

*** DEPARTMENT OF THE AIR FORCE ***

AETHER

A JOURNAL OF STRATEGIC AIRPOWER & SPACEPOWER

FUNDING NATIONAL DEFENSE

HARDWIRED FOR HARDWARE

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CASEY NICASTRO*

SPACEPOWER AND STRATEGY

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LETHAL TARGETING THROUGH US AIRPOWER

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FROM THE EDITOR

Dear Reader,

In March, the administration released the Department of Defense's fiscal year (FY) 2025 budget proposal, which reflects the short-term belt-tightening implemented by the FY 2023 Fiscal Responsibility Act. The implications of this, coupled with the tendency for Congress to default to appropriation by continuing resolution, portends another year of overall programmatic development and execution uncertainty for the Department. Ongoing global geopolitical unrest, compounded most recently by active wars in Ukraine and the Gaza Strip and aided and abetted by nonstate actors, is occurring simultaneously with the advent of what looks to be the most contentious US presidential campaign in recent history.

In sum, there is no shortage of urgent national and international security topics relevant to the Department of the Air Force worth exploring. Accordingly, our spring issue of *Æther: A Journal of Strategic Airpower & Spacepower* considers subjects ranging from defense spending and space strategy to strategic narratives and ethics in war. In **Funding National Defense**, Travis Sharp and Casey Nicastro analyze congressional changes to budget requests from FY 2016 through FY 2023 and find the legislative branch has preferenced programmatic spending over personnel and operation and maintenance expenditures, requiring DoD leaders to convey priorities clearly and Congress to sustain critical levels of nonhardware defense spending.

Our **Spacepower and Strategy** forum leads with an article calling attention to Ukraine's novel use of space. Robin Dickey and Michael Gleason discuss how Ukraine, a nonpacefaring nation, has made far better use of the domain than its spacefaring adversary, Russia—particularly in the areas of ground infrastructure, software, and information-sharing practices. These findings yield significant policy, strategy, and doctrine lessons for the US armed forces. In the second article in the forum, Jake Suss offers five proposals for space strategy based on historic Chinese strategic thought. These proposals center on exploiting asymmetric advantages that will limit adversaries' use of the domain and help the United States win conflicts in and through space.

The third article considers resiliency in space. Gary Davenport argues the newly created Commercial Augmentation Space Reserve—modeled on the Civil Reserve Air

Fleet (CRAF)—should build on lessons learned from CRAF structure and implementation in order to ensure commercial interest in the program and overall success when implemented. Lastly, Brian Goodman analyzes the US Space Force’s notion of competitive endurance through international relations theory, proposing a new theory of offense dominance in space and offering recommendations to mitigate the possibility of conflict in and through space.

Our third forum, **Narratives in Conflict**, features an in-depth analysis of the notion of strategic empathy. Robert Hinck and Sean Cullen explain the function strategic narratives serve in the development and practice of strategic empathy and the role such empathy plays in military planning and strategy.

In the first article of our final forum, **Ethics and Warfare**, Douglas Lumpkin, Philip Stewart, and Joel Kornegay examine the occurrence of moral injury in US service members. They find that while it can result in highly negative outcomes, it can build readiness and resilience in military teams and organizations if leaders approach it correctly. The forum and our issue conclude with a discussion on lethal targeting/targeted killing, viewed through the lens of the ethics theory of consequentialism. David Kritz and Shane Smith propose a four-element, ethics-based model that military planners can employ in situations involving the potential for lethal targeting/targeted killing.

Thank you for your continued support of the journal. As always, we encourage thoughtful, well-reasoned responses to our articles, with the potential for publishing in a future issue. Æ

~The Editor

HARDWIRED FOR HARDWARE

Congressional Adjustments to the Administration's Defense Budget Requests, 2016 to 2023

TRAVIS SHARP

CASEY NICASTRO

As a result of the 2023 Fiscal Responsibility Act, defense budget growth will be limited for fiscal year (FY) 2024 and FY 2025. An analysis of congressional adjustments to defense budget requests from FY 2016 to FY 2023 reveals a Congress that favors programmatic expenditures over personnel and operation and maintenance. In a time of fiscal austerity in the near term, DoD priorities must be clearly and concisely conveyed to Congress, and Congress must balance its predilection for hardware with the need to appropriately fund the nonhardware programs and components of the Department.

After increasing the DoD budget in real terms during seven of the past eight fiscal years (2016–23), Congress has pivoted toward suppressing spending by passing the Fiscal Responsibility Act.¹ Approved in June 2023 as part of the debt ceiling deal, the law limits defense budget growth for the next two years while threatening automatic across-the-board cuts, known as sequestration, of approximately \$40 billion below planned spending levels if Congress takes too long to pass full-year appropriations.² These provisions effectively hold the defense budget hostage to incentivize Congress to complete its appropriations work on time.

The law's ultimate effects on spending will depend on future congressional actions, particularly how Capitol Hill handles regular and supplemental budget bills in 2024 and 2025. Despite these uncertainties, the shift from steady spending growth to sudden budgetary restraint indicates a mercurial Congress struggling to balance competing priorities and factions.

The Hill's uneven approach to the defense budget's size, with years of bipartisan support for hefty increases suddenly giving way to an intensive focus on spending

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1. Travis Sharp, *Inconsistent Congress: Analysis of the 2024 Defense Budget Request* (Washington, DC: Center for Strategic and Budgetary Assessments [CSBA], October 2023), 5, <https://csbaonline.org/>.

2. Sharp, 7.

limits, also characterizes its treatment of specific expenditures. Based on an analysis of congressional adjustments to the administration's defense budget requests from 2016 to 2023, this article finds that Congress has exhibited a programmatic orientation toward defense spending characterized by adding funds for procurement and, to a much lesser extent, research, development, test, and evaluation (RDT&E).

At the same time, Congress has subtracted funds for military personnel, including service member pay and allowances, and operation and maintenance (O&M), including flying hours, ship operations, training, and maintenance. In short, Congress has retained its long-running fixation on acquiring "hardware," particularly favored weapons systems such as missile defense, ships, and aircraft. Of note, this article uses adjustments as a generic term referring to Congress' combined adding and subtracting of funds to DoD budget requests, not as a technical term denoting the various processes for realigning or reprogramming appropriated funds.³

Congress' preference for hardware is not exactly surprising. Lawmakers possess compelling reasons to address defense spending programmatically.⁴ As Charles Hitch, creator of the Defense Department's Planning, Programming, and Budgeting System, observed in the 1960s, "These [weapons systems] choices have become . . . the key decisions around which much else of the defense program revolves."⁵ Other studies have determined Congress' obsession with big-ticket weapons programs remains alive and well.⁶ Still, the article's reconfirmation of this enduring pattern should alert defense strategists as budgets flatten during the Fiscal Responsibility Act's two-year timespan—and potentially remain flat afterward due to continued congressional advocacy for spending limits, a political dynamic that dominated 2023.

The United States is currently navigating intense military competitions against China and Russia while managing deadly conflicts in Ukraine and the Middle East. This extraordinarily demanding security environment, which blends long-term and immediate challenges, necessitates varied investments across the Joint force. As General Mark Milley, former chairman of the Joint Chiefs of Staff, remarked in 2023, "We must not allow ourselves to create the false trap that we can either modernize [for tomorrow] or focus only on today—we must do both."⁷

3. Philip J. Candra, *National Defense Budgeting and Financial Management: Policy and Practice* (Charlotte, NC: Information Age Publishing, 2017), 318–26.

4. Samuel P. Huntington, *The Common Defense: Strategic Programs in National Politics* (New York: Columbia University Press, 1961), 3–7.

5. Arnold Kanter, "Congress and the Defense Budget: 1960–1970," *American Political Science Review* 66, no. 1 (March 1972): 135.

6. Seamus P. Daniels and Todd Harrison, "Assessing the Role of Congress in Defense Acquisition Program Instability," paper prepared for the 18th Annual Acquisition Research Symposium, Naval Postgraduate School, Monterey, CA, May 2021, <https://dair.nps.edu/>; and *Report on Congressional Increases to the Fiscal Year (FY) 2023 Defense Budget* (Washington, DC: Department of Defense [DoD], August 4, 2023), <https://comptroller.defense.gov/>.

7. Jim Garamone, "Milley Says Investments in Military Capabilities Are Paying Off," DoD, May 11, 2023, <https://www.defense.gov/>.

As budgets stagnate, if Congress does not moderate its hardware spending add-ons, at least in select areas, then it risks shortchanging the “software” underpinning US military power, including people, readiness, education, and other key ingredients of combat effectiveness often funded through the military personnel and O&M budgets.⁸

History shows the risk of underfunding these critical areas is real. Since the Cold War’s end, military personnel and O&M cuts often have exceeded procurement and RDT&E cuts when defense spending stagnates, worsening readiness shortfalls during those periods. Making hard trade-offs between hardware and so-called software proved less necessary for Congress as it boosted defense budgets throughout the past decade. Such trade-offs will prove essential under the Fiscal Responsibility Act as well as any prospective spending control agreement enacted in its wake. Congress will not have to stop adding money for weapons systems, but it will likely have to lessen those additions to ensure readiness receives the necessary funding.

If history is any guide, overcoming these difficulties now and in the future will require both the Department of Defense and Congress to make improvements. The Pentagon should find new ways to persuade Congress to support essential investments, particularly for nonhardware priorities. At the same time, military planners must develop concepts to fight and win with what the Department already has. On the legislative side, Congress needs a stronger pipeline of defense policy entrepreneurs capable of leading their colleagues to more sound decisions more of the time, specifically by harnessing their procedural power to elicit more impactful information from the Pentagon. Without actions like these, Congress’ fixation on hardware could inadvertently produce a US military that is less broadly prepared to succeed in a dangerous world where the margin of error has become perilously small.⁹

Hypotheses and Data on Congressional Spending Adjustments

Over the past 60 years, scholars have developed three competing hypotheses about how Congress addresses the administration’s defense spending requests.¹⁰ The negligible hypothesis holds that Congress does not have a significant impact on either the overall level of defense spending or the allocation of spending across programs.

8. Michael C. Horowitz, *The Diffusion of Military Power: Causes and Consequences for International Politics* (Princeton: Princeton University Press, 2010), 5; and Stephen Biddle, *Military Power: Explaining Victory and Defeat in Modern Battle* (Princeton: Princeton University Press, 2004), 203.

9. Robert M. Gates, “The Dysfunctional Superpower: Can a Divided America Deter China and Russia?,” *Foreign Affairs* 102, no. 6 (November/December 2023).

10. Raymond H. Dawson, “Congressional Innovation and Intervention in Defense Policy: Legislative Authorization of Weapons Systems,” *American Political Science Review* 56, no. 1 (March 1962): 43; Edward J. Laurance, “The Congressional Role in Defense Policy Making: The Evolution of the Literature,” *Armed Forces and Society* 6, no. 3 (Spring 1980): 436–38; Barry M. Blechman, *The Politics of National Security: Congress and U.S. Defense Policy* (New York: Oxford University Press, 1990), 23–29; and Jamie M. Morin, “Squaring the Pentagon: The Politics of Post-Cold War Defense Retrenchment” (Ph.D. diss., Yale University, May 2003), 306–7.

Proponents of this view imagine a Congress that essentially tinkers at the margins and functions as “a pushover for the Pentagon,” as Senator William Proxmire (D-Wisconsin) once put it.¹¹ If the negligible hypothesis holds true, then congressional spending adjustments should appear small and inconsequential, generally adhering to the administration’s plans.

The fiscal hypothesis posits that Congress concerns itself with the defense spending topline and pays limited attention to the particulars. Advocates of this model envision a Congress that modifies DoD funding requests primarily to achieve government-wide budgetary goals. If the fiscal hypothesis holds true, then congressional spending adjustments should concentrate on the largest portions of the defense budget—the O&M and military personnel accounts—and exhibit an across-the-board or balanced character, in dollar or percentage terms, consistent with a general indifference toward specific programs.

The programmatic hypothesis claims that, as one analyst describes it, “Congress addresses the defense budget in policy terms and uses its power of the purse as a tool to influence the shape of defense programs.”¹² Lawmakers may demonstrate a programmatic orientation for strategic reasons, as when they feel that specific military activities underpin America’s place in the world. They may also focus on programs for parochial reasons, as when their constituents depend on funding associated with certain activities. In practice, these strategic and parochial motivations often overlap and may conflict, making them difficult to disentangle.¹³ If the programmatic hypothesis proves true, then congressional spending adjustments should exhibit discernible patterns across time and category whereby funds flow toward favored activities and away from disfavored activities.

To assess these hypotheses, the authors collected data on congressional defense spending adjustments from fiscal year (FY) 2016 to FY 2023. The dataset started with 2016 because that was the first year of the upward drift in defense spending referenced in the introduction and ended with 2023 because that was the last year data were available. The dataset contains adjustments as reported in Congress’ annual enacted basic DoD appropriations bill, meaning it excludes military construction, family housing, nuclear weapons activities, and supplementals, or extra expenditures added outside the Department’s annual base budget request. Since the dataset covers only

11. Kanter, “Congress,” 129.

12. Lawrence J. Korb, “Congressional Impact on Defense Spending, 1962–1973: The Programmatic and Fiscal Hypotheses,” *Naval War College Review* 26, no. 3 (November–December 1973): 50.

13. James M. Lindsay, “Parochialism, Policy, and Constituency Constraints: Congressional Voting on Strategic Weapons Systems,” *American Journal of Political Science* 34, no. 4 (November 1990); James M. Lindsay, *Congress and the Politics of U.S. Foreign Policy* (Baltimore: Johns Hopkins University Press, 1994), 172–75; and Rebecca U. Thorpe, *The American Warfare State: The Domestic Politics of Military Spending* (Chicago: University of Chicago Press, 2014).

enacted appropriations, it excludes both authorizing legislative activity and House and Senate interim decisions preceding final enactment.¹⁴

The authors made certain technical modifications to the data to account for irregular reporting practices used in the final years of the Budget Control Act, the law that capped defense budgets from FY 2012 to FY 2021, specifically with respect to funding for Overseas Contingency Operations. Skipping these corrections or performing them differently does not change the central findings.

Altogether, the dataset consists of nearly 10,000 observations, a figure that excludes the arithmetical and inflation manipulations required to generate the results. Although the dataset does not include every line item contained in the DoD appropriations bill, it provides a sufficient body of evidence for the article's analysis.

Congressional Adjustments to DoD Funding Requests, 2016 to 2023

Over the past 75 years, Capitol Hill has not reflexively given the Pentagon whatever it asked for, refuting the negligible hypothesis. From FY 1950 to FY 2023, Congress subtracted from DoD's base budget request three times more often than it added to the request.¹⁵ Understanding this historical thriftiness illuminates the anomaly of recent years in which Congress approved significantly larger base budgets than the Department of Defense requested. Congress has overridden the Department with such generosity only twice before. Once was during President John F. Kennedy's first year controlling the budget (FY 1962), as the young president maneuvered to fulfill his campaign pledge to eliminate a "missile gap" with the Soviet Union.¹⁶ The second was during one of the most intense phases of the war in Iraq (FY 2006 and FY 2007).

14. Robert J. Art, "The Pentagon: The Case for Biennial Budgeting," *Political Science Quarterly* 104, no. 2 (Summer 1989); Mackubin T. Owens, "Micromanaging the Defense Budget," *Public Interest* 100 (Summer 1990); and Paul Stockton, "Beyond Micromanagement: Congressional Budgeting for a Post-Cold War Military," *Political Science Quarterly* 110, no. 2 (Summer 1995).

15. Linwood B. Carter and Thomas Coipuram Jr., *Defense Authorization and Appropriations Bills: FY1970–FY2006* (Washington, DC: Congressional Research Service [CRS], November 8, 2005), 29–30, <https://apps.dtic.mil/>; Barbara Salazar Torreon and Sofia Plagakis, *Defense Authorization and Appropriations Bills: FY1961–FY2021* (Washington, DC: CRS, July 12, 2021), 39, <https://crsreports.congress.gov/>; and Sharp, *Inconsistent Congress*, 15.

16. Travis Sharp, "Wars, Presidents, and Punctuated Equilibriums in US Defense Spending," *Policy Sciences* 52, no. 3 (September 2019): 386–89.

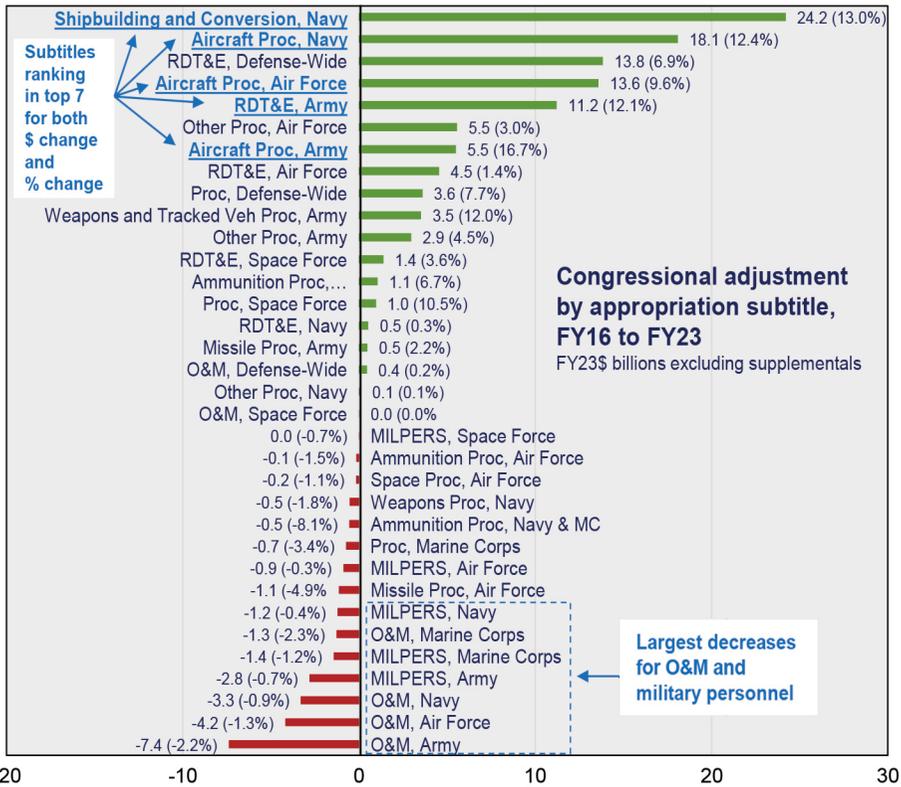


Figure 1. Congressional adjustment to president’s budget request as reported in enacted DoD appropriations bill, by appropriation subtitle (FY23 \$ billions, excluding supplementals).¹⁷

Since FY 2016, Congress has not concentrated its spending adjustments in military personnel and O&M, the appropriation titles that receive the most funding (fig. 1). Instead, it has emphasized procurement and RDT&E. This finding thus rebuts the fiscal hypothesis. From FY 2016 to FY 2023, Congress added \$79 billion for procurement above the administration’s requests. (The article reports all budgetary figures in FY 2023 constant dollars). That \$79 billion figure is 1.4 times greater, in absolute value terms, than the adjustments made to the three other accounts combined. Congress added nearly 40 percent of that extra \$79 billion in FY 2022 and FY 2023 following the expiration of the Budget Control Act.

This procurement push likely reflected a desire to compensate for years of smaller-than-preferred hardware budgets.¹⁸ Lawmakers perhaps also reasoned that underfunding military personnel, and thereby freeing up funds for procurement additions,

17. Sharp, *Inconsistent Congress*, 18–19.

18. Eric Edelman et al., *Providing for the Common Defense: The Assessment and Recommendations of the National Defense Strategy Commission* (Washington, DC: DoD, November 2018), 54–56, <https://www.usip.org/>.

was warranted because recruiting shortfalls resulted in personnel costs being smaller than expected.¹⁹ Regardless of the rationale, however, previous studies have reported a similar congressional preoccupation with procurement, so the finding here reaffirms an enduring trend, not an isolated response to contemporary circumstances.²⁰ Overall, the data show that Congress has continued its long-running pattern of using procurement increases as a preferred tool for shaping the US military, supporting the programmatic hypothesis.

Although procurement received most of Congress' largesse, two aspects of RDT&E spending deserve mentioning. First, the RDT&E budget grew faster than other accounts over the past decade, and the data prove that Congress enabled this central trend in US defense spending.²¹ Second, Congress continued relying heavily on RDT&E-directed spending requests, commonly known as earmarks, to steer funds to pet projects.²² So, even though Congress' RDT&E additions totaled less than its procurement additions, the former still provided legislators with a powerful way to advance their priorities in line with the programmatic hypothesis.

Congress' recent practice of overfunding procurement and RDT&E while underfunding military personnel and O&M carries risks with defense spending flattening under the Fiscal Responsibility Act. During budgetary downturns since the end of the Cold War, hardware funding has often received preferential treatment, at least according to the crude metric of absolute dollars. In years since FY 1992, when defense spending remained flat or declined in real terms, military personnel and O&M funding reductions exceeded procurement and RDT&E reductions 71 percent of the time by an average margin of \$18 billion.²³

The portion of defense spending dedicated to military personnel plus O&M has declined modestly since FY 1992, so Congress has not been simply cutting more from a growing spending area, contradicting the fiscal hypothesis. This 30-year trend reverses the pattern from the Cold War, when procurement plus RDT&E reductions were usually larger and procurement often functioned as a "slack variable" by absorbing disproportionate cuts during budgetary downturns.²⁴

Readiness shortfalls have often intensified in those years with flat budgets and larger cuts to military personnel and O&M, particularly when that outcome repeated

19. Thomas Novelly et al., "Big Bonuses, Relaxed Policies, New Slogan: None of It Saved the Military from a Recruiting Crisis in 2023," *Military.com*, October 13, 2023, <https://www.military.com/>.

20. Kanter, "Congress," 131–32; Korb, "Congressional Impact," 54–55; and Daniels and Harrison, "Assessing the Role," 8–9.

21. Sharp, *Inconsistent Congress*, 3.

22. John M. Donnelly, "Hill-Favored Projects Called Defense Budget's 'Black Hole,'" *Roll Call*, May 23, 2023, <https://rollcall.com/>.

23. DoD, *National Defense Budget Estimates for FY 2024* (Washington, DC: CRS, May 2023), Table 6-8, 138–145, <https://comptroller.defense.gov/>.

24. Kevin N. Lewis, *National Security Spending and Budget Trends since World War II* (Santa Monica, CA: RAND Corporation, 1990), 81, 109, <https://www.rand.org/>.

itself over multiple years, as happened during the mid-1990s and early-2010s.²⁵ In general, underfunding military personnel and O&M can degrade military preparedness in many ways, including by diminishing support for service members, reducing training opportunities, and constraining equipment maintenance.²⁶ Today, the Air Force and Navy are suffering from several of these problems, with reduced flying hours and inadequate maintenance infrastructure, respectively, representing areas of special concern.²⁷

Congress could mitigate these difficulties with funding increases, but under constrained budgets, those additions would have to come at the expense of procurement add-ons. Continuing to add procurement funds risks exacerbating readiness challenges by forcing the US military to possess equipment that it did not request, creating larger-than-anticipated bills for the personnel, training, and maintenance needed to operate that equipment.

To be clear, the argument here is not that distributing cuts equally across appropriation titles constitutes a strategically optimal response to contracting budgets. Such an approach is flawed because it fails to incorporate assessments of both the probability of war erupting and the US military's standing relative to potential adversaries. By the same logic, however, privileging hardware over military personnel and O&M, regardless of shifting war risks and power balances, represents an equally unsound approach. In the budget-constrained years ahead, Congress' willingness to forswear adding funds for hardware when necessitated by international developments, and instead allocating those funds to invest in readiness and other deserving areas of the Joint force, will prove essential to producing a US military that is as prepared as possible to defend the nation's interests across the globe.

From FY 2016 to FY 2023, Congress concentrated its spending adjustments in favored and disfavored investment areas, precisely as the programmatic hypothesis predicts. Five appropriation subtitles emerged as clear congressional favorites, receiving among the largest increases in both dollar and percentage terms: Navy shipbuilding and conversion, Navy aircraft procurement, Air Force aircraft procurement, Army RDT&E, and Army aircraft procurement.

Although Congress clearly preferred adding money for procurement and RDT&E, not military personnel and O&M, it did subtract funds from multiple procurement subtitles, including several missile and ammunition accounts. For example, it cut the

25. Jerre Wilson and Michael E. O'Hanlon, *Shoring Up Military Readiness* (Washington, DC: Brookings Institution, January 1999), <https://www.brookings.edu/>; and Robert Hale, *Budgetary Turmoil at the Department of Defense from 2010 to 2014: A Personal and Professional Journey* (Washington, DC: Brookings Institution, August 2015), 4–9, <https://www.brookings.edu/>.

26. Todd Harrison, "Rethinking Readiness," *Strategic Studies Quarterly* 8, no. 3 (Fall 2014): 42–44.

27. Dakota L. Wood, *2024 Index of U.S. Military Strength* (Washington, DC: Heritage Foundation, 2024), 456–59, 492–99, https://thf_media.s3.amazonaws.com/; *Military Readiness: Improvement in Some Areas, but Sustainment and Other Challenges Persist*, GAO-23-106673 (Washington, DC: Government Accountability Office, May 2, 2023), <https://www.gao.gov/>; and Michael P. DiMino and Matthew C. Mai, "The US Military Has a Readiness Problem," *Stars & Stripes*, October 24, 2023, <https://www.stripes.com/>.

Air Force's missile procurement requests by an average of 5 percent (~\$140 million) per year in real terms. The fact that Congress underfunded munitions purchases, despite their residing in the favored procurement account, demonstrates a selectivity consistent with the programmatic hypothesis rather than the indiscrimination associated with the fiscal hypothesis.

In terms of policy implications, the underfunding of munitions indicates Congress shares responsibility for the disappointing state of the US munitions industrial base revealed by ongoing American support for Ukraine.²⁸ Without steadier congressional support for munitions procurement, the US military will face serious problems in any future war against a peer adversary.²⁹

Digging even deeper into line-item data for the five favored subtitles, Congress added funds for favored investments in line with the programmatic hypothesis, although some evidence also exists for the fiscal hypothesis. Congress increased spending on preferred programs, in particular unmanned aircraft systems (UAS) across the services, Army rotary wing aircraft, Navy surface and expeditionary vessels, and Air Force C-130s. The extra resources absorbed by these programs, measured in both dollar and percentage terms, confirms their status as congressional darlings, a result also reported in previous research.³⁰

Of course, DoD budgetary gamesmanship potentially affected the observed outcomes. The Pentagon may have knowingly reduced its budget requests for certain programs anticipating that Congress would add funding during the appropriations process. Additionally, any favoritism in Congress' allocation of classified funds cannot be addressed by this unclassified analysis.

Judging whether the favored programs deserved Congress' budgetary largesse under the current US defense strategy is another matter entirely. On the one hand, the funding increases provided to UAS offer a clear example of Congress embracing newer technologies critical to US strategy, particularly since military service support for several of these systems has proven uneven at best.³¹

On the other hand, Congress' generous funding of helicopters and C-130s, among others, shows its preference for supporting established weapons systems. These types of programs potentially lack the compelling operational need justifying hefty budgetary

28. Stacie Pettyjohn and Hannah Dennis, *Precision and Posture: Defense Spending Trends and the FY23 Budget Request* (Washington, DC: Center for a New American Security [CNAS], November 2022), <https://s3.us-east-1.amazonaws.com/>; Pettyjohn and Dennis, "Production Is Deterrence": Investing in Precision-Guided Weapons to Meet Peer Challenges (Washington, DC: CNAS, June 2023), <https://s3.us-east-1.amazonaws.com/>; and Tyler Hacker, "Money Isn't Enough: Getting Serious about Precision Munitions," *War on the Rocks*, April 24, 2023, <https://warontherocks.com/>.

29. Tyler Hacker, *Beyond Precision: Maintaining America's Strike Advantage in Great Power Conflict* (Washington, DC: CSBA, June 2023), <https://csbaonline.org/>.

30. Daniels and Harrison, "Assessing the Role," 17.

31. Valerie Insinna, "Get Ready for Another Fight over the Future of the MQ-9 Reaper," *Defense News*, May 26, 2021, <https://www.defensenews.com/>.

increases, especially given the opportunity costs of funding them.³² In a March 2023 statement before the House Armed Services Committee, for instance, General Jacqueline Van Ovost, commander of US Transportation Command, testified that the current C-130 inventory remains adequate for meeting airlift requirements in the near future.³³ That said, it remains difficult to make unassailable judgments about the operational relevance of specific weapons given the unpredictability of the future strategic environment.

Congressional committee assignments do not fully explain Capitol Hill's preference for established weapons systems. Air Force C-130s illustrate the point. Since FY 2016, the C-130 and EC-130 programs received increases of 84.5 percent and 85.1 percent, respectively, over the Defense Department's aggregate requests. From FY 2018 to FY 2023, Congress provided the Air Force with an additional \$6.3 billion for the procurement of C-130J aircraft—a nearly 1,825 percent increase from the Defense Department's requested amount of \$347 million.

Yet, the legislator whose district features the main C-130 plant, Representative Barry Loudermilk (R-Georgia), has never served on a committee relevant to C-130 acquisition.³⁴ C-130 contractors, supply chains, and basing locations are spread throughout the United States, fortifying its political support, but the same is true for other programs such as the F-35 that received only a 10.8 percent congressional increase over the Defense Department's aggregate requests. Ultimately, the C-130's recent budgetary success likely has resulted from Air National Guard and industry lobbying, the aircraft's broad range of uses, and Congress' decades-long love affair with the program. These three factors, though more complex, offer more explanatory power than the notion of a small cabal of legislators sitting on the right committees who control the program's destiny.³⁵

Two patterns in Congress' spending adjustments indicate a more fiscal than programmatic orientation. First, Congress regularly reduced spending on programs viewed as underperforming or overfunded, including the Army's RQ-11 UAS and Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System (JLENS) blimp; the Navy's Infrared Search and Track (IRST) and carrier refueling and overhaul programs; and the Air Force's KC-46A refueling tanker. In each of these cases, Congress justified its cut by invoking program management factors such as cost growth, acquisition plan modifications, accidents, production quality shortcomings, and schedule delays. In no cases reviewed by the authors did Congress justify the reduction by citing a given program's lack of relevance to US defense strategy.

32. Jan Tegler, "Air Force under Pressure as Airlift Capacity Falls," *National Defense*, June 3, 2022, <https://www.nationaldefensemagazine.org/>.

33. *Joint Readiness and Seapower and Projection Forces Subcommittee Hearing: Posture and Readiness of the Mobility Enterprise – TRANSCOM and MARAD, Hearings before the House Armed Services Committee*, 118th Congress (2023) (statement of General Jacqueline D. Van Ovost, commander, US Transportation Command, United States Air Force), <https://www.ustranscom.mil/>.

34. Ballotpedia, s.v. "Barry Loudermilk," accessed July 27, 2023, <https://ballotpedia.org/>.

35. Frank R. Baumgartner et al., *Lobbying and Policy Change: Who Wins, Who Loses, and Why* (Chicago: University of Chicago Press, 2009).

This first pattern reveals an irony in congressional defense budgeting. Although Congress displays a programmatic orientation driven by strategy or parochialism or both, it generally justifies its decisions in fiscal terms using the language of efficiency and stewardship of taxpayer dollars. As a result, fiscal rationales function as a shield for Congress to make decisions that are presumably rooted in programmatic considerations of one kind or another.

Second, in areas such as Army RDT&E and Navy aircraft procurement, Congress distributed its spending increases across a wide variety of programs, a pattern also more consistent with the fiscal hypothesis. Many of these investments supported worthy programs, but Congress' failure to make more decisive choices, particularly with Army RDT&E, indicates a tendency to spread extra money around rather than making informed bets on a handful of key programs.

Surveying congressional spending adjustments over time brings two insights into sharper relief (fig. 2). First, congressional adjustments did not discernibly change following the release of the 2018 *National Defense Strategy*, an important document that codified the Defense Department's intention to prevail in great power competition. Congress reoriented aspects of its legislative agenda after the strategy appeared, to be sure, but that reorientation did not register clearly in the budgetary outcomes analyzed here. In fact, some congressional adjustments seemingly contradicted the strategy.

For instance, steady congressional increases for defense-wide and Army RDT&E contrasted with volatile adjustments for Air Force, Navy, and Marine Corps RDT&E. The strategy called for implementing technological advancements across the Joint force, of course, but it emphasized fielding forces capable of striking diverse targets inside enemy air and missile defense networks—a capability typically associated with air and naval forces.³⁶

Although the size of congressional adjustments does not necessarily reflect their quality, Congress did not provide the type of steady RDT&E increases for air and naval forces that one might expect given the strategy. Of course, it is possible that Congress identified fewer deficiencies with air and naval RDT&E requests and thus had fewer reasons to add funds. Still, the differing treatment of RDT&E budgets across components provides at least suggestive evidence for the programmatic hypothesis.

36. James N. Mattis, *Summary of the 2018 National Defense Strategy of the United States of America: Sharpening the American Military's Competitive Edge* (Washington, DC: DoD, January 2018), 6, <https://dod.defense.gov/>.

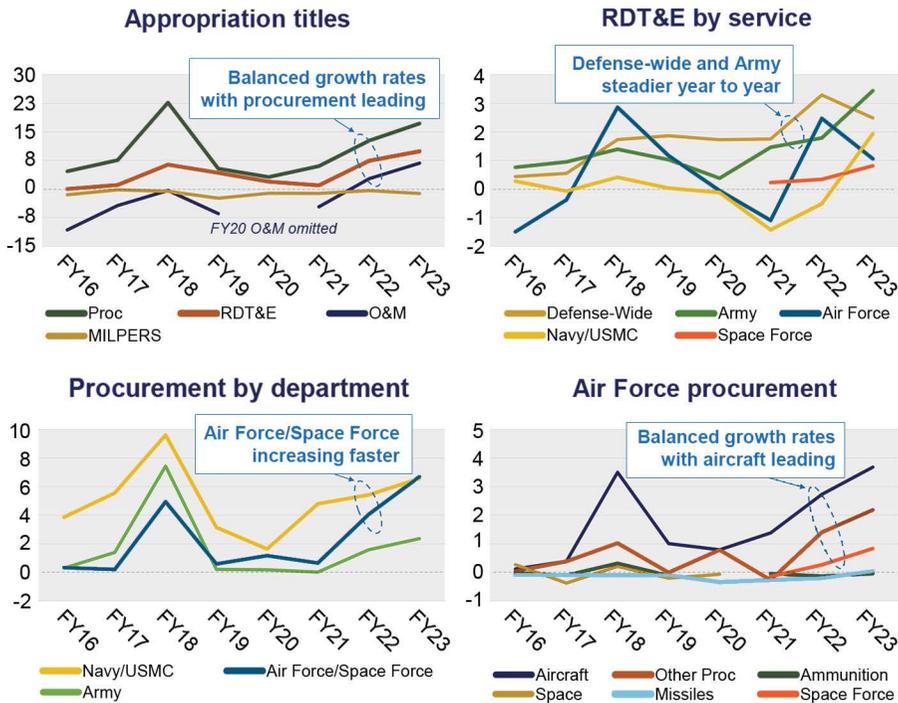


Figure 2. Congressional adjustment to president’s budget request as reported in enacted DoD appropriations bills, appropriation titles, and selected subtitles by year (FY23 \$ billions, excluding supplementals).³⁷

Second, some congressional spending additions exhibited the across-the-board or balanced character associated with the fiscal hypothesis. The appropriation titles and Air Force procurement charts in figure 2, for example, depict balanced growth rates across different spending categories, a sign of Congress doling out proportional increases while still favoring certain categories in dollar terms. Yet the procurement by department chart offers a counterexample of Congress bestowing faster-growing increases on the Air Force than on other departments. Overall, although the balance of evidence supports the programmatic hypothesis, Congress is still prone to making fiscal-style adjustments in certain areas.

Conclusion

This article demonstrates that Congress continues to exhibit a largely programmatic orientation toward defense spending characterized by overfunding procurement and RDT&E while underfunding military personnel and O&M. The article’s analysis of spending adjustments since 2016 show that congressional action significantly affects the defense budget’s size and shape, refuting the negligible hypothesis,

³⁷ Sharp, *Inconsistent Congress*, 20–21.

and it displays discernible preferences across programs, undercutting the fiscal hypothesis. The central policy problem identified by the article involves whether Congress can stave off its hunger for hardware and steer funds into other parts of the Joint force, when needed, to maximize US military preparedness under the constrained budgets of the Fiscal Responsibility Act.

The Department of Defense and Congress both shape defense budget outcomes, and both institutions should take steps to improve their handling of American defense policy in the challenging years ahead. If they do not, the US military may find itself less prepared to compete effectively against China and Russia while protecting broader American interests around the world.

