

ACCELERATE CHANGE AND STILL LOSE? LIMITS OF ADAPTATION AND INNOVATION

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Achieving air dominance requires more than technology. History reveals that technological solutions do not always offer the surest path to success. In this vein, calls for change provide terse nods to concepts and ideas, such as potential competitors' "theories of victory," while privileging more technological solutions. The services need a sound strategy to answer the requisite preliminary question of innovation or adaptation: we can, but should we? And, if we pursue innovation or adaptation in one area, what other area must be neglected because of that choice?

Great changes in the character of war are normally brought about by other forces than the power of weapons. . . . For the tendency is that sooner or later an antidote is found for each new form of attack.

Sir Frederick Barton Maurice in Jeremy Black, *War and Technology*

It is a truth now almost universally acknowledged that an air force in possession of a good fortune must be in want of a next-generation fighter jet, or so it has seemed to be the case for the US Air Force, particularly since the so-called fighter generals came to dominate the institution after the Vietnam War.¹ Perhaps at no time since the Arab-Israeli War of 1973 have the stakes to innovate or adapt a wide range of necessary capabilities been higher.

Indeed, the need to replace so much legacy equipment helps explain much of the Chief of Staff of the Air Force General CQ Brown's call to "accelerate change or lose." Whether or not his battle cry will result in meaningful results remains to be seen—the ability to innovate or adapt alone does not serve as a mandate for such activity, especially if one does not have a sound strategy in place. As Jeremy Black argues, technology can reshape war without necessarily making it "more effective," as occurred prior to and during World War I.²

All US military institutions must also subject their cultural predilection for innovation and adaptation to a cost-benefit analysis. The services have suffered from an excess

1. I am grateful to Lt. Col. Donald Seablom for his suggestions here and elsewhere as well as Dr. Ryan Wadle. All errors are my own.

2. Jeremy Black, *War and Technology* (Bloomington: Indiana University Press, 2013), 32.

of plenty in many ways that has dulled sharp decision making in the quest for effectiveness at the cost of efficiency. Historian Russell Weigley summed up the American way of war as a tendency to use overwhelming force. If Weigley's assessment was once true, this preference has perhaps now been replaced by the tendency of the US military to focus on whether it *can* do something rather than first determine if it *should*.

Defining Adaptation and Innovation

As the US military shifts from 20 years of significant planning and operations focus on counterterrorism and countering violent extremism, the United States is belatedly recognizing that China and other nations have begun dramatically undermining the US military's technological superiority. As a result, the national security community has, somewhat haphazardly, repeatedly thrown around words like innovation and adaptation.³

Innovation can be understood as the creation of a new product or entity. Frank Hoffman, for example, defines innovation as "new organizational competencies, doctrine, and tasks." By contrast, adaptation consists of incremental or evolutionary improvements. Hoffman describes this process as "learned changes to existing competencies and capability."⁴ Updating an aircraft's navigation system may be considered an adaptation, but a product like the Navy's refueling drone, the MQ-25 Stingray, would be considered innovative. Of course even this drone is not entirely new, as it is an adaptation of many inventions, including aerial refuelers. The point is to highlight how innovation and adaptation occur along a spectrum (fig. 1).⁵

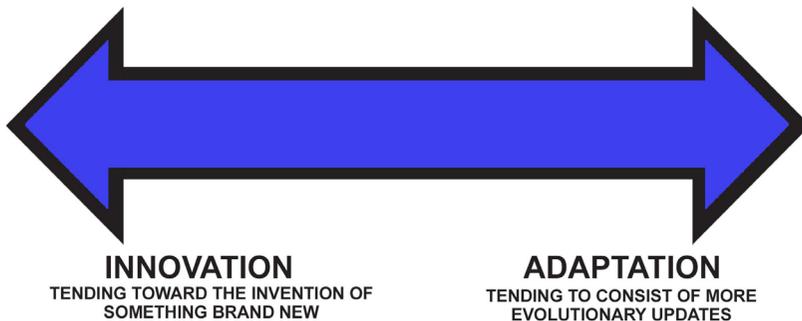


Figure 1. Spectrum of innovation and adaptation

The military is not alone in embracing innovation as an effort with inherent advantages unhindered by drawbacks. This perspective builds on ongoing progressive

3. Michael O'Bryan, "Innovation: The Most Important and Overused Word in America," *Wired*, 2013, <https://www.wired.com/>.

