed the root cause perfectly:

> The Air Force attracts technologically oriented young men and women, gives them the niftiest gadgets in the world, and says 'go to it.' Then at a certain point—major or lieutenant colonel—we say 'put away those gadgets. We want you to be a sophisticated geostrategic thinker, planner, articulate with Congress.' . . . The question is, how do we provide the necessary technical competence and skill, but at the same time broaden thinking about the

> connections of military force and diplomacy? It's a challenge for the whole institution.[31]

Celebration of the Tactical

Similarly, a technology- and platform-focused mindset lends a sort of "siren's song" effect to the *tactical level of war*, because that is where platforms operate. Airmen are easily entranced by the tactical tune, until they reach a position—typically at the grade of O-6 or O-7—where wider responsibilities require them to think more broadly. For instance, an Air Force colonel may have considerable expertise in planning complicated intra-theater airlift, or orchestrating air support to special operations forces; such complex tactical challenges are what he has practiced for years. But he has typically not thought through Design-oriented questions like, "What is the underlying problem set the coalition faces?" or "What approach might move the environment from the observed state toward the desired state?" His trained cognition is comfortably tactical. If "tactical experience alone is *insufficient* for making a strategist," then neither will it sufficiently prepare one to lead Design—for many of the same reasons.[32]

"We have created a cult of the tactical," affirms Dr. Stephen Wright of SAASS, "and it begins at [the U.S. Air Force] Weapons School [USAFWS]. We celebrate, venerate, and emulate the tactical experience, and Weapons School happens *very* early in our career."[33] This does not denigrate the unquestionably vital USAFWS at all; there is perhaps no finer tactical training provided anywhere. But it *is* supremely tactical, focused on weapons system mastery, despite some recent expansion of its curriculum into campaigning.[34]

Consider SAASS by contrast: SAASS immerses students for a full year in broad, comprehensive, strategic thinking. Its graduates have practiced and led Design; they are the glaring exception to the "typical Airman" in this analysis. Which school is more esteemed? Tellingly, the only uniform patch Airmen are allowed to wear throughout their career is "*the*

patch"—the USAFWS graduate patch. It even serves to identify: "He's a patch." SAASS graduates often may not wear their patch in later assignments. There is irony here, and veneration of USAFWS graduates reveals much about what the Air Force celebrates—and promotes.[35] "We produce great ACCEs and JFACCs," observed Lt Gen (ret.) Michael Short, "but not JTF commanders—because we all want to be the JFACC."[36]

Lack of Joint Exposure

Another typical detriment to developing an Airman's strategic thinking is his career path. The aspiring general's arc of advancement will probably be *centripetal*, rather than *centrifugal*.[37] Possessing compelling leadership potential, he will typically seek—and receive—assignments that are heavily Air Force focused, rather than serving in a joint environment.[38] For example, many Air Force majors would consider a position on the HQ USAF staff—the "Air Staff"—as more desirable than one on the Joint Staff. Although a joint assignment is required by law for promotion to flag rank, a "blue" assignment lends itself more to "blue thinking," with which the Airman is familiar and comfortable.[39] While many Airmen do recognize the value of a joint assignment, many others do not.

But prolonged, deep exposure to joint organizations and capabilities (and multinational and interagency besides) is precisely what builds an experience base for approaching complex problems with a broad, comprehensive mindset, so crucial to conduct or lead Design. To synchronize *all* elements of a problem's solution "requires officers and leaders with broad knowledge of the capabilities and limitations of *all facets* of American power," assert Darling and Lawlor. "Our current systems of officer development…often fail this most crucial test."[40] General (ret.) James McCarthy observes: "The major impediment to a commander using the best forces available is the absence of knowledge about the capabilities offered by sister-services and

special operating forces."[41] Belote notes the Air Force's common joint deficiency as well: "That lack of common framework can have disastrous consequences—consequences that a joint-minded airman might avoid."[42] The disconnect is noticed even at the highest levels in DOD: "There's something about the culture," reflects former Secretary of Defense Richard Cheney, "that identifies the Air Force with specific positions *rather than joint command*."[43] All these observations point to Air Force career development vectors that tend to minimize joint exposure and remain Service-centric;[44] thus, Airmen often lack necessary perspective to craft a broad operational approach—a key outcome of Design.