The Defense Department should find better ways to persuade Congress to support capabilities viewed as essential to warfighting success. For starters, senior defense officials should communicate precise, tangible, and specific rationales for the minimum investments needed in each spending account. They should express these rationales to Congress in compelling, jargon-free, plain English that makes their force requirements clear—a departure from the Department’s tendency to bury its recommendations in technocratic language that can inadvertently obscure the existence of risk.³⁸ As retired Air Force Lieutenant General David Deptula concluded recently, “Making better-informed decisions about the acceptability of risk and, by extension, what should be done about it requires better communication among all relevant stakeholders.”³⁹

The Department of Defense should also recognize that Congress possesses a programmatic orientation and thus will never approve exactly what the Pentagon requests, though clearer communication by the Pentagon will help shape congressional decisions. As a result, defense planners must develop operational concepts that enable the US military to fight and win using what Congress has provided. If senior officials judge they cannot accomplish the mission with the resources provided, then they must let Congress know. Yet senior officials should also avoid letting the perfect become the enemy of the good by a disproportionate focus on what Congress withholds, and instead concentrate on making efficient and effective use of what is provided.

As an atomistic institution lacking the Defense Department’s hierarchical structure, Congress depends on individual lawmakers to achieve policy outcomes. Consequently, any lasting improvements in Congress’ handling of the defense budget will only come from actions taken by individual policy entrepreneurs who synthesize politics, problems, and policies to create meaning for other lawmakers trying to navigate the often intimidating ambiguity of defense policymaking.⁴⁰ A skilled policy entrepreneur not only must

38. Thane C. Clare, “Networking to Win: Mission Prioritization for Wartime Command and Control,” *War on the Rocks*, January 15, 2024, <https://warontherocks.com/>; and Peter C. Combe II, Benjamin Jensen, and Adrian Bogart, *Rethinking Risk in Great Power Competition* (Washington, DC: Center for Strategic and International Studies, February 2023), 4–8, <https://www.csis.org/>.

39. David A. Deptula, “Managing Risk in Force Planning,” in *2022 Index of U.S. Military Strength*, ed. Dakota L. Wood (Washington, DC: Heritage Foundation, 2022), 30, <https://www.heritage.org/>.

40. Nikolaos Zahariadis, *Ambiguity and Choice in Public Policy* (Washington, DC: Georgetown University Press, 2003), 19–22.

act outside their political self-interest with some regularity but also must know more about the policy process than any of their colleagues.⁴¹

Expanding Capitol Hill's pipeline of defense policy entrepreneurs has never been easy, and today's fractured politics present additional difficulties. Yet opportunities do exist to make progress. In the mid-1970s, Representative Les Aspin (D-Wisconsin), then a newly elected congressman who later became a leading defense policy entrepreneur of his generation, penned a series of insightful articles about Congress' role in defense policy and budgeting.

Aspin's main advice was that legislative policy entrepreneurs should focus on implementing procedural changes that indirectly shape decision-making processes to produce better outcomes more of the time. Emphasizing procedure plays to Congress' strengths because, as he observed, "Making decisions on the basis of rational argument requires confronting the issues directly, and Congressmen, who are pressured from all sides, who are continually short of time, and who suffer from lack of expertise, are not likely to do that."⁴² In short, skillful legislators use procedure to get what they want through subtlety rather than confrontation.

Procedural expertise and subtlety are virtues in short supply on Capitol Hill today, but they still offer the best hope of improving congressional defense budgeting. Potential procedural rearrangements available to Congress include changing executive branch reporting relationships, mandating the establishment of certain facts before actions can occur, designating who can make decisions, and bringing outside groups or new groups into decision processes.⁴³

Of these options, mandating the establishment of facts prior to action appears especially promising. Such mandates, if designed properly, would force senior defense officials to present the type of clear, tangible, and specific assessments described in order to satisfy DoD budget requests. The goal here would not be to burden the Defense Department with additional pro forma reporting requirements. Rather, it would be to create categorically different requirements whereby senior DoD leaders must deliver plain-English justifications for advancing preferred programs in hopes of convincing a critical mass of lawmakers to approve them.

Establishing facts prior to action should happen when DoD leaders testify before Congress on their annual budget requests; however, that process has devolved into duplicative hearings characterized by an excess of indecipherable jargon making it of questionable value to Congress, the Department of Defense, or the American public.

Excising a significant portion of these unproductive annual posture testimonies and replacing them with a smaller number of more consequential and comprehensible sessions dedicated to assessing the Department's progress on important initiatives would generate far more useful information for Congress to make decisions. Such

41. Zahariadis, 21–22, 166.

42. Les Aspin, "The Defense Budget and Foreign Policy: The Role of Congress," *Daedalus* 104, no. 3 (Summer 1975): 165.

43. Les Aspin, "Why Doesn't Congress Do Something?," *Foreign Policy* 15 (Summer 1974): 78–80.

information will not eliminate the challenges created by Congress' programmatic orientation, but it stands a reasonable chance of helping Congress improve the coherence and effectiveness of US defense policy by funding programs consistent with the *National Defense Strategy* and DoD missions. Æ

SPACE AND WAR IN UKRAINE

Beyond the Satellites

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Much of the international attention on the use of space in Russia's war in Ukraine—commercial space services in particular—has focused on satellite capabilities while ignoring the significance of other aspects of space systems, such as ground infrastructure, software, and information-sharing practices. Although Russia has numerous military satellites while Ukraine has none, international and commercial space information sharing and innovations in terrestrial hardware and software have allowed Ukraine to exceed Russia in the use of space at the operational, strategic, and diplomatic levels. The US armed forces can learn policy, strategy, and doctrine lessons including the importance of robust space doctrine; decentralized, strategic information sharing; and the need to protect the ground and communications segments of space systems.

Space has played a highly visible role in Russia's war in Ukraine since and even before Russia's invasion in February 2022. Satellite images of Russian troop convoys and destroyed Ukrainian buildings have provided the backdrop informing international perspectives of the war, while space data and services have directly supported warfighters on the ground. Many observers have begun to refer to the war in Ukraine as the "first commercial space war," paralleling descriptions of the 1991 Gulf War as the "first space war."¹

Satellites themselves are usually the focus in discussions on military uses of space. Yet, satellite ground systems, satellite data processing software, decentralized information sharing, and novel applications of data from existing satellite capabilities by troops on the ground have transformed the value and use of space, especially for Ukraine and its allies. Russia has failed to capitalize on a clear lead in number and

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1. Sandra Erwin, "On National Security: Drawing Lessons from the First 'Commercial Space War,'" *SpaceNews*, May 20, 2022, <https://spacenews.com/>; and Jonathan Beale, "Space, the Unseen Frontier in the War in Ukraine," BBC, October 5, 2022, <https://bbc.com/>.

quality of satellites over Ukraine, which owned and operated no national satellites when Russia invaded. The underwhelming effects of Russia's initial, perceived space superiority indicate that space lessons learned from its war in Ukraine should also include the importance of space doctrine, information-sharing processes, and ground-based enabling segments beyond the satellites—whether commercial or government-owned.

The networked, distributed approach to using and sharing information from space pursued by Ukraine and its allies has demonstrated the asymmetric advantages of this approach compared to the centralized, hierarchical structure used by Russia. Russian forces have struggled to both collect sufficient tactically useful information from satellites and disseminate that information to warfighters in a timely manner, due to their rigid command structure.

Ukrainian forces on the other hand have been able to innovate and adapt with more decentralized command and control (C2) and more direct communications and coordination between tactical units. This has increased the demand for data processing architectures able to process and disseminate much larger amounts of data to a much larger number of recipients, a burden that could be considered and addressed in future US architectures and strategies. This article explores the uses of space in Russia's war in Ukraine and how innovations beyond those involving the satellite performing the mission have shaped the battlefield, providing some preliminary lessons for the United States' uses of space across the Joint force in future conflicts.

Components of Space Systems

Space systems can typically be broken down into three segments: (1) the space segment, or the satellites performing the mission; (2) the ground segment, or the systems and personnel on Earth that operate the satellites and the facilities that receive, process, and distribute data from satellites; and (3) the "link" segment, or the signals that connect the satellites to each other and to users and operators on the ground through data uplinks to the space segment and data downlinks back to the ground segment.² Each of these segments is vital to the collection and dissemination of data so that neglecting any one segment diminishes the value of the others.

While satellites—the space segment—are usually what come to mind when thinking about space systems, the ground segment, link segment, and enabling software expand the definition of space systems far beyond the objects in orbit. The ground segment can be subdivided into satellite command and control (C2) on the one hand and the end-user segment on the other. For satellite C2, ground stations send commands to and can receive updates and data from satellites, and for the end-user segment, individual-level systems such as mobile terminals, antennas, receivers, and transmitters can provide interfaces between satellites and users in the field. Figure 1 represents the three major segments.

2. Air Command and Staff College Schriever Space Scholars, Air War College West Space Seminar, *AU-18 Space Primer* (Maxwell AFB, AL: Air University Press, 2023), <https://www.airuniversity.af.edu/>.

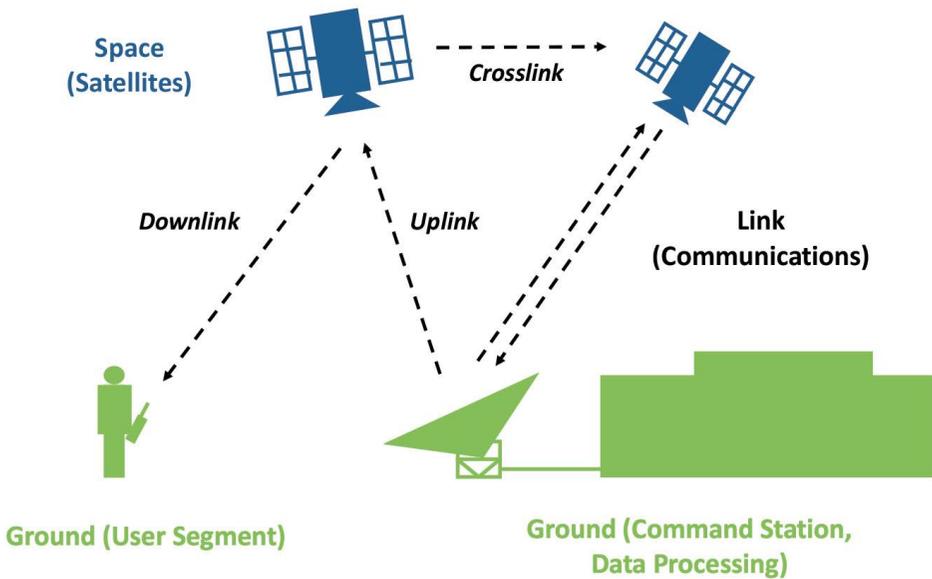


Figure 1. Space system segments

Satellite Capabilities Supporting Ukraine and Its Allies

At the onset of the Russian invasion, Ukraine did not own or operate any satellites; however, the United States and its NATO Allies have made space support available in various forms. Commercial actors have also provided a historic degree of space services to Ukraine. As a result, Ukraine has been able to leverage space systems far beyond expectations based on its capabilities prior to February 2022, which did not include independent access to space. While significant public attention has been directed at Ukraine’s success in using commercial space services at the tactical level, space-based systems have also had notable operational- and strategic-level effects.

Position, Navigation, and Timing

Ukraine uses satellite services provided by the US military, most notably, GPS position, navigation, and timing (PNT) signals. GPS signals enable a wide range of precision strike rockets, bombs, and artillery shells used by Ukrainian forces.³ At the operational and strategic levels, GPS has been the NATO standard for PNT for decades.⁴ As Ukraine depletes its stocks of Soviet/Russia-sourced military equipment, and as NATO countries rearm Ukraine with NATO standard weapons,

3. Beale, “Unseen Frontier.”

4. Tim Vasen, “Is NATO Ready for Galileo?” *Journal of the JAPCC* [Joint Air Power Competence Centre] 28 (December 2019), <https://www.japcc.org/>; and Michael P. Gleason, “Galileo, Power, Pride, and Profit” (Ph.D. diss., George Washington University, January 31, 2009), 97, 215, <https://apps.dtic.mil/>.

Ukraine may rely more upon GPS. Although there are alternatives to GPS, such as the European Galileo system, open-source reporting on the conflict does not suggest if or how they are being used.

Electro-optical and Synthetic Aperture Radar (SAR) Imagery

Before the February 2022 invasion, Ukraine benefited in several ways from US national security satellites. Imagery satellites provided intelligence to US national-level leadership, enabling the Biden administration to confidently raise the alarm globally about Russia's intentions and alert Allies to the threat. US-furnished strategic intelligence made its way to NATO field commands prior to the invasion, and the Alliance deployed additional forces in the region.⁵ Once the fighting began, US national security Earth observation and electronic signals intelligence helped fill the intelligence gaps as the US military pulled its surveillance planes back from international airspace near Russia's borders and the Black Sea.⁶

Commercial remote-sensing satellites include those capable of collecting high-resolution, electro-optical imagery and synthetic aperture radar (SAR) imagery. SAR imagery, although not collected by as many satellites and operators as electro-optical imagery, has the unique benefit of functioning even in low-visibility conditions, such as nighttime or cloudy weather. Commercial satellites help track buildups of Russian forces and troop movements within Ukraine and in Russia and Belarus. The availability of various kinds of imagery has helped Ukraine accurately locate, track, and target Russian forces prior to strikes and conduct battle damage assessments afterwards, which has in turn helped improve the efficiency and conservation of ammunition.⁷

Journalists and nongovernmental organizations have used satellite imagery creatively to reveal war crimes committed by Russia. Commercial companies such as Maxar, Planet, and BlackSky have directly contributed to this activity by providing images to these entities.⁸ These collaborations have been used to map mass graves, the systematic looting and destruction of cultural heritage sites, the forced adoption and re-education

5. Garrett Reim, "Lessons from War in Ukraine from Former USAF Commander," *Aviation Week Network*, December 6, 2022, <https://aviationweek.com/>; and W. J. Hennigan, "U.S. Deploys Forces in Response to Putin's Ukraine Moves," *Time*, February 22, 2022, <https://time.com/>.

6. Reim.

7. David Ignatius, "How the Algorithm Tipped the Balance in Ukraine," *Washington Post*, December 19, 2022, <https://www.washingtonpost.com/>; Steve Rosenberg and Jaroslav Lukiv, "Ukraine War: Drone Attack on Russian Bomber Base Leaves Three Dead," *BBC*, December 26, 2022, <https://www.bbc.com/>; Anna Ahronheim, "Russian Bombers Capable of Carrying Nukes Detected near Finland," *Jerusalem Post*, September 30, 2022, <https://www.jpost.com/>; and Egle E. Murauskaite, "U.S. Military Assistance to Ukraine in 2022: Impact Assessment," Strategic Multilayer Assessment (SMA), SMA EUCOM Speaker Series, livestreamed presentation, March 15, 2023, YouTube recording, 1:01:47, <https://www.youtube.com/>.

8. Denise Chow and Yuliya Talmazan, "Watching from Space, Satellites Collect Evidence of War Crimes," *NBC News*, May 3, 2022, <https://www.nbcnews.com/>.

of Ukrainian children in camps, the systematic destruction of food production and storage capacities, and the targeted destruction of health and education facilities.⁹

Satellite Communications

Ukraine uses several commercial satellite communication (SATCOM) systems for a wide variety of purposes. In the opening days of the conflict, Ukrainian President Volodymyr Zelensky stayed in regular contact with the United States even while mobile, using a secure satellite phone that the White House had given the Ukrainian government before the invasion occurred.¹⁰ Iridium, Globalstar, and Inmarsat all have capabilities in that sector.¹¹

Zelensky also uses Starlink satellites to directly address Ukrainians, national parliaments, and international organizations around the world. Commercial telecom satellites enable Ukrainians to stay connected with each other as well. The Luxembourg-based satellite operator SES broadcasts most Ukrainian TV channels and has provided space-based emergency internet and phone services to refugee camps along the Ukrainian border.¹²

Starlink provides broadband internet connectivity for a wide range of military and civilian users across Ukraine and has been crucial to Ukraine's battlefield successes. Starlink satellites provide connectivity enabling secure communication and situational awareness from top echelons to command bunkers and units in the field.¹³ On the battlefield, Ukrainian warfighters have used internet connectivity provided by Starlink as a key communication method for a wide range of activities as they find, target, and destroy enemy forces.¹⁴

Starlink also enables "tele-maintenance" of US and NATO weapon systems in Ukraine. When something breaks and Ukrainian forces lack the expertise to repair it, Ukrainian forces have used Starlink to reach back to US maintenance specialists at a base in Poland.

9. "Recent Reports," Conflict Observatory, accessed on March 1, 2023, <https://hub.conflictobservatory.org/>.

10. Kylie Atwood and Zachary Cohen, "US in Contact with Zelensky through Secure Satellite Phone," CNN, March 1, 2022, <https://www.cnn.com/>; "The Phone That Zelensky Uses to Avoid Being Found by Russia," *Marca*, March 16, 2022, <https://www.marca.com/>; and "Iridium 9575A for U.S. Government," Iridium (website), accessed March 2, 2023, <https://www.iridium.com/>.

11. Ben Gran, "What Is a Satellite Phone?," *SatelliteInternet.com*, June 12, 2023, <https://www.satelliteinternet.com/>.

12. Pierre Weimerskirch, "SES Supports Ukraine from Space," *RTL Today*, March 2, 2022, <https://today.rtl.lu/>.

13. Beale, "Unseen Frontier."

14. Sam Skove, "How Elon Musk's Starlink Is Still Helping Ukraine's Defenders," *Defense One*, March 1, 2023, <https://www.defenseone.com/>; Nick Allen and James Titcomb, "Elon Musk's Starlink Helping Ukraine to Win the Drone War," *Telegraph*, March 18, 2022, <https://www.telegraph.co.uk/>; and Alexander Freund, "Ukraine Using Starlink for Drone Strikes," *DW (Deutsche Welle)*, March 27, 2022, <https://www.dw.com/>.

These specialists diagnose the problem via video, walk the Ukrainian forces through the recommended fixes, or help put a new part on order directly from the field.¹⁵

There have been several challenges involved in relying on Starlink, including public incidents where SpaceX founder and CEO Elon Musk questioned on social media whether Starlink services should continue to be provided to Ukraine.¹⁶ SpaceX's growing restrictions on Starlink services within Ukraine have caused concern and driven some exploration of alternatives.

Other commercial satellite companies provide Ukraine internet connectivity from space, including Viasat, OneWeb, SES, Iridium, Inmarsat, Eutelsat, and Avanti.¹⁷ Viasat, OneWeb, and SES are all working to build more capacity, including through new constellations and new agreements with Ukrainian telecom operators.¹⁸ Nevertheless, Starlink remains the most visible provider of mobile satellite communication services in Ukraine.

Radio Frequency Monitoring

Some commercial satellites have another relevant capability: the ability to monitor radio frequency (RF) signals. Commercial space-based RF sensing is useful to detect jamming of GPS and communication signals and geolocating the jamming's source.¹⁹ GPS jamming can disrupt many basic services, including transportation networks, air travel, logistics, and telecommunication. Tracking this interference can help operators come up with alternatives and work-arounds.²⁰ For example, in March 2022, the company HawkEye 360 publicly announced it had "the capability to detect and geolocate Global Positioning System (GPS) interference, with analysis of data over Ukraine revealing extensive GPS interference activity."²¹

The United States, the European Union (EU), and like-minded nations also use commercial satellites to help enforce the sanctions imposed on Russia and Russian individuals. For example, the yachts of individually sanctioned Russian oligarchs have

15. Patrick Tucker, "US Soldiers Provide Telemaintenance as Ukrainians MacGyver Their Weapons," *Defense One*, September 18, 2022, <https://www.defenseone.com/>.

16. Isabelle Khurshudyan et al., "Musk Threatens to Stop Funding Starlink Internet Ukraine Relies on in War," *Washington Post*, October 14, 2022, <https://www.washingtonpost.com/>.

17. Theresa Hitchens, "A Musk Monopoly? For Now, Ukraine Has Few Options outside Starlink for Battlefield Satcoms," *Breaking Defense*, October 19, 2022, <https://breakingdefense.com/>.

18. Hitchens; "OneWeb Confirms Successful Deployment of 40 Satellites Launched with SpaceX," *Eutelsat OneWeb*, press release, January 10, 2023, <https://oneweb.net/>; Martin Coulter and Supantha Mukherjee, "Telecom Operator Veon Confirms Deal with British Satellite Firm OneWeb," *Reuters*, March 1, 2023, <https://www.reuters.com/>; and Courtney Albon, "SES Launches Advanced Broadband Satellites As Military Demand Grows," *C4ISRNet*, December 16, 2022, <https://www.c4isrnet.com/>.

19. Tracy Cozzens, "HawkEye 360 Tech Reveals Early GPS Interference in Ukraine," *GPS World*, April 29, 2022, <https://www.gpsworld.com/>.

20. Cozzens.

21. "Hawkeye 360 Signal Detection Reveals GPS Interference," *Hawkeye 360*, press release, March 4, 2022, <https://www.he360.com/>; and Cozzens.

been tracked globally using RF monitoring of onboard ship automatic identification system transmitters from companies such as Hawkeye 360, Spire, and Kleos Space.²² Such tracking has enabled the seizure of the yachts when they reach foreign ports.²³ Likewise, the same commercial space companies contribute to tracking cargo ships that are evading sanctions, documenting the theft of Ukrainian grain and enabling subsequent enforcement actions and future reparations.²⁴

Space Capabilities beyond Satellites

The robust and diverse satellite capabilities coming to bear in Russia's war in Ukraine, especially from the commercial sector, are only a third of the story. Every service provided by a satellite in orbit is made usable by hardware and software on Earth. Innovations in these terrestrial aspects of space systems as well as novel policies and practices for sharing satellite information have done just as much, if not more, than the satellite capabilities themselves to provide Ukraine an advantage in the war.

The Ground Segment

Russia's war in Ukraine has demonstrated both the value and the vulnerability of the Earth-based aspects of space systems. Modems, terminals, and other ground-based receivers of satellite communications signals have been highly visible in the conflict. One of the reasons Starlink has been so broadly used at the tactical level is because the antennas are the size of a pizza box, smaller than those of many other commercial satellite systems, making them easy to carry by mobile, tactical teams.²⁵ Mobile satellite ground systems have been vital for replacing the telecommunications ground infrastructure destroyed by Russia.

Ground segments of space architectures have also become targets. In the hour before troops moved into Ukraine in February 2022, Russia conducted a cyberattack that disabled Viasat modems, including terminals used for Ukrainian command and control. This attack also had international and strategic effects, disabling tens of thousands of ground-based terminals throughout Europe and disrupting wind turbines

22. Tim Fernholz, "Satellites Are Hunting 'Dark Vessels' That Evade Sanctions at Sea," Quartz, November 8, 2022, <https://qz.com/>.

23. Alessandra Bonomolo and William McLenna, "Inside the Capture of a Russian Oligarch's Super yacht," BBC, November 11, 2022, <https://www.bbc.com/>.

24. Simão Oliveira, "Grain Laundering: Seeing Who's Hiding in the Dark Shipping," *Spire* (blog), October 26, 2022, <https://spire.com/>; Michael Biesecker et al., "Russia Smuggling Ukrainian Grain to Help Pay for Putin's War," AP, October 3, 2022, <https://apnews.com/>; Fernholz, "Satellites"; and Jérôme Weiss, "Sanctions on Russia As It Presses In on Ukraine," *Spire*, April 14, 2022, <https://spire.com/>.

25. Admin, "David, Goliath, & Space – Is This How Future Wars Will Be Fought?," *Downlink, Produced by US Defense & Aerospace Report*, podcast, 37:12, February 12, 2023, <https://defaeroreport.com/>; and Hitchens, "Musk Monopoly?"

and internet services.²⁶ Russia's action showed how many aspects of infrastructure and communications in Ukraine and Europe relied on the terminals, while also highlighting a major cyber vulnerability in these ground systems.²⁷

Unlike the similarities between the threats posed by cyberattacks to ground and space segments, physical threats can play very different roles against the ground segments of space systems than against the space segments. While physical threats to satellites are still somewhat limited to either direct-ascent missiles or co-orbital weapons capable of reaching specific orbits, satellite control centers or terminals traveling with military units can be just as vulnerable to physical attack as any other facility or materiel on Earth.

Conversely, Ukrainian armed forces have sometimes taken advantage of some of Russia's unwitting uses of data from space systems. For example, GPS PNT receivers are commercially available and ubiquitous around the world, embedded within innumerable commercially available products, such as smartphones. Some smartphone photos taken by Russian forces and posted on social media had embedded GPS-enabled geolocation data.²⁸ Ukrainian forces were able to target those GPS coordinates and destroy Russian forces with precision, using GPS-enabled munitions.²⁹

The Link Segment

Space does not just connect people to other people; it also connects people to systems that sense and shoot. Autonomous vehicles and remotely piloted drones are often guided through satellite communications links, allowing much greater drone range. At the unit level, Ukrainian forces have leveraged Starlink to relay drone video feeds directly to artillery batteries in real time, allowing artillery batteries to observe precisely where their artillery rounds are landing and adjusting fire as needed.³⁰ Reconnaissance drones using Starlink satellite relays have also enabled coordination of other ground forces, such as directing soldiers with shoulder-fired, antitank weapons where to position themselves for an attack.

Attack drones that directly target Russian tanks, positions, and other objectives are also enabled by Starlink.³¹ One example is the coordinated drone attack on the Russian navy at Sevastopol on October 29, 2022. Drones provided real-time intelligence, confused the enemy by creating chaos at the base, and enabled the main explosive-laden

26. Anthony J. Blinken, "Attribution of Russia's Malicious Cyber Activities against Ukraine," US Department of State, press release, May 10, 2022, <https://www.state.gov/>.

27. Katrina Manson, "The Satellite Hack Everyone Is Finally Talking About," Bloomberg, March 1, 2023, <https://www.bloomberg.com/>.

28. Stavros Atlamazoglou, "Deadly HIMARS Strikes Show How Ukrainian Forces Are Turning Cell Phones into 'Force Multipliers,'" *Business Insider*, January 15, 2023, <https://www.businessinsider.com/>.

29. Beale, "Unseen Frontier."

30. Skove, "Starlink"; and Tamir Eshel, "Coordinated Drone Attack Targets the Russian Black Sea Fleet at Sevastopol," *Defense Update*, October 30, 2022, <https://defense-update.com/>.

31. Skove; and Freund, "Ukraine."

autonomous strike boats to close in on the intended targets. This targeting included a precision hit on the *Admiral Makarov*, reportedly the Black Sea Fleet's new flagship after the missile cruiser *Moskva* sank.³²

Yet the direct use of space to enable drones and other military systems has raised concerns from the commercial operators of such satellite communications networks. In February 2023, following complaints to the UN by Russia about Starlink's support to Ukraine, SpaceX Chief Operating Officer Gwynne Shotwell expressed opposition to certain "offensive" uses of Starlink by Ukrainian forces and stated actions were being taken to restrict those uses.³³

Although the effects or follow-through on that statement are not yet clear in open sources, this dynamic raises questions of whether certain commercial satellite operators, without US government input, will begin unilaterally restraining themselves around activities they deem "off limits" in a conflict. Ukraine's precedent-setting use of commercial space services, providing commercial links that enable kill chains on a scale never seen before, may make some commercial satellite companies uncomfortable and cause them to reevaluate their interests.

The Role of Data

While the data and services collected and processed by space systems have been invaluable in Ukraine, one reason why the impact has been so significant has been the underlying policy and doctrinal environment that enabled or encouraged data to be shared quickly with key stakeholders. In addition, along with innovations in hardware, the software and applications allowing units to rapidly process and disseminate information have proven invaluable to Ukrainian military efforts against Russia. Ukrainian forces have also benefited from receiving raw rather than processed data, along with requisite training on how to exploit the raw data. The timeline for transferring data from space to warfighters has dropped from days to hours or, in some circumstances, fewer than ten minutes.³⁴

The "Uber for artillery" application, GIS Arta, allows units collecting information on potential targets, including from satellites, to share that information directly with units that could fire on the targets.³⁵ This pairs sensors with shooters in a decentralized network instead of having to funnel specific information up and back down through centralized command nodes.

As another example, Palantir software can draw imagery from a total of 306 commercial satellites. Soldiers in battle can use handheld tablets to request more satellite coverage if they need it. Western military and intelligence services work closely with

32. Eshel, "Drone."

33. Adela Suliman, "SpaceX Questions Ukraine's Use of Starlink for War," *Washington Post*, February 9, 2023, <https://www.washingtonpost.com/>.

34. David Sandy (former chief of staff, UK Ministry of Defence Space Directorate), interview by Mick Gleason, virtual, February 2023.

35. David Burbach, comments, in "David, Goliath, & Space."

Ukrainians to facilitate this information sharing.³⁶ Cloud-based environments have also helped remove data stovepipes and minimize the need to translate between systems.³⁷ Ultimately, sharing data is less expensive than collecting it, so pursuing new models for dissemination of data allows for a wider range of possibilities to add value and utility.³⁸

The encouragement of information sharing and decentralized data dissemination has helped counter Russian narratives and reveal Russia's activities and war crimes, while also increasing the resilience and effectiveness of Ukrainian armed forces. The availability and relative ease of sharing commercial satellite imagery were key factors in generating the international support for sanctions against Russia.

In 2022, a US Intelligence Community leader noted that the US Intelligence Community more than doubled its procurement of commercial satellite imagery leading up to the conflict.³⁹ According to the official, the imagery from companies "was able to flow directly to those who need [it], EUCOM, NATO, and directly to Ukrainians."⁴⁰ In some cases, the soft power enabled by sharing imagery from satellites manifested into hard power advantages, including more war materiel provided to Ukraine. Much of this was hard to anticipate. For example, Germany changed its longstanding Russia policy, *Ostpolitik*, to offer heavy arms to Ukraine, including sending advanced battle tanks to the country.⁴¹

In sum, even without satellites Ukraine has been able to use space systems to great effect, highlighting that satellites are only one part of the equation. This does not diminish the importance of satellites but should elevate appreciation for the importance of the ground and link segments. Russia's use of space in its war in Ukraine provides another useful case.

Strategic and Operational Use of Space by Russia

Russia has used satellites for intelligence, surveillance, and reconnaissance (ISR) and communications while attempting to interfere with space assets supporting Ukraine. Yet the constraints imposed by Russia's highly centralized military C2

36. Ignatius, "Algorithm."

37. Todd Harrison and Matthew Strohmeyer, "Commercial Space Remote Sensing and Its Role in National Security," Center for Strategic and International Studies, February 2, 2022, <https://www.csis.org/>.

38. Josef Koller, "The Future of Ubiquitous, Realtime Intelligence: A GEOINT Singularity," Aerospace Corporation Center for Space Policy and Strategy, August 8, 2019, <https://csps.aerospace.org/>.

39. Sandra Erwin, "As Russia Prepared to Invade, U.S. Opened Commercial Imagery Pipeline to Ukraine," *SpaceNews*, April 6, 2022, <https://spacenews.com/>.

40. Erwin.

41. Frank Jordans, Kirsten Grieshaber, and Samya Kullab, "US, Germany to Send Advanced Tanks to Aid Ukraine War Effort," AP, January 25, 2023, <https://apnews.com/>; and Isabel Muttreja and Bernhard Blumenau, "How Russia's Invasion Changed German Foreign Policy," Chatham House, November 18, 2022, <https://www.chathamhouse.org/>.

methods and an aging space architecture have resulted in a perceived underwhelming contribution of Russian space capabilities to the fight.

Russian Military Space Capabilities

In early 2022, at the onset of its war in Ukraine, Russia had numerous but somewhat limited space capabilities. The Russian PNT system, GLONASS, enables deployments, force movement, and precision-guided munitions. Russia uses a small number of highly capable ISR satellites, with more than 30 satellites providing electro-optical imagery as well as a new radar observation platform, systems for missile warning, and electronic and signals intelligence satellites.⁴²

But this still leaves significant gaps in its space-based ISR coverage. Russian military SATCOM is insufficient as well. One expert indicated: “Russian troubles apparently hinge on a shortage of open optical and synthetic aperture radar satellites. Whereas its deficient command, control, and communications (C3) systems are the result of having too few satellite communication channels and terminals.”⁴³ Russia’s communications infrastructure had such low battlefield performance that Russian forces turned to unsecure means of communication such as mobile phones.

Whatever the limitations of Russia’s military space capabilities leading up to the Russian invasion of Ukraine, Ukraine was at a clear disadvantage in terms of satellite capabilities, as mentioned above. Yet, Russia has largely failed to capitalize on its advantage. The reasons why span well beyond the satellite capabilities themselves and involve both the ground and link segments and the problem of data management.

Even in cases where Russia is collecting information or communicating via space systems, it has faced difficulty in disseminating the information and data to Russian forces in an efficient or timely fashion. An assessment of Russia’s space capabilities from 2019 indicated that even its new ISR systems had issues: “In addition to the high failure rate of the satellites, the products and services that they do provide often fail to meet the requirements of end users and are not competitive with equivalent foreign capabilities.”⁴⁴ While the Russian SATCOM architecture appears to be more robust than space-based ISR, military communications operate under a very hierarchical, slow, and vertically organized structure in contrast to the more network-centric approaches used by the Ukrainian armed forces and their allies.⁴⁵

Russia’s highly centralized command structure limits its utilization of information from space, as demonstrated by the combat operations of Russian battalion tactical groups in Ukraine in 2013 and 2015. A review of the failures and vulnerabilities of

42. *Challenges to Security in Space: Space Reliance in an Era of Competition and Expansion* (Washington, DC: Defense Intelligence Agency, 2022), <https://www.dia.mil/>.

43. Pavel Luzin, “Russia’s Space Satellite Problems and the War in Ukraine,” *Eurasia Daily Monitor* 19, no. 76 (May 24, 2022), <https://jamestown.org/>.

44. Anatoly Zak, *Russian Military and Dual-Purpose Spacecraft: Latest Status and Operational Overview*, CNA Occasional Paper (Arlington, VA: Center for Naval Analyses, June 2019), <https://www.cna.org/>.

45. Luzin, “Satellite Problems.”

these units found C2 was centralized so that there was no networked common operating picture (COP), making changes to it difficult to disseminate quickly and efficiently. Moreover, intelligence collection tended to be narrowly focused without general coverage beyond a specific objective.⁴⁶ It is not entirely clear if Russia has corrected these deficiencies, suggesting that in the near term, Russia will not be able to effectively use its space capabilities for tactical warfighting to an extent comparable to the United States, its Allies and partners, and Ukraine.

While several commercial satellite firms support Russia's military activities, Russia has made less use of commercial space capabilities than Ukraine and its allies have.⁴⁷ This is partially because many commercial companies have now locked Russia out of their services, and face sanctions from the United States and others if they allow Russia to use these services. For example, the Russian companies TerraTech and AO BARL provide satellite imagery of Ukraine to Russia, and the Chinese company Spacety and its Luxembourg-based subsidiary provided SAR imagery to the Wagner Group, according to the sanction announcement.⁴⁸ But Russia's less-than-robust use of commercial satellite services is also due to its military structure, which is not conducive to the decentralized, networked approach favored by these commercial technologies.⁴⁹

Beyond technical, doctrinal, and commercial challenges, human factors may be playing a significant role in Russia's limited uses of space in Ukraine. As with other industries across Russia, the space industry has struggled with incompetence, corruption, and mismanagement for decades, with "unqualified or unmotivated personnel responsible for human errors," contributing to major quality control issues.⁵⁰ These problems are paired with personnel issues on the battlefield, especially regarding inexperienced Russian conscripts and convicts.⁵¹ It is hard to decentralize data and decision-making if there is no trust or distribution of competency.

Counterspace Systems: Not Just Countersatellites

The Russian military focuses heavily on electronic warfare capabilities, including a range of ground-based and mobile systems to counter GPS, communications, and radars.⁵² Other counterspace capabilities pursued by Russia include cyber systems,

46. Nicolas J. Fiore, "Defeating the Russian Battalion Tactical Group," *Armor* (Spring 2017), <https://www.moore.army.mil/>.

47. Luzin, "Satellite Problems."

48. "Treasury Sanctions Russian Proxy Wagner Group As a Transnational Criminal Organization," US Department of the Treasury, press release, January 26, 2023, <https://home.treasury.gov/>.

49. "David, Goliath, & Space."

50. Zak, *Russian Military*.

51. Victoria Smolkin, "One Reason Russia Is Struggling in Ukraine," *Politico*, March 3, 2022, <https://www.politico.com/>; and Isabelle Khurshudyan and Kamila Hrabchuk, "As Morale Suffers, Russia and Ukraine Fight a War of Mental Attrition," *Washington Post*, October 13, 2022, <https://www.washingtonpost.com/>.

52. *Challenges to Security*.

directed-energy weapons like the Peresvet laser weapon system, and the direct-ascent antisatellite (ASAT)-capable Nudol system.⁵³ These systems have been put to use both in the lead up to and during Russia's invasion of Ukraine. The Nudol system, for example, was used to destroy a defunct Russian satellite in an ASAT test in November 2021, three months before the invasion of Ukraine.

Russian forces have actively interfered with space systems supporting Ukraine. In UN meetings, Russian delegates have publicly called out numerous commercial space companies, claiming that the companies were supporting the Ukrainian armed forces in a way that could make them "legitimate targets for retaliation."⁵⁴ In practice, many Russian counterspace activities have focused more on communications links and ground architectures than on satellites.