4. Frank Hoffman, *Mars Adapting: Military Change During War* (Annapolis, MD: Naval Institute Press, 2021), 7.

5. Hoffman, *Mars Adapting*, 6.

strains in US culture writ large beginning early in the twentieth century. Progressivism stressed how technology and other reforms could improve societal efficiency, a notion the US military wanted to act on anyway in seeking to avoid any replication of World War I trench warfare.⁶ The Army Air Forces took this movement one step further, seeking to wage warfare faster, more cheaply, and more humanely by carefully selecting strategic targets rather than focusing on defeating fielded forces.

Ironically, though, in World War II, the Army Air Forces largely threw out any possibility of efficiency in the European theater as it sought to validate its strategic bombardment theory. Efficiency can be defined as “economy in the application of force, comparing cost to outcome” in pursuit of effectiveness.⁷ General Henry H. “Hap” Arnold has received attention for how well he enabled innovation and adaptation, bringing together industry, airmen, and academics. But the extent to which his ability to lead an organization through combat successfully is more arguable, especially considering how he pushed for numbers of sorties to be flown, even in less than optimal weather conditions.

Arnold’s aggressive approach made strategic airpower very imprecise, the very opposite of what the Army Air Forces had spent much of the interwar period seeking to implement. In 1943, Arnold began pushing his friend, Eighth Air Force Commander General Ira C. Eaker to pursue numbers of sorties over either efficiency or effectiveness. Richard Overy estimates that 75 percent of the Army Air Forces’ effort in the Allied Combined Bomber Offensive can be considered “blind bombing,” or radar guided.⁸ Unfortunately, radar bombing struggled to provide much-needed precision at a time when it was not uncommon to drop bombs five miles off target.⁹ By contrast, only 25 percent of the Allied effort involved the daylight precision bombing that the institution preached prior to the war, the kind of precision necessary to attack key targets like oil refineries.

The wasted effort to be seen “doing something” is staggering. That is not to say the Combined Bomber Offensive did not produce important strategic outcomes for the Allies in terms of achieving air superiority and impeding the Germans’ ability to maneuver. Rather, the point is that the Combined Bomber Offensive could have achieved a similar outcome at far less human and economic cost.

Adaptation and Innovation in the US Military

More than 75 years later, the US military seeks to accelerate processes for understandable reasons, leading military leaders to look to civilian corporations for

6. Mark Clodfelter, *Beneficial Bombing: The Progressive Foundations of American Air Power, 1917–1945* (Lincoln: University of Nebraska Press, 2010).

7. Donald J. Mrozek, *Air Power and the Ground War in Vietnam: Ideas and Actions* (Maxwell AFB, AL: Air University Press, 1988), 99.

8. Richard Overy, *The Bombers and the Bombed: Allied Air War over Europe, 1940–1945* (New York: Penguin, 2013), 158, 204.

9. Overy, *Bombers and the Bombed*, 158.

inspiration. This trend is perhaps best epitomized by the unofficial adoption of Facebook's notion of moving faster and breaking things.¹⁰ But as Lee Vinsel argues, this mantra can be disastrous for those who have to design "actual" products that function as envisioned.¹¹ The Samsung Galaxy 7 phone, for example, received high praise for its innovative nature before being recalled for serious problems with batteries bursting into flames, reflecting a "fundamental problem" with the phone itself, as the need to entice consumers with a new product led engineers to push safe boundaries.¹²

Successful innovation also requires far more than savvy ideas or someone with the technical capacity for implementing those ideas. As Hoffman stresses, an institution must have the necessary organizational learning capacity for successful adaptation. "An organization must support a deep understanding of history coupled with a decentralized leadership philosophy; a culture that promotes a flexible, realistic and non-dogmatic operational doctrine, the organizational capacity to explore ideas . . . and both formal and informal information-sharing practices."¹³ Successful innovation and adaptation thus require top-down and bottom-up leadership as well as ways to disseminate successful adaptations. Well-trod paths must be woven into institutional memory and habits.

Unfortunately, recent Air Force efforts to accelerate change have not entirely met Hoffman's vision for long-term success despite their splashiness. In the past few years, for example, the Air Force has created more than 50 innovation hubs, provided squadrons with more than \$64 million to pursue innovation, and even established the Spark Tank competition.

But as Evan Hanson and James Eimers point out, the Air Force failed to create the organizational means to follow through with promising ideas selected through competitions like Spark Tank. Senior leaders did not provide continued guidance and encouragement, and Airmen selected to pursue ideas felt isolated and stressed by the need to develop their ideas in addition to continuing their normal daily Air Force responsibilities.¹⁴ This tendency accords with the Air Force's past trajectory, having often grounded the battle cry for change in an excessive emphasis on technological solutions. As Carl Builder notes, the Air Force worships at the "altar of technology."¹⁵

Recent articles, while making brief nods to culture, ideas, and other factors, largely continue to exhibit this predilection. One recent *Air & Space Power Journal* article im-

10. Hemant Taneja, "The Era of 'Move Fast and Break Things' Is Over," *Harvard Business Review*, January 22, 2019, <https://hbr.org/>.