Underutilizing PME

Prior to assignment on a planning staff, Airmen are not often required to practice Design, or to think strategically. However, a major exception is PME, whose curriculum is often designed specifically to stimulate such thinking. AWC, for example, prepares students (O-5 and O-6) to "lead in the strategic environment," persistently elevating students' thinking above the tactical and Service-centric toward "employment of airpower *in joint operations*."[45] (emphasis added) Other Air Force PME hews to similar goals. But it is easy for an Airman, caught up in the tempo of assignments and tasks, to miss the significance of the transformation their thinking should undergo. She might "pick up something here or there" at PME, but can easily believe better value lies somewhere back in her "real" career field. Ironically, should she be promoted past O-5, strategic thought and leadership will essentially *be* her career field—making it crucial to develop the required thinking tools at ACSC or even—in an introductory way—Squadron Officer College (SOC). The demands of Operational Design will not wait for O-6 rank; such joint, comprehensive thinking is required of an O-4, for instance, on a combatant command or joint task force planning staff. As it is, real-world planning suffers:

"We don't do mission analysis well," noted Lt Gen Short. "We rush through it to get to course of action development. Because of that, our center of gravity is not optimally derived—if it is derived at all."[46]

The Remedy: How Airmen Will Lead and Excel at Design

To characterize the factors above as "damning" would miss an important point: they result from longstanding thinking and practice that have produced an excellent air arm. That the Air Force "gets the job done," with breathtaking success, is not in question. Rather, these factors have left many Air Force officers *as aspiring joint leaders* on unequal footing at the operational level, which can easily include leading Design. Therefore, how can the Air Force produce well-equipped strategic thinkers? Five specific lines of effort can begin to reshape the Service to do so.

Leverage the Strengths of Airmindedness

Airmen will naturally approach Operational Design in a way consistent with their Service culture and warfighting medium. That can *add* value to Design, if done carefully. An Airman's thinking is necessarily flexible and adaptable. New Air Force doctrine, juxtaposing Design with airmindedness, points out that "Airmen view operations, including the application of force, more from a functional than a geographic perspective."[47] This is a positive conceptual step—the operating environment is holistic, so thinking about it should not be geographically constrained. (However, neither should it be *functionally* constrained, so Airmen must still beware.)

Also, Airmen are typically comfortable with a "freestyling," figure-it-out-as-we-go approach—unhelpful for following a checklist, but very well suited for Design, which is characterized by creativity and intuition, two traits an Airmen is apt to have. Further, the "no-holds-barred" mission debrief culture, so familiar to USAFWS graduates and the flying

community, is precisely the desired atmosphere for a Design team: critically consuming higher guidance is not only allowed, but necessary. (Other Service cultures often have a tougher time with this.[48]) Airmen are also quick to take advantage of emergent opportunities, which can lead to insightful departures from conventional thinking.[49]

On the other hand, Airmen will have to resist some typical traits, such as the air-medium-driven ability (and thus tendency) to make quick decisions. Belote wisely points out "there is a fundamental tension between *alacrity of command* and the time required for an *interdisciplinary approach* to bear fruit."[50] The latter approach, with its associated "simmer time," is more congruent with Design.

Broaden Accessions from STEM

Over its lifetime, the Air Force has especially prized officer recruits from the science, technology, engineering, and mathematics (STEM) fields. At the U.S. Air Force Academy, a Bachelor of Science degree is awarded *regardless* of major—because two-thirds of a graduate's credit hours are always in the heavily technical core curriculum.[51] This makes sense if analytical, process-oriented thinking is most valuable—but what about when thinking must broaden beyond processes, or ascend from the tactical to the operational or strategic? "Systems thinking [prominent in Design] stands in contrast to reductionism or analytical thinking,"[52] and we have "trained our imaginations to be fundamentally linear."[53] Linear, STEM-saturated imaginations, coupled with type "A" personalities, want to press hard toward the "right answer."[54] But for wicked problems, there *is no* right answer, and STEM officers may struggle with Design's iterative, exploratory, intuitive approach. The Air Force should broaden its accessions, seeking college graduates with majors (or at least minors) in political science, history, psychology, or the

arts. This would balance the junior officer corps with more creative and intuitive thinkers, improving nonlinear approaches like Design.[55]