The Russian cyberattack on Viasat in February 2022 was able to deny Ukrainian forces the use of key space capabilities by exploiting a vulnerability in ground systems.⁵⁵ Russian interference with global navigation satellite system (GNSS) signals has disrupted targeting and troop coordination as well as carried the potential to disrupt air travel, logistics, and other basic services.⁵⁶ Yet Russia's efforts to jam Starlink satellites have faced resistance as Starlink operators have been able to adapt code to counter the interference, a countermeasure referred to as "fantastic" and "eye-watering" by Office of the Secretary of Defense Director of Electronic Warfare Dave Tremper.⁵⁷

Lessons for the United States

Asymmetric Advantages

The US Joint Force may gain many insights from Ukraine that highlight both US asymmetric advantages and potential gaps or areas for improvement. For example, military planners, strategists, and analysts should recognize that the satellite capabilities themselves are not the stars of this show. Instead, the ground and link segments

53. *Challenges to Security*.

54. "Statement by the Head of the Russian Delegation K.V. Vorontsov at the Second Session of the Open-Ended Working Group Established Pursuant to UNGA Resolution 76/231 (Unofficial Translation)," UN Office for Disarmament Affairs, September 12, 2022, <https://documents.unoda.org/>; "First Committee, 22nd Plenary Meeting – General Assembly, 77th Session," UN Web TV, October 26, 2022, video, 3:12:22, <https://webtv.un.org/>; "5th Meeting, 3rd Session Open-ended Working Group on Reducing Space Threats," UN Web TV, February 1, 2023, video, 2:57:58, <https://webtv.un.org/>; and "4th Meeting, 3rd Session Open-ended Working Group on Reducing Space Threats," UN Web TV, January 31, 2023, video, 2:47:48, <https://webtv.un.org/>.

55. "Russia behind Cyberattack with Europewide Impact an Hour before Ukraine Invasion," United Kingdom Foreign, Commonwealth & Development Office, press release, May 10, 2022, <https://www.gov.uk/>.

56. Cozzens, "HawkEye 360."

57. Kate Duffy, "Interference: Elon Musk Reported Russia Was Increasing Efforts to Jam Starlink Satellite Internet in Ukraine, But Hasn't Succeeded," *Business Insider*, May 11, 2022, <https://www.businessinsider.com/>; and Duffy, "A Top Pentagon Official Said SpaceX Starlink Rapidly Fought Off a Russian Jamming Attack in Ukraine," *Business Insider*, April 22, 2022, <https://www.businessinsider.com/>.

that facilitate networked data dissemination methods and innovative application of the data from satellites have allowed Ukraine, with no satellites of its own, to make better use of space than Russia. As well, planners, strategists, and analysts should consider how threats have manifested against these ground segments and links rather than to satellite capabilities.

Ukraine has demonstrated that what matters is not only what satellite data or services are provided, but also how they are delivered to the warfighter. In April 2023, then-Major General David Miller—who at the time was director of operations, training, and force development for US Space Command—indicated that warning, surveillance, and targeting information ultimately has no value if it cannot get to the user.⁵⁸ Trained, motivated, and innovative warfighters themselves are a further force multiplier, as shown by how Ukrainian forces have leveraged space capabilities.⁵⁹

Similarly, Chief of Space Operations General B. Chance Saltzman stated that a key goal of the US Space Force going forward is “making sure that not only do we have the systems to do the mission, but that our operators have the training, the experience, and we have validated tactics that actually enable those capabilities.”⁶⁰

The use of space in Ukraine has shown that commercial data sources provide effective alternatives to classified space-derived information, enabling more efficient information sharing across partners and Allies. Information-sharing policies and practices combined with the space-derived information itself have allowed the United States and its Allies and partners to coordinate a comprehensive response to Russia’s invasion of Ukraine across military, diplomatic, and economic sectors.

Moreover, the war is a reminder of the competitive advantage the United States and its partners and Allies achieve from the strength of open, transparent societies compared to closed autocracies. The sheer volume and variety of sources and means of dissemination facilitated by space services and used by Ukraine to share information, particularly about the movements and potential war crimes of Russian forces, have helped keep Russia from controlling the narrative on the international stage. Russia’s centralized structures have largely prevented it from being able to use space effectively in Ukraine. As a result, the Kremlin has failed to shape the perception of the invasion in a way that favors Russia. These dynamics could play out similarly in a crisis involving other countries that try to tightly control the flow of information, such as China.

Areas for Improvement

One of the most significant challenges demonstrated by Russia’s war in Ukraine is the vulnerability and threat toward ground components and software related to space

58. “Spacepower Security Forum 2023: A Mission to Protect and Defend Assets in Space,” transcript of conference proceedings, Mitchell Institute for Aerospace Studies, April 5, 2023, <https://mitchellaerospacepower.org/>.

59. “Spacepower Security Forum.”

60. Theresa Hitchens, “Ukraine Spotlights ‘Criticality’ of Space in Conflict: Saltzman,” *Breaking Defense*, January 13, 2023, <https://breakingdefense.com/>.

systems. Several leaders across industry and the military have indicated that ground systems and software, such as cloud environments, can be particularly vulnerable in conflict.⁶¹ Accordingly, the hardening of ground systems, software, and cloud environments may be a key investment in securing space systems as a whole. Distributed architectures in ground systems, not just in space, have been put to the test for several commercial actors throughout the war. The US Space Force may be able to derive direct lessons for future architectures, particularly for SATCOM.

General Kevin Chilton, the former commander of US Strategic Command, has pointed to the challenge raised by this dynamic for the Joint force writ large. The Army, Navy, Air Force, and Marines—not the Space Force—typically buy the user equipment and therefore “need to step out and make sure they have the proper user equipment, or the space capabilities are for naught.”⁶² This statement highlights how a satellite’s value is dependent on the usability of its data by warfighters and decision-makers. Therefore, Joint force investments in user equipment play a key role in the effectiveness of Space Force capabilities. Coordinating across organizational seams among end users, satellites, and data processing and dissemination can pose a complex task requiring sound policy and doctrine, not just capable technology.

The Joint force will also need to consider the challenge of balancing the hierarchical needs of a military with the potential benefits of decentralization of information and decision-making. Although decentralization has aided Ukraine’s use of space in many ways, legal, policy, and operational requirements will require a degree of centralization to ensure the US military is able to achieve its objectives in an effective, responsible manner.

Conclusion

The space enterprise is not confined to satellites in orbit. As impressive as satellite capabilities may be, Russia’s war in Ukraine has demonstrated their operational and strategic impacts are magnified vastly by terrestrial hardware and software, and by the networked, distributed approach to using and sharing information.

It is also clear that merely possessing satellite capabilities is not enough to ensure space support for the warfighter. Increasing opportunities to make use of space information and services developed by others have enabled Ukraine to close the gap in space capability while Russian forces have apparently struggled to provide sufficient space-derived information to their warfighters in a timely fashion. This dynamic indicates that doctrine, policy, information-sharing structures, and data-processing capabilities, while not always the most visible components of space strategy, can be a driving force for competitive advantage in war.

Russia’s war in Ukraine spotlights many trends and patterns that the Joint force should watch closely for future implications to the role space may play in war. The war

61. “Spacepower Security Forum.”

62. “Spacepower Security Forum.”

demonstrates the value of space to terrestrial forces while also highlighting the value of links—interconnectivity—and terrestrial systems for space forces. Even as the US Space Force develops an independent identity and structure as a service, it must continue to strengthen the ties to and interoperability with the rest of the Joint force. Æ

ASYMMETRIC WARFARE IN SPACE

Five Proposals from Chinese Strategic Thought

JAKE SUSS

Chinese thinkers like Sun Tzu offer universally-applicable strategic recommendations for national security, but the advancement of military space operations invites further analysis of Eastern thinking as it relates to space. Such strategic thinking applied to new challenges posed by the space domain in the development of broader space strategy expands perspectives and improves durability. Looking through the strategic lens of Chinese thought regarding exploiting local asymmetric advantages elucidates several recommendations for limiting adversaries' use of the domain and winning conflicts extending to space.

Despite more than two millennia passing since Sun Tzu wrote *The Art of War*, its tenets are still applicable today. Militaries across the world study Sun Tzu and apply strategic prescriptions derived from chariot warfare in the Warring States period (475–221 BCE) to modern military conflict.¹ Although his lessons have stood the test of time, advancements in modern technology and military strategy open new areas for contemplation through a Chinese strategic lens.

Space is a relatively recent addition to historical warfighting domains and is ripe for a deeper consideration in terms of Sun Tzu and later Chinese strategic thinking.² As the People's Republic of China (PRC) builds its military capabilities, including space-based assets, Chinese thought becomes increasingly more applicable to understanding Beijing's intentions and developing Western doctrine regarding space matters. In order to win in space and fill a theoretical gap in modern space strategy, planners must consider broadly applicable strategic guidance through the lens of historical and contemporary Chinese thought.

Space is a critical component of modern life and warfare. In the First Gulf War, China witnessed the American military's use of space to dominate Iraq's military—at

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1. Sun Tzu, *The Art of War: Bilingual Chinese and English Text*, trans. Lionel Giles and John Minford (North Clarendon, VT: Tuttle Publishing, 2016).

2. John W. Raymond, *Spacepower: Doctrine for Space Forces*, Space Capstone Publication (Washington DC: Headquarters US Space Force, June 2020).

the time, the fourth largest military in the world.³ American military capabilities, including space-enabled navigation and communications, were decades ahead of China's post-Tiananmen military.

In the three decades since the First Gulf War, international space capabilities have proliferated and increased in sophistication. Global navigation satellite system constellations now power civilian smartphones in addition to military smart bombs. Space-based internet such as SpaceX's Starlink offers speeds 3,500 times faster than dial up, and high-resolution commercial satellite imagery now costs tens of dollars—thousands of dollars cheaper than a decade ago.⁴

Militarily, space is a key enabler for terrestrial forces. Control of the ultimate high ground is more contested than ever. The PRC, Russia, India, and the United States have tested antisatellite (ASAT) missiles capable of reaching low-Earth orbit (LEO).⁵ Several countries are pursuing electronic warfare, directed energy, and cyber capabilities that could temporarily or permanently disable satellites or disrupt space-enabled services.⁶ Although the First Gulf War is widely considered the first space-enabled conflict, no country has yet contested space in open conflict.⁷ As a result, space combat strategy currently relies on theoretical underpinnings derived from other domains, models, and exercises, rather than concrete historical combat examples. While real-world space combat will certainly modify today's space strategy, the lack of historical models makes a thorough and sound theoretical background a crucial starting point for future space conflict.

The Art of War provides a basis for contemplating modern combat, but the nature of the space domain and recent developments in Chinese military thought invite an analysis of Eastern strategic thinking relevant to space. Many areas of Sun Tzu's work are applicable in all domains, yet space provides unique opportunities and challenges not considered by *The Art of War's* terrestrial-only environment.

This article examines historical and contemporary Chinese strategic writing to illuminate areas for consideration in broader space strategy. This includes the application

3. Dean Cheng, "Evolving Chinese Thinking about Deterrence: What the United States Must Understand about China and Space," Heritage Foundation, March 2018, <https://www.heritage.org/>.

4. Yarnaphat Shaengchart and Tanpat Kraiwanit, "Starlink Satellite Project Impact on the Internet Provider Service in Emerging Economies," *Research in Globalization* 6 (June 2023): 100132, <https://doi.org/>; Kim Ann Zimmermann and Jesse Emspak, "Internet History Timeline: ARPANET to the World Wide Web," LiveScience, April 8, 2022, <https://www.livescience.com/>; and Dexter Jagula, "Satellite Imagery for Everyone," IEEE Spectrum, November 22, 2022, <https://spectrum.ieee.org/>.

5. Victoria Samson and Brian Weeden, "Op-Ed: India's ASAT Test Is Wake-up Call for Norms of Behavior in Space," *SpaceNews*, January 23, 2023, <https://spacenews.com/>; and James Dickinson, *Hearing on National Defense Authorization Act for Fiscal Year 2023 and Oversight of Previously Authorized Programs, Before the Committee on Armed Services House of Representatives*, 117th Cong., 2nd session (2022) ("Priorities and Posture of United States Space Command," presentation by General James H. Dickinson, commander, US Space Command), <https://www.armed-services.senate.gov/>.

6. Dickinson.

7. Peter Anson and Dennis Cummings, "The First Space War: The Contribution of Satellites to the Gulf War," *RUSI Journal* 136, no. 4 (1991).

of historical writings like *Thirty-Six Stratagems*, Maoist “people’s war” doctrine, and contemporary PRC writings on space strategy. While the proposed strategic recommendations are written through the lens of such Chinese sources, they are as universally applicable as those from *The Art of War*.

Asymmetric Warfare

To understand the basis for Beijing’s thoughts on space, one must first understand the strategic context of historical and contemporary Chinese thought on strategy writ large. Finding asymmetric advantages underpins the strategic thought of military theorists spanning from ancient China to the modern PRC. Sun Tzu devoted an entire chapter to the discussion of weak and strong points and how to concentrate one’s own strength at the enemy’s weak points.⁸ Wang Jingze expanded on this thought in his sixth-century *Thirty-Six Stratagems* by proclaiming one should avoid direct confrontation with a strong enemy and instead attack weaknesses elsewhere.⁹

More recently, in the twentieth century, Mao Zedong also emphasized the need to attack only when the local balance of power is advantageous and victory assured by pitting strength against weakness.¹⁰ Contemporary Chinese strategists like Qiao Liang and Wang Xiangsui call for expanding these asymmetric attacks into domains like economic, cultural, and information domains.¹¹ PRC activities similarly demonstrate a willingness to use asymmetric tactics, like maritime militia vessels, against countries like the Philippines whose military capabilities lag far behind China’s.¹²

Attacking a superior force with an inferior force is generally recognized as folly in Chinese strategic thought; however, such a strategy focuses more on local, relative asymmetries, unlike the contemporary Western thought of absolute asymmetries. After 2001, the United States devoted significant attention to doctrine focused on the rise of “non-traditional, asymmetrical, and insurgent-terrorist” threats, highlighting holistic, comparative strengths.¹³ Both historical and contemporary Chinese strategists assess that asymmetries can provide local, sometimes temporary strengths that can achieve tactical advantages. These asymmetries can occur in tactical and operational levels, with “whole pitted against separate parts of a whole,” so that a strategically weaker country can still

8. Sun Tzu, *Art of War*.

9. Wang Jingze, *Thirty-Six Stratagems, bilingual ed.* (Los Angeles, CA: Lionshare Chinese Classics, 2015), 6.

10. Mao Zedong, *Quotations from Chairman Mao Tse-Tung: The Little Red Book, bilingual ed.* (Beijing, China: Peking Foreign Language Press, 1996), Mao Tse-Tung Internet Archive, <https://www.marxists.org/>.

11. Qiao Liang and Wang Xiangsui, *Unrestricted Warfare* (Beijing: PLA Literature and Arts Publishing House Arts, 1999).

12. Andrew Erickson and Connor Kennedy, “China’s Maritime Militia,” Center for Naval Analyses, 2016, <https://www.cna.org/>.

13. Michael J. Mazarr, “The Folly of ‘Asymmetric War,’” *Washington Quarterly* 31, no. 3 (2008): 33.

leverage asymmetries.¹⁴ These tactical advantages compound to form strategic victory through self-preservation and destruction of the enemy.¹⁵

Modern People's Liberation Army (PLA) literature emphasizes the transient, limited nature of control derived from balancing relative strengths to achieve objectives.¹⁶ Particularly in light of China's recent comparative military disadvantage since the First Opium War (1839–42) and the "century of humiliation," exploiting small, transient, or ideological asymmetries is crucial to maximizing capability against holistically more capable adversaries.¹⁷ Additionally, although PRC combat power is advancing rapidly, with the ultimate goal of creating a globally powerful military force, many military leaders still envisage conflict from a position of holistic disadvantage, so the PRC must maximize local asymmetries to achieve strategic goals.¹⁸ Consequently, the following recommendations derive and apply Chinese strategy and context to inform the broader development of space strategy.

Proposals for Space Strategy

The following sections offer five general proposals concerning the execution of space operations across the conflict continuum, which Chinese thinkers generally perceive as including ongoing competition.¹⁹ These considerations are derived primarily from historical and modern Chinese theoretical views of asymmetric warfare, historical Chinese thought, and contemporary PLA writings, but they are applicable to conflict in the space domain. As with Sun Tzu's original writing, they are not intended to serve as imperatives or laws that cannot be violated, but as recommendations to consider. Contravening one of these proposals does not guarantee defeat, nor does following each one guarantee victory. Yet as strategic recommendations for space operations, abiding by these propositions could enhance one's prospects for victory.

Proposal 1. Space is an idea, not just a location. Space strategy should be separated from location in order to attack the enemy's weaknesses and optimize one's own strengths.

As mentioned, ancient and modern Chinese strategy generally emphasizes finding asymmetric ways to secure victory. The sum of historical strategists'—Sun Tzu, Wang Jingze, and Mao—thoughts on conflict, particularly with an enemy of equal or

14. Sun Tzu, *Art of War*, 382.

15. Mao, *Quotations*.

16. 记荣仁 and 王学进 [Ji Rongren and Wang Xuejin], "试析制交通权与制空权,制海权的关系 [Assessing the Relationships between Command of Communications, Command of the Air, and Command of the Sea]," *中国军事科学* [*China Military Sciences*] 15, no. 4 (2002).

17. Xinhua, "Full Text: Speech by Xi Jinping at a Ceremony Marking the Centenary of the CPC," *Global Times*, July 2017, <https://www.globaltimes.cn/>.

18. Xinhua.

19. Eric Kuznar and George Popp, "China's Perception of the Continuum of Conflict," NSI, October 2019, <https://nsiteam.com/>.

superior strength, is to find and exploit weaknesses. Moreover, the PRC's history of ideological conflict with capitalism and Mao's exhortations that "every Communist and revolutionary should take up this [ideological] weapon" further underscore its penchant to attack an adversary's ideas, not just physical capabilities.²⁰ In that light, space is as much an idea as it is a location.

Of course, there are physical laws and a distinct geography that define space, but the modern military use of space essentially distills to persistent or recurring overhead access. The ability to overfly countries at will is a significant benefit of space operations, but the mechanism of access may come just as easily from nontraditional persistent overhead capabilities such as unmanned aerial vehicles (UAV) or balloons as from orbital assets. Space operations must consider more than the physical geography of space, which enables targeting and overcoming the enemy's advantages while finding innovative ways to provide persistent overhead capabilities to one's own forces.

This theory of attacking space as an idea rather than as a physical location is particularly useful for countries with relative weaknesses in space. Considering the idea of space as persistent overhead access expands attack vectors beyond the physical geography of space and enables alternatives for countries without robust space capabilities. For example, the United States is heavily reliant on space-based capabilities, but the Democratic People's Republic of Korea (DPRK) has an extremely small space-based intelligence, surveillance, and reconnaissance (ISR) capability.²¹ For the DPRK and other countries with limited space capabilities like Iran, even a high-altitude nuclear detonation that destroys most of the satellites in LEO would have little effect on their own minimal space capabilities.

Furthermore, nontraditional persistent overhead capabilities provide additional asymmetric advantages, particularly in times of conflict. In peacetime, satellites flying outside the atmosphere enjoy legal protections not afforded to objects like balloons, but the PRC has already demonstrated a willingness to flout sovereignty issues with high-altitude balloons.²² Conflict reduces the import of some legal considerations, and although subject to considerations of international opinion and strategic escalation, using balloons or UAVs to provide persistent overhead coverage in conflict affords secondary benefits. The PRC demonstrated that even in peacetime, balloons may fly largely unhindered over 40 countries and five continents.²³ When unconstrained by peacetime rules, balloons could easily provide both theater coverage of a conflict in the Indo-Pacific as well as strategic overflight of the American homeland.

Nontraditional persistent overhead capabilities also provide targeting, command, and control complications to adversaries. While the United States shot down a Chinese

20. Mao, *Quotations*, 5891.

21. "Why Are North Korea's Satellite Launches Controversial?," Reuters, November 22, 2023, <https://www.reuters.com/>.

22. Edward Wong and Julian E. Barnes, "Chinese Balloon Had Tools to Collect Electronic Communications, U.S. Says," *New York Times*, February 9, 2023, <https://www.nytimes.com/>.

23. Wong and Barnes.

balloon in February 2023, it used a fifth-generation fighter and advanced heat-seeking missile to do so.²⁴ During a conflict, the widespread use of balloons or other aerial objects to augment or replace space services like ISR and communications would dramatically increase adversary targeting requirements, particularly when coupled with the use of dummies and decoys.

In a regional conflict around Taiwan or the South China Sea, the additional aircraft, missiles, and personnel required to defend the American homeland from balloons would be unavailable to participate in deployed operations. Conversely, balloons launched on a westward trajectory from India or the Middle East could complicate PRC air defense targeting solutions.

High-altitude balloons also split most countries' space, air defense, and territorial/homeland defense commands. In a 2023 congressional hearing, US Air Force General B. Chance Saltzman jokingly underscored this in answer to a question on "near space" balloons by referring to them as "far air."²⁵ PRC organizations are similarly divided: the PLA Strategic Support Force has space responsibilities, PLA Air Force has the responsibility for strategic air defenses, and the PLA maintains tactical air defenses.²⁶ As a result, the widespread use of alternative persistent overhead assets will complicate a country's targeting calculus, even if these balloons carry no offensive capabilities or countermeasures.

The use of high-altitude balloons or UAVs to provide traditionally space-based services offers several additional advantages for spacefaring and non-spacefaring nations alike. Because these assets are relatively closer to the Earth's surface, signal strength is significantly stronger in accordance with the inverse square law. Similarly, due to the increased proximity, electro-optical, infrared, or other imagery capabilities may be more detailed than space-based imagery or will require less substantial equipment. Thus, nontraditional overhead systems can provide advantages in communications and ISR services.

Additionally, the physical location of balloons or high-altitude UAVs may improve electronic attack capabilities. This is similarly true for communications jammers or other electronic warfare options. Finally, adding defensive missile countermeasures like flares and other electronic countermeasures will increase a balloon's or UAV's resilience and add further targeting complications for adversaries. This is particularly true when swarms of balloons or UAVs with intermixed ISR, communications, jamming, and dummy platforms clog a country's airspace during a conflict.

Balloons and UAVs are only two examples of the vulnerabilities and opportunities that arise when decoupling space strategy exclusively from its geographic location.

24. Jim Garamone, "F-22 Safely Shoots Down Chinese Spy Balloon off South Carolina Coast," US Department of Defense (DoD), February 4, 2023, <https://www.defense.gov/>.

25. Sandra Erwin, "Space Force: We Expect to See 'Interfering, Blinding' of Satellites during Conflict," *SpaceNews*, March 15, 2023, <https://spacenews.com/>.

26. Anthony Cordesman and Joseph Kendall, "China Military Organization and Reform" (working draft, Center for Strategic and International Studies [CSIS], August 1, 2016), <https://csis-website-prod.s3.amazonaws.com/>.

Challenging the idea of traditionally space-based services offers significantly more prospects to array asymmetric strengths against adversary weaknesses, both offensively and for providing capabilities to terrestrial forces. Finally, although balloons and UAVs are tested options available today, there are likely novel capabilities not yet developed or fielded that may be even more effective.

Proposal 2. Space is the principal battlefield in space warfare, but space operations are inseparable from terrestrial operations and objectives. Space warfare comprises activities affecting and affected by the orbital, link, and ground segments, and should contribute to achieving strategic goals.

Space operations predominantly occur in or affect space. Chinese military dictionaries and strategic analyses consider space operations to be military actions occurring primarily in space with the intent to seize, hold, and use command of space.²⁷ American military doctrine defines the space area of responsibility as altitudes equal to or greater than 100 kilometers above mean sea level.²⁸ Both these definitions are helpful in understanding the principal area of space operations along the competition continuum, but additional nuance is required to assess the full range of actions that occur in, affect, and are affected by space.

Space operations are comprised of three principal segments: orbital, link, and ground. The orbital segment includes assets in space, the link segment covers the electromagnetic spectrum used to communicate with and between satellites, and the ground segment includes the terrestrial infrastructure used to control and communicate with satellites.²⁹ Degrading any of these segments can compromise space-based services and may achieve the tactical goal required for a specific operation.

Attacking different segments or combinations thereof may provide the most effective or accessible vector. Targeting the ground or link segments of an adversary's space system echoes Wang Jingze's dictum to "besiege Wei to rescue Zhao," by finding a more convenient target to attain the desired effect.³⁰ The logistical cost of denying an adversary space capability by destroying its ground infrastructure may be significantly lower than denying the same in space. Conversely, using nonkinetic space capabilities to set more advantageous political conditions in competition carries far lower risk than some terrestrial options. The skilled strategist must consider the full range of

27. Jiang Lianju and Wang Liwen, eds., *In Their Own Words: Lectures on the Science of Space Operations* (Maxwell AFB, AL: China Aerospace Studies Institute, Air University, April 2013), <https://www.airuniversity.af.edu/>.

28. Dickinson, *Hearing; and Space Operations*, Joint Publication 3-14 (Washington, DC: Chairman of the Joint Chiefs of Staff, April 10, 2018, incorporating change 1, October 26, 2020).

29. Brian Garino and Jane Gibson, "Chapter 21: Space System Threats," CSIS, September 2018, <https://aerospace.csis.org/>.

30. Wang, *Thirty-Six Strategems*, 5.

attack options in the objective military conditions, within which one directs the military “drama full of color, power and grandeur.”³¹

While occurring predominantly in space, military space operations are inseparable from terrestrial operations and strategic goals. Space effects may intrinsically generate strategic outcomes, but more often, space is a tool that supports actions in other domains. Space-enabled capabilities such as ISR, precision navigation and timing (PNT), and communications affect forces’ ability to conduct operations.³²

Although one must field offensive and defense capabilities to ensure space access and control while denying the enemy the same, controlling space without providing space-enabled services does not significantly benefit terrestrial or strategic objectives. Just as air superiority is not the only requirement for strategic victory—which the United States learned in Vietnam and Afghanistan—control of space alone does not guarantee victory.³³ Unless and until the Earth is no longer the principal population center for humanity, space operations must support strategic terrestrial objectives.

Proposal 3. It does not matter if an attack is kinetic or nonkinetic, as long as it achieves the objective. Debris-generating kinetic kills have long-lasting consequences; they should be anticipated. Nonkinetic kills provide flexible escalatory options and can work in concert with kinetic kills to achieve desired effects. Nonkinetic attacks against the adversary’s mind may achieve desired effects as efficiently as against electromagnetic targets.

Nonkinetic options that generate space effects are at least as important as kinetic capabilities. Because nonkinetic attacks generally do not create debris, their use threshold is far lower. Reversible nonkinetic attacks like jamming and dazzling lasers further lower the threshold for use. Strategists like Sun Tzu consider the conflict continuum quite fluidly, which resonates in modern PRC gray zone activities, so reversible effects both help to improve one’s position in competition and leave an outlet for foes to escape and save face.³⁴

Nonkinetic attacks may also facilitate kinetic attacks or deception operations. For example, blinding space domain awareness satellites while executing a co-orbital, kinetic antisatellite attack greatly increases the attack’s chance of success. Similarly, a temporary cyberattack that interrupts a reconnaissance satellite’s downlink may be more effective than blatantly destroying the satellite in allowing naval forces to enter a battlespace surreptitiously.

Traditional nonkinetic attacks span the electromagnetic spectrum, from radio frequency jammers to lasers, but attacking an adversary’s mindset or partners can be just as effective. SpaceX’s decision to limit Ukraine’s use of its services for military

31. Mao, *Quotations*, 5053.

32. Jiang and Wang, *Lectures*.

33. Giulio Douhet, *The Command of the Air*, trans. Dino Ferrari (Maxwell AFB, AL: Air University Press [AUP], 2019).

34. Sun Tzu, *Art of War*, 529; and Kuznar and Popp, “China’s Perception.”

purposes during its conflict with Russia demonstrates the usefulness of this tenet.³⁵ SpaceX made this decision unilaterally, not under an adversary's influence, but it demonstrates the power a country may wield if it can influence a foreign commercial provider or ally to curtail services.

In fact, because proliferated constellations such as Starlink are more resilient than traditional architectures, generating effects against them through influence may be significantly more cost effective than generating the same effect with jammers or other offensive capabilities.³⁶ Generating nonkinetic effects by influencing an adversary's allies or commercial providers may be particularly effective for countries who rely on ground segment stations located abroad. This is a direct corollary to the *Thirty-Six Stratagems* advice on spies, to "undermine the enemy's ability to fight by secretly causing discord between him, his friends, [and] allies."³⁷

Proposal 4. Space operations are strategic in nature and can have a strong deterrent effect. To deter effectively, the enemy must fear one's capabilities prior to a conflict. During a conflict, space should be used aggressively to retaliate and achieve a favorable operational situation.

Both the United States and the PRC emphasize deterring conflict as a key task for their militaries and as preferable to open warfare.³⁸ Space can act as a key contributor to deterrence, including deterring the tactical use of counterspace capabilities, as well as supporting nuclear strategic deterrence. PRC discussions underscore not only this use of space as a contributor to holistic strategic deterrence, but also the use of some space capabilities that require a lower threshold than nuclear deterrents, providing flexibility in deterrent options.³⁹ A comprehensive discussion of space's role in strategic deterrence and deterrence theory is beyond the scope of this article, but a brief overview of several key space deterrence themes is provided.

Deterrence requires the use of threats in one or multiple domains to dissuade a target from taking actions that change the status quo.⁴⁰ A key component of this understanding is that deterrence requires forcing an adversary to do (or refrain from doing) an action, not just influencing an adversary's thought. For example, many Imperial Japanese military leaders—including Admiral Isoroku Yamamoto—believed attacking the United States to be an unwinnable strategy, but this did not deter their actions

35. James FitzGerald, "Ukraine War: Elon Musk's SpaceX Firm Bars Kyiv from Using Starlink Tech for Drone Control," BBC News, February 9, 2023, <https://www.bbc.com/>.

36. Greg Hadley, "Proliferated Architecture Necessary for Future Satellite Communications," *Air & Space Forces Magazine*, January 7, 2022, <https://www.airandspaceforces.com/>.

37. Wang, *Thirty-Six Stratagems*, 36.

38. Lloyd J. Austin III, *2022 National Defense Strategy* (Washington, DC: DoD, October 27, 2022), <https://media.defense.gov/>; and M. Taylor Fravel, *Active Defense: China's Military Strategy since 1949* (Princeton: Princeton University Press, 2019).

39. Jiang and Wang, *Lectures*.

40. Jon R. Lindsay and Erik Gartzke, *Cross-Domain Deterrence: Strategy in an Era of Complexity* (New York: Oxford University Press, 2019), 2.

in December 1941.⁴¹ Consequently, effective deterrence requires that the adversary fear the capabilities and actions they would face in a conflict to the extent that they are unwilling to begin a war at all or at minimum refrain from undesired actions. This can help achieve Sun Tzu's dictum to "subdue the enemy's troops without fighting."⁴²

A key component to managing adversaries' trepidation of friendly capabilities is ensuring that they both understand some threats arrayed before them and fear the still-unknown secret capabilities. Striking a balance between revealing one's capabilities to ensure an adversary knows of their existence while maintaining secrecy and preventing the development of countermeasures is crucial. An adversary cannot fear an unknown capability, but some weapons or tactics may only be effective for their first use. It is seldom advantageous to disclose capabilities for which the adversary can easily develop countermeasures, or whose value derives from its surprise.

Similarly, disclosing capabilities that adversaries can easily duplicate, particularly given the PRC's penchant for reengineering, is unwise. Conversely, weapons that the adversary already possesses, weapons for which there are no easy countermeasures, or a willingness to use attacks in other domains to counter space aggression are useful disclosures for deterrence.

Many space operations are inherently strategic in nature, and space capabilities can significantly contribute to strategic deterrence. While nuclear weapons are the ultimate strategic deterrent, space plays an essential enabling role. Satellites are a critical component of nuclear command, control, and communications, and the United States heavily leverages space-based ISR architectures to provide first warning of nuclear launches.⁴³ Nuclear-tipped ballistic missiles transit through space, and space-based threats to terrestrial targets such as space planes or fractional orbital bombardment systems can challenge traditional missile warning and defense architectures.⁴⁴

Additionally, modern reliance in some countries on space-based capabilities such as communications and PNT services provides an opportunity for generating dramatic strategic effects across an adversary's entire population. PRC literature also discusses space's opportunity to restrain the outbreak of war or escalation thereof by "displaying necessary space strategic strengths that have deterrence as their goal."⁴⁵ Putting aside concerns for destabilization, consider the deterrent effect to a technologically advanced country preparing for an immediate military campaign if its entire country suffered even a 60-second simultaneous loss of PNT, access to nuclear command and control satellites, and a space-based ISR blackout. Even a brief interruption of some of these capabilities may force a country to reconsider offensive operations.

41. Ian W. Toll, *Pacific Crucible: War at Sea in the Pacific, 1941–1942* (New York: W.W. Norton, 2012).

42. Sun Tzu, *Art of War*, 170.

43. Marie Villareal Dean, "Space-Based Nuclear Command and Control: A Guide," CSIS, January 13, 2023, <http://aerospace.csis.org/>.

44. Dickinson, *Hearing*.

45. Jiang and Wang, *Lectures*, 58.

Space also provides opportunities to deter attacks against one's own space assets and targets for cross-domain deterrence. The threat of facing counterspace weapons may be enough to deter an adversary from using one, and immediate retribution in kind may deter further space attacks. Depending on the scale of the conflict, a country may also be able to deter counterspace weapons employment by threatening its terrestrial launch or command and control locations with cyberattacks or conventional munitions. PRC maritime militia gray zone activities demonstrate a parallel willingness to use this type of cross-domain deterrence strategy in other domains.⁴⁶

Additionally, PRC thinking on integrated strategic deterrence stresses that some options are better deployed and coordinated across domains, either challenging the ground and link segments or by threatening retaliation in other domains entirely.⁴⁷ Finally, denying adversary space capabilities provides an option for flexible escalation and deterrence of further aggression. A country may be unwilling or unable to prosecute a war if faced with a denial of space services and capabilities.

Even during conflict, offensive and defensive space operations may still be limited in time or scope, but striving for space superiority maximizes one's own capabilities and limits an adversary's freedom to operate.⁴⁸ Used in concert with other capabilities, local space superiority, enough to control the right terrain for a few hours or minutes, may be sufficient to achieve strategic goals. While the Taiwan Strait is only 97 nautical miles wide, it takes days for the United States to move aircraft carriers into theater if not already forward deployed.⁴⁹ Consequently, if the PRC can deny American space-based ISR and communications for several hours, that may be enough to prevent easy American intervention in a Taiwan invasion. Conversely, if the United States can deceive China's ISR satellites for several hours, it may enable sufficient force redeployment from bases like Korea or Guam to cripple a PRC invasion fleet.

Just as nuclear powers may still fight conventional wars, the scope and scale of a conflict may still limit the use of kinetic weapons that generate debris and threaten the tenability of the environment. Yet a maximal use of nonkinetic options to generate reversible and nonreversible space effects during conflict is critical to mitigating an adversary's technological advantages while maximizing one's own. Finally, in the face of degraded technological weapons, a country's asymmetric advantage in this way may not be fighting under "informationized" conditions leveraging the totality of modern technology, but rather may be one's ability to employ analog weapons to achieve strategic objectives instead of focusing on restoring degraded technologies.⁵⁰

46. Erickson and Kennedy, "China's Maritime Militia."

47. Lindsay and Gartzke, *Cross-Domain Deterrence*.

48. Cheng, "Evolving Chinese Thinking."

49. Joseph W. Lisenby Jr., "Repelling a Chinese Invasion of Taiwan: A Space, Forces, Time Dilemma for United States Pacific Command" (research paper, US Naval War College, Newport, RI, 2001).

50. "China's National Defense in 2010," Ministry of National Defense, March 2011, <http://eng.mod.gov.cn/>.

Proposal 5. Space has its own key terrain that must be seized and held to achieve space dominance.

Although space is immense, there are key areas and points that are particularly advantageous for military use. As with terrestrial terrain features, occupying a key space location can convey advantages for the operator and simultaneously deny those to an adversary. These features include orbits like LEO, sun-synchronous orbit, and geosynchronous Earth orbit (GEO); Lagrange points; the Moon; and even terrestrial terrain that enables space operations.

LEO and GEO are increasingly crowded orbits with distinct uses. LEO is relatively close to Earth, enabling higher signal strengths, lower latency, better imaging resolution, and reduced lift costs. The lower altitude reduces launch costs, which makes proliferated architectures more cost efficient. Moreover, the proximity makes LEO optimal for ISR satellites and even some communications payloads. At 35,786 kilometers altitude above Earth's equator, GEO is significantly farther than LEO, but satellites in GEO match Earth's rotational period and essentially hover over the same position on Earth's surface. This distinct advantage provides benefits for communications satellites and some ISR satellites and confers a larger aperture than LEO satellites. Although a larger expanse than LEO, the relatively narrow GEO belt provides precious few locations for a growing quantity of satellites.