11. Lee Vinsel and Andrew L. Russell, *The Innovation Delusion: How Our Obsession with the New Has Disrupted the Work that Matters Most* (New York: Currency, 2020), 8–9.

12. Anna-Katrina Shedletsy, "Samsung Galaxy Note 7 Teardown: How Aggressive Design Caused Battery Explosions," *Instrumental*, n.d., accessed January 3, 2022, <https://instrumental.com/>.

13. Hoffman, *Mars Adapting*, 272.

14. Evan Hanson and James Eimers, "The Air Force America Needs: Innovation, Spark Tank, and Ideas to Sustain Air Dominance," *Strategy Bridge*, November 16, 2020, <https://thestrategybridge.org/>.

15. Carl H Builder, *The Masks of War: American Military Styles in Strategy and Analysis* (Baltimore: Johns Hopkins Press, 1993), 21.

portantly acknowledges Builder's point that after the Vietnam War "airpower theory lost its central role in driving the future direction of the USAF to be replaced by a focus on incremental improvements in the tactical and operational art of flying jet aircraft."

The authors also note that culture enables technological change. But at the same time, the authors want this culture to support not adaptation—those "incremental improvements" they decry—but innovation, insisting that "sustaining war-fighting advantages in the twenty-first century will require a dramatic increase in technological innovation at all levels," thereby enabling "the next generation of technology, often while the current generation [is] just reaching the field."¹⁶ This future-leaning argument, however, offers no reason why a "dramatic increase" in innovation is required in comparison to airpower's past trajectory. It also offers little insight into why the Air Force should lean into innovation over adaptation, concluding that "technology is the key to combat advantage," a technologically deterministic proposition.¹⁷

Even airpower scholar and retired general I. B. Holley Jr. fell victim to this tendency. He offered early in one work that "Napoleon had no weapons better than his adversaries. He merely took advantage of their possibilities."¹⁸ Yet Holley contradicted himself elsewhere, concluding, "to exist in a warring world the nation must pick winning weapons." This statement leads to a bit of a conundrum considering the rhetoric that embraces typical, albeit problematic assumptions about a next war being necessarily fast. As such, the weapon often must be selected, developed, and fielded before conflict breaks out. Like Cooley and Dougherty, moreover, Holley's emphasis on weapons being "winning" smacks of technological determinism; what constitutes a war-winning technological distinction is an entirely different debate.

Recently, Air Force leaders have pushed beyond aircraft to contextualize airpower's foundation as rooted in something deeper than platforms. (Historically, arguments for innovation and adaptation in the Air Force have tended to be platform-centric. Builder probably goes too far in saying somewhat condescendingly that the Air Force of all the services is the "most attached" to "toys."¹⁹) Yet while leaders may have jettisoned the myopic focus on a fighter aircraft, they have perhaps just substituted a broader range of capabilities for a single platform.²⁰ This may be an improvement in some regards, but the focus still privileges material over intellectual solutions.

Of course some in the Air Force recognize this. Then-Brigadier General Alex Grynekwich posited in 2017 that the air superiority solutions of 2030 would "require a

16. William T. Cooley and George M. Dougherty, "Every Airman and Guardian a Technologist: Reinvigorating a Disruptive Technology Culture," *Air & Space Power Journal* 35, no. 2 (Summer 2021): 77, <https://www.airuniversity.af.edu/>.

17. Cooley and Dougherty, "Disruptive Technology Culture," 89.

18. I. B. Holley, *Technology and Military Doctrine: Essays on a Challenging Relationship* (Maxwell AFB, AL: Air University Press, 2004), 5.

19. Builder, *Masks of War*, 23.

20. Sydney J. Freedberg Jr., "A Computer That Happens to Fly": USAF, RAF Chiefs on Multi-Domain Future," *Breaking Defense*, April 16, 2018, <https://breakingdefense.com/>.

rejection of platform-based thinking that yearns for a ‘silver bullet’ solution.”²¹ In this vein, he proposed a sixth-generation air superiority aircraft not even be called a fighter in case that classification might limit imagination.²²

Achieving air dominance, however, requires more than technology. Historians have continually sought to remind the Air Force that technological solutions do not always offer the surest path to success. In this vein, Brown’s call for change provides terse nods to concepts and ideas, such as potential competitors’ “theories of victory,” while privileging more technological solutions.²³