Promote Broad, Joint Career Exposure

The Air Force must move from centripetal to centrifugal career arcs—and offer *promotion accordingly*, inducing Airmen to seek joint and interagency exposure. "The Air Force must make joint warfighters," insisted former CJCS John Shalikashvili, "seek positions for its frontrunners, to grow them as joint warfighters."[56] As Lt Gen Short noted, assignment to the Air Operations Center (AOC) or the Commander, Air Force Forces (COMAFFOR) staff offer tremendous joint experience; greater likelihood for promotion should follow, making them more desirable.[57] Another possibility, offered by Shalikashvili and others, would be to split Air Force officers into two "career tracks"—one oriented toward deep tactical expertise (with USAFWS a key milestone), the other emphasizing career breadth, strategic thinking, and joint operations.[58] Gen Gene Renuart, former Commander, U.S. Northern Command (USNORTHCOM), envisioned an "O-6 cross-Service exchange program": instead of group command, select O-6s could advise other Services' flag-rank commanders—and the Chief of Staff of the Air Force would "push" them for subsequent wing command.[59] Promotion potential is the key to any of these ideas—with that incentive, officers will stop viewing joint assignments as "a painful sidetrack to be endured, not embraced, and certainly not sought after."[60]

Maintain Momentum in PME Curriculum Shift

If PME is *the* venue to grow broad, strategic thinking, as asserted above, it should be full of Design-related curricula to equip Airmen for such work. Fortunately, there has been solid progress along these lines. At AWC, some seven instructional periods (fourteen course hours) in the Warfighting curriculum are infused with Design, the Joint Land Aerospace and Sea

Simulation (JLASS) elective resonates with it, and the end-of-course Global Challenge wargame utilizes it.[61] ACSC is not quite as far along; it offers a "Cross-Domain Operational Strategist" elective featuring graduate-level Design, but should further integrate those thinking tools into the mainstream curriculum.[62] Even SOC should consider introducing broader, more comprehensive thinking into junior officers' intellectual toolkits. At every level, even operational assignments do not provide better thinking tools than PME does for "clear understanding of the complex environment of the situation...the purpose of military involvement...[and] the approach required to address the core issues."[63]

Also, as Design is established in Air Force doctrine, shorter, more readable, more easily applicable "mini-publications" explaining the concept—with examples—would help Airmen understand it. This would also partly absolve Airmen of the well-founded charge that "we have great doctrine, but we don't read it."[64] ACSC is writing the upcoming AFDD 5-0, which will constitute a primer on Design.[65]

Individual Professional Preparation

No matter the level of Air Force institutional effort to equip Airmen to think broadly and strategically, some of the burden falls upon Airmen themselves. They cannot rely on PME or operational experience to provide a complete intellectual toolkit for great Design and strategic thinking. Airmen must do a great deal of the work. The study of history, viewed critically through the lens of operational art theory, is a superb starting point: theory is "a guide to anyone who wants to learn about war from books," avers Clausewitz; "it will light his way, ease his progress, train his judgment, and help him to avoid pitfalls. . . . It is meant to guide [the commander] in his self-education."[66] A broad base of knowledge is required to think strategically. There is no substitute for it, and Airmen will not gain sufficient knowledge by

direct experience—so they must read. Successful commanders throughout history often used a form of Design methodology, though they did not call it that; a savvy student will study such operations carefully. Also, the study of fields such as geopolitics, human psychology, systems theory, and game theory bolsters the "non-STEM" cognitive functions that can serve Airmen well in Design.[67]

Beyond study, Airmen must relentlessly pursue the *why* of any action, plan, or mission. Understanding purpose and intent, in the environmental context, is crucial for Design. The practice of carefully noting one's own cognitive biases will help avoid pitfalls when a Design team veers toward similar bias. Finally, the Army's Mission Command construct—especially the principle of *creating a shared understanding*—is a useful entry point into the kind of thinking Design demands, and merits careful study and practice.[68]

Strong Medicine: Is It Really Worth It?