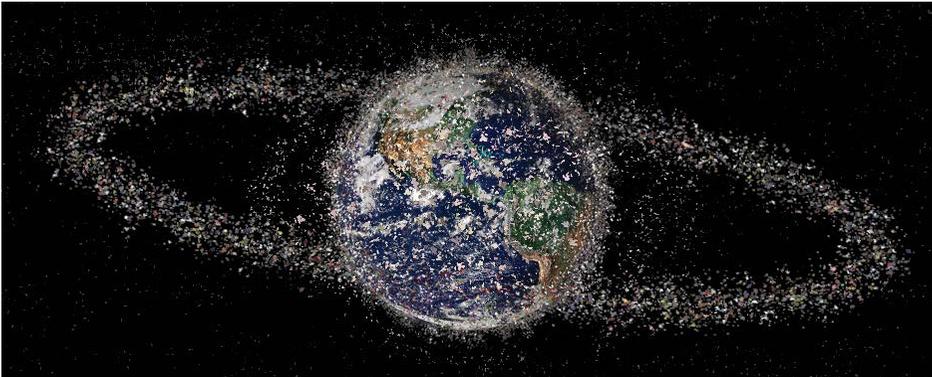


Figure 1. GEO congestion⁵¹

Both Chinese and American strategic space thought emphasize the need to seize space superiority, which includes maintaining freedom of action in critical orbits.⁵² Maximizing one's own use of these orbits is beneficial, but denying adversary use when needed is equally important. Such denial may range from temporarily disabling satellite relay communications to creating widespread kinetic damage.

Because of the challenges associated with launching more satellites, particularly if an orbit is full of debris, space superiority may differ from superiority in other domains. Contemporary Chinese space strategists emphasize that space superiority

51. Image Credit: "Artist's Interpretation of Space Debris Orbiting Earth," Catherine Smith.

52. Jiang and Wang, *Lectures*; and Raymond, *Spacepower*.

includes the use of space and ability to deny adversaries the same, but it may be local or temporary in nature.⁵³ This differs somewhat from other domains, for in space, a country may achieve superiority simply by preventing others from using space with counterspace weapons employed from other domains, while maintaining only a small presence in the domain.

Lagrange points, which allow a spacecraft to remain relatively stationary due to gravitational effects, will become critical enablers for space operations as countries move into cislunar space, to the Moon, and beyond. The PRC has already used a relay satellite at Earth-Moon Lagrange 2, a point on the far side of the Moon, to facilitate a lunar probe landing.⁵⁴ Additionally, Earth-Moon Lagrange 1, a point between Earth and the Moon, has applications for space domain awareness looking back toward Earth's orbits.

Similar to the gravitational constraints of GEO, Lagrange points constitute a discrete, precise location whose control may greatly facilitate attaining space superiority. While not as proliferated as traditional Earth orbits, these points may acquire increased value for space operations and become a point of contention for military space competition. This is similarly true of the Moon, where the PRC and Russia agreed to develop a joint lunar base.⁵⁵ Beyond the Moon's economic and mineral implications, control of the Moon and supporting Lagrange points may be space's contested high ground in coming years.

Space operations also require key terrestrial terrain, which makes this geography a prime target to control. Spaceport locations can offer key advantages in orbit inclination, weather, and population proximity, so guaranteed launch access is an important component of attaining space superiority.⁵⁶ Similarly, ground segment control stations play a key role in space operations. Depending on the orbit and satellite's purpose, multiple ground stations or relays in both hemispheres may be critical for timely links, control latency, and domain awareness. If using balloons or high-altitude UAVs to provide persistent overhead capabilities, launch locations that can exploit jet streams, trade winds, and winds aloft are critical. Finally, all these terrestrial locations become potential attack locations that affect space operations without the need to attack the orbital segment.

Conclusion

Although space strategies may not heed each of these recommendations, sound military planning will consider their implications. Conflict in space is an emerging domain

53. Jiang and Wang.

54. Kristin Burke, "What Is China Doing at the Lunar Distant Retrograde Orbit?" (Maxwell AFB, AL: China Aerospace Studies Institute, Air University, March 2022), <https://www.airuniversity.af.edu/>.

55. Namrata Goswami, "The Strategic Implications of the China-Russia Lunar Base Cooperation Agreement," *Diplomat*, March 20, 2021, <https://thediplomat.com/>.

56. Thomas Roberts, *Spaceports of the World* (Washington, DC: CSIS, March 2019), <https://www.researchgate.net/>.

of military strategy, and first contact in space will rely heavily on innovative solutions to new dilemmas. Consequently, considering these perspectives from Chinese strategic thought in the construction of space strategy broadens perspectives and improves durability in case of conflict.

Conflict in, through, and from space will require militaries to challenge traditional concepts, attack enemy weak points to deny space benefits, and find new ways to provide services in a degraded environment. Space capabilities and the potential for space conflict are vital components of achieving national and terrestrial objectives. Space is the ultimate high ground, but it must be one of many tools used in concert to achieve strategic objectives.

Conflict in space will likely rely on temporary and local space superiority, but one only needs to achieve that superiority at the appropriate time and place to secure victory. Space combat may be temporary and reversible—for example, just enough to blind ISR satellites during an invasion of Taiwan—or it may be the ultimate deterrent to military operations. Regardless of the endeavor, success in space will require cunning and ingenuity to outthink and outmaneuver one's opponents.

This article provides only a brief, selected discussion of space within the context of historical and modern Chinese military strategy, but additional study is needed to continue developing a comprehensive space strategy. Additional research on cooperation with Allies and partners, secrecy and deception, and developing space human capital will benefit space strategists. Moreover, an analysis comparing this with Western strategic thinking and space doctrine based on Clausewitz's theories would be useful as well. The space domain's importance is growing, so the demand for space strategy and capabilities will only increase. Æ

US COMMERCIAL AUGMENTATION SPACE RESERVE

Integrating Commercial Capabilities for a Resilient and Flexible Space Architecture

GARY L. DAVENPORT

The recently announced Commercial Augmentation Space Reserve program, based on the long-standing Civil Reserve Air Fleet, provides a mechanism by which the United States can leverage the commercial space industry in support of military space security concerns. As Congress considers funding the program, key lessons from the structure and implementation of the Civil Reserve Air Fleet will bolster commercial interest in the program and ensure its success in future conflicts.

The character of space warfare is changing.¹ In 2022, the Russian war in Ukraine revealed just how influential the space domain is in war. Incredibly, commercial actors, not states, appeared to provide the most impactful space services to Ukraine at the start of the war. SpaceX's Starlink enabled Ukrainian leadership to not only communicate with its fielded military forces but also continue its strategic messaging to the outside world to garner support.² Earth imagery companies Planet and Maxar delivered near real-time intelligence detailing the order of battle and battle damage assessments.³

In a future conflict, the United States can leverage its commercial industry to quickly and effectively bolster or surge the national security space architecture. To accomplish this, the United States should model civilian-military cooperation in the

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1. Thank you to Gregory Johnson and Giles "David" Arceneaux of the Institute for Future Conflict, and Lieutenant Colonel Matthew Smith of the US Air Force Academy, Department of Political Science, for feedback on this project.

2. Kurt Vinion, "How Elon Musk's Starlink Became Invaluable to Ukraine's War Effort," Radio Free Europe, Radio Liberty, October 20, 2022, <https://www.rferl.org/>.

3. "Satellite Images Show More Russian Military Deployments in Eastern Ukraine," Axios, April 13, 2022, <https://www.axios.com/>; and Mariel Borowitz, "The War in Ukraine Shows How Important Private Satellite Companies Have Become—Especially in Times of Conflict," SatNews, August 16, 2022, <https://news.satnews.com/>.

space domain after the air domain's Civil Reserve Air Fleet (CRAF) framework. Leveraging the commercial industry enables the United States to become flexible and adaptable to evolving technologies, operational requirements, and commercial offerings.⁴ This effort aligns with the 2020 *Defense Space Strategy*, which states, "DoD will develop an agile space enterprise that can take advantage of emerging technological and commercial innovation in order to continually outpace adversaries' threats."⁵

Space is more than a warfighting domain. It is a strategic location, offering the United States exploration, prestige, and wealth. As US commercial companies seek the resources of the space domain, it is the duty of the US military to protect them.⁶ The CRAF model, which has proven successful in the air domain, would be well suited for the space domain. Specifically, certain aspects of the CRAF model are applicable to the space domain and will provide resilience and increased capacity for the United States' national security space architecture.

History has taught us that eventually, war is probable. In 2015, Harvard professor Graham Allison stated that the odds of the United States and China going to war were "much more likely than recognized at the moment."⁷ This sentiment has caused the United States to shift its focus from the Middle East and once again prioritize great power competition. Future conflict between the United States and China will include the space domain. To prepare for and deter conflict through and in the space domain, the United States needs a resilient and flexible space architecture.

Terms of Reference

For the purposes of this article, a reserve fleet consists of aircraft or spacecraft that are fully or partially functional and equipped for service but not currently needed for military operations. These assets may already be in the field or in a standby mode until called upon. Once activated, the reserve fleets complement existing organic military capabilities. Commercial assets are operated by commercial operators who agree to take tasking orders from US Transportation Command or US Space Command.

Increased capacity, sometimes referred to as flexibility, provides a surge capability of supplementary assets in times of humanitarian disaster, crisis, or conflict. These may include ground-based sites, launch vehicles, air-based assets, or space-based assets. Resilience is defined as "the ability to prepare for and adapt to changing conditions and withstand and rapidly recover from disruption." It also "includes the ability to withstand and recover from deliberate attacks, accidents, or naturally occurring

4. "RFI/Sources Sought Commercial Augmentation Space Reserve (CASR) Framework," SAM.gov, accessed August 14, 2023, <https://sam.gov/>.

5. *Defense Space Strategy Summary* (Washington, DC: Department of Defense [DoD], June 2020), 7, <https://media.defense.gov/>.

6. Namrata Goswami and Peter A. Garretson, *Scramble for the Skies: The Great Power Competition to Control the Resources of Outer Space* (Lanham, MD: Lexington Books, 2020), 47.

7. Graham Allison, "The Thucydides Trap: Are the US and China Headed for War?," *Atlantic*, September 24, 2015, <https://www.theatlantic.com/>.

threats or incidences.”⁸ Space architecture resilience or mission assurance can be achieved by resisting attacks with defensive operations, surviving attacks with on-board protection, and the reconstituting of assets after an attack.⁹ As an example, Planet, a remote sensing company, achieves resiliency through its disaggregated systems in case of a failure.¹⁰ In wartime, having resilience makes adversaries’ decision-making processes more challenging.

The Military Space Domain

The space domain has been militarized since the Soviet Union launched Sputnik in 1957, and although it was nothing more than a transponder, Sputnik struck fear into the hearts of the American people as it demonstrated the ability to deliver Soviet capabilities to anywhere in the world.¹¹ By 1967, more than 100 countries signed the Outer Space Treaty to prevent the placement of nuclear weapons and other weapons of mass destruction into outer space.¹² Space had become a domain that could no longer be ignored, and countries started to discover how to use the ultimate high ground to create a security advantage.

In 1991, the US military leveraged GPS, intelligence, surveillance, and reconnaissance (ISR), and satellite communications (SATCOM) to outmaneuver Iraqi forces in what has been referred to as the first space war.¹³ While space warfare arguably had been conducted as early as the Cold War, Operation Desert Storm demonstrated how the use of space capabilities acted as a force multiplier and thereby cemented the United States’ reliance on space for military operations. US and Allied forces now turn to space to support Joint warfighting functions. Space capabilities support the Joint warfighter in the air, land, and sea domains, as well as protect and defend space from both kinetic and nonkinetic hostile actions. If space assets are attacked and degraded, ground forces will lose the force multiplier effects nominally provided.

Over the last 25 years, despite America’s desire to keep space a benign domain, civilian and military leaders have increasingly recognized space as a warfighting

8. *United States Government Compendium of Interagency and Associated Terms (A Non-official Guide to Department Dictionaries and Other Terminology Sources)* (Washington, DC: Joint Doctrine Interorganizational Clearinghouse, November 2019), 834, <https://www.jcs.mil/>.

9. *Space Domain Mission Assurance: A Resilience Taxonomy* (Washington, DC: Office of the Assistant Secretary of Defense for Homeland Defense and Global Security, September 2015), <https://man.fas.org/>.

10. Brad Townsend, *Security and Stability in the New Space Age: The Orbital Security Dilemma* (New York: Routledge, 2020), 158.

11. Paul Dickens, *Sputnik: The Shock of the Century* (Chicago: Bloomsbury Publishing, 2019).

12. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (Outer Space Treaty), December 19, 1966, UN Res 2222 (XXI), <https://www.unoosa.org/>.

13. Larry Greenemeier, “GPS and the World’s First ‘Space War,’” *SciAm [Scientific American]*, February 8, 2016, <https://www.scientificamerican.com/>; and B. Chance Saltzman, “Remembering the First ‘Space War’: A Discussion with Lt. Gen. B. Chance Saltzman,” interview by Frank A. Rose, Brookings, March 19, 2021, YouTube video, 1:00:28, <https://www.brookings.edu/>.

domain. In 1997, Air Force Chief of Staff General Ronald Fogleman first described the need for an air and space service.¹⁴ In its 2001 report, the Rumsfeld Space Commission pushed even further and advocated for a separate Space Corps and eventually a Space Department.¹⁵ The Trump administration and Congress turned the latest page by creating the US Space Force in 2019.¹⁶ The Obama, Trump, and Biden administrations have emphasized space exploration and policy development that enable the burgeoning US commercial space sector to compete internationally.¹⁷ Space Force doctrine also emphasizes the need for unity of action and commercial space integration.¹⁸ Yet despite advances in policy and organizational structure, the space architecture itself is long overdue for modernization.

The current US military space architecture is made up of outdated, large, relatively immobile, and bespoke systems. The dated nature of these systems creates a risk for a wide range of military activities, including space command and control, intelligence collection and dissemination, and nuclear command, control, and communications (NC3). The commercial space sector is proving to be more adaptable to emerging technologies and has surpassed the US government in its number of capabilities in what used to be a civil- and military-dominated domain. The growing commercial space industry saw \$427.6 billion in revenue in 2022, up from \$396.2 billion the year before.¹⁹

In July 2023, the US Space Force identified the shortcomings in its own organic capabilities, and after consulting with industry, introduced a new concept known as the Commercial Augmentation Space Reserve (CASR) program.²⁰ This program is modeled after the Civil Reserve Air Fleet program, a cooperative and voluntary partnership between US airlines and the Department of Defense to augment military

14. *Hearing on the Fiscal Year 1998 Department of Defense Authorization Request, House National Security Committee*, 105th Cong. (1997) (statement from General Ronald R. Fogleman, chief of staff of the Air Force), March 5, 1997, accessed August 14, 2023, <https://irp.fas.org/>.

15. Commission to Assess United States National Security Space Management and Organization, *Report to the Commission to Assess United States National Security Space Management and Organization* (Washington, DC: Office of the Secretary of Defense, January 11, 2001), 81, <https://aerospace.csis.org/>.

16. Christina Wilkie, "Trump Floats the Idea of Creating a 'Space Force' to Fight Wars in Space," CNBC, March 13, 2018, <https://www.cnbc.com/>; and Elizabeth Howell, "Trump Launches US Space Command to Control the Warfighting Domain," Space.com, August 30, 2019, <https://www.space.com/>.

17. Barack Obama, *National Space Policy of the United States of America* (Washington, DC: White House, June 28, 2010), <https://obamawhitehouse.archives.gov/>; Donald J. Trump, *National Space Policy of the United States of America* (Washington, DC: White House, December 9, 2020), <https://trumpwhitehouse.archives.gov/>; and Joseph R. Biden, Jr., *National Security Strategy* (Washington, DC: White House, October 2022), <https://www.whitehouse.gov/>.

18. John W. Raymond, *Spacepower: Doctrine for Space Forces*, Space Capstone Publication (Washington, DC: USSF, June 2020), 14, <https://www.spaceforce.mil/>.

19. Loren Grush, Tyler Kendall, and Bloomberg, "The Commercial Space Industry, Led by Elon Musk's SpaceX, Is Expected to Blast Off with 41% Growth over the Next 5 Years," *Fortune*, July 24, 2023, <https://fortune.com/>.

20. "RFI/Sources."

aircraft capability during a national defense-related crisis. In return carriers are given preference in handling commercial peacetime military cargo and passenger traffic.²¹

The commercial space age has arrived, and according to Heidi Shyu, under secretary of defense for research and engineering, the United States must leverage the innovative commercial space industry.²² Commercial companies' programs are less likely to become technologically obsolete compared with government programs. Proliferated low-Earth orbit (LEO) constellations exemplify how commercial companies are creating a network of on-orbit processing and battlefield management flexibility. Market competition, supported through sound regulation, will likely cause more frequent innovative reinvestment in the commercial sector than the government sector. Unlike the Department of Defense, private industry constantly invests to keep its value in the market and maintain its competitiveness.²³

History of the Civil Reserve Air Fleet

For over 70 years, the Air Force has maintained a successful partnership with the commercial air industry for the air domain. Since the establishment of the CRAF in 1951, the Air Force has benefitted from additional capacity through the US airline industry.²⁴ This program has allowed the Air Force to surge its air fleet capacity in times of crisis. While not delivering combat forces directly into hot zones, the additional CRAF aircraft fly sorties in relative safety, disencumbering military aircraft and enabling them to fly into combat situations. The CRAF model is only implemented in extreme situations where the government cannot pull together sufficient resources to save lives. It is intended to be only short term. The US military is still required to be combat ready for wartime events such as Operation Enduring Freedom or Operation Desert Shield.

CRAF operates in three stages, with activation limited to stages I and II thus far. Stage I covers minor regional crises, humanitarian assistance, or disaster relief operations, while stage II covers major theater wars. Stage III, which has not been activated to date, covers national mobilization.²⁵ By activating these stages, the US

21. "Civil Reserve Airfleet," US Department of Transportation, accessed September 18, 2023, <https://www.transportation.gov/>; and David Graham, *Sustaining the Civil Reserve Air Fleet (CRAF) Program* (Washington, DC: Institute for Defense Analyses, May 2003), 6, <https://apps.dtic.mil/>.

22. Matthew Weinzierl and Mehak Sarang, "The Commercial Space Age Is Here," *Harvard Business Review*, February 12, 2021, <https://hbr.org/>; and Jaspreet Gill, "DoD Launches New 'Effort' to Rapidly Adopt Commercial Space Capabilities," *Breaking Defense*, April 18, 2023, <https://breakingdefense.com/>.

23. Clayton M. Christensen, *The Innovator's Dilemma: The Revolutionary Book That Will Change the Way You Do Business*, 1st ed. (Cambridge, MA: Harvard Business School Press, 1997).

24. "Civil Reserve Airfleet."

25. "Civil Reserve Air Fleet," USAF (website), accessed February 22, 2023, <https://www.af.mil/>; and David C. Arnold and Peter L. Hays, "SpaceCRAF: A Civil Reserve Air Fleet for Space-Based Capabilities," *Joint Forces Quarterly* 64 (2012).

Transportation Command commander gains the flexibility to surge and respond quickly to emergencies.²⁶

The first call up of CRAF, utilizing stages I and II during the Persian Gulf War, not only showcased the effectiveness and importance of the program but also brought to light certain shortcomings.²⁷ Commercial airlines were responsible for transporting 67 percent of troops and 25 percent of air cargo to the Gulf during the conflict. In the aftermath, the airlines successfully redeployed 85 percent of troops and 42 percent of air cargo.²⁸

CRAF was activated for a second time during Operation Iraqi Freedom, and an informal survey of CRAF participants indicated positive outcomes from the program's implementation.²⁹ The second activation was also limited to stages I and II. Stage I was activated for the third time on August 22, 2021, for the evacuation of Afghan refugees as it was considered a humanitarian crisis.³⁰

These three implementations prove the effectiveness of a reserve fleet model and represent how this could be advantageous if executed in the space domain. The space domain is the largest of all the domains and yet the Space Force is the smallest of the US armed services. The number of resilient forces required to not only protect and defend orbital assets but also provide effects to Joint warfighters is beyond the capacity of the US government.

A Framework for Space

Advancements in space technology and increased military dependence on commercial space capabilities have created operational vulnerabilities that policy has yet to address. These vulnerabilities exist in the launch, space, and ground segments. The process by which the US government calls upon the space commercial sector to support its national security interests is as ad hoc and inefficient as those used at the beginning of the Global War on Terror. Yet, unrealized opportunities to quickly increase space resiliency and capacity exist amid these vulnerabilities. By utilizing commercial assets, a reserve fleet can offer needed resiliency and capacity to military forces.

As proven in the Berlin Airlift, there are many logistical challenges that must be addressed to produce the desired results of integrating commercial and organic

26. John A. Tirpak, "CRAF for the Future," *Air and Space Forces Magazine*, December 22, 2014, <https://www.airandspaceforces.com/>.

27. "Department of Defense Activates Civil Reserve Air Fleet," press release, DoD, August 22, 2021, <https://www.defense.gov>; and Heidi M. Peters, "Afghanistan Evacuation: The Civil Reserve Air Fleet (CRAF) and the Defense Production Act (DPA)," Insight 11731 (Washington, DC: Congressional Research Service, August 25, 2021), <https://crsreports.congress.gov/>.

28. Graham, *Sustaining*, 6.

29. Graham.

30. Peters, "Afghanistan Evacuation," 2; "DoD Activates"; and Dave Mistich "The Pentagon Is Calling on 6 U.S. Airlines to Help with the Afghan Evacuation Effort," National Public Radio, August 22, 2021, <https://www.npr.org/>.

military capabilities.³¹ The key sectors in the commercial space industry are launch services, the space-based sector, and the ground-based sector, and each can be used to augment military capability to increase capacity and resiliency. Similar to the airlift sector, the launch—spacelift—sector moves people and cargo. The space-based sector includes satellite communications, space domain awareness, and orbital servicing vehicles. The ground-based sector includes command and control sites and ground-based telescopes. For this article, the ground sector includes the electromagnetic links needed to operate satellites. Each of these sectors, although separate and unique, can contribute to a CASR program.

CASR: Improving Resiliency

A commercial space reserve would enhance the US national space security architecture by offering improved resilience and increased capacity. This would be accomplished by using disaggregated constellations, which are most common in innovative commercial applications. This approach goes further than purchasing additional commercial services, which aligns with the chief of space operation's interest in distributed, lower cost, commercial-type satellites to disaggregate critical systems.³² Commercial space reserve fleets can offer a swift backup capability to the legacy systems often operated by the US military and Intelligence Community.

Launch Sector

CASR will create a resilient launch architecture capable of delivering military and civilian satellites to orbit during times of crisis. Currently, the United States relies heavily on launch service vehicles, such as SpaceX's Falcon 9 and the United Launch Alliance's (ULA) Atlas V and Delta IV rockets. Yet if one of these launch vehicles were to experience a failure or capacity constraint, such as that which occurred while trying to resupply the International Space Station in 2022, the Space Force's ability to launch critical payloads into space could be severely impacted.³³ In a time of war, the United States' space resiliency will suffer due to its incapability to reconstitute space assets.

To overcome this challenge, CASR allows the United States to quickly tap into a larger pool of alternative launch services by including additional commercial space transportation providers. Pre-arranged contracts with launch providers will reduce logistical issues and time frames, thereby increasing the resiliency of both the spacelift and space-based sectors. The space-based sector requires launch services to be resilient, as the launch sector is responsible for reconstituting the space-based sector. A US

31. Graham, *Sustaining*, 26; Theodore Joseph Crackel, *A History of the Civil Reserve Air Fleet* (Washington, DC: Air Force History & Museum Program, 1998); and Peters, "Afghanistan Evacuation."

32. Sandra Erwin, "Space Force Nominee Sees Growing Threats to U.S. Satellites from Rival Powers," *SpaceNews*, September 13, 2022, <https://spacenews.com/>.

33. Stephen Clark, "Supply Chain Issues Delay Northrop Grumman's Next Space Station Cargo Flight," *Spaceflight Now*, July 19, 2022. <https://spaceflightnow.com/>.

Space Force payload could supersede any pending commercial payload and launch more quickly once CASR is initiated.

Space Sector

Orbital service vehicles are a growing commercial industry. Under CASR these vehicles would remove debris, refuel, and repair critical military satellites that are not fully mission capable. Companies like Astro Scale, Northrup Grumman, and Starfish Space are already hard at work developing and launching the first orbital service vehicle prototypes. These evolving technologies will eventually lead to capabilities the United States will rely upon for removing debris from orbit or providing satellite life extensions, thereby enhancing resiliency.³⁴ In a situation that requires dangerous debris to be removed, CASR could be activated more quickly than a traditional service contract and preempt other paying customers in support of national security. This is like CRAF, where aircraft are called up in short order, interrupting regularly scheduled services and redirecting assets to support a military operation.

CASR: Improving Capacity

Moving beyond resiliency, increased capacity is the second way national security architecture is enhanced by a space reserve. A commercial space reserve fleet provides surge capacity to support US space objectives. For example, a commercial reserve fleet could provide flexibility if the United States wanted to quickly expand its space presence or respond to emerging threats in space. This is different than adding a regular commercial contract service. The CASR program will shorten the timeline needed to mobilize assets, strengthen plans and wargames with expected available forces, and solidify the authorities required to act in a crisis or conflict.

The secretary of defense grants the US Transportation Command commander the authority to activate CRAF in times of crisis. Similarly, the US Space Command commander can be granted the authority to activate CASR. This gives the US military the capability to quickly mobilize its commercial reserve fleets to conduct military-related missions without having to rely solely on legacy government vehicles or begin the lengthy process of creating a new contract with a commercial partner and determining how to integrate the commercial assets.

Furthermore, technology in the space industry evolves rapidly, and spacecraft or satellite designs become outdated relatively quickly. Many of the operational military satellites are decades-old. The legacy MILSTAR (Military Strategic and Tactical Relay) program is the nuclear hardened, NC3 satellite constellation and was launched in the

34. SpaceLogistics, "Mission Extension Pod," Northrop Grumman (website), accessed February 27, 2023, <https://www.northropgrumman.com/>; "ADRAS-J," Astrocale (website), accessed February 27, 2023, <https://astrocale.com/>; and "Otter is There, On Call and Ready to Support," Starfish Space (website), accessed February 27, 2023, <https://www.starfishspace.com/>.

1990s.³⁵ It is made up of only five large satellites with fixed positions in geosynchronous orbit. A commercial reserve fleet adds flexibility in times of crisis as it is regularly updated or upgraded without the need for additional government acquisitions.

The United States has been leveraging commercial satellite communications for decades, but CASR would provide the means through which this could be done more successfully. During the height of the Global War on Terror, the United States determined it required more bandwidth than was organically available to effectively fight terrorism. The commercial industry provided the military with the surge capacity needed, but the ad hoc approach created inefficiencies that were avoidable. According to a 2011 Government Accounting Office report, the Department of Defense spent over \$1 billion on increased capacity by leasing commercial satellite communications bandwidth.³⁶ The report showed the Department was fragmented and inefficient in its approach to sourcing satellite communications.

In a 2014 report, the Department of Defense found the average cost of commercial satellite communication services not bought through the Defense Information Systems Agency (DISA) was about 16 percent higher than those purchased through DISA.³⁷ Similar to how all DoD air travel must take place on CRAF-participating airlines, all future commercial satellite communication for the Defense Department would be purchased from participating CASR companies. CASR provides a solution to these inefficiencies as all commercial satellite communications will be coordinated, purchased, and managed by a single government entity.

Today, satellite communication providers such as ViaSat, Amazon's Kuiper System, and SpaceX's Starlink and Starshield are principal communication providers with more bandwidth than the Department of Defense. As the United States faces attrition of its organic satellite communications capabilities during a conflict, the providers that agree to participate in the reserve fleet model will furnish reserve capacity. Additionally, commercial companies would be allowed to use the additional capacity until the reserve fleet is activated. As a bonus to US national security, the communication providers could be called upon to deny service to adversaries of the United States.

Moreover, this surge capability enhanced with modern commercial technology sends an important strategic message. By activating and calling up the space reserve in a time of conflict, the United States communicates to the entire world that it is mobilizing its forces and bringing a larger force to bear. This capability of strategic messaging provides a range of benefits, including increased clarity, improved understanding, enhanced persuasiveness, increased engagement, and improved outcomes. By effectively communicating a message in a way that resonates with the target audience, strategic messaging can help to achieve US goals and objectives. In short, without firing a

35. "Enhanced Polar System," Northrop Grumman (website), accessed August 14, 2023, <https://www.northropgrumman.com/>

36. "Defense Satellite Communications: DOD Needs Additional Information to Improve Procurements," GAO [US Government Accountability Office], July 17, 2015, <https://www.gao.gov/>.

37. "Defense Satellite Communications."

shot, the United States may be able to achieve its objective or prevent an adversary from achieving theirs.

Challenges to CRAF and Implications for CASR

While the CASR program is modeled after the successful CRAF program, it must incorporate the lessons learned from CRAF operations in the air domain to yield positive results for US space architecture. Aspects of the CRAF framework may be challenging to transfer to the space domain, including the physics of the domain itself, differences in industry sectors between the air and space domains, and programmatic challenges.

Domain Physics

In the air domain, commercial aircraft do not need to operate in contested areas, and crews avoid the risk of being shot down. In contrast, satellites must overfly contested environments due to orbital mechanics, which puts them at risk if they are supporting military operations.

Industry Sectors

The next challenge in transferring this framework to CASR is the additional industry sectors that are notably different from the CRAF program. As mentioned, the space domain has three distinct industry sectors instead of the one transportation sector of the air domain: launch, space, and ground. The concept of operations, rules of engagement, and other details on how resources will be allocated—including bandwidth, radio frequency bands, and geographical region—will depend on the sector and technology type, and will require further study.

Programmatic Challenges

While the CRAF program has been a success in providing US Transportation Command with additional capacity in times of need, three program management challenges have emerged that have possible implications for CASR. These challenges include the initial failure to implement the program incentives effectively, an overreliance on the commercial airlines for forward deployment, and the investment by commercial industry in the wrong type of aircraft.

Incentives. The first challenge to CRAF came as many military members were not using the prenegotiated airlines.³⁸ The CRAF program was designed to entice commercial airlines by offering preference in providing cargo and passenger services for the Department of Defense.³⁹ DoD employees use the City Pairs Program, a perk enjoyed by CRAF airline participants, which confers preferred status to the airlines for

38. Graham, *Sustaining*, 30, A-33–A-34.

39. Peters, “Afghanistan Evacuation,” 1.

government travel, resulting in monetary gains.⁴⁰ Without the commitment from the Defense Department to mandate its employees to use the City Pairs Program airlines, however, passenger travel volume eroded. This issue is compounded in peacetime when military personnel are not traveling overseas, thereby further reducing the ticket purchases from the airlines. Learning from the early mistakes of the CRAF program, the CASR program must offer and follow through with compelling incentives to entice the commercial industry to join CASR.

Overreliance on Commercial Airlift. While commercial airlines bring a great amount of additional capacity, operating in a military environment produces complications. For one, as a 2003 Institute of Defense Analysis report notes, civilian aircrews must volunteer for missions and may choose not to fly into hostile areas.⁴¹ The same report also found these crews often lack the training for military missions. Moreover, commercial airlines' radio systems were not designed to communicate with military equipment, which caused communication difficulties and lack of proper supervision of operations.⁴² The most recent activation of CRAF to support the Afghanistan evacuation in 2021 faced similar challenges as the all-volunteer aircrews struggled with the decision of whether to participate or not.⁴³

Additionally, the Air Force's overreliance on commercial partnerships led to a decrease in its own organic fleets' ability to respond to major military engagements. The commercial reserve fleets offered a false sense of capacity. During Desert Shield in 1990, Military Airlift Command relied heavily on the commercial fleet for several thousand airlift sorties and could not have achieved the movement of personnel and cargo without the activation of CRAF.⁴⁴

Like the CRAF program, CASR shares the risk of overreliance on the commercial industry and thereby of becoming dependent on factors beyond its control. For example, if SpaceX Chief Executive Officer Elon Musk suddenly decided not to support a particular conflict, he could remove SpaceX's spacelift service from the US Space Force. This would result in the service losing one of its two launch partners and crippling its ability to deliver assets to space.

To avoid the noted interoperability challenges of the CRAF program, the Space Force and US Space Command will need to conduct wargame exercises for CASR participants to enrich the commercial partners' understanding of military strategic thinking and the nature of future conflicts. These wargames can also be used to discover capability gaps, identify communication barriers, and decipher appropriate levels of command-and-control authorities. For example, an outcome from the

40. *Military Readiness: Civil Reserve Air Fleet Can Respond as Planned, But Incentives May Need Re-vamping*, GAO 03-278 (Washington, DC: GAO, December 30, 2002), <https://www.gao.gov/>.

41. Graham, *Sustaining*, 28.

42. Graham, 26; Crackel, *History*; and Peters, "Afghanistan Evacuation," A-32.

43. Joseph Hostetler, "CRAF Program Officially Activated: Big 3 Airlines and More Tapped to Aid in the Kabul Crisis," *The Points Guy*, August 22, 2021, <https://thepointsguy.com/>.

44. Crackel, *History*, 219.

2015 Schriever Wargame highlighted the value of commercial companies and their ability to bolster US resiliency.⁴⁵

Shortage of commercial aircraft. The third challenge for the CRAF program is insufficient passenger and cargo aircraft availability. The airline industry has often been encouraged to buy wide-body aircraft capable of carrying large cargo, but for the most part the airlines ignored these requests.⁴⁶ Commercial equities, not CRAF requirements, drive what sort of aircraft are needed. The historical trends illustrate the difference between the Air Force's desired number of aircraft for passenger and cargo delivery and the actual number of available aircraft from the commercial partners. The target requirement and actual number of aircraft rarely met, and at times the number of available aircraft fell short of the goals of the CRAF program.

Fortunately, the nascent CASR program has a major advantage over the CRAF program in that it can offer many more incentives to its commercial partners. This does not preclude CASR from the risk of a shortage in the appropriate number or types of space systems required for US space architecture. This risk may be mitigated only if US policymakers, Space Systems Command leadership, and the commercial space industry work together to offer the right kind of incentives to secure the right type of commercial assets required for national security. Combined, these additional benefits offer compelling financial and regulatory incentives for companies to participate in CASR and contribute to the overall success of the program.

CASR Industry Incentives

Priority for Future Contracts

First, the opportunity to gain priority for future DoD contracts is a significant incentive for companies to voluntarily join CASR, with priority source selection criteria being a key consideration. Source selections for DoD contracts are highly competitive and involve substantial capital, often leading to protests or lawsuits to contest the results, as exemplified by the recent legal action taken by SpaceX to claim a nearly billion-dollar contract.⁴⁷ With the potential to earn contracts worth billions of dollars, the allure of joining CASR may prove to be irresistible to companies.

Fast Pass to the Industry

Second, there are other potential areas that merit exploration, including the possibility of waivers to streamline licensing processes with the Federal Communications

45. Joan Johnson-Freese, *Spacewarfare in the 21st Century* (New York: Routledge, 2017), 98–99.

46. Graham, *Sustaining*, 229.

47. Alan Boyle, "SpaceX Files Lawsuit against the Federal Government—But Asks to Keep the Details under Wraps," *GeekWire*, May 17, 2019, <https://www.geekwire.com/>.

Commission and Federal Aviation Administration, as well as priority range scheduling and infrastructure support.

Early access to spectrum auctions through the National Telecommunications and Information Administration could serve as a significant motivator for participation. The organization plays a pivotal role in managing spectrum usage, including identifying additional spectra for commercial utilization. As space companies heavily rely on the radio frequency spectrum for bandwidth, which directly impacts revenue generation, having access to additional spectra becomes crucial to meet growing resource demands, avoid interference, and ensure reliable service. By joining CASR, smaller or newer companies could establish a stable revenue stream, provided they meet the requirements of the program.

Security Support

Third, there are supplementary advantages to be considered that may further entice prospective CASR members. Given China's lack of distinction between commercial and state actors, companies providing support to the United States through CASR would necessitate robust protection measures, including standard National Security Agency encryption support and intelligence information. CASR participants could be given security clearance and access to US Space Command's Commercial Integration Office, which offers classified intelligence and facilities.⁴⁸ As a result, commercial companies would have the information needed to help safeguard their assets from nefarious actors.

Participation in Safety Standards

Fourth, like ships traversing international waters, CASR participants could incorporate transponders on future CASR spacecraft. The space environment is becoming more congested each year. Objects in low-Earth orbit are traveling at 17,000 miles per hour and pose a significant navigational hazard to every other object in a similar orbit. The Space Force relies on its own external sensor for space situational awareness rather than transponders from the spacecraft.⁴⁹ The private sector has already shown interest in working together to develop norms for safe, predictable, and responsible space actions.⁵⁰ These transponders could function as a beacon and report satellite locations, thereby increasing situational awareness, safety, and attribution.

Additionally, CASR members could consider using modular bus designs for future spacecraft. Leveraging modular spacecraft designs could establish industry standards

48. Theresa Hitchens, "SPACECOM Plans New, Unified 'Commercial Integration Office' to Work with Private Firms," *Breaking Defense*, March 3, 2023, <https://breakingdefense.com/>.