Case Studies in Adaptation and Innovation

Four examples from three different services highlight the continuity between earlier strains of adaptation and innovation and today: the use of helicopters in the Vietnam War, the tactical focus of the Marine Corps’ expeditionary advanced basing operations, Army fitness, and how the Air Force seeks to implement the JADC2 concept. These case studies highlight how innovation and adaptation should be considered within the broader context of the Department of Defense’s problematic strategies.²⁴

Until civilian leadership and Congress force the US military to face tough choices, it will continue to pursue a tactical smorgasbord of adaptation and innovation rather than a holistic plan unified in pursuit of an overarching strategy. In an environment characterized by changing political parties and various terminologies for future conflict, the Department of Defense must chart a desired end state and embrace a measured path toward achieving necessary capabilities. Adaptation and innovation also must be reconsidered within a culture of inefficiency that continues to exist even amid the threat of tightening budgets.

US Army Helicopters in the Vietnam War

Militaries must align adaptation and innovation with a sound strategy that befits a war’s unique character and context. The immense challenge this poses can be seen in the innovative, creative ways the US Army integrated helicopters into the Vietnam War for tactical and operational success but not for strategic success. Indeed, new technology in the form of the helicopter married to old ideas such as the need to move troops around faster, largely enabled a problematic search-and-destroy strategy given the Vietnam War required far more political than military solutions.²⁵ As early as

21. Alex Grynkeiwich, “The Future of Air Superiority, Part IV: Autonomy, Survivability, and Getting to 2030,” *War on the Rocks*, January 18, 2017, <https://warontherocks.com/>.

22. “Defining the Next Air Superiority Platform,” *Air Force Magazine*, July 10, 2017, <https://www.airforcemag.com/>.

23. Charles Q. Brown Jr., *Accelerate Change or Lose* (Washington, DC: Headquarters, Department of the Air Force, August 2020), <https://www.af.mil/>.

24. Paul Scharre and Ainikki Riikonen, “The Defense Department Needs a Real Technology Strategy,” *Defense One*, April 21, 2020, <https://www.defenseone.com/>.

25. Mrozek, *Ideas and Actions*, 73.

1970, for example, counterinsurgency expert Sir Robert Thompson argued the helicopter may have been one of the “major contributions to the failure of strategy” in the war.²⁶

Despite the enormous tactical benefits provided by the helicopter—ranging from evacuating injured infantrymen quickly to enabling the more efficient mobility by air—innovation proved to be counterproductive at a strategic level.²⁷ If lack of local support explained the inability to arrive via ground transport, then the use of helicopters only bypassed the need to gain the backing of the local population. The innovation represented by the helicopter allowed the US military to avoid the painstaking work of securing local support.

Helicopters enabled commanders to pursue the questionable notion that “the name of the game . . . was contact.”²⁸ Many commanders favored kinetic contact to draw on the enormous amount of firepower the United States had at its disposal—the United States dropped double the bomb tonnage on Vietnam, Laos, and Cambodia that it had during World War II.²⁹ But the North Vietnamese Army, an elusive, thinking opponent, generally refused to fight on unfavorable terms. Again, a more nonkinetic approach designed to provide security and meet the significant grievances of local populations might have been more productive.

As Donald Mrozek argues, “innovation, flexibility, and versatility are part of the vocabulary of virtue in the United States.” But these often positive traits can be problematic. At times in Vietnam, “innovation may have brought more harm than good, more risk than opportunity. . . . The difficulty lay largely in calling correctly where innovation turned into excess.”³⁰

The Marine Corps and Tactical Adaptation

Despite challenging budgets, the United States should not fool itself that it is particularly parsimonious. The US military still has the luxury of adapting and innovating with what other nations might consider expensive gimmicks. A 2021 social media post, for example, hailed a CH-53 heavy-lift helicopter carrying a naval strike missile to test the Marine Corps’ concept of expeditionary advanced base operations (fig. 2).³¹ The question must be asked: How does such a tactical adaptation support strong operational or, even more importantly, strategic concepts?

26. Mrozek, *Ideas and Actions*, 73.

27. Mrozek, *Ideas and Actions*, 76.

28. Mrozek, *Ideas and Actions*, 77.

29. Cooper Thomas, “Bombing Missions of the Vietnam War,” Esri ArcGIS Storymaps, n.d., accessed January 3, 2022, <https://storymaps.arcgis.com/>.