The remedies above represent fundamental changes to the Air Force in recruiting, career progression, promotion, education, and even culture. Some might argue the "cure" is worse than the "disease" in terms of effort and time: must the Service take such far-reaching measures simply to generate officers who can think strategically or lead Design? After all, these measures would mean upending paradigms in place since 1947—and their result has been far from disastrous. One could argue the campaigns of World War II, for instance, were designed and executed tolerably well *without* an Airman leading the planning staff (or commanding the joint force). If the Air Force only produces the rare strategic thinker or geographic combatant commander today, what of it? With a peerless air arm, perhaps the status quo is acceptable.

This argument has certain attractive elements, but several flaws. First, it essentially argues the Air Force should be relegated to the role of a support Service, underpinning either a

land-based or maritime-based joint commander. If that happened, the Air Force would not need to produce joint-minded, strategic thinkers, since Airmen would not lead joint forces. Centripetal career arcs and the platform-centric, tactical mindset would sum up an Airman, a JFACC assignment becoming his career zenith. These are *tendencies*, kept in check by the realization that Airmen should be joint and coequal. Making the Air Force a support arm, however, would make the tendencies ironclad. Not only would Airmen fail to *lead* joint Design, in short order they could not practice it.

But is this a bad thing? Is it a disservice to the nation if the Air Force is a support arm? To answer, consider that air, space, and cyberspace capabilities are *too central to contemporary operations* for Airmen to relegate Design expertise or leadership to other Services by default. Even cursory looks at operations in Libya (2011), Israel-Lebanon (2006), Iraq (2003), and Kosovo (1999) make clear that air, space, and cyberspace played enormously outsized roles in those campaigns—to say nothing of many humanitarian assistance and irregular warfare operations over the same period. An Airman is the best choice to lead Design efforts for problem sets in which air, space, and cyberspace play key roles. Even when they do not, Airmen must still be capable Design partners, articulating airpower's contribution to the operational approach. Systems perspective comes naturally to an Airman and adds great value to Design—provided he avoids an overly reductionist tendency. In sum, the character of modern warfare requires the nation to maintain its Air Force on coequal footing with the other Services. Therefore, while such significant measures are very difficult to implement, they must be taken to change the institution and produce Airmen who excel at Design.

Conclusion

Design is the primary thinking tool of joint planners today, both in doctrine and practice. If Airmen leads Design with inadequate preparation, risks immediately surface: they may easily receive guidance uncritically, solve the wrong problem, misunderstand the environment, fail to adapt to changing circumstances, or fail to achieve objectives. A number of cultural and career factors inherent to the Air Force make these risks very real and perpetuate deficiencies: Airmen typically think in terms of platforms and technology, celebrate tactics, lack joint exposure, and undervalue PME. They are often not "dressed for success" when rising to levels at which broader thinking is required. Several remedies can help greatly to mitigate these issues, though they are not quick or easy. First, Airmen can leverage the strengths of airmindedness while avoiding its pitfalls. Second, the Air Force can broaden its officer accessions beyond STEM to fields of study conducive to Design. Third, the Air Force can value joint and strategy-minded career paths, promoting accordingly. Fourth, PME curriculum can incorporate Design more robustly, to include streamlined, applicable doctrine. Finally, individual Airman can (and must) study and practice forms of thinking that will build Design "muscle." If all this is done, the gap will close, and Airmen will grapple with complex, adaptive, wicked problems as ably as officers from any Service.

Notes

1. Edward C. Cardon and Lieutenant Colonel Steve Leonard, "Unleashing Design: Planning and the Art of Battle Command," *Military Review* 90, no. 2 (March-April 2010): 2.

2. "Operational Design" is the term for this methodology used in JP 5-0 (2011). Although some scholars distinguish "design" and "operational design," the two terms will be used synonymously in this analysis, except as noted.

3. "Joint" is here meant to include "combined or multinational" as well. It is acknowledged that whenever possible, the U.S. will prefer to employ its military instrument of power in concert with allies or coalition partners. For this analysis, however, to keep repeating "joint, combined, multinational, or coalition operations" would be cumbersome.

4. Joint Publication (JP) 5-00.1, *Joint Doctrine for Campaign Planning* (Washington, DC: GPO, 25 January 2002), II-1.

5. U.S. Army Field Manual (FM) 3-24, *Counterinsurgency* (Washington, DC: Government Printing Office (GPO), 15 December 2006), 4-1.