49. *Space Situational Awareness: DOD Should Evaluate How It Can Use Commercial Data*, GAO-23-105565 (Washington, DC: GAO, April 24, 2023), <https://www.gao.gov/>.

50. Johnson-Freese, *Spacewarfare*, 146.

for refueling, upgrading, and servicing, thereby enhancing the Department of Defense's resilience.

Environmental Standards

Fifth, disposal considerations or complete exemption of liability could be granted to companies operating under the auspices of CASR. The Environmental Protection Agency regulates companies dumping pollutants into the ocean. Similarly, the US government regulates satellite service and orbital debris mitigation. Companies operating in space must plan to deorbit if in low-Earth orbit, maneuver to a stay-away orbit if in medium-Earth orbit, or super-sync if in geosynchronous Earth orbit, all before their satellites have reached their end-of-life.

In 2022 the Federal Communications Commission adopted a stricter five-year time frame for deorbit for satellites in low-Earth orbit.⁵¹ These new norms will inevitably begin a new global standard for space debris mitigation, increasing the cost to field a new satellite. CASR satellites should be exempt from the new five-year disposal rule if activated and utilized under CASR direction. Some exemptions may not be necessary since assets could be refueled, repaired, or disposed of by other CASR-contracted service vehicles.

Industry Recognition

Sixth, establishing goodwill, credibility, and a strong brand for a company is crucial in today's business landscape. As such, marketing costs are a significant part of many business strategies. At the 2023 CASR Forum, executives expressed that with the recent Russian invasion of Ukraine, patriotism is on the rise and companies want to work with the US military.⁵² To encourage companies to join the CASR program, the Department of Defense should provide recognition through public statements, media coverage, or other means. This prestige could generate greater awareness for a fledgling company seeking to enhance its marketing efforts compared to what it could achieve on its own. Moreover, larger companies could reallocate some of their marketing budgets, benefiting from the positive image and public support associated with touting their patriotic service.

Indemnification

Finally, and most importantly, indemnification must be included in the CASR program. Indemnification encompasses the contractual obligation of the government to

51. Jeff Foust, "FCC Approves New Orbital Debris Rule," *SpaceNews*, September 29, 2022, <https://spacenews.com/>.

52. Chad Malone, moderator, "Application of Launch Providers," presentation at the Commercial Augmentation Space Reserve (CASR) Forum, George Mason University, Arlington, VA, February 10, 2023; and Sandra Erwin, "Space Force Considers Public-Private Partnerships to Respond to Crises," *SpaceNews*, February 20, 2023, <https://spacenews.com/>.

cover the loss of a company's assets, including potential revenue loss. Fortunately, this is supported by precedent.⁵³ Commercial industry leaders at the 2023 CASR Forum, representing diverse space companies ranging from launch providers to satellite operators, concurred that the assurance of indemnification is critical and expressed eagerness to participate in CASR.⁵⁴

Conclusion

The policy implications of creating a Commercial Augmentation Space Reserve program are numerous. The United States will enhance its national security and defense readiness by increasing its resilience, capacity, and ability to respond to a crisis. Yet policy will determine if the program is successful. Policymakers will need to determine the extent to which the CASR program is exercised through wargames and include commercial partners to work out capability gaps, identify communication barriers, and decide appropriate levels of command-and-control authorities.

The Civil Reserve Air Fleet program struggled with managing the correct balance of its air assets. In implementing CASR, both policymakers and military leaders must determine the minimum and maximum resources required of each specific space sector: spacelift, space, and ground. This may include, but is not limited to, launch services, satellite communications, orbital services for debris removal or life extension missions, ground command and control, space object surveillance and identification, and space-based situational awareness. Additionally, policymakers and military leaders will need to carefully consider the incentives the CASR program may present to commercial partners. Incentives which offer advantages to commercial companies for future government contracts are likely to be fraught with disputes, which often end in lawsuits.

Next, the government agencies offering incentives will all require individual instruction. The National Telecommunications and Information Administration will require a policy to offer radio frequency spectrum incentives to CASR partners. Similarly, the Federal Communications Commission and Federal Aviation Administration will need policies to streamline the licensing process for space activities. The National Security Agency requires a policy directing them to adequately provide encryption protocol to CASR participants. The CASR participants may need an exemption from all the above agencies' debris mitigation standards, and policymakers should create a program to hire orbital debris removal companies if necessary.

Moreover, civilian and military leaders may need to develop public affairs guidance to openly praise commercial participation. Creating a unified approach will ensure the proper amount of goodwill is garnered for each participating company and praise is distributed fairly. Finally, and crucially, DoD policymakers should enact indemnification using the Department's CRAF regulation for indemnification as precedent.

53. DoD Federal Acquisition Regulation (FAR), 52.250-1 Indemnification Under Public Law 85-804, <https://www.acquisition.gov/>.

54. Malone, "Launch Providers."

If in the inevitable event that conflict extends into the space domain, the United States must be prepared. Just as the Civil Reserve Air Fleet program achieved success in the aviation realm, the potential implementation of the Commercial Augmentation Space Reserve program holds the promise of enabling the US Space Force to harness the strengths of the commercial space sector. This amplified collaboration between government and commercial industry will bolster US resilience and flexibility in and through space. The CASR initiative exploits the escalating technological landscapes and the ever-evolving array of commercial solutions. Policymakers and military leaders must work with the commercial space industry to harness the burgeoning technological landscape and create the CASR program needed to prepare for future space conflict. Æ

OFFENSIVE DOMINANCE IN SPACE

BRIAN R. GOODMAN

The US Space Force's competitive endurance framework may exacerbate offense-defense balance problems in space. Applying concepts of realism, the security dilemma, and offense-defense balance to the notion of competitive endurance supports a new theory of offense dominance in the space domain. Specifically, advances in military technology, space mobility and logistics, and space domain awareness provide an advantage to attackers and increase the probability of conflict in space. By prioritizing defense-focused technology development, defense-centric doctrine and tactics, and greater information-sharing, the Space Force can offset the factors driving increased advantage to the offense and decrease the likelihood of conflict.

Integrated deterrence, the centerpiece of US national security policy, operates on relatively straightforward logic: prevent conflict by making the cost of attack prohibitively high either by minimizing an attack's efficacy or punishing an attacker.¹ The 2022 *National Defense Strategy* defines the former as deterrence by denial and the latter as deterrence by direct cost imposition.² Escalation control is closely linked to deterrence: if deterrence succeeds, then competition will remain stable and conflicts will not escalate; if conditions destabilize or escalate, deterrence has failed.

To this end, the Space Force has begun developing strategies, concepts, doctrines, and policies for achieving deterrence and avoiding escalation in space. This process entails, in part, asking questions such as, In what ways does current US space strategy affect deterrence and escalation dynamics? What are the various factors that impact stability and security? What are the ways in which this occurs? A theory of offensive-dominance in space helps explain how Space Force policy, reflected in its competitive endurance framework, might impact deterrence and escalation to make conflict and

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1. Joseph R. Biden, Jr., *National Security Strategy* (Washington, DC: White House, October 2022), <https://www.whitehouse.gov/>.

2. Lloyd J. Austin III, *National Defense Strategy of the United States* (Washington, DC: Department of Defense [DoD], October 22, 2022), <https://media.defense.gov/>.

escalation in space more or less likely. This theory reveals how offense-defense balance problems—where the cost an offensive military force must pay is weighed against the defensive investment necessary to prevent an opponent’s victory—incentivize conflict in the space domain.

The Importance of Theory

The social sciences, including international relations (IR) and military strategic studies, depend on theory to make scholarship applicable to policymakers.³ Absent theory, unspoken, perhaps faulty, assumptions flourish and threaten policymakers with illusory solutions. For example, in US Space Force doctrine, space mobility and logistics is defined as the movement and support of military equipment and personnel to, from, and through the space domain.⁴ One may assume that increasing the availability of space launches will improve the US Space Force’s ability to reconstitute forces after an attack in space, thereby decreasing an attack’s efficacy and increasing domain stability.

While it seems logical at first read, is this cause-and-effect relationship between launch capacity and domain stability correct? One’s answer depends on their theoretical framework. The above assumption operates under the notion of deterrence theory: lowering the probability of an attack by signaling the ability to successfully degrade an adversary’s space mission via rapid reconstitution should be stabilizing. Under a different theory, however, increased space mobility and logistics capabilities will destabilize a world where improved mobility favors offensive action, as detailed below. After all, what assurances do adversaries have that US investments in these capabilities will only be used to reconstitute satellite constellations and not rapidly deploy orbital weapons?

Ultimately, the perceptions of nations in the international system, shaped by their theoretical frameworks, will determine if increased space mobility and logistics capabilities will, in fact, improve or diminish space stability.⁵ Theory is therefore important because it establishes an intellectual scaffolding for policy assessments.

Competitive Endurance

Competitive endurance, firmly nested in the framework of integrated deterrence of the *National Security Strategy* and *National Defense Strategy*, articulates the Space Force’s “assumptions, logical conclusions, and guiding principles” for mission success.⁶ The

3. John J. Mearsheimer and Stephen M. Walt, “Leaving Theory Behind: Why Simplistic Hypothesis Testing Is Bad for International Relations,” *European Journal of International Relations* 19, no. 3 (September 1, 2013), <https://doi.org/>.

4. John W. Raymond, *Spacepower: Doctrine for Space Forces*, Space Capstone Publication (Washington, DC: US Space Force [USSF], June 2020).

5. Robert Jervis, *Perception and Misperception in International Politics*, new ed. (Princeton: Princeton University Press, 2017).

6. B. Chance Saltzman, CSO Note to Guardians (C-Note #15), Subject: Competitive Endurance, July 7, 2023, <https://www.spaceforce.mil/>.

Space Force designates competitive endurance as the means of achieving “space superiority when necessary while also maintaining the safety, security, stability, and long-term sustainability of space.” The concept is actualized through three core tenets: 1) avoiding operational surprise, 2) denying first-mover advantage, and 3) conducting responsible counterspace campaigning.⁷

Missing from the logic are the theoretical underpinnings that link the nature of the international system to the Space Force’s desire for the stability achieved through the notion of competitive endurance. This article completes the formulation by analyzing the Space Force’s competitive endurance framework using principles of offense-defense balance theory to illuminate the service’s conceptual foundations. Offense-defense balance offers two analytical advantages. First, it provides a solid theoretical foundation with a wide explanatory range and prescriptive richness.⁸ Second, principles of offense-defense balance underwrite the logic of some elements of Space Force policy, such as competitive endurance’s emphasis on avoiding surprise.

Realism, the Security Dilemma, and Offense-Defense Balance

A comprehensive analysis of competitive endurance requires an overview of existing international relations theory germane to this notion, particularly realism, the security dilemma, and offense-defense balance.

Realism

For realists, in an anarchic world that lacks a superordinate authority to provide a security guarantee, nations engage in power-seeking behaviors to ensure stability and the promotion of national interests—such interests are the primary driver of state actions in global affairs.⁹ As Ukraine experienced in the spring of 2022, there was no external guarantor of the nation’s territorial sovereignty after the Russian invasion. Other states in the international system are extremely reluctant to challenge Russia and its nuclear arsenal directly.¹⁰

Inevitably, this system produces conflicts between nations and, occasionally, war. This condition, in turn, produces fear and suspicion in states because they can never be assured that danger, violence, and war are not soon coming. Threats to a state’s existence are ever-present, and states can only be confident in their own efforts to

7. Saltzman, C-Note #15.

8. Stephen Van Evera, “Offense, Defense, and the Causes of War,” *International Security* 22, no. 4 (1998), <https://doi.org/>.

9. Kenneth Neal Waltz, *Theory of International Politics* (Long Grove, IL: Waveland Press, 2010); and Waltz, *Man, the State and War: A Theoretical Analysis* (New York: Columbia University Press, 2001).

10. Bryan Frederick, Mark Cozad, and Alexandra Stark, *Understanding the Risk of Escalation in the War in Ukraine* (Santa Monica, CA: RAND Corporation, September 21, 2023), <https://doi.org/>.

minimize the risk of being dominated or destroyed by other states. The resulting power-seeking—as opposed to power-maximizing—behavior ensures security and survival.

Security Dilemma

As states compete for relative power, a dilemma emerges within the international system. This security dilemma exists because states can never be sure of other states' intentions as they pursue power—particularly military power. Rational states within an anarchic international system will seek to protect themselves from outside aggression, and military power provides effective means of defense. Yet given the uncertainty and fear inherent in the international system, states can never be confident that weapons acquired by a rival state will be used exclusively for self-protection and not for aggression or coercive threats.¹¹

Therefore, one state's investment in defensive military power will incentivize a rival state to make its own investment in military power.¹² The rival nation's response and subsequent increase in military power intensifies the state's threat perception and encourages additional investment in military power, intensifying the spiral and producing an arms race between the two states. In turn, the armament spiral produced by the security dilemma will culminate when a dispute between the states eventually emerges that triggers war.¹³

Note that conflict need not be intended or desirable, as illustrated by the now infamous “false alarm” incident of November 1979, when a mistaken use of an exercise tape caused US missile warning systems at the Pentagon, Strategic Air Command, and North American Aerospace Defense Command to falsely indicate a Soviet ballistic missile attack on the United States.¹⁴ Accidents, errors, or miscommunications are all that is needed to push preexisting tensions resulting from a security dilemma into active military conflict.

Offense-Defense Balance

This dreary outlook prompted noted political theorist Robert Jervis to ask a rhetorical question, “Why are we not all dead?”¹⁵ In answer, he observes that the standard security model is insufficiently nuanced to explain the behavior of states in the real world and offers offense-defense balance theory as a remedy. The offense-defense balance reflects

11. Ken Booth and Nicholas J. Wheeler, *The Security Dilemma: Fear, Cooperation and Trust in World Politics* (Basingstoke, UK: Palgrave Macmillan, 2008); and Robert Jervis, *Cooperation under the Security Dilemma* (Los Angeles: Center for Arms Control and International Security, University of California, Los Angeles, 1977).

12. Jervis, *Perception*.

13. John A. Vasquez, *The War Puzzle Revisited*, Cambridge Studies in International Relations 110 (Cambridge, UK: Cambridge University Press, 2009).

14. “False Warnings of Soviet Missile Attacks Put U.S. Forces on Alert in 1979–1980,” National Security Archives, March 16, 2020, <https://nsarchive.gwu.edu/>.

15. Jervis, *Cooperation*, 170.

the amount of resources a state must invest in offense to offset a rival state's investment in defense.¹⁶ This balance can be expressed as a ratio, where the cost an offensive military force must pay (X) is related to the defensive investment (Y) necessary to prevent victory. Therefore, if state A invests \$3 million in military technology to overcome state B's defensive investment of \$1 million, then the offense-defense balance can be expressed as 3:1.

Jervis offers two variables for offense-defense balance. First, he contends a measure of distinguishability exists between some offensive and defensive capabilities. For example, land mines are better understood as defensive weapons, while little defensive rationale exists for weapons such as aircraft carriers. Therefore, states can provide for their security while minimizing the security dilemma by investing in military technology, which is primarily defensive in nature and recognized as such by rivals. Second, Jervis contends the offense-defense balance influences the probability of conflict. Environments where it is easier for one state to destroy military forces and acquire territory than to defend their own are offense-dominant; defense dominance is the inverse.

High offense-defense ratios make conflict less likely. In contrast, low offense-defense ratios make conflict more likely because "when the offense has the advantage over the defense, attacking is the best route to protecting what you have . . . and it will be hard for any state to maintain its size and influence without trying to increase them."¹⁷

While offense-defense balance can be measured in terms of economic investment, a separate question exists regarding the causes of relative offensive and defensive dominance. What factors or conditions tilt an environment's balance in favor of the offense or defense? Extant literature has reached a consensus about two: military technology and geography.

Regarding military technology, IR scholars identify two major areas that incline an environment to offensive advantage.¹⁸ First, improvements in mobility favor the offense because a force cannot attack if it cannot move, while defense can be accomplished while holding a position. As one study notes, "Nearly all historical advances in military mobility—chariots, horse cavalry, tanks, motor trucks, aircraft, mobile bridging equipment—are generally considered to have favored the offense, while major countermobility innovations—moats, barbed wire, tank traps, land mines—have favored defense."¹⁹

Second, improvements in firepower generally favoring the defense can be seen by inverting the logic—attackers are more susceptible to firepower since they must move and, therefore, expose themselves. Thus improvements in mobility favor the offense and render an environment more susceptible to conflict by decreasing the offense-defense

16. Sean M. Lynn-Jones, "Offense-Defense Theory and Its Critics," *Security Studies* 4, no. 4 (June 1, 1995), <https://doi.org/>.

17. Jervis, *Cooperation*, 211.

18. Charles L. Glaser and Chaim Kaufmann, "What Is the Offense-Defense Balance and Can We Measure It?," *International Security* 22, no. 4 (1998), <https://doi.org/>.

19. Glaser and Kaufmann, 63.

balance ratio. Conversely, improvements in countermobility and firepower increase the offense-defense balance ratio, making conflict less likely. Continuing the previous example, if state B adds a \$1 million countermobility system that raises state A's cost to attack by \$10 million, the new offense-defense balance can be expressed as 11:2, indicating a further advantage to the defense.

Geography influences the offense-defense balance through three causal mechanisms. First, rugged terrain slows movement, strains logistics, and strengthens defense more than easier terrain. Second, terrain that provides cover where defenders can hide strengthens the defensive balance. Third, greater distances favor the defense over shorter distances, given the logistical and economic difficulty of an inherently offensive requirement to project power.²⁰

The Offense Dominance of the Space Domain

According to Stephen Van Evera, “‘offense dominant’ means that conquest is fairly easy; ‘defense dominant’ means that conquest is very difficult.” Like Van Evera, this article maintains defending is usually easier than conquering and uses “‘offense dominant’ broadly, to denote that offense is easier than usual, although perhaps not actually easier than defense.”²¹

As discussed above, offense-defense balance theory holds that conflict is more likely in offense-dominant systems. Applying offense dominance in space suggests that given anarchic international systems consistent with realism-rooted security dilemmas, the likelihood of conflict in space is increasing over time due to three causal factors.

First, advances in military technology have made negating a satellite or its mission far less expensive than constructing and fielding one. Second, military technology that enables increased mobility and maneuver in space is quickly developing. Third, a multinational emphasis on improved satellite identification and tracking has eroded the ability of space systems to leverage the opacity of the space domain as an effectual cover. In the following section, this article will outline a theory of offensive dominance in space, supported by present trends that indicate an increased degree of offensive dominance in the domain in the future.

This foundational theory thus enables strategists to bridge the gap between broader IR concepts and competitive endurance. While space as an arena for geopolitical conflict represents an evolution in warfighting domains, the central tenet of offense-defense balance and the implications of military technology and geography still apply.²² In fact, an argument can be made that space is more sensitive to changes in the offense-defense balance, given that space systems are experiencing exponential growth in technological innovation.

20. Glaser and Kaufmann.

21. Van Evera, “Offense,” fn 1, 5.

22. Brad Townsend, *Security and Stability in the New Space Age: The Orbital Security Dilemma*, Space Power and Politics (London: Routledge, 2020).

Advances in Military Technology

Classification issues make quantitative comparisons of advancing military technology's impact on the offense-defense ratio challenging in unclassified settings; nevertheless, some generalizable examples are available. The venerable GPS provides a clear glimpse into how unbalanced the cost ratio of attack to defense has become.

According to the Government Accountability Office, the latest generation of GPS Block IIIIF satellites are procured at approximately \$497 million per unit.²³ Operationally, the GPS constellation requires a minimum of 24 operational satellites to maintain worldwide navigation services 95 percent of the time.²⁴ The cost of the GPS Block IIIIF constellation is calculated to be approximately \$11.9 billion by extrapolating the cost per satellite to the minimum necessary constellation. While GPS jamming is limited to a geographic region, offensive electronic warfare systems capable of negating the GPS mission can be procured relatively inexpensively.

For example, a recent experiment revealed that effective jamming techniques can negate a GPS-enabled unmanned aerial vehicle at close ranges with a \$420 software-defined radio platform.²⁵ Extending to operationally relevant ranges requires only signal amplification, typically costing on the order of tens of thousands of dollars.

Another example of the strong offense-dominant nature of the space environment was the US Air Force's destruction of an earth observation satellite in 2008, worth "hundreds of millions," with a Standard Missile-3 at a total cost of between \$40 and \$60 million.²⁶ Even a conservative offense-defense calculation produces a ratio of 1:4—a figure extremely favorable to the offense.

The lesson of both examples is that very expensive satellites can be negated using very inexpensive counterspace weapons, producing an environment increasingly tilted toward offensive dominance as states develop kinetic and electronic warfare arsenals. Given the technical constraints that prohibit transitioning all Space Force missions to small, proliferated satellite constellations, one should expect this condition to persist for the foreseeable future.

The relative ease of destroying compared to defending space systems is also becoming more pronounced. According to open-source data, the number of satellites operated by the United States' main competitors, China and Russia, has increased by approximately 70 percent between 2019 and 2021.²⁷ This includes significant

23. "Weapon Systems Annual Assessment," Government Accountability Office, June 8, 2023, <https://www.gao.gov/>.

24. "GPS Space Segment," GPS.gov, accessed December 14, 2023, <https://www.gps.gov/>.

25. Renato Ferreira et al., "Effective GPS Jamming Techniques for UAVs Using Low-Cost SDR Platforms," *Wireless Personal Communications* 115, no. 4 (2020): 2705–727, <https://link.springer.com/>.

26. Jamie McIntyre, "Attempt to Shoot Down Spy Satellite to Cost up to \$60 Million," CNN, February 15, 2008, <https://www.cnn.com/>; and Andrea Shalal-Esa, "Expensive New U.S. Spy Satellite Not Working: Sources," Reuters, August 9, 2007, <https://www.reuters.com/>.

27. *Challenges to Security in Space 2022: Space Reliance in an Era of Competition and Expansion* (Washington, DC: Defense Intelligence Agency, March 2022), <https://www.dia.mil/>.

investments in counterspace weapons research and development, deployment, and operations. Neutral and partner nations of the United States have reached the same conclusion and have increased spending on antisatellite (ASAT) weapons accordingly. Among the numerous examples are India's 2019 direct-ascent ASAT missile test and the United Kingdom's investment of \$1.6 billion in military space capabilities.²⁸ Additionally, regional powers such as Iran and North Korea have recognized the offensive imbalance and have increased their development of ASATs in recent years.²⁹

Cumulatively, recent increases in global ASAT development can be viewed as an international consensus on the space domain's offensive dominance. Were it easier to defend a satellite, states would be developing protective technologies in greater proportions. One can expect this space arms race to continue and accelerate in accordance with the predictions of the security dilemma and offense-defense balance theory.

Increased Space Access and Mobility

As mentioned earlier, attacking forces must be able to relocate while defenders can dig into fortified, static locations. Therefore, advances in mobility and maneuver favor the offense. US Joint doctrine defines the task of maneuver as military operations to "place the enemy in a disadvantageous position through the flexible application of combat power."³⁰ Military operations in space are no different. While the principles of mobility and maneuver have endured over the history of war, they assume a new character in the space domain.

In space, concepts of mobility and maneuver manifest as the "ability to resource, apply, and leverage spacepower in, from, and to the space domain."³¹ Principles of maneuver are fundamentally applied in space through operations and technology to increase a state's ability to launch new satellites into space, reposition satellites once in orbit, and resupply operational satellites with fuel or technology updates. Spacefaring nations are increasingly investing significant resources into advancing all three of these applications, which, in turn, further shifts the balance in space to the offense.

Advancements in spacelift technology have rapidly increased the rate at which states can launch satellites. According to data compiled by the Center for Strategic and International Studies, the number of global space launches have steadily risen from 50 in 2000 to 182 in 2022.³² This rise corresponds to the decreasing economic cost of launching satellites. For example, the cost of a heavy launch to low-Earth orbit in 2004

28. Brandon Weeden and Victoria Samson, *Global Counterspace Capabilities: An Open Source Assessment* (Broomfield, CO: Secure World Foundation, April 2023).

29. Kiseok Kang, "Extended Space Deterrence: Providing Security Assurance in Space," *Journal of Strategic Security* 16 (July 1, 2023), <https://doi.org/>.

30. *Joint Campaigns and Operations*, Joint Publication (JP) 3-0 (Washington, DC: Chairman of the Joint Chiefs of Staff, June 18, 2022), III-37.

31. Raymond, *Spacepower*.

32. "Space Environment: Total Launches by Country," Aerospace Security, Center for Strategic and International Studies (CSIS), July 24, 2023, <https://aerospace.csis.org/>.

was \$11,600 per kilogram in the United States. By 2018, that price had fallen to \$1,500 per kilogram, with future projections anticipating additional price decreases.³³ Advancements in China and India have produced similar results.³⁴ Increasing the launch capacity of a state produces a corresponding increase in the amount of military spacecraft, including orbital ASAT systems, that can be deployed to the space domain in a given time.

For historical context, this situation is analogous to the problems of US power projection in World War I. In 1917, the US Army faced a daunting problem transporting a force of 500,000 men to Europe, which required a significant increase in logistical capacity to mobilize quickly and efficiently. The US Army solved its mobilization problem during the war by reappropriating civil and commercial ships.³⁵ In 2023, military space forces face similar bottlenecks to mobilizing technology and deploying satellites from Earth to space. Therefore, spacefaring nations are increasing the number of transports to orbit, now through technological advancement instead of the asset reappropriation of 1917. The result is identical in both cases: more combat power in a theater of operations increases the offensive capability of a deployed force.

This relationship between space mobility and offensive capacity can be demonstrated historically. The military space community underwent a significant paradigm shift in January 2007 when China tested a direct-ascent kinetic ASAT missile on one of its own malfunctioning weather satellites.³⁶ Before 2007, the United States and Russia were the only major states involved in militarizing space. China's ASAT test was the first instance of a US competitor's ability to apply principles of mobility to project combat power into space directly from the Earth. China's direct-ascent ASAT missile ended US policymakers' view of space as an uncompetitive and uncontested environment.³⁷

Since 2007, an additional 10 nations have developed military space programs as part of their national security strategies.³⁸ Furthermore, according to the Central Intelligence Agency, the number of nations with active space programs has grown from 2 in 1957 to 94 in 2023.³⁹ Space was prohibitively distant for most nations in the twentieth century,

33. Thomas G. Roberts, "Space Launch to Low Earth Orbit: How Much Does It Cost?" *Aerospace Security*, September 1, 2022, <https://aerospace.csis.org/>.

34. "China's Long March Rocket Launch Opportunity Opens Auctions for 1st Time," *Global Times*, July 9, 2023, <https://www.globaltimes.cn/>; and Nivedita Bhattacharjee, "India's First Private Rocket Company Looks to Slash Satellite Costs," *Reuters*, November 26, 2022, <https://www.reuters.com/>.

35. "The American Expeditionary Forces - A World at War," Library of Congress, accessed December 18, 2023, <https://www.loc.gov/>.

36. Shirley Kan, *China's Anti-satellite Weapon Test*, RS22652 (Washington, DC: Congressional Research Service, April 23, 2007).

37. Todd Harrison et al., "The Evolution of Space as a Contested Domain," in *Escalation and Deterrence: In the Second Space Age*, ed. Todd Harrison et al. (Washington, DC: CSIS, 2017), <http://www.jstor.org/>.

38. Kari Bingen, Kaitlyn Johnson, and Makena Young, *Space Threat Assessment 2023* (Washington, DC: CSIS, April 2023), <https://csis-website-prod.s3.amazonaws.com/>.

39. Central Intelligence Agency, "Reference - Space Programs," *World Factbook*, accessed December 18, 2023, <https://www.cia.gov/>.

both literally and technologically. Today, nearly any global economy may have realistic aspirations of accessing space.

Yet, a nation's increased access to space is indistinguishable from its increased ability to deploy space forces to the operational environment. In offense-defense balance, maneuver is the ability to "move, supply, and concentrate forces for battle."⁴⁰ US Joint doctrine further defines maneuver as "deploying forces into an operational area" and the ability to "deploy, shift, regroup, or move joint and/or component force formations within the operational area by any means or mode."⁴¹ Taken together, these definitions reveal that increasing spacelift capacity can be properly understood as simultaneously increasing space maneuver and mobility, a condition favoring the offense as evidenced by the Space Force's tactically responsive space concept.⁴²

Space mobility and maneuver are also being increased by government-sponsored advances in in-space servicing, assembly, and manufacturing (ISAM) technologies.⁴³ While ISAM has a wide array of technical applications, the role of satellite refueling in orbital mobility and maneuver is germane to this discussion. Currently, satellites are limited in their ability to maneuver by fuel constraints. While all modern mobilization equipment—including ships, aircraft, and trucks—requires fuel, satellites are uniquely hindered by an inability to be refueled. Therefore, military space planners must be extremely judicious about when and how to maneuver an orbital weapon system. Yet future ISAM advancements that permit on-orbit satellite refueling remove the incentives for operationally constraining mobility and maneuver.

In addition to maneuver implications, the dual-use nature of on-orbit servicing technology presents additional security dilemma problems. States can never be sure whether another state's repair satellite will be weaponized against their space forces.⁴⁴ As one spacepower theorist explained, "If I can tighten a screw on my satellite, I can loosen a screw on yours."⁴⁵ Taken together, increased global space launch capacity and ISAM technology maturation increase orbital mobility and maneuver capabilities and, consequently, the space domain's offensive dominance.

Space Domain Awareness

Under offense-defense balance theory, environments that provide defenders places to hide favor the defense. Historically, space has been a highly opaque setting, giving

40. Glaser and Kaufmann, "Offense-Defense Balance," 62.

41. JP 3-0, III-37.

42. See Aaron Blore, "Responsiveness Is Not Operational: Aligning Strategy in the Newest Service," *Æther: A Journal of Strategic Airpower & Spacepower* 2, Special Edition (Winter 2023), <https://www.airuniversity.af.edu/>.

43. In-Space Servicing, Assembly, and Manufacturing [ISAM] Interagency Working Group, National Science & Technology Council, *ISAM National Strategy* (Washington, DC: White House, April 2022), <https://www.whitehouse.gov/>.

44. Amir Lupovici, "The Dual-Use Security Dilemma and the Social Construction of Insecurity," *Contemporary Security Policy* 42, no. 3 (July 3, 2021), <https://doi.org/>.

45. Nathaniel Lee, conversation with the author, June 9, 2019.

space systems ample opportunity to hide among gaps in sensor coverage. The domain's impenetrability made the military tasks of finding, fixing, and tracking satellites technically difficult. Calculating satellite locations and velocity vectors is prone to mathematical errors, which increase position uncertainty and thus severely hinder ASAT weapons targeting.⁴⁶ The opacity of space is also unsettling for policymakers since they can never be sure that an unknown threat does not lurk in obfuscated terrain.

Accordingly, the Space Force has increased its emphasis on improving space domain awareness (SDA) capabilities, resulting in the first tenet of competitive endurance—avoiding operational surprise. According to the Space Force's chief of space operations, avoiding operational surprise means “space forces must be able to detect and preempt any shifts in the operational environment that could compromise the ability of the joint force to achieve space superiority,” and this “requires an enhanced level of space domain awareness.”⁴⁷

The SDA enhancements have driven significant investment in global terrestrial sensor coverage and the development of several satellites designed to find and track objects in space. In 2015, the US military announced initial operational capability of the Geosynchronous Space Situational Awareness Program. In 2020, the US military established a space surveillance radar system in the Pacific Ocean, and in 2022, the US Space Force and the Australian Department of Defence finalized the deployment of an optical satellite tracking telescope in Australia.⁴⁸ US leadership has also produced a multinational, multisector SDA data-sharing agreement where satellite-tracking data is shared among 117 government, civil, and commercial entities.⁴⁹

While improving space domain awareness capability is a clear imperative for the Space Force, space strategists should think carefully before assuming that increased SDA capabilities will automatically produce a more stable space domain. One cumulative effect of improved SDA is reducing the available locations for unknown defensive systems that constrain attacks. Said differently, increases in SDA capability reduce the uncertainty which acts as a restraining force on leaders' decisions to attack. Additionally, improvements in SDA increase a military's ability to target on-orbit space systems, effectively lowering the cost of attack by increasing the probability of kill. Both factors favor offense over defense.

46. Aubrey Poore, Jeffrey Aristoff, and Joshua Horwood, eds. *Covariance and Uncertainty Realism in Space Surveillance and Tracking* (Washington, DC: Air Force Space Command Astrodynamics Innovation Committee, June 17, 2016), <https://apps.dtic.mil/>.

47. B. Chance Saltzman, “Guardians in the Fight,” keynote address, Air & Space Forces Association (AFA) Warfare Symposium, Aurora, CO, March 7, 2023, <https://www.airandspaceforces.com/>.

48. SpOC [Space Operations Command] Staff Writer, “U.S. Space Surveillance Telescope in Australia Achieves Initial Operational Capability,” *Space War: Your World at War*, September 30, 2022, <https://www.spacewar.com/>; “Swinging for the Space Fence,” USSF, April 7, 2020, <https://www.spaceforce.mil/>; and “Geosynchronous Space Situational Awareness Program,” USSF, accessed December 18, 2023, <https://www.spaceforce.mil/>.

49. USSPACECOM Public Affairs, “USSPACECOM Adds Portugal – a Strategic NATO Ally – to SSA Data Sharing Cadre,” USSPACECOM, July 15, 2020, <https://www.spacecom.mil/>.

A reading of Clausewitz might support the notion that increases in SDA capability remove the advantages of surprise typically perceived as critical to the offense.⁵⁰ Removing the offensive advantage of surprise means increases in SDA capability actually favor the defense. Yet these objections are misplaced for two reasons.

First, there is little justification for the presumption that a force's ability to find, track, and target adversary satellites eliminates the adversary's potential for strategic surprise. Unknown payloads on known satellites provide an effective means of achieving surprise. For example, Russia's deployment of a suspected nuclear satellite has ignited fear and insecurity worldwide. The possibility of a devastating unwarned attack from a satellite with a possible nuclear payload was sufficient enough for congressional leadership to characterize the situation as a "grave national security threat."⁵¹ Here, awareness of the subject satellite's location is insufficient to ameliorate fear of strategic surprise. Surface-to-space antisatellite missiles, hypersonic weapons, fractional orbital bombardment systems, and cyber weapons all provide additional examples of technologies adversaries can utilize to generate surprise despite advancements in SDA capability.

Second, the advantage of surprise is more relevant at the tactical level of war and less effective at the strategic and structural levels of analyses. "History did not show cunning to be a significant trait," argues Clausewitzian scholar Antulio Echevarria. "Nor did it show surprise to be strategically significant, as a rule."⁵² Clausewitz himself observed this in *On War*: "Basically, surprise is a tactical device, simply because in tactics time and space are limited in scale. Therefore in strategy surprise becomes more feasible the closer it occurs to the tactical realm."⁵³

Taken together, these two factors can lead one to reasonably conclude SDA advancements will not significantly impact a state's ability to generate strategic surprise, and even if they did, such impacts would not significantly impact the strategic and structural conditions that are the topic of this article. Therefore, increases in SDA capability will not restrain offensive forces but will inhibit defenders, as argued above.

Competitive Endurance in an Offensive Dominant System

The Space Force's theory of success, competitive endurance, has two primary objectives: space superiority and the stability of the space domain. Given the security dilemma and space's offensive dominance, the service will likely discover that competitive endurance's two objectives are in opposition to each other. Developing the capability necessary to achieve space superiority will destabilize the space domain because US rivals can never be sure of America's benign intent.

50. Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton: Princeton University Press, 1989).

51. Christian Davenport et al., "U.S. Officials Say Russia Has Deployed a Nuclear Weapon in Space," *Washington Post*, February 15, 2024, <https://www.washingtonpost.com/>.

52. Antulio J. Echevarria II, "7 Principles of Strategy," in *Clausewitz and Contemporary War*, ed. Antulio J. Echevarria II (Oxford, UK: Oxford University Press, 2007), 165, <https://doi.org/>.

53. Clausewitz, *On War*, 198.

Consider the US reaction to China's testing of a satellite grappling capability. In 2021, China's SJ-21 satellite attached to a defunct Chinese navigation satellite and towed it to a disposal orbit. As argued earlier, this capability is a clear example of dual-use technology. The SJ-21 could be used as benign space debris cleanup or to attack a US satellite. Viewed through the lens of realism and compounded by uncertainty with regard to China's intentions, the United States had little choice but to interpret the SJ-21 as a threat. As General James H. Dickinson, former US Space Command commander observed, "Whether it's directed energy, whether it's direct ascent . . . or SJ-21s, those kinds of capabilities provide, or can provide, a layer of capabilities that we need to be concerned about."⁵⁴ Unsurprisingly, the United States' rivals have expressed nearly identical concerns about the X-37, the US-developed space plane.⁵⁵

Conversely, actions the Space Force might take to maintain the space domain's stability will likely undermine the service's ability to achieve space superiority. One of the few ways a state can reassure a rival is by using costly signals, such as disarmament, because costless signals are easily dismissed. Yet, such signals in an offense-dominant system are dangerous because of the environmental incentives to attack.⁵⁶ In the space domain, such costly signals will preclude the Space Force from operationalizing the capability needed to ensure the Joint Force has access to space-enabled weapons, if needed. Additionally, costly signals are strongly disincentivized because the United States cannot trust rival powers to reciprocate.