30. Mrozek, *Ideas and Actions*, 123.

31. Twitter, Jordan Fox @J_FoxthePog, September 2, 2021.



Figure 2. Twitter post from Jordan Fox

Just as it is worth asking if the helicopter's introduction to the Vietnam War enabled an unsound strategy, one can ask to what extent the US military is currently pursuing the proper balance between efficiency and effectiveness. The US military must increasingly shift its innovatively and adaptationally optimistic culture from asking whether it can do something to whether it should, recognizing tactical solutions do not solve strategic problems.³² Unfortunately, a can-do culture is not an unalloyed good.

Historically, the Marine Corps has been the most frugal of the services. Jokes abound of Marines using duct tape to solve just about any problem. Huey pilots, for example, have sometimes pointed to their ironically low-tech aiming device: a square piece of electrical tape affixed to the windshield to which they align with the target. Indeed, one their most heralded adaptations entailed what we would today call commercial off-the-shelf-technology: in the interwar period, Marines identified the Higgins boat—which began its life as a vessel to cruise Louisiana bayous—as a potential candidate for an amphibious landing vessel.

Today's Marine Corps is more profligate as exemplified by the opening vignette. The CH-53K is estimated to cost around \$135 million per aircraft, staggering given it is even more expensive than the much-maligned F-35.³³ The new platform is also anticipated to be used in joint forcible entry missions, thereby suggesting its employment

32. Special Inspector General for Afghanistan Reconstruction (SIGAR), *Quarterly Report to the United States Congress* (Washington, DC: SIGAR, July 30, 2021), 62, <https://www.sigar.mil/>.

33. David Daly, "Is \$138 Million for the CH-53K King Stallion Helicopter Justified?" *Defense Post*, August 31, 2020, <https://www.thedefensepost.com/>.

in an anti-access/area-denial environment.³⁴ The joint light tactical vehicle carrying the missile costs about \$350,000.³⁵ A naval strike missile costs \$2 million.³⁶ The Corps envisions employing these missiles from the ground as a kind of artillery force for the Navy.³⁷

The cost of the Marine Corps' attempt to support the Navy in the kind of mass needed in a peer conflict cannot be scaled efficiently. This highly expensive tactical solution exemplifies what T.X. Hammes has characterized as the US military's embrace of the "exquisite few."³⁸ While one often thinks of temperamental capabilities like the F-35 as epitomizing the "exquisite few," in reality it far better encapsulates how the US military tries to solve problems on a wider scale.

No wonder, then, that the Corps recently admitted it needs more funding, claiming it has cut all possible waste.³⁹ In the past, though, it has pursued more cost-effective adaptations such as a plywood glider drone to air drop supplies.⁴⁰ Even the US service with a reputation for thrifty innovation and adaptation has gone adrift.

Army Combat Fitness Test

The Marine Corps is not alone in this approach to tactical adaptation, as evident in the relatively new and costly Army combat fitness test (ACFT), which requires about \$30 million in new equipment alone. The test claims to make fitter, more combat-ready soldiers.⁴¹ While the justification—improved combat efficiency—for the fitness test is compelling, the reality is that only about thirty percent of the Army consists of combat elements, having steadily fallen from a peak of about 50 percent in World War I, except for a brief period during the surge in Operation Iraqi Freedom.⁴²

Builder's insights into institutional culture illuminate how the fitness test is partly about the Army seeking to revitalize its purportedly lost-warrior ethos. Some Army

34. "Marine Corps Prepares New CH-53K for First Flight," *Military News*, October 21, 2014, <https://www.military.com/>.

35. Sydney J. Freedberg Jr., "JLTV: New \$911M Order Strengthens Oshkosh's Hand for Recompete," *Breaking Defense*, December 2, 2020, <https://breakingdefense.com/>.

36. David Wichner, "Navy Details Plan to Deploy New Raytheon Anti-Ship Missile," *Arizona Daily Star*, April 30, 2021, <https://tucson.com/>.

37. Ben Wan Beng Ho, "Shortfalls in the Marine Corps' EABO Concept," *Proceedings* 146, no. 7 (July 2020), <https://www.usni.org/>.

38. T. X. Hammes, "The Future of Warfare: Small, Many, Smart vs. Few & Exquisite?," *War on the Rocks*, July 16, 2014, <https://warontherocks.com/2014/07/the-future-of-warfare-small-many-vs-few-exquisite/>.

39. Patricia Kime, "At the Limits of What I Can Do: Marine Corps Commandant Makes Plea for Funding," *Military News*, June 16, 2021, <https://www.military.com/>.

40. Kyle Mizokami, "The Marines Are Testing a Glider Drone Made of Plywood," *Popular Mechanics*, April 20, 2017, <https://www.popularmechanics.com/>.

41. Matthew Cow, "Full Details: The Army Finally Reveals Future Combat Fitness Test," *military.com*, July 8, 2018, <https://www.military.com/>.