6. Dr. Milan Vego, "A Case Against Systemic Operational Design," *Joint Force Quarterly*, no. 53 (Spring 2009): 70.

7. Alex J. Ryan, "Military Applications of Complex Systems," in *Handbook of the Philosophy of Science*, Vol. 10, *Philosophy of Complex Systems*, ed. Cliff Hooker et al. (Amsterdam, NY: North Holland Publishing Co., 2011), 726-7. This way of thinking was a major influence on the U.S. military's strategy (or lack thereof) in Vietnam from 1965-1973.

8. Dr. Horst W.J. Rittel and Dr. Melvin M. Webber, "Dilemmas in a General Theory of Planning," *Policy Sciences* 4 (1973): 161.

9. U.S. Army War College, *Campaign Planning Handbook: Academic Year 2012* (Carlisle Barracks, PA, 2012), 21.

10. School of Advanced Military Studies (SAMS), *Art of Design: Student Text, Version 2.0* (Fort Leavenworth, KS, May 2010), 1.

11. SAMS, *Art of Design*, 1. Design theory caught Naveh's attention in 1991 along with that of Dov Tamari. Naveh, a special operator by trade, founded and co-directed the IDF's Operations Theory Research Institute (OTRI). He developed *Systemic Operational Design* as a corrective for perceived "shortcoming[s] in IDF thinking about the operational level of war." Besides UNIFIED QUEST, there were other collaborative Design-related efforts between SAMS and Naveh/OTRI. (See William E. Young, *JFACC as Architect: Using Systemic Design to Create Options in a World of Wicked Problems* (Maxwell AFB, AL, School of Advanced Air and Space Studies [SAASS], 2006), 82.)

12. General James N. Mattis, Memorandum for U.S. Joint Forces Command, 9 October 2009.

13. Cardon and Leonard, "Unleashing Design," 3. See also Grant Martin, "A Tale of Two Design Efforts (and why they both Failed in Afghanistan)," *Small Wars Journal* (July 7, 2011): 1-15.

14. Wayne W. Grigsby Jr. et al., "Integrated Planning: The Operations Process, Design, and the Military Decision Making Process," *Military Review* 91, no. 1 (January-February 2011): 29.

15. SAMS, *Art of Design*, 1.

16. U.S. Army Doctrine Publication (ADP) 5-0, *The Operations Process* (Washington, DC: Government Printing Office (GPO), 17 May 2012), 7.

17. Young, *JFACC as Architect*, 12.

18. Rittel and Webber, "Dilemmas," 161-167.

19. Jack Kem, *Design: Tools of the Trade* (Fort Leavenworth, KS, U.S. Army Combined and General Staff College, May 2009): 12.

20. Celestino Perez, Jr., "A Practical Guide to Design: A Way to Think About It, and a Way to Do It," *Military Review* 91, no. 2 (March-April 2011): 44.

21. Xander Bullock, "Design: How, Not Why," *Military Review* 90, no. 2 (March-April 2010): 104.

22. Stefan J. Banach, "Educating By Design: Preparing Leaders for a Complex World," *Military Review* 89, no. 2 (March-April 2009): 96.

23. Joint Publication (JP) 5-0, *Joint Operations Planning* (Washington, DC: GPO, August 2011), III-7. These four steps could be done in parallel, as they are strongly interrelated. A planning staff might have a dedicated team to work on design; if so, this team should take great care not to "unplug" from the detailed planning effort (perhaps traditional deliberate planning), since the two efforts *must* remain "a continuous process, not merely a product exchange." (See Bullock, "Design: How, Not Why," 106.)

24. Ibid., III-18.

25. Clearly, there will be many exceptions to the five factors analyzed subsequently; any generalization of 65,000 Air Force officers is bound to be wrong in some degree.

26. Howard D. Belote, *Once in a Blue Moon: Airmen in Theater Command,* CADRE Paper no. 7 (Maxwell AFB, AL: Air University Press, 2000): 84.

27. Carl H. Builder, *The Masks of War: American Military Styles in Strategy and Analysis* (Baltimore, MD: Johns Hopkins University Press, 1989): 17.