Although these aims seem ultimately unreconcilable as discussed, there is a way forward for Space Force decisionmakers. The Space Force should consider three paradigmatic courses in pursuing competitive endurance to minimize instability while retaining the ability to achieve space superiority.

Invest in Technologies Favoring Defense

Central to ideas of offense-defense balance is the principle of distinguishability between offensive and defensive weapons in some cases.⁵⁷ While current Space Force thinking can be interpreted as doubtful of such distinguishability, the service should consider how future acquisitions impact the offense-defense ratio through the mechanisms of mobility and firepower. According to offense-defense balance theory, high lethality/low maneuverability weapons with limited range are better understood as defensive systems that disincentivize attack by increasing the cost attackers must pay while decreasing the attacker's probability of success. Examples from other domains

54. Cambrie Eckert, "JUST IN: SPACECOM Prepared to Defend U.S. Assets," *National Defense*, July 19, 2023, <https://www.nationaldefensemagazine.org/>.

55. Brent M. Eastwood, "908 Days in Space: Why China and Russia Fear the X-37B Space Plane," *MSN*, May 12, 2023, <https://www.msn.com/>.

56. Evan Braden Montgomery, "Breaking Out of the Security Dilemma: Realism, Reassurance, and the Problem of Uncertainty," *International Security* 31, no. 2 (October 1, 2006), <https://doi.org/>.

57. Jack S. Levy, "The Offensive/Defensive Balance of Military Technology: A Theoretical and Historical Analysis," *International Studies Quarterly* 28, no. 2 (1984), <https://doi.org/>.

that can be applied to space, albeit with limitations, include concepts of point fortification and defense identification zones with appropriate enforcement capabilities.

Develop Defense-centric Doctrines and Tactics

The companion of the inherent capabilities of weapons is the doctrine and tactics that govern their operation. As a historical example, Napoleon's conceptions of maneuver warfare and rapid mobility were not predetermined by the technology of the age—he was working with the same arsenals other states possessed. Napoleon's development of offensive doctrine and tactics that could then be applied to available weapons made him distinct. As one scholar notes, "The offensive or defensive character of a weapons system must be defined by both its intrinsic characteristics and the tactical doctrine which determines its use."⁵⁸

As the Space Force develops and codifies its operational doctrine and tactics, this article recommends the service develop and publish doctrine at the operational level (3-10X) specific to protection as a defined Joint function. Operational doctrine should call out defensive approaches to space superiority. The Joint function of "protection" is an obvious place for the service to start. Operational doctrine will signal both internally and externally the value the Space Force places on defense and stability and will also inform the downstream tactical doctrine used by space operators.

Provide Transparency in Counterspace Strategy and General Capabilities

Minimizing uncertainty in rival states is a third critical element of addressing the tension between the two objectives in competitive endurance. Unfortunately, one of the unintended consequences of the Space Force's development of highly classified space systems is increasing uncertainty and fear among the United States' strategic competitors, thereby exacerbating the existing space security dilemma. While calls for reforming the classification architecture are not new, and while significant barriers to declassification justifiably exist, the Space Force should seek to increase transparency when possible. As General John Hyten, former vice chairman of the Joint Chiefs of Staff noted, "You can't deter people if everything you have is in the black [classified]."⁵⁹

Ultimately, nations who better understand each other will be less susceptible to the misperceptions that drive security spirals and instability.⁶⁰ The Space Force can contribute to this dynamic by reinvigorating discussions about selective declassification, especially of defensive weapons, and ensuring continued open-source access to service doctrine.

58. Levy, 226.

59. Robert Fahs, "Gen. Hyten Finds Over-Classification of Space Information Undermines National Security, Promises Reform," *Transforming Classification* (blog), National Archives of the United States, December 1, 2020, <https://transforming-classification.blogs.archives.gov/>.

60. Charles L. Glaser, "The Security Dilemma Revisited," *World Politics* 50, no. 1 (1997), <https://doi.org/>.

Conclusion

The Space Force's competitive endurance strategy, aimed at achieving space superiority while maintaining stability, faces inherent paradoxes as actions to enhance space superiority may instead destabilize the domain. As technology advances and space becomes more accessible, the space domain's offensive dominance grows, amplifying the security dilemma. The Space Force's commitment to competitive endurance should be guided by these considerations to ensure a secure and stable space environment for the benefit of all spacefaring nations. Addressing the challenges posed by the offensive dominance of space necessitates a reasoned approach grounded in established international relations theory. Failure to connect military strategy to theoretical foundations threatens the ability of policymakers and planners to execute the goals of competitive endurance. Æ

DECODING THE ADVERSARY

Strategic Empathy in an Era of Great Power Competition

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Effective strategy requires strategic empathy. Yet what strategic empathy is and how to practice it remain unclear. As critics warn, the concept is vague and can lead to overly sentimental policymaking. Proponents, however, maintain that strategic empathy is necessary to avoid strategic failure and can reduce the potential for spiraling conflict and miscalculation. This article clarifies the concept, including its linkage to strategy, and offers the framework of strategic narratives as a means for employing strategic empathy so that strategists can develop the necessary mindset to succeed in an era of great power competition.

Retired Lieutenant General H. R. McMaster routinely exhorts US policymakers to employ strategic empathy to better understand how foreign countries behave.¹ He claims strategic empathy is necessary to avoid strategic failures caused by American hubris and narcissism: “We should reject narcissistic tendencies, adopt a reasoned approach to foreign policy based on strategic empathy, and sustain national security and defense strategies that acknowledge the agency that rivals, adversaries, and enemies exercise over the future.”²

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1. H. R. McMaster, “The Retrenchment Syndrome: A Response to ‘Come Home, America?’” *Foreign Affairs* 99, no. 4 (2020); McMaster, *Battlegrounds: The Fight to Defend the Free World* (New York: Harper Collins, 2020); McMaster, “How China Sees the World: And How We Should See China,” *Atlantic*, May 2020, <https://www.theatlantic.com/>; and McMaster, “Developing Strategic Empathy: History as the Foundation of Foreign Policy and National Security Strategy,” *Journal of Military History* 84, no. 3 (2020).

2. *Hearing on Global Security Challenges, Before The Senate Armed Services Committee*, 117th Cong. 5 (2021) (statement of retired Lieutenant General H.R. McMaster, US Army), <https://www.armed-services.senate.gov/>.

McMaster's argument for empathy is not entirely novel. As one scholar recently noted, "Empathy is not a new concept in international relations or strategy."³ Indeed, in 1966, 1984, and 1991, a US Information Agency research officer argued for "realistic empathy" to better understand the Soviet Union, Vietnam, and Iraq, while former Secretary of Defense Robert McNamara's first lesson from his reflections on the Vietnam War was to "empathize with your enemy."⁴ Former Secretary of Defense Robert Gates also exhorts in his memoir that US failures in Afghanistan resulted from policymakers being "profoundly ignorant about our adversaries and about the situation on the ground."⁵

Applying strategic empathy in future planning is essential. After all, military strategy requires "astute analysis of friendly, neutral, adversary, and enemy interests and will."⁶ Further, Joint doctrine discussing the information environment argues, "the Joint Force must change how it views, plans, and executes operations" by developing "the ability to understand the perceptions, attitudes, and other elements that drive behaviors."⁷ The need for strategic empathy is especially acute given the 2022 *National Defense Strategy's* focus on deterrence. As one political scientist explains, three decades of research on deterrence emphasizes one crucial fact: "It is the perceptions of the potential aggressor that matter, not the actual prospects for victory or the objectively measured consequences of an attack."⁸

Despite the calls for strategic empathy and evidence of its importance, what it is and how to practice it remain unclear. To address these issues, this article argues strategic empathy concerns itself with understanding the interests and motivations of others in order to shape their behavior in support of one's national interests. This process is enacted through employment of strategic narratives and analysis of others' narratives. Political actors, whether individuals or a collective, use these narratives to define and mobilize political communities toward their future goals.

In this regard, strategic narratives provide a useful entry point from which foreign observers can attain information regarding the interests, motivations, and future policy directions of others. Such narratives also indicate how such information can be used to shape foreign behavior in ways aligned with one's own strategic objectives. Taken together, approaching strategy through strategic empathy requires one actor,

3. Claire Yorke, "Is Empathy a Strategic Imperative? A Review Essay," *Journal of Strategic Studies* 46, no. 5 (2023): 2, <https://doi.org/>.

4. Robert McNamara, *In Retrospect: The Tragedy and Lessons of Vietnam* (New York: Vintage, 2017); Ralph K. White, "Misperception and the Vietnam War," *Journal of Social Issues* 22 no. 3 (1966); White, "Empathizing with Saddam Hussein," *Political Psychology* 12, no. 2 (1991); and White, *Fearful Warriors: A Psychological Profile of US-Soviet Relations* (New York: Free Press, 1984).

5. Robert M. Gates, *Duty: Memoirs of a Secretary at War* (New York: Alfred A. Knopf, 2014), 589.

6. *Strategy*, Joint Doctrine Note 2-19 (Washington, DC: Chairman of the Joint Chiefs of Staff [CJCS], 2019), vi.

7. *Joint Concept for Operating in the Information Environment*, Joint Publication (JP) (Washington, DC: CJCS, 2022), 19.

8. Michael J. Mazarr, *Understanding Deterrence* (Santa Monica, CA: RAND Corporation, 2018), 7, <https://www.rand.org/>.

via strategic narratives, to consider—although not necessarily accept—the needs and concerns of others and to be willing to adapt one’s own behavior and messaging to resonate with foreign audiences. Defining strategic empathy, including its linkage to strategy and international politics, helps clarify what strategic narratives are and how they function to achieve strategic empathy.

Empathy and Security Studies

Broadly speaking, empathy is the “art of stepping imaginatively into the shoes of another person, understanding their feelings and perspectives, and using that understanding to guide your actions.”⁹ Empathy is thus action-oriented and includes both cognitive and affective dimensions. The cognitive dimension, known as “perspective taking,” is the practice of conscious, deliberate attempts to understand how others perceive and experience the world. In contrast, empathy’s affective dimension focuses on attempts to align one’s feelings with others by understanding their emotional states and how those emotions factor into their behavior.¹⁰

Empathy is distinct from concepts like sympathy or compassion. Whereas sympathy and compassion both imply a prosocial and benevolent attitude toward others, empathy does not inherently require such positive regard.¹¹ In other words, one can empathize with another person’s situation, mindset, and/or emotions without sharing, agreeing, or approving of their perspective.¹² Indeed, the practice of empathy requires one to maintain a distinction between the self and other.¹³ Failure to do so not only risks introducing egocentric biases and inaccuracies regarding others’ perspectives but can also cause negative interpersonal outcomes when linked to perceptions of self-threat.¹⁴

Empathy can be applied at both the micro and macro levels. One can engage in empathy to understand an individual’s mindset, such as that of political leader Russian President Vladimir Putin. Or one can engage in empathy for a generalized other—a grouping of individuals with shared experiences, values, cultural backgrounds, and other factors, such as Russians more broadly. Both instances require at least some knowledge of the subject. Research shows it is easier to empathize with those more similar to ourselves and harder to empathize with those with whom we

9. Roman Krznaric, *Empathy: Why It Matters, and How to Get It* (New York: Perigee, 2014), x.

10. Yorke, “Empathy.”

11. Ute Frevert, *Emotions in History: Lost and Found* (Budapest: Central European University Press, 2011), 150, 178; White, *Fearful Warriors*, 9; and Krznaric, *Empathy*, ix.

12. Matt Waldman, *Strategic Empathy: The Afghanistan Intervention Shows Why the U.S. Must Empathize with Its Adversaries* (Washington, DC: New America Foundation, 2012), 2, <https://static.newamerica.org/>.

13. Amy Coplan, “Understanding Empathy: Its Features and Effects,” in *Empathy: Philosophical and Psychological Perspectives*, ed. Amy Coplan and Peter Goldie (Oxford, UK: Oxford University Press, 2011), 5.

14. Claudia Sassenrath, Sara D. Hodges, and Stefan Pfattheicher, “It’s All about the Self: When Perspective Taking Backfires,” *Current Directions in Psychological Science* 25, no. 6 (2016).

have greater differences.¹⁵ Consequently, US strategists will likely find it easier to empathize with culturally congruent nations than with more culturally divergent nations or nonstate actors.

Strategic Empathy

Strategy requires empathy. According to Thomas Schelling, strategic situations are those whereby “the best course of action for each player depends on what other players do.”¹⁶ Accordingly, the most fundamental solution concepts in game theory assume a player’s ability to view the game from another’s perspective.¹⁷ Beyond strictly rationalist perspectives of strategic behavior, humanists argue empathy is critical in understanding the human landscape within which strategy achieves its desired ends.¹⁸ Empathy, then, is foundational to all theories of strategic behavior, including perspectives from idealism (constructivism), liberalism, realism, feminism, and neo-Marxism with a core thread of international relations research associating the absence of empathy with policy failures and greater insecurity.¹⁹

Analytically, the term strategic empathy is best understood as a more focused subcategory of empathy. As stated, strategic empathy entails one’s attempt to understand another actor’s affective and cognitive perspectives of a situation in order to craft a response that advances one’s own national interest. If practiced correctly, strategic empathy is a crucial factor in gaining information about an adversary or ally’s motivational thinking with emotional considerations as important as cognitive considerations.²⁰

Yet the strategic goal does not end in information gathering. Gaining insight into others’ worldviews achieves strategic outcomes only when that information is applied: it must be used to design one’s behavior in a manner such that the targeted other draws the desired conclusions from it.²¹ In other words, strategic empathy ensures one’s strategic behavior aligns with the other’s perceptions in order to influence that other’s behavior in

15. Peter Goldie, “How We Think of Others’ Emotions,” *Mind & Language* 14, no. 4 (1999); Goldie, *The Emotions: A Philosophical Exploration* (New York: Oxford University Press, 2000); and Amy Coplan, “Will the Real Empathy Please Stand Up? A Case for a Narrow Conceptualization,” *Southern Journal of Philosophy* 49, no. 1 (2011).

16. Thomas C. Schelling, *The Strategy of Conflict* (Cambridge, MA: Harvard University Press, 1960), 3.

17. Tania Singer and Ernst Fehr, “The Neuroeconomics of Mind Reading and Empathy,” *American Economic Review* 95 no. 2 (2005).

18. Yorke, “Empathy.”

19. Joshua D. Kertzer, Ryan Brutger, and Kai Quek, “Perspective Taking and the Security Dilemma: Cross-national Experimental Evidence from China and the United States,” October 1, 2023, *World Politics* (forthcoming), <https://jkertzer.sites.fas.harvard.edu/>; and Yorke, “Empathy.”

20. John D. Grover, *Strategic Empathy as a Tool of Statecraft* (Washington, DC: Center for the National Interest, 2016), <http://cftni.org/>; and Joshua D. Kertzer and Dustin Tingley, “Political Psychology in International Relations: Beyond the Paradigms,” *Annual Review of Political Science* 21 (2018).

21. Robert Jervis, *Perception and Misperception in International Politics* (Princeton: Princeton University Press, 1976).

ways supportive of one's national interests. Mere comprehension of others' interests falls short of achieving one's strategic outcome if not combined with action.

For example, when the Carter administration normalized relations with China, progress occurred only when National Security Adviser Zbigniew Brzezinski unabashedly labeled the Soviet Union a threat to global security while sharing US intelligence on Soviet missile locations with Chinese leaders. In contrast, Secretary of State Cyrus Vance's prior negotiations with Chinese officials failed due to his measured discussion of US-Soviet relations. Despite both US officials' knowledge of the Sino-Soviet split and China's interest in combatting Soviet influence, only Brzezinski was able to communicate US policy in a manner resonant to Chinese leaders, including his usage of more emotive descriptions of Soviet character and interests.²²

Obstacles to Empathy

In the realm of international politics, understanding other actors is easier said than done. As classical realism notes, the anarchical structure of the international system breeds uncertainty and incentivizes actors to misrepresent private information to others.²³ Consequently, failures of empathy frequently lead to security dilemma thinking whereby actions taken by one state to augment its own security leads others, in response, to increasingly fear for their own security, resulting in spiraling conflict.²⁴

In addition to structural challenges posed by the international environment, human factors can make empathy harder to employ. McMaster highlights one of these areas by discussing the problems of hubris and narcissism. Focusing on US foreign policy decision-making specifically, McMaster asserts that US beliefs in American superiority and past military dominance lead policymakers to ignore the wants and needs of others, overemphasize US agency, and discount others' abilities to shape the strategic environment.²⁵

The United States is not alone when struggling to empathize with others. Leaders of other nations inaccurately focus too heavily on their own perceptions of threat while discounting their adversaries' sense of vulnerability.²⁶ Studies show rational and moral thought processes are inhibited when humans are dealing with emotionally charged issues.²⁷ During conflict situations, practicing empathy is more difficult when

22. Zbigniew Brzezinski, *Power and Principle* (New York: Collins, 1985), 197–219.

23. Hans J. Morgenthau, *Politics among Nations: The Struggle for Power and Peace* (Boston: McGraw-Hill, 1985); and James Fearon, "Rationalist Explanations for War," *International Organization* 49, no. 3 (1995).

24. Robert Jervis, "Cooperation Under the Security Dilemma," *World Politics* 30, no. 2 (1978); Jervis, "Hypotheses on Misperception," *World Politics* 20, no. 3 (1968); and Jervis, *Perception*.

25. McMaster, *Battlegrounds*.

26. Janice G. Stein, "Building Politics into Psychology: The Misperception of Threat," *Political Psychology* 9, no. 2 (1988).

27. Grover, "Strategic Empathy"; Karla McLaren, *The Art of Empathy: A Complete Guide to Life's Most Essential Skill* (Boulder, CO: Sounds True, 2013), 272–74; and John Garnett, "The Causes of War and the Conditions of Peace," in *Strategy in the Contemporary World: An Introduction to Strategic Studies*, ed. John Baylis et al. (Oxford, UK: Oxford University Press, 2002), 81.

opposing parties demonize the other, fueling in-group/out-group mentalities that re-inforce negative stereotyping and superiority differentiation, which then prompt greater egoistic behavior.²⁸

Despite these challenges, an aspect of international relations research suggests empathizing with others helps prevent and manage conflict. One analysis argues empathy is crucial to breaking out of the security dilemma and can generate greater appreciation for the causes of fears in others, thereby mitigating actions that would otherwise lead to greater feelings of insecurity or threat.²⁹ Studies have found that putting oneself in another's shoes is "pivotal" to the de-escalation of spiraling conflict and that empathy can serve as an "antidote" to the overestimation of one's importance, mediating the prevalence of enemy images and narratives of enmity that do not reflect the realities and complexities of the situation.³⁰ As a recent study on cross-national empathy shows, prompting individuals to see international issues through the eyes of other states can increase domestic support for international cooperation.³¹

Yet a more nuanced analysis suggests the practice of empathy can have a dark side as well. In competitive situations, engaging in perspective taking can accentuate perceptions of conflict, "akin to pouring gasoline on a fire."³² If actors perceive each other as having opposing goals, perspective taking can make cooperation less likely by heightening awareness of conflicts of interest and reducing trust.³³ Moreover, actors with strong emotional attachments to their in-group identity who engage in perspective taking of a hostile out-group may see the out-group as more of a threat to their own self-identity when social identity is involved.³⁴ When nationalism comes into play, individuals deriving their self-esteem from membership within their national community may become more prejudicial toward a hostile out-group when asked to engage in perspective taking.³⁵

While these studies demonstrate the complexities of empathetic thought processes in international politics, they fall short in explaining how strategic empathy is enacted. Practitioners are thus left with instructions to improve their perspective-taking skills without consideration as to what ends to apply them toward.³⁶ This position

28. Garnett.

29. Nicholas Wheeler and Ken Booth, *The Security Dilemma: Fear, Cooperation, and Trust in World Politics* (New York: Palgrave Macmillan, 2008).

30. Joshua Baker, "The Empathic Foundations of Security Dilemma De-escalation," *Political Psychology* 40, no. 6 (2019); and Yorke, "Empathy."

31. Don Casler and Dylan Groves, "Perspective Taking through Partisan Eyes: Cross-national Empathy, Partisanship, and Attitudes toward International Cooperation," *Journal of Politics* 85, no. 4 (2023).

32. Jason R. Pierce et al., "From Glue to Gasoline: How Competition Turns Perspective Takers Unethical," *Psychological Science* 24, no. 10 (2013).

33. Kertzer, Brutger, and Quek, "Perspective Taking."

34. Mark Tarrant, Raff Calitri, and Dale Weston, "Social Identification Structures the Effects of Perspective Taking," *Psychological Science* 23, no. 9 (2012).

35. Kertzer, Brutger, and Quek, "Perspective Taking."

36. Allison Abbe, "Understanding the Adversary: Strategic Empathy and Perspective Taking in National Security," *Parameters* 53, no. 2 (2023).

seeks to improve the quality of information for information's sake alone, focusing on immediate, tactical interactions among interlocutors rather than strategically shaping the security environment. Yet approaching strategic empathy through the framework of strategic narratives not only mitigates misperceptions but also offers a framework to influence foreign actors' perceptions and behaviors.

A Lens for Achieving Strategic Empathy

Storytelling has long been a central mechanism by which humans understand others' worldviews. Stories—via books, movies, or other storytelling media—present a cast of characters with various motives unveiled by the narrative's plotlines and scenes of action. Audiences lose themselves in well-delivered stories, finding their own attitudes and intentions changed.³⁷ Over time, stories form one's own understanding of the world, including their and others' places within it. For these reasons, assessing foreign actors' strategic narratives offers a useful entry point into understanding and shaping the strategic worldviews undergirding their foreign policy behavior and military strategies.

Scholars of international relations increasingly recognize the power of strategic narratives in international politics. According to one analysis, political actors use strategic narratives as a communication tool to give determined meaning to the past, present, and future in their pursuit of some political goal.³⁸ Such narratives operate on three levels: 1) international system narratives describing how the world is structured; 2) national narratives describing the story of the state, including its values, goals, and identity; and 3) issue narratives describing why a certain policy is needed or disputed.

Strategic narratives serve multiple strategic functions. First, narratives about the state help unite domestic audiences toward collective action by defining a shared identity. Stories about a nation's history, founding principles, moral integrity, and cultural prestige all supply the ontological foundation of a state. This foundation explains who constitutes the "we" (present), which allows the collective to progress by establishing not only what "once was" (past) but also what "ought to be" (future).³⁹ In the US context, these foundational myths include American democratic exceptionalism and beliefs in the universal value of individual rights. When activated, these values enable the United States to pursue a global agenda. When in doubt, or during times of division, US policy turns inward.

37. John Deighton, Daniel Romer, and Josh McQueen, "Using Drama to Persuade," *Journal of Consumer Research* 16, no. 3 (1989); Richard J. Gerrig, *Experiencing Narrative Worlds: On the Psychological Activities of Reading* (New Haven, CT: Yale University Press, 1993); and Tom van Laer et al., "The Extended Transportation-Imagery Model: A Meta-analysis of the Antecedents and Consequences of Consumers' Narrative Transportation," *Journal of Consumer Research* 40, no. 5 (2014).

38. Alistair Miskimmon, Ben O'Loughlin, and Laura Roselle, *Strategic Narratives: Communication Power and the New World Order* (New York: Routledge, 2014).

39. Jelena Subotić, "Narrative, Ontological Security, and Foreign Policy Change," *Foreign Policy Analysis* 12, no. 4 (2015).

Second, strategic narratives make international politics intelligible. Comprehending the overwhelming complexity of the world necessitates cognitive shortcuts.⁴⁰ Narratives provide key sensemaking functions by connecting events together within a larger cause-effect plotline, explaining why certain agents act in the manner reported. On the international level, this includes characterizing one's allies and enemies, reinforcing one's own identity through contrasts to others, and describing routine ways in which international agents treat each other in pursuit of state interests. Such narrative contrasts are evident in the case of the Cold War when US leaders referred to the Soviet Union as an "evil empire"; in US policy following the 9/11 terrorist attacks through the global war on terrorism; and, most recently, in US descriptions of strategic competition with China as a battle between autocracy and democracy.

Over time, national identity narratives and stories about the international system sediment within society, forming cultural cognitive boundaries enabling and constraining the activities of political actors.⁴¹ States form national security cultures derived in part by their national mythologies, narrative constructions of past events, and relationships with historical friends and foes.⁴²

Although strategic narratives can adapt and change, effectively doing so requires the new narrative elements to be interpreted within the previous ones to preserve a sense of before and after.⁴³ Prominent strategic narratives can therefore imbue state policy with enduring master frameworks shaping future policy behaviors in unanalytical and nonreflexive manners.⁴⁴ Russia's anti-Western foreign policy can be read as a legacy of the Cold War while the Chinese Communist Party's narrative of rejuvenating China's strength is rooted in a "century of humiliation" and deeper sense of Chinese civilizational importance. Thus it is possible to identify a country's narrative trajectory and future policy pathways, making assessment of others' strategic narratives a fertile ground to engage in strategic empathy.⁴⁵

Military Understanding through Narrative

Narratives play a crucial role in military operations. Joint Publication 3-04, *Information in Joint Operations*, states "narratives are an integral part of campaigns, operations,

40. Jennifer Mitzen, "Ontological Security in World Politics: State Identity and the Security Dilemma," *European Journal of International Relations* 12, no. 3 (2006).

41. Janet Hart, "Cracking the Code: Narrative and Political Mobilization in the Greek Resistance," *Social Science History* 16, no. 4 (1992).

42. Thomas U. Berger, *Cultures of Antimilitarism: National Security in Germany and Japan* (Baltimore: Johns Hopkins University Press, 1998); Peter J. Katzenstein, *The Culture of National Security: Norms and Identity in World Politics* (New York: Columbia University Press, 1996); and Brent J. Steele, *Ontological Security in International Relations: Self-identity and the IR State* (London: Routledge, 2008).

43. Felix Berenskoetter, "Parameters of a National Biography," *European Journal of International Relations* 20, no. 1 (2014); and Subotić, "Narrative."

44. James V. Wertsch, "The Narrative Organization of Collective Memory," *Ethos* 36, no. 1 (2008).

45. Robert S. Hinck et al., *The Future of Global Competition: Ontological Security and Narratives in Chinese, Iranian, Russian, and Venezuelan Media* (New York: Routledge, 2022).

and missions.”⁴⁶ As one scholar explains, “Military strategy is situated in broader political and public spheres that are linked by storytelling.”⁴⁷ Narratives and military strategy work together to influence adversaries by uniting perceptions and understandings of security, interests, action, and intent. Narratives’ strategic impacts stretch across the continuum of competition by setting, shaping, and contesting the information environment prior to and during conflict.

Approaching strategic empathy through narrative analysis has multiple practical and theoretical benefits for strategists. First, viewing empathy as a narrative competency best explains how one comes to empathetically understand others and helps avoid egocentric biases. Rather than attempting to understand others’ actions by examining their current mental states, a narrative approach can uncover the why of such actions by placing them within a deeper contextual plotline attuned to others’ historical and cultural experiences. Narratives offer a “form or structure” that helps one frame their understanding of others’ behaviors. By understanding others’ actions through narratives, “we start to see others engaged in their actions, not simply in terms of the immediate and occurrent context,” and “we start to see them as engaged in longer-term projects (plots) that add meaning to what they are doing.”⁴⁸

Second, pursuing strategic empathy through narrative understanding contributes toward a more accurate conceptualization of warfare. Citing Carl von Clausewitz, one philosophy scholar explains, “War is not an exercise of the will directed at inanimate matter,” with treatment of it as such “bound to lead to one mistake after another.”⁴⁹ Incorporating empathy thus helps balance the military’s “customary predisposition” toward physical dynamics of warfare including its human elements.⁵⁰

Whereas physical sciences rely on etic understandings of the world, or knowledge produced through only observable behavior, empathy concerns itself with emic understandings, or knowledge of the meanings and interpretations that drive human behavior.⁵¹ Although an etic understanding of warfare is necessary, by itself it is insufficient. Empathy marks an epistemic necessity to warfare, aligned with Clausewitz’s human conceptualization of it, by establishing understandings of others’ symbolic perceptions of their strategic situations.⁵²

Analysis of Russia’s 2022 invasion of Ukraine illustrates the problems of an overly etic approach to war. Focusing on Russia’s overwhelming materiel advantage,

46. *Information in Joint Operations*, JP 3-04 (Washington, DC: CJCS, 2022), II-5.

47. Nick Blas, “Beyond Storytelling: Strategic Narratives in Military Strategy,” *Æther: A Journal of Strategic Airpower & Spacepower* 2, no. 1 (2023), <https://www.airuniversity.af.edu/>.

48. Shaun Gallagher, “Empathy, Simulation, and Narrative,” *Science in Context* 25, no. 3 (2012): 371.

49. Kevin Cutright, “The Empathetic Soldier,” *International Journal of Philosophical Studies* 27, no. 2 (2019); and Carl von Clausewitz, *On War*, ed. and trans. Michael E. Howard and Peter Paret (Princeton: Princeton University Press, 1976), 149.

50. Cutright, 279.

51. Robert H. Lavenda and Emily Ann Schultz, *Core Concepts in Cultural Anthropology*, 3rd ed. (Boston: McGraw-Hill, 2010), 43.

52. Cutright, “Empathetic Soldier.”

strategists believed that Kyiv would quickly fall. Instead, facilitated by Ukrainian President Volodymyr Zelensky's leadership, the invasion of the capital ignited Ukrainian nationalism and led to stout resistance.

Evaluating Strategic Narratives

While strategic narratives can help unveil other actors' views of the strategic landscape, as with empathy, misreading them risks miscalculation. Avoiding the traps of incorrectly applying strategic empathy onto others' strategic narratives requires a brief consideration of what makes strategic narratives effective. Strategic narratives achieve a persuasive effect not through factual accuracy but by the degree to which they resonate with audiences. This resonance comes from the story's coherence and fidelity.

Narrative coherence describes whether the story makes internal sense—whether the characters and their motives and actions flow as expected, with audiences needing sufficient detail or characterization of the agents involved to be able to draw desired conclusions from the story. Narrative fidelity reflects whether a story has external validity—whether it rings true to audiences by aligning with their life experiences, values, and previous outcomes witnessed.⁵³

Narrative fidelity thus is both a resource and constraining factor for elites when constructing strategic narratives. At any given time, multiple narratives circulate among various social institutions, including those constructed by media and governmental structures.⁵⁴ Elites then activate and deactivate certain narrative elements over others to garner support for specific policy agendas. For the story to define audiences' social reality such that they support or act toward the intended goal, however, a critical mass of social actors must accept it as common sense.⁵⁵ Effective narratives therefore must fulfill the audience's need for meaning and purpose while maintaining some level of credibility.

As all political communities possess their own political myths and narrative origin stories, the persuasiveness of a strategic narrative relies on the degree to which such stories can claim universality and cohere with others' strategic narratives.⁵⁶ Narrative persuasion then is grounded in empathy and achieves transnational effects by invoking shared political values and emotions. Effective international narratives can coax nations into supporting foreign campaigning, such as when the

53. Walter R. Fisher, "Narration as a Human Communication Paradigm: The Case of Public Moral Argument," *Communications Monographs* 51, no. 1 (1984).

54. Margaret R. Somers and Gloria D. Gibson, "Reclaiming the Epistemological 'Other': Narrative and the Social Construction of Identity," in *Social Theory and the Politics of Identity*, ed. Craig Calhoun (New York: John Wiley & Sons, 1994).

55. Ronald R. Krebs, *Narrative and the Making of US National Security* (Cambridge, MA: Cambridge University Press, 2015); and Charlotte Epstein, *The Power of Words in International Relations: Birth of an Antiwhaling Discourse* (Cambridge, MA: MIT Press, 2008).

56. Olivier Schmitt, "When are Strategic Narratives Effective? The Shaping of Political Discourse through the Interaction between Political Myths and Strategic Narratives," *Contemporary Security Policy* 39, no. 4 (2018).

United Kingdom and France used Alliance narratives in 2011 to garner American support for military intervention into Libya.⁵⁷ They can also be used by adversaries to undermine such commitment, such as Russia's usage of strategic narratives in the 2014 Ukraine conflict.⁵⁸

Toward a Framework for Assessing Strategic Narratives

Given the strategic function of narratives and the inner grammar of their construction, analyzing how foreign actors construct and project narratives about the international environment can reveal meaningful insight into their national interests and key levers of support or contestation. Due to their public nature, strategic narratives offer one of the most available entry points into empathizing with others. An analysis of strategic narratives begins first by identifying prominent speeches, media coverage of elite rhetoric, and/or countries' strategic documents. Next, a descriptive examination of the core elements of the narrative is required—that is, strategists must identify the actions, agents, scenes, instruments, and motives provided in the story and how these elements operate at issue, national, or international levels.

Third, strategists must evaluate the narrative's logic, setting aside their own cultural and cognitive biases in an attempt to understand how and why the narrative serves some purpose for the political actor(s) involved. If some element of the narrative seems absurd, factually incorrect, or too alien to comprehend, the strategist should seek further understanding from regional experts or other sources of information.

Finally, only after the strategist achieves a sufficient understanding of the other's narrative should they begin to consider how their own objectives align or conflict with others'. In doing so, strategists seek ways to articulate their interests in a manner intelligible to others such that the target audience's behavior is shaped either in cooperative support of the strategist's interests—the logic of soft power and attraction—or through the target audience's recognition and acceptance of the strategist's deterrence messaging—the logic of hard power.

As strategists analyze foreign actors' strategic narratives and articulate their own, they must bear in mind the intersubjective nature of international affairs. While strategists may focus their inquiry on one specific foreign actor, they must not eschew the interests and roles of other countries or political actors in interpreting and reinforcing perceptions of global affairs. Although countries' capabilities vary, building coalitional support for one's narrative, or reducing that of a competitor's, can multiply the persuasive impact of a strategic narrative such that it achieves a critical mass of support from strategic stakeholders, resulting in greater narrative dominance.

As such, when analyzing others' narratives and reflecting upon one's own interests, strategists need to consider the degree of coherence and fidelity their depiction of

57. Laura Roselle, "Strategic Narratives and Alliances: The Cases of Intervention in Libya (2011) and Economic Sanctions against Russia (2014)," *Politics and Governance* 5, no. 3 (2017): 103.

58. Maria Snegovaya, *Putin's Information Warfare in Ukraine: Soviet Origins of Russia's Hybrid Warfare* (Washington, DC: Institute for the Study of War, September 2015), 7, <https://www.understandingwar.org/>.

world affairs may hold for multiple audiences. The more insular one's interests are, or the more specific one articulates those interests, the less space others may have to share in the story, reducing the narrative's strategic impact. Enactment of strategic empathy is thus a two-way process, with the pursuit of one's interests bounded by the target audience's wants and needs; this requires not only an ability to articulate one's interests effectively but also a willingness to, at times, adjust one's policy or behavior so that it aligns with others.

Consideration of others' narratives is especially important in a post-Cold War era as globalization continues to both connect and fragment political communities along cultural and economic fault lines. Unfortunately, two decades of US policy has largely ignored others' interests while emphasizing cosmopolitan values that have little resonance for developing nations. Evidence of this comes from global debates over Russia's 2022 invasion of Ukraine. Instead of viewing the conflict as an affront by Russia to the global order, media narratives and political speeches from Middle Eastern countries and the Global South characterized it as merely a war between Russia and the West.

In both cases memories of the past influenced the perception of the present. For Arabic nations, European countries' warm welcome of Ukrainians fleeing Russia's onslaught was contrasted to the plight of Syrian refugees rejected by Europe. For those in the Global South, the story was but another example of imperialism at work with weaker nations left to bear the burden of higher food and energy costs.⁵⁹ While such narratives are only partially correct—German Chancellor Angela Merkel initially welcomed many Syrians at political cost—they demonstrate the latent effects of ignoring others' material needs, which US competitors like Russia and China actively highlight to discredit the current global order.

Enacting Strategic Empathy

At the 2007 Munich Security Conference, Putin warned that the world had reached a “decisive moment” where it needed to “seriously think about the architecture of global security.”⁶⁰ In doing so, he projected an international system narrative rebuking the Western-led order as deeply “flawed,” lacking “moral foundations,” and leading to a “world in which there is one master, one sovereign”—a world that is “pernicious” for “all those within this system” to which Russia would actively contest.⁶¹

This speech marked the start of Russia's revisionist trajectory, followed by Russia's military invasions of Georgia in 2008, interventions on behalf of Bashar Al-Asad in Syria, and annexation of Ukrainian Crimea in 2014. Throughout this period, Moscow increasingly projected identity narratives lauding Russia's military capability and economic resiliency,

59. Colum Lynch, “The West Is With Ukraine. The Rest, Not So Much,” *Foreign Policy*, March 20, 2022, <https://foreignpolicy.com/>; and Neil MacFarquhar, “Developing World Sees Double Standard in West's Actions in Gaza and Ukraine,” *New York Times*, October 23, 2023, <https://www.nytimes.com/>.

60. Vladimir Putin, “Speech and the Following Discussion at the Munich Conference on Security Policy,” February 10, 2007, Munich, Germany, transcript, <http://en.kremlin.ru/>.