42. John J. McGrath, *The Other End of the Spear: The Tooth-to-Tail Ratio (T3R) in Modern Military Operations* (Fort Leavenworth, KS: Combat Studies Institute Press, 2007), <https://www.armyupress.army.mil/>.

leaders insist “[c]ombat is age and gender-neutral.” Yet after six years of preliminary testing, the new fitness test retained age and gender bias: the Army sought to determine the new test’s effectiveness drawing on a sample size of 136 men and only 16 women, with a relatively low average age of 24. 16 women out of a sample set of 152 underrepresented women in its testing.⁴³ The Army should have experimented with a more representative gender balance in developing the test.

The Army also argues the new test “measures a Soldier’s physical ability to execute combat-related tasks.” It follows this text with an image of a soldier deadlifting 340 pounds to achieve “maximum points.”⁴⁴ What is left unclear is how a slew of kettlebells, pulling sleds, 3000 pounds of weights, and other equipment approximate combat enough to necessitate such a far-reaching and costly test.

The test epitomizes an approach to perfecting Army physical fitness or focusing on effectiveness while discarding efficiency or other more practical and far less costly approaches to improving a culture of Army physical fitness.

As such, the Army’s approach exemplifies Weigley’s American way of war, a definition that includes the acceptance of vast inefficiencies as part of the cost of the military achieving its desired effects. In the development of the ACFT, the Army demanded the gold standard of equipment and what it believed offered the most effectiveness, regardless of efficiency. Since announcing the test and revealing that the equipment would cost \$30 million, that number has increased three years later to \$63.5 million, or just under one-half the cost of a CH-53K.⁴⁵

Adaptation and innovation, both peacetime and wartime, are critical to military success. But the services must carefully apply a cost-benefit analysis to their actions in an era of limited budgets that demands the military scrupulously allocate funds. The culture of adaptation and innovation adopted by the US military in recent years is crucial to revitalize increasingly outdated legacy equipment. But so much is required that the US military cannot afford the gold-standard approach except when absolutely necessary, and, in the case of the new ACFT, the ability to deadlift 340 pounds is of minimal use to the majority of Soldiers. There will be no feats of strength or Crossfit gyms on the battlefields of tomorrow.

43. Emma Moore, “The ACFT and the Problems with the Military’s Cult of Physical Fitness,” December 16, 2019, <https://www.military.com/>; Jillian Hamilton, “Congress Pauses ACTF until Independent Study Completed,” January 4, 2021, <https://news.clearancejobs.com/>; Kyle A. Novak, *A Critical Review of the Baseline Soldier Physical Readiness Requirements Study*, American Statistical Association Foundation, November 19, 2020, <https://kylenovak29.s3.amazonaws.com/>; and David Brown, “ACFT FUBAR: Bad Data Driving a Bigger Wedge between Active Duty and Reserve,” News and Career Advice, ClearanceJobs, May 12, 2021, <https://news.clearancejobs.com/>.

44. Thomas Brading, “ACFT 3.0: Exploring a More Inclusive Scoring Assessment, Planks Stay,” Army News Service, March 22, 2021, <https://www.army.mil/>.

45. Steve Beynon, “For Guard and Reserve Soldiers without Easy Access to Equipment, ACFT Training Costs Pile Up,” June 3, 2021, <https://www.military.com/>.

The Air Force and JADC2

With the drawdown in Iraq and, more recently, Afghanistan, the US military has quickly turned to preparing for more high-end, conventional conflict. But it has struggled to determine the ultimate purpose for adaptation and innovation, lacking a sound strategy for pursuing great power competition. If nothing else, the US military must come to terms with the reality that one cannot win simply by selecting “winning” weapons. Today’s military professionals can no longer assume—if they ever should have to begin with—they can “win” by “virtue of our overwhelming dominance in military power.” Indeed, this assumption has resulted in “diluted operational doctrine and clouded concept development.”⁴⁶

Two decades of strategic struggle in pursuit of victory over terrorism led to a batten-down of the hatches. The military sought to do what it had done so well tactically over the last twenty years, namely, speed up and make the kill chain more lethal when rules of engagement allowed. Additionally, over the last decade, the US military has insisted this process could best be enabled by making each domain’s capabilities more seamless and interconnected.