28. William H. Burks, *Blue Moon Rising? Air Force Institutional Challenges to Producing Senior Joint Leaders* (Fort Leavenworth, KS: School of Advanced Military Studies (SAMS), 2010): 9-10.

29. Lt Gen Michael Short, USAF (ret.), interview with author, 10 Sep 2012.

30. Scott Bethel et al., "Developing Air Force Strategists: Change Culture, Reverse Careerism," *Joint Force Quarterly* 58 (3rd Quarter 2010): 83.

31. Quoted in Belote, *Once in a Blue Moon*, 76.

32. Bethel et al., "Developing Air Force Strategists," 84.

33. Dr. Stephen Wright (School of Advanced Air and Space Studies, Maxwell AFB, AL), interview by the author, 13 Oct 2012.

34. Col Howard D. Belote, USAF (ret.), interview with author, 7 Oct 2012.

35. Wright interview.

36. Short interview.

37. "Centripetal" here means a career generally composed of Air Force (non-joint) assignments focused on Air Force issues or operations. By contrast, "centrifugal" means purposeful career choices that broaden an officer into joint assignments.

38. Short interview.

39 Belote, *Once in a Blue Moon*, 76.

40. Paul Darling and Justin Lawlor, "Fulfilling the Promise: A Joint Corps for a Joint Military," *Military Review* 92, no. 3 (May-June 2012): 83.

41. James P. McCarthy, "Commanding Joint and Coalition Operations," *Naval War College Review* 46, no.1, seq. 341 (Winter 1993): 15.

42. Belote, *Once in a Blue Moon*, 69.

43. (emphasis added) Quoted in Belote, *Once in a Blue Moon*, 70. Cheney was specifically commenting on the lack of Air Force four star generals in geographic combatant command positions, but his observation holds true at much more junior levels.

44. The major exception to the non-joint career tendency is awareness that at least one joint assignment as a field grade officer is required for eventual promotion to flag rank. Fulfilling such a joint assignment is viewed by many officers—though not all—as "checking a required square."

45. Air War College official Web site, Commandant's Welcome Letter, http://www.au.af.mil/au/awc/awchome.htm (accessed 5 Nov 2012).

46. Short interview.

47. Air Force Doctrine Document (AFDD) 3-0, *Operations and Planning*, (Maxwell AFB, AL: Curtis E. LeMay Center for Doctrine Development and Education, 9 November 2012): 50.

48. Bullock, "Design: How, Not Why," 103.

49. Col Jeff Reilly, USAF (ret.), (Air Command and Staff College, Maxwell AFB, AL), interview by the author, 4 Oct 2012.

50. Belote interview.

51. Wright interview.

52. Bradford W. Tippett, "Assessing the Requirement for Operational Design in the Face of Nonlinearity" (Quantico, VA: United States Marine Corps Command and Staff College, 2009), 12.

53. Alan D. Beyerchen, "Clausewitz, Nonlinearity and the Unpredictability of War," *International Security*, Winter 1992/93, 61.

54. Wright interview.

55. Some design advocates, such as BG Huba Wass de Czega, USA, contend that a scientific thinking frame is beneficial for Design—that intuition is not necessarily helpful, as it may "leap" to the wrong conclusion.

56. Quoted in Belote, *Once in a Blue Moon*, 76.

57. Short interview.

58. Besides General Shalikashvili, others who have invoked this concept are Paul Darling and Justin Lawlor, 2012; Bethel et al., 2010; Reilly (interview 2012); and Belote (interview 2012).

59. Gen Gene Renuart, USAF (ret.), interview by the author, 16 Oct 2012.

60. Bethel et al., "Developing Air Force Strategists," 87.

61. At AWC, Design's integration into the curriculum is largely owing to the efforts of associate professor Dr. Bert Frandsen.

62. Col (ret.) Richard "Kemo" Perry, USAF (Air Command and Staff College, Maxwell AFB, AL), interview by the author, 5 Oct 2012.

63. FM 3-24, *Counterinsurgency*, 4-2.

64. Short interview.

65. Perry interview.

66. Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1976), 141.

67. Belote interview.

68. U.S. Army Doctrine Publication (ADP) 6-0, *Mission Command* (Washington, DC: Government Printing Office (GPO), 17 May 2012), 2.

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