61. Putin.

demonized the West, and anointed itself as the champion of conservative religious values—all of which granted the nation a greater sense of agency and purpose.⁶²

While critical of such claims, the West largely fell victim to Russia's narratives. Western societies not only turned inward, succumbing to Russia's antiglobalist agenda by pursuing isolationist policies and increased questioning of NATO's relevance, but also ceded to Russia's security claims. Most notably, in 2014, a *Foreign Affairs* analysis contended that the 2014 Ukraine crisis was "the West's fault."⁶³ Although this analysis of Russian interests held weight, the conclusion—blaming the West while excusing Russian aggression—marked a sympathetic approach toward Russian interests grounded in an etic understanding of the structural dynamics of international politics rather than one of strategic empathy. Such analysis not only neglects the desires and agency of other nations, but also weakens Western resolve while emboldening Russian behavior.

Although Moscow eventually fell victim to its own strategic narcissism, prevention of future conflict and the pursuit of US national interests are best served not by sympathizing or ignoring competitors' interests but by enacting strategic empathy. This includes a mixture of hard and soft power efforts to articulate the rules of the international system in ways resonant to others and a willingness by the United States and partner nations to defend them. Successful strategic empathy thus requires the study and assessment of others' security challenges as a means for aligning other actors' will in support of US national security; it includes the evaluation of competitor, partner, Ally, and neutral nations' identities and interests as a means to shape regional and global information spaces in ways that dissuade aggression by others.

Fortunately, some evidence of this approach can be seen with current US policy toward China. The US narrative of strategic competition provides space both for cooperative and competing engagements with others. Engagement with regional parties helps raise the costs of China's aggression while solidifying others' commitment toward a rules-based regional order. Such efforts will need to continue, including greater investments into narrative persuasion backed with meaningful action to solidify expectations and routinize cooperative behavior. In the Asia-Pacific region, this means the United States and its Allies must create alternative, multilateral economic opportunities while highlighting the deleterious consequences of China's mercantilist policies. The United States must also continue to link Beijing's support for Moscow to maintain commitment from European nations to rethink their interests with China, including the use of their collective bargaining power to set fairer trade practices and reduce domestic dependencies on Chinese trade.

Ultimately, China's dangerous attempts to remake the international order must be shown as such. Chinese President Xi Jinping's narrative vision of the "China Dream," offers key leverage points to influence China's future trajectory, in particular its continued ability to deliver economic growth and regain the sense of the loss of prestige

62. Hinck et al., *Future*.

63. John J. Mearsheimer, "Why the Ukraine Crisis Is the West's Fault: The Liberal Delusions That Provoked Putin," *Foreign Affairs* 93, no. 5 (2014).

and cultural leadership. In both cases, the United States' ability to demonstrate Xi's lack of progression toward such goals can shift Chinese leaders' strategic calculus through efforts to link Xi's policies to a declining security environment and reduced moral authority, evident in a coalescence of competing forces, a distasteful partnership with Russia, and weakening domestic growth.

Finally, while characterizing the US-China relationship as a battle between democracy and autocracy may be an alluring identity narrative, reframing the competition as one over economic growth, rather than values, avoids discrediting the entirety of China's leadership with such a narrative likely more resonant to developing nations lacking the luxury of ideological considerations. Taken together, affirming how far China has come while noting how far it could fall if it pursues its militarism can reframe its future actions, but only if the United States commits to doing so. Successful strategy toward China, then, requires more than just an understanding of what China wants; it requires US strategists to act upon and communicate this understanding in such a way to keep the world's second largest economy from turning away from the very system that enabled its growth.

Conclusion

As the United States reenters a period of great power competition, this one characterized by its relative power decline, strategic empathy becomes increasingly critical for strategy practitioners. The distinct advantage of empathy in its capacity to deepen our understanding of the adversary can potentially unveil vulnerabilities and avenues for maintaining a competitive advantage, while identifying areas for cooperation as well. The strategic empathy framework detailed above enables one to detect disruptions through analysis of others' strategic narratives. Built upon layered analysis, this understanding facilitates the juxtaposition of varying narratives, which reveal others' inherent power structures, objectives, and underlying strategic logics. This in turn gives insights into the core values and interests of others and assists in identifying pivotal shifts that may call for deeper scrutiny. Beyond these strategic utilities, the framework aids in gauging the effectiveness of campaigns that can challenge others' narratives.

Regardless of the geopolitical backdrop, the universal truth remains: there is an ever-present benefit in comprehending others more deeply and authentically. By harnessing insights offered by strategic empathy through a narrative framework, one can navigate the intricate web of great power competition and ensure their strategies are not just reactive but also forward-thinking and transformative, leading to continuing advantage. Æ

MORAL INJURY
Wounds of an Ethical Warrior

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Moral injury disproportionately affects uniformed service members. When unaddressed, it can cause personal devastation and impair readiness. Yet moral injury is not a problem to be solved; rather, it functions as a check on military institutions. By understanding moral injury as an expected result of humans at war and as a feature of the ethical warrior, leaders can increase readiness and build more resilient service members. Those who embrace their inner humanity and accept the risk to warn others of moral and ethical dangers should be supported, not ostracized. Shifting the conversation from elimination to preparation, military branches can create a culture where warriors can better align moral principles with their chosen profession of military service and deal with moral injury more effectively.

For as long as there have been wars, humans have carried the scars of battle. In the past few decades, the concept of moral injury (MI) has been engaged to assist service members with understanding the internal wounds they encounter. An examination of moral injury, including the continuum along which moral wounds occur, the ways in which service members carry these wounds, the manner in which unresolved moral concerns project onto others—particularly the unit—and the ways in which moral injury has been cognitively confined into existing military paradigms challenge the military to reexamine the phenomenon as both an inevitable and inherent feature of humanity.

Given the enduring nature of war and the complex moral dilemmas that military personnel encounter, a thorough understanding of MI will result in improved outcomes for individuals and will foster a more resilient force.

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Moral Injury Examined

Moral injury is the “psychological, biological, spiritual, behavioral, and social impact of perpetrating, failing to prevent, or bearing witness to acts that transgress one’s deeply held moral beliefs.”¹ The key word in this definition is transgress, derived from the Latin terms *trans* and *gradi*, meaning “to step over.” The morally injured person has drawn a line in the sand. Life on one side involves behaving as a moral being acting in good faith in the world. Life on the other side involves perpetrating, failing to prevent, or bearing witness to things a moral being abhors. The individual has “stepped over” over this line, having violated their deepest convictions. They may have a valid justification for their actions—an ethical dilemma, a mandatory order, or unfortunate circumstances—but they cannot reconcile the event internally. Moral injury differs from posttraumatic stress disorder (PTSD) in the conceptual understanding of the wound and the agent. One study notes,

PTSD, by its nature as a clinical construct, implies guilt and shame to be pathological. Moral injury, in contrast, frames guilt and shame as normal responses by a moral agent with an active conscience attempting to reckon with the moral complexity of combat deployment, which may or may not include the direct experience of warfare.²

Moral injury has also been described as the “effects of the difference between the way things are and the way things should be.”³ Many Americans are raised with rudimentary ethical structures formed by families, schools, community groups, and religious organizations; often simple platitudes prevail. During initial military training, a simplistic understanding of the world can continue uncontested by the service components. Core values are emphasized as the fundamental building blocks of each branch, and many service members’ worldviews are not challenged with critical reflection. What remains for most recruits is a highly curated, optimistic, and unrealistic understanding of the world in which they are entering.

1. Brett T. Litz et al., “Moral Injury and Moral Repair in War Veterans: A Preliminary Model and Intervention Strategy,” *Clinical Psychology Review* 29, no. 8 (December 2009): 697, <https://doi.org/>.

2. Chris J. Antal, Peter D. Yeomans, and Dana S. Kaminstein, “Transforming Veteran Identity through Community Engagement: A Chaplain-Psychologist Collaboration to Address Moral Injury,” *Journal of Humanistic Psychology* 63, no. 6 (November 2023): 803, <https://doi.org/>.

3. Douglas E. Lumpkin, “Moral Injury: A Chaplain’s Perspective” (lecture, Basic Chaplain Course, Air Force Chaplain Corps College, Maxwell AFB, AL, January 21, 2021).

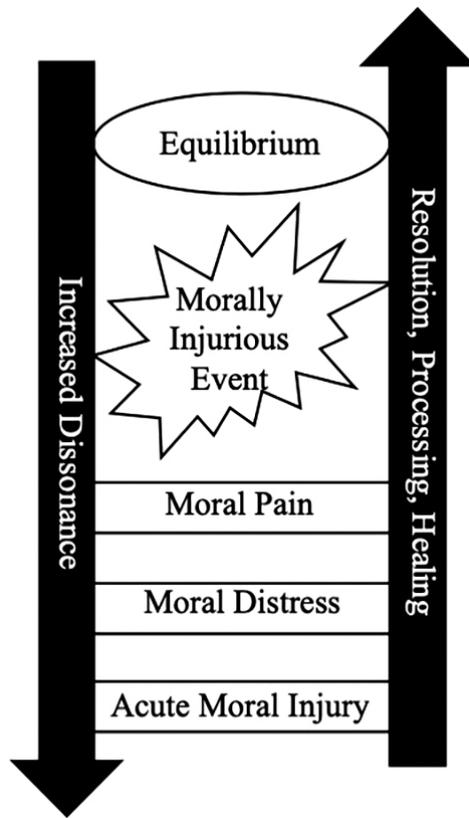


Figure 1. Continuum of moral injury

At some point, many service members will face a situation that does not easily align with their preconceived notions of how the world or the American military system functions. Perhaps it is when they witness combat for the first time, or when a trusted leader betrays shared values. For many, it is in that same moment of experiencing a potentially morally injurious event that they begin to seriously reflect on their “default” beliefs about how the world ought to work.⁴

The cultural background for many Americans, especially those raised in the United States, has not necessarily prepared them to grapple with complex moral situations. Society seldom contemplates morally complicated questions such as, “Is it ethical to kill a child to keep your battle buddies alive?” And while most service members will intuitively recognize the dilemma between their expectations and their current reality, very few will have received moral injury training or completed the deep self-reflection that may potentially offset the dissonance created by potentially morally injurious events.

4. James W. Fowler, *Stages of Faith: The Psychology of Human Development and the Quest for Meaning* (San Francisco: Harper & Row, 1981).

Furthermore, MI wounds are not identical but instead vary in severity on a continuum consisting of three levels: (1) moral pain, (2) moral distress, and (3) acute moral injury.⁵

Moral Pain

Moral pain is a common occurrence when an individual's experience does not align with their understanding of what is right or good. Generally, individuals have the conceptual and community resources to address this type of challenge.

Moral Distress

If moral pain remains unreconciled, however, moral distress can occur, resulting in increased sorrow and anxiety. This is particularly common in complex situations, such as when an individual is faced with the dilemma of choosing between two irreconcilable "right" or "wrong" options or when shared values are betrayed by a trusted leader.

Acute Moral Injury

Any form of unresolved moral distress may escalate into acute MI, resulting in potentially serious physical, mental, and spiritual consequences.⁶ As MI may occur in a variety of ways, it is important to note that events rarely fall into simplistic categories, such as a singular transgression of moral expectation. It is compelling to classify individuals as either perpetrators, victims, or witnesses. Yet people seldom see their complex situations in such clear-cut terms. For instance, if someone suffers harm from a leader, they may also feel anger toward themselves for supporting or continuing to participate in the same system.

In one moral injury narrative, a female service member reports providing sexual favors for a unit commander in exchange for protection from regular exposure to enemy action. The member's distress was multifaceted, concerning their own sexual exploitation (as "victim"), their complicity in exposing other service members to danger (as "perpetrator"), and their inaction to the exploitation of others (as "silent witness" to systemic abuse). All three personas exist and overlap within the broader framework of MI.

Moral Injury Carried

Military members who hold mismatched expectations between their ideal of how their world should work and how the world is currently functioning and who lack a complex moral framework are highly susceptible to moral injury. Psychiatrist Jonathan

5. Philip Stewart, presentation to Invisible Wounds Initiative, via teleconference, Headquarters US Air Force, Washington, DC, September 21, 2021.

6. "Hard Truths and the Duty to Change": *Independent Review Commission on Sexual Assault in the Military* (Washington, DC: DoD, June 2, 2021), 10, 22.

Shay coined this term in the mid-1990s after an extended process of attempting to help Vietnam veterans reintegrate into society.⁷ Moral injury is so intrinsically tied to the military that the bulk of the research deals specifically with service members and veterans.

Those who participate in war are at a heightened risk of developing maladaptive behaviors. Combat exposure is particularly significant as it “raises stakes and generates extreme situations so reliably.”⁸ Relationship issues, anger, and an increase in “multiple mental health symptoms” are all connected to the taking of a life in combat.⁹ The “atrocities of war” have a direct effect on “hazardous alcohol use and drug abuse symptoms.”¹⁰

Furthermore, the risk of committing morally injurious actions “that fall within the rules of engagement” increases in relation to “combat exposure and deployment length.”¹¹ A United Kingdom study of veterans treated by military clinicians found high levels of moral distress—a precursor to MI—among their veteran patients.¹²

Exposure to morally injurious events increases the risk of suicide in post-9/11 veterans. Betrayal, the longest-studied and most frequently cited trigger for moral injury, doubles the risk for a suicide attempt during a member’s time in service. Likewise, women who acknowledge betrayal have over 50 percent higher risk for suicide both during and after separation from the service.¹³ Suicide, while an extreme outcome, serves as a strong indicator of the profound impact service members suffer when experiencing betrayal, either perceived or real.

Betrayal is also a prominent concern of personnel impacted by sexual violence. A DoD commission concluded that individuals who experienced military sexual trauma felt a sense of betrayal from the perpetrators of the assault, their chain of command, and the overall system that was meant to provide support following the traumatic event.¹⁴ Betrayal is a strong predictor of moral dissonance, and repeated minor transgressions can rise to the level of acute MI.¹⁵

7. Jonathan Shay, *Achilles in Vietnam: Combat Trauma and the Undoing of Character* (New York: Scribner, 1994).

8. Joseph McDonald, *Exploring Moral Injury in Sacred Texts* (Philadelphia: Jessica Kingsley Publishers, 2017), 23.

9. Shira Maguen et al., “The Impact of Reported Direct and Indirect Killing on Mental Health Symptoms in Iraq War Veterans,” *Journal of Traumatic Stress* 23, no. 1 (February 2010): 89, <https://doi.org/>.

10. Allison R. Battles et al., “Moral Injury and PTSD as Mediators of the Associations between Morally Injurious Experiences and Mental Health and Substance Use,” *Traumatology* 24, no. 4 (December 2018): 253, <https://psycnet.apa.org/>.

11. Sheila Frankfurt and Patricia Frazier, “A Review of Research on Moral Injury in Combat Veterans,” *Military Psychology* 28, no. 5 (June 9, 2016): 321, <https://doi.org/>.

12. Victoria Williamson, Neil Greenberg, and Dominic Murphy, “Moral Injury in UK Armed Forces Veterans: A Qualitative Study,” *European Journal of Psychotraumatology* 10, no. 1 (2019): 4, <https://doi.org/>.

13. Shira Maguen et al., “Moral Injury and Peri- and Post-Military Suicide Attempts among Post-9/11 Veterans,” *Psychological Medicine*, published online January 17, 2022, 5, <https://doi.org/>.

14. “*Hard Truths*,” 10, 22.

15. Elizabeth G. Epstein and Ann B. Hamric, “Moral Distress, Moral Residue, and the Crescendo Effect,” *Journal of Clinical Ethics* 20, no. 4 (2009); Henk ten Have and Mario do Céu Patrão Neves, “Moral Residue,” in *Dictionary of Global Bioethics* (Cham, Switzerland: Springer, May 28, 2021); and Jill Horning, “The Moral Consequences of Context” (thesis, McMaster University, Hamilton, Ontario, 2015).

Counterintuitively, geographic proximity to hostilities does not affect risk. The technology of remotely piloted aircraft permits crews to be thousands of miles physically removed from their target while maintaining a close cognitive and empathic connection.¹⁶ Pilots and sensor operators are separated merely by the screen distance, approximately eighteen inches, from the perpetration of violence. Remote warriors “kill an enemy combatant, see the horror of his body being blown apart or his blood spewing everywhere, watch his heat signature escape from his body as he dies, and watch those that come to mourn his death—all in zoomed-in high-definition color.”¹⁷

Likewise, Intelligence Community professionals, who appear even further removed from hostilities, can also experience moral injury. As part of their routine duties, analysts examine violent content through images, audio, and video, and clandestine operators depend upon lies and deception to thwart enemy objectives. Such situations can lead to moral distress, violating the notion that one should always act with integrity and speak the truth in all circumstances.

For individual service members, the impacts of unaddressed MI can be devastating. “The capacity for trust” in others is impaired, and they may experience an elevated level of despair.¹⁸ If a rigorous effort is not undertaken to confront the dissonance, it will continue to haunt the morally injured person, and they will persist in behavior that “undermine[s] their own well-being and engagement in life.”¹⁹

Moral Injury Projected

The profound individual toll associated with unresolved MI can lead to a flawed assumption by those who observe it. Rather than embracing the systemic nature of the problem, leaders are apt to assume the service member alone will bear the brunt. This is an understandable assumption, as one of the leading indicators of MI is isolation. Personnel “experience a withdrawal,” removing “themselves from their support systems and society in general.”²⁰ Yet the impacts of MI are rarely contained within the sphere of an individual human being and frequently extend to both the family and the military unit.

Leaders are frequently shielded from the specific details of their subordinates’ home life as individuals attempt to maintain autonomy and separation between their personal and professional duties. Insofar as individuals wish to maintain this separation, it is reasonable to assume leadership may be unaware of severe moral injury until

16. Dave Blair and Karen House, “Avengers in Wrath: Moral Agency and Trauma Prevention for Remote Warriors,” *Lawfare* (blog), November 12, 2017, <https://www.lawfaremedia.org/>.

17. Kenneth Wayne Phelps III, *On Killing Remotely: The Psychology of Killing with Drones* (New York: Hachette Book Group, 2021), 206–7.

18. Jonathan Shay, “Moral Injury,” *Psychoanalytic Psychology* 31, no. 2 (April 2014): 182, <https://psycnet.apa.org/>.

19. Frankfurt and Frazier, “Review,” 322–23.

20. MaryCatherine McDonald, “Haunted by a Different Ghost: Re-Thinking Moral Injury,” *Essays in Philosophy* 18, no. 2 (2017): 5, <https://doi.org/>.

the member's readiness is disrupted by the symptoms. If the fallout from maladaptive social behavior, relationship complications, and mental health concerns begin to overwhelm the member's ability to cope, those who are experiencing instability in the mental, spiritual, and social domains will progress until they are unable, unwilling, or unqualified to meet their work mission requirements.

Physical ailments are also a symptom of moral injury. Research indicates sufferers associated not just mental anguish with their untreated moral wounds but also chronic, physical pain.²¹ One clinical psychologist explains "bodily pain" is "more familiar than 'trauma pain,'" and service members "find it easier to focus upon, and to complain about physical pain than to connect with the various forms of the distressingly subtle, indefinable, and incomprehensible forms of psychological pain."²²

By classifying their symptoms as physical pain, service members are permitted to exert seeming autonomy over the situation and can engage in a nonstigmatized form of treatment.²³ Pain is also a useful rationale for further isolation and avoiding additional triggers or other potentially morally injurious situations. Regardless of which factors are exhibited, an inability to accomplish the mission might be a potential sign of one of the three forms of wounds experienced along the continuum of moral injury.

When MI persists over an extended time frame, what initially appeared to be issues with personal readiness or discipline in the member can present in an increasingly severe symptomology. A chaplain recounts this phenomenon after accompanying a collection team at the site of a rotary wing crash, where all souls aboard were lost. The decision by the team leader to fly a training mission, despite weather warnings, haunts the rescuers with a sense of systemic, moral betrayal to this day:

I keep in touch with [members of] the search and rescue team. . . . Many of them exited the service shortly after, and I do not believe that is a coincidence. Some just waited for their enlistments to run out, but others began to have significant issues that did not seem to match their previous work ethic. Things just began to happen to these men and women as they processed that

21. Hannah M. Hinkel et al., "Moral Injury and Chronic Pain among Military Veterans in an Integrated Behavioral Health Clinic," *Psychological Trauma: Theory, Research, Practice, and Policy* 15 (2023): 140–43, <https://doi.org/>; Rachel L. Boska et al., "Understanding Moral Injury Morbidity: A Qualitative Study Examining Chaplain's Perspectives," *Journal of Religion and Health* 60, no. 5 (October 2021): 3090–99, <https://doi.org/>.

22. Renos K. Papadopoulos, *Moral Injury and Beyond: Understanding Human Anguish and Healing Traumatic Wounds* (London: Taylor & Francis Group, 2020), 4.

23. See Pinky Dharmshaktu, Vandana Tayal, and Bhupinder Singh Kalra, "Efficacy of Antidepressants as Analgesics: A Review," *Journal of Clinical Pharmacology* 52, no. 1 (January 2012): 6–17, <https://doi.org/>; and Gregory T. Carter and Mark D. Sullivan, "Antidepressants in Pain Management," *Current Opinion in Investigational Drugs* 3, no. 3 (March 2002): 454–58, <https://pubmed.ncbi.nlm.nih.gov/>.

event. Some of them did not have the capacity, ability, resources, or support they needed to handle it in a good way.²⁴

The shock of handling human remains, especially “for those who are unaccustomed or unprepared . . . is one of the most consistent predictors of long-term distress.”²⁵ Feeling that those sacrifices were unnecessary turned this tragedy into a morally injurious event. Barring comprehensive, force-wide engagement on MI, members are required to either hide symptoms, depart service, or face discharge after destructive outcomes manifest.

A further impact on the military organization is unit effectiveness in combat. One former commander for a remotely piloted aircraft squadron explains that “causing moral injury is a tactic of the enemy.”²⁶ With advances in emergency medical care and the increase in troop safety afforded by technology, battlefield casualties are far less frequent than in previous conflicts. As a potential adversary looks for new ways to inflict wounds on troops, they leverage the moral framework of American service members as a tactic to create psychiatric and spiritual casualties. Methods such as employing human shields or establishing fighting positions in hospitals or religious sites can be seen as a purposeful tactic to reach this end state. The desired outcome is to push the combat operator into a moral extreme.

On one end of the spectrum, the service member hesitates to engage for fear of violating their own standards or facing society’s moral consequences. On the other, they allow anger to cloud their interpretation, outright dismissing the rules of engagement and employing an ends-justifies-the-means ethic, up to the committing of war crimes and atrocities. Both outcomes can be exploited.

In the narrative below, a veteran explains how a morally injurious situation quickly modified his moral framework on the battlefield:

In Iraq, one of their biggest tactics was . . . female suicide bombers. So, there was a school there for special needs girls . . . anywhere from 10–15 years old, and they would take them out of the school and rig those explosives and tell them to walk. . . . That changed my moral compass. . . . I have no problem shooting guys in the face. You know, it’s like, ahh, that’s the reason. . . . I [realized] I do not have any issues, that I can sleep real good at night knowing I shot these guys in the face. . . . That’s tough.²⁷

24. Philip N. Stewart and Douglas E. Lumpkin, “Bearing Witness: A Phenomenological Analysis of the Intersections between Service Members, Military Chaplains, and Potentially Morally Injurious Events,” in *Moral Injury Research, Discussions, and Support Methods*, vol. 2, ed. Susan Watson and Daniel L. Roberts (Robbins, NC: Moral Injury Support Network for Servicewomen, Inc., 2023), 53–54.

25. Litz et al., “Moral Injury,” 696.

26. David Blair, “Understanding Remote Warfare: Cognitive Distance vs. Physical Distance” (lecture, SOCOM 2019 Moral Injury Symposium, Washington, DC, August 6, 2019).

27. McDonald, “Haunted,” 15.

In the same story, both extremes play out. On one hand, this combat veteran expresses a personal animosity toward the injustice he is witnessing. Unchecked, these feelings can lead to vigilantism. Per the interviewer, however, the statement, “That’s tough,” was not about the young women who were being targeted, but rather that the veteran was “surprised and troubled by his lack of shame or guilt.”²⁸

The injured are tormented by a world that lacks moral boundaries. Moral injury is not just an individual concern. A frequent refrain to describe veterans across multiple generations of combat is “the war followed them home.” This is just as true for the military units as it is for the families who express these sentiments. Those who do not or are not able to process their experiences can only internally contain the suffering for so long. At some point, the ripple effects will be noticed by all those around, including the military organizations they serve.

Moral Injury Confined

The phenomenon of moral injury has the potential to hamper unit effectiveness through hesitancy to act in morally ambiguous situations, through shifts in unspoken organizational ethos, and through transgressions which range from minor up to full dereliction of ethics, while causing readiness issues for individuals and their families.

Therefore, it is important for leaders to confront the causes and effects of MI. Furthermore, commanders have their own moral responsibility to fulfill, namely, returning the nation’s sons and daughters to life as a civilian after their time of service is completed. When facing a crisis of this magnitude, military leaders may be tempted to treat MI with an “identify, diagnose, and eliminate” methodology. To mediate the effects of MI on the force, two systems are often proposed as potential solutions: military medicine or education and training.

Military Medicine

The military medical system specializes in caring for the wounds of combat. In recent decades there has also been a heightened focus on PTSD and traumatic brain injury. These maladies have been categorized as “invisible wounds,” considered the “signature injuries” of the Global War on Terror.²⁹ Simultaneously, veterans have voiced a growing awareness of their own moral injuries. Given the presence of occasional overlapping symptoms, some in the medical community have integrated MI treatment as a component of the existing invisible wounds framework.³⁰

28. McDonald, 12.

29. National Council on Disability, *Invisible Wounds: Serving Service Members and Veterans with PTSD and TBI* (Washington, DC: March 4, 2009), <https://files.eric.ed.gov/>.

30. Philip Held et al., “Using Prolonged Exposure and Cognitive Processing Therapy to Treat Veterans With Moral Injury-Based PTSD: Two Case Examples,” *Cognitive and Behavioral Practice* 25, no. 3 (August 2018): 17–18, <https://doi.org/>.

Though convenient to group these wounds into a similar category, this simplification leads to problematic conclusions. By implementing a medical model, a service member may assume they are broken and must be fixed; there is significant concern that pathologizing moral injury could lead to it being seen as a “stain on the service member’s or veteran’s moral character.”³¹ Commanders may also assume someone honestly wrestling with moral complexity is unfit for the mission. This is a dangerous precedent, leading to moral and spiritual health being used as a go/no-go indicator for readiness. This behavior will likely drive further stigma and ensure that dissonance will be left to fester.

Moral injury experts question “the efficacy of the psychiatric paradigm when used as a sole or in some cases even a primary resource for approaching unusual forms of veteran distress such as those often associated with MI.”³² Traumatic experiences need not be regarded as dysfunctions, but rather as unfortunate but vital components of a person’s story, capable of producing development and even personal growth as that person engages in the exploration and processing of difficult situations.

Training and Education

Similarly, the military’s training infrastructure is another compelling system in which to employ a solution for MI. It is robust, exists at every stage of the personnel life cycle, and excels at distributing military-specific information to large groups of people. Yet top-down directed training also presents both legal and perception hurdles. As morality significantly overlaps religious and spiritual issues, treading too far into this territory is constitutionally dangerous. Similarly, those “struggling with moral conflict may perceive justifications coming from military commanders, psychologists, and chaplains, even when well-intentioned, as a form of betrayal, and consequently lose trust and develop a sense of alienation.”³³

Furthermore, there are “a variety of moral injuries suffered” and a “variety of repair[s] . . . [as] each experiences war differently.”³⁴ Mass training is bound by time constraints and a need for uniformity, neither of which address important needs for those with moral concerns. While some effective preventative work can be done, such as training leaders on ethical decision-making, this is not a sufficient substitute for intentional development of individual members’ abilities to critically reflect on moral and ethical matters.

31. Erika Ann Jeschke, “Marooning Moral Injury,” *Æther: A Journal of Strategic Airpower & Spacepower* 2, no. 3 (Fall 2023), 75, <https://www.airuniversity.af.edu/>.

32. David W. Alexander, “Defining and Differentiating Moral Injury’s Key Features,” *Mental Health and Addiction Research* 3, no. 3 (2018): 6, <https://doi.org/>.

33. Tine Molendijk et al., “Contextual Dimensions of Moral Injury: An Interdisciplinary Review,” *Military Psychology* 34, no. 6 (November 2, 2022): 747, <https://doi.org/>.

34. Nancy Sherman, *Afterwar: Healing the Moral Wounds of Our Soldiers* (New York: Oxford University Press, 2015), 10.

While it is vital to introduce the general concepts of moral injury, traditional military training methods are unlikely to produce any further practical benefits. MI is messy and individualized. A deeper understanding of the subject and methods for healing would remain beyond the extent of what most service-wide training programs could provide.

Moral Injury Reexamined

Medical and military training models have significant limitations, and leaders often resort to the familiar “find, fix, and finish” methodologies to address battlefield issues. As a result, these factors contribute to assumptions that impede the military’s capacity to confront the complexities of MI. The greatest misconception is that moral injury can be completely prevented. Yet the injury is as old as war itself, and warriors have recorded its effects as long as writing has been a mode of communication.³⁵ The only way to eliminate MI in combat is to eliminate warfare completely. Therefore, the most efficacious step toward reducing the impact is for the nation’s leaders to carefully consider the physical, mental, and spiritual burdens placed on their warriors before ordering them into combat.

As former President Jimmy Carter has said, “War may sometimes be a necessary evil.”³⁶ Violence, death, and destruction are the core ingredients of combat. No matter how justifiable its cause, military members will be injured, the innocent will be harmed, and lives will be lost. Yet, if we acknowledge the existence of a “necessary evil,” that requires inflicting harm to prevent greater harm, it implies that some actions taken by humans as a result of inherently good human characteristics—courage or the desire to protect others—result in individual harm done while providing increased safety to others. The ability to experience MI embodies this feature of humanity.

Moral injury, when best understood and when processed in a meaningful way, is more akin to a guardrail than a disease. Those who face MI should not be seen as weak or broken. Rather, this feature of their humanity should be embraced, as an outright positive display of the character required in which to conduct a fight justly. Those who embrace their inner humanity may function as the proverbial canary in a coal mine, warning others of dangers, while placing themselves at risk.

For example, while the incident still would have occurred, an individual raising their moral distress regarding the actions of Kilo Company, Third Battalion, First Marine Regiment, in Haditha on November 19, 2005, would not only have made a significant difference in the months that followed, but also expressing this distress may have changed the narrative relayed to the public surrounding US involvement in Iraq.³⁷

35. Shay, *Achilles*, 6.

36. Jimmy Carter, “Nobel Peace Prize Lecture” (lecture, Nobel Peace Prize, Oslo, Norway, December 10, 2002), <https://www.jimmycarterlibrary.gov/>.

37. William Langewiesche, “Rules of Engagement,” *Vanity Fair*, March 26, 2007, <https://www.vanityfair.com/>.

While an enemy might try to leverage foundational morals against the force, it remains true that a well-developed human conscience is the strongest tool of diplomacy available, increasing overall effectiveness of a force in the information warfighting function for internal, ally and partner, and even enemy recipients of a prevailing narrative. Moral warriors should be educated and cultivated. Leaders ignore these voices at their peril.

Furthermore, experienced warriors must act as safety valves for future generations. When expressed, MI is the root of the nation's conscience, acted out in a human form. By reflecting upon the folly of their own experiences, veterans may spare the nation's sons and daughters from moral and physical harm.

Great leaders and tacticians understand this role of moral injury. It explains how William Tecumseh Sherman can say, "I am sick and tired of fighting. . . . Even success the most brilliant is over dead and mangled bodies. . . . It is only those who have never heard a shot, never heard the shrieks and groans of the wounded and lacerated (friend or foe), that cry aloud for more blood, more vengeance, more desolation."³⁸ And later, as then US Army Chief of Staff Dwight Eisenhower said, "I hate war as only a soldier who has lived it can, only as one who has seen its brutality, its futility, its stupidity."³⁹ It is through the means of moral humans that nations should execute warfare, and likewise, be constrained by those same individuals.

Moral Injury Embraced

If the ability to be morally injured is not a weakness but rather a necessary feature of a healthy and ethical human conscience, then leaders at all levels must understand and embrace this uniquely human phenomenon inside of military formations. The discussion of disorienting experiences and healthy processing of traumatic events should be modeled by leaders, and service members must receive opportunities to explore these concepts without fear of retaliation. Likewise, military leaders must integrate the inevitable consequences of using moral beings as a weapon system into a foundational understanding of the force. Yet this is not necessarily intuitive to military leaders nor support agencies, which both rely on existing models to inform their thinking on this issue.

One applied behavioral ethicist advises leaders to view their organization's moral network as a human immune system. This paradigm places moral injury in an appropriate frame of understanding. Like the body, service members become exposed to harmful events which may produce MI; such is the nature of living. They will need to know how to respond to those events. They will need to build immunity to those things which intend to do them harm.⁴⁰ It is for this reason that inoculations can build

38. B. H. Liddell Hart, *Sherman: Soldier, Realist, American* (New York: Da Capo Press, 1993), 402.

39. Dwight D. Eisenhower, "Address before the Canadian Club" (Canadian Club, Ottawa, Canada, January 10, 1946), <https://www.eisenhowerlibrary.gov/>.

40. Marc-Charles Ingerson and Douglas E. Lumpkin, "Developing Moral Agility: Parallels from the Human Immune System," preprint, submitted February 20, 2023.

qualified, controlled immunity without direct exposure to an agent that would otherwise result in catastrophic consequences. Intense exposure to moral-injury-inducing events can overload the moral immune system, but cautious inoculation can train the moral immune system to react rightly to potentially morally injurious events.

A human's immune system contains three lines of defense against harmful elements:

- The barrier immune system is the most effective layer of defense, keeping pathogens outside of the organism. A primary representation of this feature is the skin, which forms a shield that blocks harmful entry.
- A more generalized defense is the innate immune system. At this level, the body uses uniform tactics to quickly respond to and counter pathogens. This one-size-fits-all approach does not always work and may require a more advanced tactic from the adaptive immune system.
- The adaptive immune system is the last resort when a pathogen has not been handled by the other defensive mechanisms. As the most specialized layer, it recognizes harmful characteristics and builds immunity to any future encounters.

When the body's lines of defense function, both independently and in tandem, they enhance the system's ability to maintain overall health. Understanding this layered approach can offer valuable insight into determining the most effective areas for the military enterprise to focus its effort on developing immunity against the most adverse effects of MI. In applying the insight of this analogy to the military context, the service components can strengthen their three lines of defense to combat the potential dangers of MI.

Ethical Image Barrier

The initial component of the human immune system analogy is the barrier layer. In the same fashion that one's skin presents a certain image of the body to the world, the United States military also presents an image to the public. The skin layer for the military is the presentation and discussion of common values and norms of military service—the profession of arms as a shared value and the explicit and implicit narratives that accompany this.

To demonstrate an image of an authentically moral force would further curb the negative effects of MI. In this system, standards for moral and ethical choices remain high. Service members seek a nuanced understanding of complex world events and opposing forces without resorting to dehumanizing tactics. Recruits are equipped with this knowledge before they raise their hand to join, and it continues with them as part of their formation. Those who would violate those norms are prewarned that it will not be tolerated and considered a failure to adapt. (Incidentally, this is the image the military purports to exhibit, but it does not do this in practice.) While this is a noble aspiration, the difficult work in this phase of immunity is ensuring the actions throughout the organization always meet up with the aspirations. If this layer does not provide adequate, genuine protection, the system will be overrun by harmful effects.

Indeed, organizational culture is a protective factor with regard to moral injury. From the unit to the service level, the authenticity of leadership and organizational culture have a profound impact on the potential for morally injurious events to occur and on the reactions of members to these events.

Replicated Innate Moral Values

The second insight from the human immune system concerns the innate immunity level. Something is innate when it is inherited or an essential component. The most important task for embracing moral injury involves building the knowledge and acceptance of this peculiar military-centric phenomenon into the DNA of every troop. It is crucial to provide ethics training that encompasses both specific career fields and warfare in general. Morally complex scenarios should be inserted into exercise and training scenarios to build repetitions of this moral muscle in junior officers and enlisted members.

Leaders at every level should strive to model moral thinking in their decision-making. Furthermore, when betrayal or ethical violations have occurred inside an organization, leaders should seek to deal with the behavior as transparently as possible. Shay argues when leaders are “expert, ethical, and properly supported,” many cases of MI can be completely avoided.⁴¹ Troops “who reported better leadership were more likely to report following the rules of engagement” and a staggering “30% of soldiers and Marines reported that their commanding officers did not clearly disavow unnecessary harm to noncombatants.”⁴² Additionally, one scholar compellingly argues commanders and judge advocates can also prevent MI by “decisively-engag[ing] risk areas at the embryo stage” as it “might lead to legal issues if left unaddressed.”⁴³ All service members are essential to this process.

Rituals have also been shown to play an important role in the processing of MI.⁴⁴ The military has a long history of welcoming ritual and imbuing it with meaning for the force. Expanding opportunities in this realm would prove a useful addition to the military structure. Events in which service members from past wars impart hard-earned knowledge to future generations would be incredibly useful.