The Air Force eagerly subscribed to this approach, seeking to develop technologies as the leading enabler of connecting all the devices. In 2020, Air Force Chief of Staff General David L. Goldfein sought to incorporate technology similar to the Uber App into the Air Force, insisting it would provide a seamless solution for increasing the kill chain’s speed, explaining, “You match a vehicle with a target . . . and you can see it all happen. You’ve got options you can pick from, you can see the driver, the license plate, you can watch that person coming towards you. You start thinking about that application militarily . . . it’s exciting.”⁴⁷

This process may be exciting, but Vinsel reveals the limits of what is a very complicated process, highlighting how “digital-age companies” struggle when they “encounter old problems in their new ventures in the material world” including logistics, ethical norms, and other considerations.⁴⁸ The military cannot afford to get it wrong when a product must be reliable amid the fog and friction of war.

Over the last five years, all-domain operations morphed out of the concept of multi-domain battle, which initially sought to reconstitute the improved relations between the Army and the Air Force that made air-land battle doctrine possible back in the late 1970s and early 1980s. But if air-land battle doctrine at least consisted of a basic idea of how to employ force to win by attacking the first- and second- echelon forces, all-domain operations is an amorphous emphasis on simply speeding up the kill chain and doing more of the same. In this way, it is technologically deterministic at its core.

46. Frank Hoffman, “Defeat Mechanisms in Modern Warfare,” *Parameters* 51, no. 4 (Winter 2021), <https://press.armywarcollege.edu/>.

47. David Roza, “The Air Force Is Using Uber-Like Technology to More Efficiently Vaporize Bad Guys,” *Task & Purpose*, January 27, 2020, <https://taskandpurpose.com/>.

48. Vinsel, *Innovation Delusion*, 9.

If anything, the failed political outcome of Afghanistan, a conflict in which the US military had air superiority and a speedy kill chain, shows the hollowness of this idea as the main solution to preparing for high-intensity conflict with near-peer or peer competitors.

Some might argue that Joint all-domain command and control (JADC2) is based more on ideas than on technology, namely that of maneuver warfare.⁴⁹ Unfortunately, maneuver warfare has not proven itself. In effect, maneuver warfare better suits the ideal world than the real one. Lawrence Freedman argues in this vein that maneuver warfare relies on an “essentially romantic and nostalgic view of strategy.”⁵⁰ Cathal Nolan echoes these critiques by describing how maneuver warfare enthalls military professionals with the “quick fix: the sudden Blitzkrieg, the rapid war of maneuver, the sweeping brilliance of the great captain.”⁵¹

Consequently, maneuver warfare ideas such as “creating multiple dilemmas for the enemy” coexist at odds with principles of war such as simplicity and concentration. The fog and friction of war make it highly challenging the United States will be able to create short-lived but synchronized “windows of opportunity.”⁵² Other issues abound such as requiring vulnerable space, cyber, and electromagnetic capabilities with technological fetishisms potentially blinding some to what potential enemies can do well and cheaply.

An additional point about motives for adaptation and innovation should be noted, namely, the “process of innovation itself can be corrupted into one of institutional self-interest and self-protection,” a characteristic shared by each military service.⁵³ It can be argued, for example, that the Air Force has pursued technologies like the advanced battle management system in part because it sought to ensure its continued importance.⁵⁴ While there are many advantages to JADC2 that will be invaluable in a highly-contested environment, the Air Force should appropriately balance efforts to innovate and adapt in this realm to innovate and adapt with enablers possessing the kind of mass required to bring enough strategic effect to bear.

Some have suggested the Air Force has been adrift in its identity since strategic bombing lost its grip as the locus of institutional culture.⁵⁵ In some ways, the subsequent development of fighters equipped with precision weapons, sophisticated sen-

49. James B. Hecker, “Foreword: Joint All Domain Operations,” *Air & Space Power Journal* 35, no. 2 (Summer 2021): 2, <https://www.airuniversity.af.edu/>.

50. Lawrence Freedman, *Strategy: A History* (New York: Oxford University Press, 2013), 210.

51. Cathal Nolan, *The Allure of Battle: A History of How Wars Have Been Won and Lost* (New York: Oxford University Press, 2016), Introduction.

52. Juan Canovas, “Multi-Domain Operations and Challenges to Air Power,” Joint Air Power Competence Centre, 2019, <https://www.japcc.org/>.

53. Mrozek, *Ideas and Actions*, 71.

54. Valerie Insinna, “What’s the End Game for the US Air Force’s Command and Control Overhaul?,” C4ISRNET, May 21, 2019, <https://www.c4isrnet.com/>.

55. Ed Kaplan, *To Kill Nations: American Air Strategy in the Air-Atomic Age and the Rise of Mutually Assured Destruction* (Ithaca, NY: Cornell University Press, 2015), vii–viii.

sors, and stealth technology enabled them to perform more efficiently in a kind of role akin to strategic bombers, allowing precision to somewhat function as an acceptable substitute for strategic bombing in Air Force identity.

Yet three of the four services now have stealthy fighters equipped with precision weapons and sophisticated sensors, raising legitimate questions about how the Air Force truly differs.⁵⁶ Of course no other service can match the Air Force in sustaining capabilities like tankers, intelligence, surveillance, and reconnaissance platforms, and other aircraft. In effect, the Air Force provides a wide, holistic set of air capabilities across the broad range of military operations. The combination of these capabilities and being more attuned to how to employ airpower flexibly explain the need for an independent Air Force.

With the advent of JADC2, some Air Force leaders may be signaling that command and control more than air superiority justifies continued Air Force independence and deserves emphasis as its most important role. This change gains credence when considering the degree to which recent events appear to echo previous air superiority challenges experienced by other militaries, such as the Yom Kippur War in 1973, in which the ground element of the Israeli Defense Forces helped the air component secure air superiority.⁵⁷

Conclusion

Slogans such as “accelerate change or lose” must be pursued thoughtfully and carefully. As Black argues, “there is a widespread belief that superior technology is always the answer without understanding what the question is.”⁵⁸ Without a sound strategy, the pursuit of innovation and adaptation can be counterproductive.

Helicopters represented a highly innovative development that made many key contributions to the Vietnam War, but the air mobile concept enabled the Army, in large part, to make just enough body count progress to pursue a failed military strategy. The Marine Corps’ latest use of expensive technology to show the feasibility of its operational concept may or may not make sense. After all, using a helicopter equal in cost to an F-35—itself possibly a question mark in contested airspace—to ferry a missile to an island outpost vies for the crown of most expensive Uber ride short of space tourism.⁵⁹ If the platform is used to advance questionable operational or strategic concepts that flounder or fail in wartime, it may prove to be the most costly.

Just because a service can do something does not mean that it should. The services should debate the prudent level of effort for proofs of concept in a Joint context. It is one thing to have an idea and work through the problem of operationalizing it. But if

56. Robert M. Farley, *Grounded: The Case for Abolishing the U.S. Air Force* (Lexington: University Press of Kentucky, 2014).

57. Insinna, “End Game.”

58. Black, *War and Technology*, 30.

59. Greg Hadley, “F-35 Not as Survivable as Previously Hoped, HASC Chair Says,” *Air Force Magazine*, August 30, 2021, <https://www.airforcemag.com/>.

war broke out, more survivable options might prove better in terms of solutions, such as a kind of quiet cargo submarine (one might harken back to the submarines of World War I, which were more submersible boats than submarines).⁶⁰

Change is critical, but so often the call to accelerate change ignores the great continuities in warfare, such as anticipating war's fog and friction, which provide just as many insights into sound preparation. Certainly there is a time and place for appropriate exquisite capabilities. At times the Air Force recognizes this reality, perhaps having realized of late the importance of mass. The service may be struggling now, as the other services are, to conceptualize and balance a high/low force structure mix.⁶¹

Striking the correct balance between change and continuity is difficult. As one person once warned the United States, "if a chariot pulled by four inferior horses [was] pitted against one pulled by four superior horses, this often [led] to the defeat of the chariot pulled by the superior horses."⁶² However counterintuitive this idea might seem, it can be true of technology employed against terrorist organizations as well as of technology employed against near-peer and peer adversaries.

How does the US military make a "grounded projection into the future" rather than hewing to "fantastical" theories of future conflict?⁶³ Is a full table saw required or will the \$10 saw suffice for a project? Without a sound strategy in place, one ends up pursuing a number of disparate projects akin to beginning a number of home improvement projects on a house for which the building plans have yet to be fleshed out. A sound strategy will help the services answer the requisite preliminary question when it comes to the decision to innovate or adapt: we can, but should we? And, if we pursue innovation or adaptation in one area, what other area must be neglected because of that choice? *Æ*

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60. Also see Collin Fox, "Taking Notes from Narcos: Semi Submersible Unmanned Ships for Great Power Competition," Capability Analysis, Center for International Maritime Security, May 1, 2020, <https://cimsec.org/>.

61. John A. Tirpak, "Air Force Moving toward Multi-Domain Munitions, away from 'Exquisite' Types," *Air Force Magazine*, November 30, 2021, <https://www.airforcemag.com>.

62. Quoted in James Sbrega, "Southeast Asia," in *Case Studies in the Development of Close Air Support*, ed. Benjamin Franklin Cooling (Washington, DC: Office of Air Force History, 1990), 440.

63. H. R. McMaster, "Foreword," in *Learning the Lessons of Modern War*, ed. Thomas G. Mahnken (Stanford, CA: Stanford University Press, 2020), xvi.

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