Likewise, purposeful engagements between civilians and military members, in which a realistic view of warfare could be shared, would do a great deal to assist personnel who feel disconnected from the country that sent them to war. Other modern rituals will also need further development. For instance, a squadron that has a 24-hour stateside mission has a sign over its front door that reads, “Welcome to the AOR,” and personnel tap that sign on their way into the building. Conspicuously missing is a similar ritual for members to be reminded that when they leave for the

41. Shay, “Moral Injury,” 183.

42. Frankfurt and Frazier, “Review,” 321.

43. Erik D. Masick, “Moral Injury and Preventative Law: A Framework for the Future,” *Military Law Review* 224 (2016): 267.

44. Molendijk et al., “Contextual Dimensions,” 5.

day, they are crossing back over from being people of war to people of peace in their families and communities. Creating scenarios to accept and process moral injury as a regular part of military life is a crucial step in moving forward, toward a culture that supports the well-being of service members who have experienced MI.

Specialized Adaptive Interventions

The final measure of strengthening the MI immune system exists at the adaptive level. For the body, this stage is where previous exposure allows a targeted and specific response to a pathogen. Specialized cells undergo a maturation process so they can eliminate unwanted intrusions and produce antibodies that mark the harmful substances. The parallel for the military requires a specific determination and maturation process for specialized individuals, who could recognize the signs and symptoms of MI.

The chaplain corps is a key resource in this effort. The 72-hour master's level education required for incoming chaplains includes extensive study in morality, spirituality, ethics, and grief. This prerequisite training, along with their experience in pastoral care and counseling, makes chaplains a uniquely qualified resource for MI care.

Similarly, experienced warriors who have faced and processed their own moral injuries are prime candidates for recognizing and guiding other service members through a process of integration. What both chaplains and these experienced warriors share is the ability to function as a "benevolent moral authority."⁴⁵ This is a key ingredient, as veterans consistently report that discussion of morally injurious events "with friends, colleagues or family members was considered cathartic"; however, those conversations alone do not help "to resolve their moral dissonance."⁴⁶

Alongside the right personnel, addressing MI also requires engagement in the contexts in which it is most likely to occur. This includes, but is not limited to, post-deployment, after the loss of comrades, during human remains collection, after the betrayal of a leader, in response to accidents and natural disasters, and prior to the conclusion of military service. Training, equipping, and deploying chaplains and experienced warriors to situations in which potential morally injurious events are likely to occur is vital to combat the harmful effects of unprocessed trauma. Using this three-tiered model of (1) an ethical image as a barrier, (2) highly replicated innate moral values, and (3) specialized adaptive intervention techniques, the military system can better protect itself against the harmful effects of MI.

Conclusion

Acknowledging moral injury as a normal occurrence for an ethical warrior may be operationally difficult when a commander or a unit is faced with readiness concerns and

45. Litz et al., "Moral Injury," 701.

46. Victoria Williamson et al., "The Impact of Trauma Exposure and Moral Injury on UK Military Veterans: A Qualitative Study," *European Journal of Psychotraumatology* 11, no. 1 (December 31, 2020): 6, <https://doi.org/>.

the devastating effects of acute moral injury on those who are suffering. Yet the ability to endure damage to the soul serves as a vital check mechanism within human warriors and protects the militaries they serve. Implementing recommendations from the immunity model of MI can improve the overall well-being of units and individuals.

Rigorous training on ethical and moral fundamentals, particularly in small group settings, enables personnel across the force to replicate principled character traits. Recognizing when MI is present or likely to occur allows chaplains, specialists, and experienced warriors to impart knowledge to younger generations. Likewise, unquestionable ethical conduct at all levels of leadership sets a standard for the institution as a whole. Leaders must be prepared to meet these challenges with their personnel, ensuring they are equipped to make appropriate moral and ethical judgments in the most complex situations. Æ

**LETHAL TARGETING
THROUGH US
AIRPOWER**
A Consequentialism Perspective

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What model provides a framework for determining a proportional amount of good for lethal targeting? Employing a qualitative, comparative case study approach, this article argues that a consequentialist approach can assess proportional good, aiding ethical decision-making in lethal targeting. The model derived from this analysis provides another means for policymakers to assess the ethical employment of airpower and spacepower. This consequentialist perspective enriches the lethal targeting discourse within foreign policy, complementing existing theories and offering insights into ethical decision-making in these circumstances.

The employment of lethal targeting, once rare, grew significantly after September 11, 2001. This politically motivated action is intended to eliminate a perceived threat. Yet the consequences of lethal targeting extend far beyond the immediate situation, impacting the broader geopolitical landscape. These consequences underscore the need to address its ethical and practical challenges.¹

This article addresses a crucial question: What model provides a framework for determining a proportional amount of good for lethal targeting—that is, how does one determine whether the ends justify the means of a targeted killing? Employing a qualitative, comparative case study approach, this article argues a consequentialism ethics approach can assess proportional good, aiding ethical decision-making in targeting. The argument emerges from two case studies that apply consequentialism’s “weighing machine” of positive versus negative outcomes to analyze each case. The model derived from that analysis provides another means for policymakers to evaluate the ethical employment of airpower and spacepower.

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1. Michael C. Haas and Sophie-Charlotte Fisher, “The Evolution of Targeted Killing Practices: Autonomous Weapons, Future Conflict, and the International Order,” *Contemporary Security Policy* 38, no. 2 (2017).

Of special note, the article is concerned with ethics, not legality, presuming compliance with international law and the *Department of Defense Law of War Manual*. The authors also recognize the extensive doctrine-based processes and procedures the services and combatant commands employ for target development, vetting, and validation, based on their professional experiences. Concepts like noncombatant privilege, collateral damage, object of attack, military necessity, distinction, military objective, and proportionality are deeply ingrained in the article's approach.²

At no point in this article should the reader conclude the authors assert a violation of noncombatant privilege, for example. Employing the consequentialist philosophical lens of a proportional amount of good, the article instead seeks to add to this rich body of work by going beyond legality to explore the ethical terrain, contemplating what is morally justified and prudent.

An Ethical Framework

Just War Theory

Originating from classical and Christian philosophical traditions, just war theory delves into the ethical considerations surrounding warfare and encompasses both *jus ad bellum*, or right to war, and *jus in bello*, or right in war. *Jus ad bellum* addresses the criteria for justifying the decision to engage in war, including principles like just cause, legitimate authority, and proportionality, while *jus in bello* focuses on the moral constraints guiding the conduct of war, emphasizing principles of discrimination and proportionality.³

This theory, championed by scholars such as Thomas Aquinas and Hugo Grotius, serves as a moral compass for policymakers, military leaders, and individuals navigating the complexities of armed conflict, aiming to reconcile the demands of justice with the realities of international relations. By linking the decision to engage in conflict with the responsibility to conduct it justly, just war theory serves as a guiding principle for the profession of arms, aiming to achieve objectives while upholding ethical standards.⁴ This article applies the theory to the realm of targeting using the lens of consequentialism.

2. *Department of Defense Law of War Manual* (Washington, DC: Office of General Counsel, Department of Defense [DoD], updated July 2023), 50–70, <https://media.defense.gov/>; and *Targeting*, Air Force Doctrine Publication (AFDP) 3-60 (Washington, DC: Department of the Air Force, November 12, 2021), 8–9, <https://www.doctrine.af.mil/>.

3. Nico Vorster, "Just War and Virtue: Revisiting Augustine and Thomas Aquinas," *South African Journal of Philosophy* 34, no. 1 (2015): 55, 60–62; Gregory Reichberg, *Thomas Aquinas on War and Peace* (Cambridge, UK: Cambridge University Press, 2017), viii; and Steven Forde, "Hugo Grotius on Ethics and War," *American Political Science Review* 92, no. 3 (1998): 644–45.

4. Eric Patterson, "Just War in the 21st Century: Reconceptualizing Just War Theory after September 11," *International Politics* 42, no. 1 (2005): 118; Michael Walzer, *Just and Unjust Wars: A Moral Argument with Historical Illustrations* (New York: Basic Books, 1977); and Seth Lazar, "War," *Stanford Encyclopedia of Philosophy*, May 16, 2016, <https://plato.stanford.edu/>.

Consequentialism

Jeremy Bentham is often regarded as the founding figure of modern consequentialism with his development of utilitarianism, which prioritizes maximizing happiness or pleasure and minimizing pain as the ultimate moral principle. John Stuart Mill further refined utilitarianism, emphasizing qualitative distinctions between pleasures and the importance of individual liberties. Henry Sidgwick contributed significantly to consequentialist thought by exploring the complexities and challenges of utilitarian reasoning.⁵

Consequentialism is a broader ethical theory than utilitarianism. It evaluates the morality of actions based on their consequences, with the principle that the right action is the one that leads to the best overall outcome. Utilitarianism is a specific form of consequentialism that focuses on maximizing overall utility or happiness as the standard for determining the rightness of actions. Thus, utilitarianism is a subset of consequentialism, with its emphasis on maximizing utility being one approach within the broader framework of consequentialist ethics.⁶

In the realm of security studies and lethal targeting, consequentialism ethics offers a compelling framework for evaluating the moral dimensions of military actions. Consequentialism is rooted in the principle of maximizing the overall good or utility. It focuses on the outcomes or consequences of an action rather than its intrinsic moral nature. This approach hinges on evaluating the balance between positive and negative outcomes, questioning whether the ends justify the means.

The ethical scrutiny of lethal targeting operations under a consequentialist lens spurs a thorough examination of whether such actions are the most ethical ways to achieve the desired results. As such, consequentialism prompts decisionmakers to assess the potential benefits and harms of lethal targeting operations, considering factors such as civilian casualties, long-term strategic objectives, and the broader impact on societal well-being. As a guide to ethical decision-making, consequentialism navigates the complex landscape of national security and armed conflict by prioritizing the net positive outcomes of military actions.⁷

5. Jeremy Bentham, *Utilitarianism* (London: Progressive Publishing Company, 1890), 5–20; John Stuart Mill, *Utilitarianism* (Toronto: Ryerson University Press, 2022), 14–38; and Henry Sidgwick, *The Methods of Ethics* (London: Macmillan and Co., 1874), 1–14.

6. Daniel Jacobson, “Utilitarianism without Consequentialism: The Case of John Stuart Mill,” *Philosophical Review* 117, no. 2 (2008): 159–70; and Martin Peterson, “From Consequentialism to Utilitarianism,” *Journal of Philosophy* 100, no. 8 (2003): 403.

7. Lukasz Kiraga and Andrzej Dzikowski, “Ethical Concerns of the Veterinarian in Relation to Experimental Animals and In Vivo Research,” *Animals* 13, no. 15 (2023): 2476; Ronald P. Dempsey, Elizabeth E. Eskander, and Veljko Dubljević, “Ethical Decision-Making in Law Enforcement: A Scoping Review,” *Psych* 5, no. 2 (2023): 576; and Yakov Ben-Haim, “Robust-satisficing Ethics in Intelligence,” *Intelligence and National Security* 36, no.5 (2021).

Lethal Targeting

Lethal targeting, or targeted killing, has been defined as “the intentional, premeditated, and deliberate use of lethal force, by a state or its agents acting under color of law, against a specific individual who is not in the perpetrator’s custody.”⁸ Lethal targeting has been viewed as an ethically ambiguous action.⁹ The ethical ambiguity arises from various factors, including the potential for civilian casualties, a lowered bar for the tolerance of the use of force, the uncertainty surrounding the identification of targets, the legality and proportionality of the action, and the broader geopolitical consequences.¹⁰ As such, critics argue lethal targeting can violate principles of just war theory, such as proportionality and discrimination, by causing harm to noncombatants or targeting individuals without due process.¹¹

Additionally, the secretive nature of some lethal targeting operations and the lack of transparency in decision-making processes exacerbate the ethical ambiguity surrounding this practice.¹² Yet proponents of lethal targeting argue it can be justified as a means of preventing imminent threats and protecting national security interests.¹³ Supporters also highlight lethal targeting’s deterrent effect, lower cost in terms of money and lives, and the inconsistent track record of other foreign policy actions such as sanctions.¹⁴ These pro and con considerations highlight the complex ethical considerations involved in assessing the morality of lethal targeting actions. US doctrine for lethal targeting states “lethal action should be taken in an effort to prevent terrorist

8. Philip Alston, “Statement of UN Special Rapporteur on U.S. Targeted Killings without Due Process,” ACLU (website), August 3, 2010, <https://www.aclu.org/>.

9. Thomas Ward, “Norms and Security: The Case for International Assassination,” *International Security* 25, no. 1 (2000): 106; and Simon Frankel Pratt, “Crossing Off Names: The Logic of Military Assassination,” *Small Wars & Insurgencies* 26, no.1 (2015): 3, 8.

10. James I. Walsh and Marcus Schulzke, *The Ethics of Drone Strikes: Does Reducing the Cost of Conflict Encourage War?* (Carlisle, PA: Strategic Studies Institute and US Army War College Press, 2015), vii–x, 2–6, 40; and David L. Perry, *Partly Cloudy: Ethics in War, Espionage, Covert Action, and Interrogation* (Lanham, MD: Scarecrow Press, 2009), 5–11.

11. John Lango, “Nonlethal Weapons, Noncombatant Immunity, and Combatant Nonimmunity: A Study in Just War Theory,” *Philosophia* 38, no. 3 (2010); Neil C. Renic, “Justified Killing in an Age of Radically Asymmetric Warfare,” *European Journal of International Relations* 25, no. 2 (2019); and Matthew Strebe, “And the President Droned On: Just War Theory and Targeted Killings,” *Episteme* 25, no. 1 (2014): 37–40, 43–49.

12. Ward, “Norms,” 124–25.

13. Perry, *Partly Cloudy*, 5–11.

14. Neta C. Crawford, “Blood and Treasure: United States Budgetary Costs and Human Costs of 20 Years of War in Iraq and Syria, 2003–2023,” Watson Institute International & Public Affairs at Brown University, March 15, 2023, <https://watson.brown.edu/>; Meghann Myers, “Wars in Iraq and Syria Cost Half a Million Lives, Nearly \$3T: Report,” *Military Times*, March 17, 2023, <https://www.militarytimes.com/>; Pratt, “Crossing Off Names,” 8; and Risa A. Brooks, “Sanctions and Regime Type: What Works, and When?,” *Security Studies*, 11, no. 4 (2002).

attacks against U.S. persons only when capture of an individual is not feasible and no other reasonable alternatives exist to effectively address the threat.”¹⁵

Proportionality versus Proportional Amount of Good

It is important to note the difference between the *DoD Law of War Manual* definition of proportionality and how this article uses proportional amount of good. The manual defines proportionality as “the principle that even where one is justified in acting, one must not act in a way that is unreasonable or excessive.”¹⁶ In contrast, “proportional amount of good” in consequentialism pertains to the ethical assessment of actions based on their ability to maximize overall well-being, considering the magnitude of positive outcomes relative to any negative consequences, without direct reference to military objectives or collateral damage.¹⁷

Comparative Case Studies

In the United States, where human agents remain responsible for targeting decisions and execution, understanding the human and social dimensions of this process becomes crucial. Examining the research question in this way leads to valuable insights into what constitutes a proportionally good outcome in the context of lethal targeting.

The in-depth analysis of two contrasting case studies reveals the complexities of lethal targeting as seen through a consequentialist lens. Each represents a different scenario that military personnel encountered when conducting targeting operations. The first, the June 7, 2006, strike against Abu Musab al-Zarqawi, represents a long-tracked, high-value target pursued with dedicated resources over time. In contrast, the August 29, 2021, strike targeting suspected Islamic State-Khorasan (ISIS-K) militants, later revealed to be civilians, unfolded amid the chaotic withdrawal from Afghanistan, highlighting the challenges of rapid decision-making in fluid situations.

Al-Zarqawi Strike

Born in the Jordanian city of Zarqa in 1966, Abu Musab al-Zarqawi became the symbol of anti-American and anti-Shia resistance in post-invasion Iraq. He took the helm of al-Qaeda in Iraq (AQI), the precursor to the Islamic State of Iraq and ash-Sham (ISIS), drawing jihadists from around the world to Iraq. The reign of al-Zarqawi, who operated under the cloud of a \$25-million American bounty, saw a significant surge in suicide bombings. He marshaled a core of approximately 1,200 fighters, including ex-Iraqi military and intelligence personnel, orchestrating not only beheadings

15. “Procedures for Approving Direct Action against Terrorist Targets Located outside the United States and Areas of Active Hostilities,” redacted, declassified document, US Department of Justice, May 22, 2013, <https://www.justice.gov/>.

16. *DoD Law of War Manual*, 60.

17. Oscar Horta, Gary David O’Brien, and Dayron Teran, “The Definition of Consequentialism: A Survey,” *Utilitas* 34, no. 4 (2022): 368–70.

and attacks on coalition forces but also an agenda to cripple Iraqi governance and ignite a Sunni-Shia civil war, leaving a trail of thousands dead in its wake.¹⁸

Al-Zarqawi's ability to evade death or capture over the years advanced his standing among jihadists. Narrowly escaping coalition forces twice over 18 months appeared to embolden him. At his demise, analysts tied the militant leader to jihadists in approximately 40 countries.¹⁹

The air strike that killed al-Zarqawi occurred shortly after 6 p.m. on June 7, 2006, at a safe house in a palm forest 1.25 miles outside Hibhib, approximately 30 miles north of Baghdad. After receiving a tip from Jordanian intelligence, American officials vectored two F-16s conducting a standard counterimprovised explosive device patrol to the location, dropping one GBU-12 laser-guided 500-pound bomb followed by a GBU-38 joint direct attack munition.²⁰

Reports indicated that six people died in the air strike, including al-Zarqawi, his spiritual adviser, chief courier, 16-year-old wife, and one child. When coalition forces arrived on the scene at 6:40 p.m., al-Zarqawi was still alive, but attempts to treat him proved unsuccessful, and he died on the scene. The air strike occurred after weeks of intelligence work focused on tracking the spiritual adviser and chief courier, which began based on tips from informants.²¹

The air strike's reverberations rippled through the militant ranks, sowing discord and suspicion. Al-Zarqawi's lieutenants, afraid of betrayal, interrogated their men in a desperate hunt for informants.²² Analysts saw this internal turmoil as a sign of AQI's vulnerability, with the *New York Times* calling the announcement of his death a "major watershed in the war."²³ Al-Zarqawi, with his "star power" and role as an "important cheerleader for Islamic militants in Iraq," was considered a critical figure, and his death dealt a severe blow to the morale and cohesion of the group.²⁴

18. George Michael, "The Legend and Legacy of Abu Musab al-Zarqawi," *Defence Studies* 7, no. 3 (2007): 338–39, 343, 345, 348; and Donald J. Reed, "On Killing al-Zarqawi—Does United States Policy Know Its Tools in the War on Terror?," *Homeland Security Affairs* 2, no. 2 (July 2006): 3.

19. Michael, 338, 345, 348; and John F. Burns, "U.S. Strike Hits Insurgent at Safehouse," *New York Times*, June 8, 2006, <https://www.nytimes.com/>.

20. Combined Operations Center, American Forces Press Network, "Air Force F-16 Airstrike Kills al-Zarqawi," USAF, June 9, 2006, <https://www.af.mil/>; Jim Garamone, "Zarqawi Air Strike Shows Aerial Flexibility, General Says," US Air Force (USAF), June 16, 2006, <https://www.af.mil/>; Scott Macleod et al., "How They Killed Him," *TIME Magazine*, June 11, 2006, and Peter Chambers, "Abu Musab Al Zarqawi: The Making and Unmaking of an American Monster (in Baghdad)," *Alternatives: Global, Local, Political* 37, no. 1 (2012): 40.

21. Chambers, 40; Burns, "Safehouse,"; and Macleod et al.

22. Macleod et al., "They Killed Him."

23. Burns, "Safehouse."

24. Macleod et al., "They Killed Him"; "Will It Make a Difference? The Death of Abu Musab al-Zarqawi," *Economist* 379, no. 8481 (June 10, 2006): 43; Burns; and "Coalition Forces Kill Abu Musab al-Zarqawi," USAF, June 8, 2006, <https://www.af.mil/>.

For coalition forces, the killing resonated as a moral victory and a psychological boost.²⁵ In this vein, *The Economist* declared it “America’s single biggest scalp in nearly five years of fighting Islamist terror,” a potent symbol of resilience in the face of brutal tactics.²⁶ Similarly, al-Zarqawi’s demise served as a stark message to remaining jihadists: the Americans were a powerful foe, capable of taking down even the most notorious figures.²⁷ Moreover, the elimination of the man estimated to be responsible for over 6,000 deaths offered a much-needed boost for both the Bush and al-Maliki administrations in the United States and Iraq, respectively.²⁸

Conversely, not all analysts saw al-Zarqawi’s death as a turning point for the better. Skeptics pointed to the decentralized nature of the Iraqi insurgency, arguing that removing one node would not cripple the network. They warned martyrdom could elevate al-Zarqawi into a powerful recruiting tool, inspiring the next generation of jihadists. Furthermore, his foreignness alienated some within the insurgency, who did not consider al-Zarqawi their leader. His brutal tactics, often targeting civilians, had also backfired, creating distance from elements of the resistance. For these analysts, his removal risked galvanizing support for the jihadists’ cause rather than diminishing it.²⁹

Osama bin Laden’s response was swift. Within a week, he tapped Abu Hamza al-Muhajir, an Egyptian, to fill the void left by al-Zarqawi. After that, the organization that would ultimately become ISIS put in place a process of succession embedded in its newly formed concept of a protostate structure to promote the long-term legitimacy of the leader and the organization.³⁰

Applying a consequentialist lens. An analysis of the targeted killing of al-Zarqawi applying a consequentialist framework examines the air strike’s intended and unintended consequences to assess its ethical justifiability.

The US objective in targeting al-Zarqawi was multifaceted. Primarily, it aimed to eliminate a prominent terrorist leader responsible for significant violence and instability in Iraq. In terms of intended consequences, planners hoped his death would disrupt AQI’s operations, demoralize its members, and potentially deter future acts of terrorism. The strike also aimed to send a message of resolve to insurgents and bolster Iraqi morale.

In terms of positive consequences, the strike temporarily reduced the levels of insurgent violence, disrupted al-Qaeda leadership, and generated a symbolic victory. Al-Zarqawi’s death led to a short-lived decline in AQI’s attacks and overall violence in

25. Michael, “Legend,” 348; and Reed, “On Killing,” 2.

26. “Will It Make a Difference?”

27. Daniel Byman, “What Zarqawi’s Death Means for the Insurgency,” Brookings, June 8, 2006, <https://www.brookings.edu/>.

28. Burns, “Safehouse”; Michael, “Legend,” 348–49.

29. Reed, “On Killing,” 2; “Will It Make a Difference?”; Byman, “Zarqawi’s Death”; and Michael, 350–51.

30. Michael, 348; and Haroro J. Ingram and Craig Whiteside, “Generation Killed: The Challenges of Routinizing Global Jihad,” *War on the Rocks*, August 18, 2022, <https://warontherocks.com/>.

Iraq.³¹ This outcome suggests the strike achieved its primary objective of mitigating immediate terrorist threats. Removing a charismatic and influential leader like al-Zarqawi caused temporary disarray within AQI, potentially hindering its operational capacity and recruitment efforts.³² The successful targeting of a high-profile individual boosted American morale and demonstrated the United States' commitment to combating terrorism on a global scale.

In terms of negative, unintended consequences, the strike resulted in the deaths of innocent civilians, a violation of the principle of noncombatant immunity. This outcome raises ethical concerns about the proportionality of the action and the potential for long-term resentment. Another negative consequence of the strike, increased or sustained levels of violence, suggests the long-term impact of the killing of al-Zarqawi might be ambiguous. While violence initially dipped, AQI eventually recovered and even escalated its attacks under new leadership. The strike, as part of the broader Iraq War, contributed to the destabilization of the country, creating a power vacuum and breeding ground for future extremist groups.³³

Of note, this last unintended consequence bears significant negative weight and raises questions about the wider geopolitical ramifications of the action. The power vacuum created after al-Zarqawi's death and the broader intervention in Iraq contributed to the rise of ISIS, a more brutal and global threat than AQI. This repercussion illustrates the complex ripple effects of military interventions. The civilian casualties and perceived disregard for Iraqi sovereignty fueled anti-American sentiment in the region, hindering long-term efforts to foster cooperation and counterterrorism initiatives.³⁴

Overall, the strike against al-Zarqawi demonstrates the complex nature of consequentialist analysis in complex situations. While the intended consequences prior to the strike seem to align with the ethical principle of maximizing good, the negative unintended consequences resulting from the strike raise significant ethical concerns and highlight the inherent risks of such actions. Despite those concerns, the implications of removing a known senior terrorist leader with international significance from the battlefield compels a definitive moral judgment: the good outweighed the bad.

31. Reed, "On Killing," 1–9; and Stephanie S. Kostro and Garrett Riba, "Resurgence of al Qaeda in Iraq: Effect on Security and Political Stability," Center for Strategic and International Studies, March 4, 2014, <https://www.csis.org/>.

32. Kostro and Riba; Kenneth Katzman, *Iraq and al Qaeda*, RL32217 (Washington, DC: Congressional Research Service [CRS], 2007), 10; *Exploiting Disorder: al-Qaeda and the Islamic State* (Brussels: International Crisis Group [ICG], March 14, 2016), 16, <https://www.crisisgroup.org/>; and *Iraq after the Surge I: The New Sunni Landscape* (Brussels: ICG, April 30, 2008), 2, 11–12, 16–19, <https://www.crisisgroup.org/>.

33. Brian Fishman, "After Zarqawi: The Dilemmas and Future of Al Qaeda in Iraq" *Washington Quarterly* 29, no. 4 (2006): 25; and Peter Galbraith, *Unintended Consequences: How War in Iraq Strengthened America's Enemies* (New York: Simon & Schuster, 2008), 1–5.

34. Jenna Pitchford, "The 'Global War on Terror,' Identity and Changing Perceptions: Iraqi Responses to America's War in Iraq," *Journal of American Studies* 45, no. 4 (2011); and Amy LeBlanc, "Embedded Journalism and American Media Coverage of Civilian Casualties in Iraq," (Master's thesis, Universitetet i Tromsø, 2013), 30.

ISIS-K Strike

August 2021 witnessed a frantic race against time as coalition forces orchestrated their withdrawal from Afghanistan. The Taliban's rapid offensive threatened the Afghan government, culminating in its capture of Kabul on August 15. Adding to the turmoil, on August 26, amid the thousands desperately seeking escape at Hamid Karzai International Airport (HKIA), Abdul Rahman al-Logari, a member of ISIS-K, detonated a suicide bomb, killing 13 American service members and 169 Afghans.³⁵

In the wake of this attack, roughly 60 threat streams emerged, pointing toward further ISIS-K attacks at HKIA.³⁶ Yet the concentration of coalition forces at the airport hampered their ability to effectively assess the veracity of these threats. Faced with the converging risks of the recent attack, the advancing Taliban, and the barrage of information, American forces adopted a heightened state of vigilance, perceiving Kabul as a complex and interconnected "threat landscape."³⁷

In this tense atmosphere, American personnel launched an air strike on August 29 against a suspected ISIS-K target believed to be preparing to launch another attack against HKIA. On that day, six MQ-9 Reaper unmanned aerial systems tracked a white Toyota Corolla that was suspected of being part of an imminent threat to personnel conducting evacuation activities at the airport. The Reapers monitored the vehicle for over eight hours after it arrived at a target area of interest approximately three kilometers from the airport.³⁸

As operators tracked the vehicle, various actions reinforced the perception of its ties to the plot to attack HKIA. These actions included driving in a manner associated with countersurveillance techniques, picking up and dropping off adult males, retrieving a package in a black bag from a building, and carefully loading canisters into the trunk. Believing the car might be a vehicle-borne improvised explosive device posing an imminent threat to ongoing evacuation efforts at HKIA, the US military authorized a self-defense strike. At 4:53 p.m., an AGM-114 Hellfire missile using a delayed fuse struck the vehicle, killing three adults and seven children.³⁹

35. Clayton Thomas, *U.S. Military Withdrawal and Taliban Takeover in Afghanistan: Frequently Asked Questions*, R46879 (Washington, DC: CRS, September 17, 2021), 9–13; Derek Gregory, "Midnight's Victims," *Area Development and Policy* 8, no. 4 (2023): 5, 10; "Deadly US Drone Strike in Kabul Did Not Break Law, Pentagon Says," BBC, November 3, 2021 <https://www.bbc.com/>; and Charles Savage et al., "New Declassified Video Shows U.S. Killing of 10 Civilians in Drone Strike," *New York Times*, January 19, 2022, <https://www.nytimes.com/>.

36. Anna Coren et al., "US Military Admits It Killed 10 Civilians and Targeted Wrong Vehicle in Kabul Airstrike," CNN, September 17, 2021, <https://www.cnn.com/>; and David Vergun, "Air Force Official Briefs Media on Deadly Drone Strike in Kabul," DoD, November 3, 2021, <https://www.defense.gov/>.

37. Gregory, "Midnight's Victims," 10, 20–21.

38. Gregory, "Midnight's Victims," 1, 6, 10, 12; and Savage et al., "Declassified Video."

39. Savage et al., "Declassified Video"; Azmat Khan, "Military Investigation Reveals How the U.S. Botched a Drone Strike in Kabul," *New York Times*, January 6, 2023, <https://www.nytimes.com/>; Vergun, "Air Force Official"; and Gregory, 1, 6, 10–14.

Poststrike reporting and investigations revealed that those targeted were unaffiliated with ISIS-K. The driver, Zemari Ahmadi, was identified as an employee of an American aid organization. The Toyota was a company-owned car used to ferry employees and complete company activities. The black bag that operators saw retrieved was a laptop, and the canisters were determined to be water jugs needed due to inconsistent service at homes. Furthermore, the secondary explosion initially attributed to detonating explosives was determined to be from a nearby propane tank. Finally, operators missed the presence of children in the compound.⁴⁰

An Air Force investigation concluded that the August 29th air strike did not violate US law or the law of armed conflict. Investigators attributed the incident to confirmation bias and communication breakdowns, exacerbated by several contributing factors. These included the chaotic withdrawal environment, the overwhelming volume of threat streams, the recent attack at HKIA, operator stress, the absence of coalition forces in the city, and perceived time constraints that limited thorough analysis. Of note, one day later, ISIS-K militants attempted an attack on HKIA using rockets fired from a white Toyota Corolla, approximately 200 meters from the location struck on August 29, highlighting the complex and evolving threat landscape.⁴¹

Applying a consequentialist lens. The August 2021 incident presents a poignant case study for consequentialist analysis, raising critical questions about the ethical implications of targeted strikes and the complexities of decision-making in wartime environments.

Analysis of the case reveals few indicators of potential positive consequences. For one, the intended goal of neutralizing an imminent threat at the airport holds merit within a consequentialist framework, aiming to maximize lives saved and minimize potential harm.

The resulting negative consequences, however, are far more apparent. First, the tragic loss of 10 innocent lives, including children, constituted a devastating violation of the principle of noncombatant immunity and represents the most significant negative consequence. This violation casts a profound shadow on the justifications for the strike.

Second, as a second-order effect of the casualties, the incident significantly eroded trust in American operations among the Afghan civilian population and the international community, potentially hindering future cooperation and counterterrorism efforts. This long-term consequence carries substantial negative weight. The civilian casualties and subsequent revelations further tarnished the American image on the world stage, raising concerns about the United States' commitment to human rights and the principles of just war theory.⁴² This reputational damage has tangible negative consequences for geopolitical relations and global standing.

40. "Transcript: Pentagon Press Secretary John Kirby and Air Force Lt. Gen. Sami D. Said Hold a Press Briefing," DoD, November 3, 2021, <https://www.defense.gov/>; Coren et al., "US Military"; Savage et al.; and Gregory, 1, 8.

41. Khan, "Military Investigation"; "Transcript"; and Gregory, 8.

42. Sayed Salahuddin, "Airstrikes Kill Scores of Afghan Civilians-Officials," Reuters, August 9, 2007, <https://www.reuters.com/>; and Savage et al., "Declassified Video."

Finally, these civilian casualties fueled resentment and distrust toward the United States, potentially creating fertile ground for the recruitment and growth of extremist groups.⁴³ This unintended consequence highlights the potential long-term ramifications of such actions. Additionally, events like this one carry the potential to erode internal morale and cause the questioning of procedures within military units.

Through a consequentialist lens, the August 29th strike presents a conundrum. While the intended goal of preventing an attack aligns with maximizing positive outcomes, the devastatingly negative consequences—particularly the civilian casualties and their long-term ramifications—raise serious ethical concerns and cast a shadow on the justification for the action. Determining whether the good outweighed the bad concerning this strike necessitates a clear reckoning with its resulting positive and negative consequences. Despite the potential for preventing an attack, the magnitude and gravity of the negative outcomes compel a more definitive moral judgment: the bad outweighed the good.

Framework Emerging from Case Analysis

Based on the qualitative analysis of the two case studies, one deemed to represent a proportional amount of good and one that did not, the researchers propose a consequentialist lethal targeting assessment model to aid decisionmakers in future scenarios. Once again, it is crucial to note that compliance with the *Law of War Manual* and the use of robust doctrine-based processes and procedures in US actions are assumed, with the model focusing on ethics as opposed to legality. The assessment model is comprised of four criteria:

- Planners considered the human rights of the citizens of the target country.
- Planners determined the objectives of the decision to select lethal targeting were just.
- Planners determined lethal targeting was necessary to obtain the just objectives (of note: this is different than just cause for war, the primary normative principle of *jus ad bellum*).
- Planners eliminated less ethical methods to obtain the objectives.

Discussion

Human Rights?

While not explicitly addressing human rights, consequentialist principles are inherently intertwined with their protection. Minimizing harm and maximizing well-being align with human rights by prioritizing the inherent value and dignity of all individuals. Thus, the ethical ramifications of targeted strikes cast a complex shadow,

43. “Durbin, Leahy Urge President Biden to End Lethal Force Outside of War Zones, Revise Nation’s Counterterrorism Policies,” September 27, 2021, US Senate Committee on the Judiciary, <https://www.judiciary.senate.gov/>

particularly when scrutinized through the lens of consequentialism. The examination of the two case studies reveals the delicate dance between prioritizing immediate threats and the long-term well-being of civilians in recipient countries.

Some consideration for Iraqi citizen's human rights is evident in the targeted strike against al-Zarqawi. American officials publicly framed the strike against al-Zarqawi as necessary to protect Iraqi civilians from AQI violence, emphasizing its aim to disrupt the group's operations and leadership. Choosing al-Zarqawi, a figure responsible for significant civilian casualties, could be interpreted as aiming to minimize future harm to civilians inflicted by his leadership.⁴⁴

Yet the strike targeting suspected ISIS-K militants in Afghanistan presents a contrasting case. While aimed at a perceived imminent threat, the location within a populated area inherently carried a risk to civilians. This decision raises concerns about prioritizing immediate threat mitigation over civilian safety. The strike eroded trust in American operations and fueled anti-American sentiment, potentially hindering future cooperation and counterterrorism efforts in Afghanistan. This long-term negative consequence contradicts one of the intended positive outcomes.

Taken together, both cases support the notion that direct, repeatable procedures for considering civilian casualties, as a reflection of a broad consideration for human rights, belong in the consequentialist model. These procedures would include comprehensive risk assessments based on thorough intelligence gathering and analyses of potential civilian harm, ensuring targeted actions are proportionate to the threat. Procedures would also explore alternative approaches that minimize civilian risk. In the event that lethal targeting is undertaken, mechanisms would be in place that would ensure the United States takes responsibility for unintended consequences, conducts transparent investigations, and holds individuals accountable for failures.

Just Objectives?

In the consequentialist framework, just objectives refer to goals or aims that, when pursued, result in outcomes that maximize overall utility or promote the greatest good. These objectives are assessed based on their ability to generate positive consequences and minimize negative repercussions for individuals affected by the action or decision.⁴⁵ As shown in the case studies, determining justness in cases of lethal targeting involves navigating a challenging equation, weighing potentially significant positive outcomes against the risk of unforeseen negative consequences and potential violations of laws or international norms.

Eliminating al-Zarqawi, who was responsible for significant civilian casualties and who served as a symbol of terrorist violence, sought to disrupt AQI operations, potentially saving future lives. Targeting a prominent figure like al-Zarqawi aimed to

44. Macleod et al., "They Killed Him"; Chambers, "Abu Musab Al Zarqawi," 40–41; Burns, "Safehouse"; and Michael, "Legend," 348.

45. Sidgwick, *Ethics*, 1–14; and Mill, *Utilitarianism*, 14–38.

showcase American commitment to countering terrorism, potentially deterring future attacks. Unforeseen negative consequences like the destabilization of Iraq and the rise of ISIS highlight the risk of unintended harmful outcomes, even when seeking positive, just consequences.

In the Afghanistan strike, the targeting of suspected ISIS-K militants aimed to thwart an attack on Hamid Karzai International Airport, potentially saving American lives and preventing civilian casualties. Protecting American personnel and facilitating troop withdrawal were key objectives, aligning with national security interests. Preventing an attack would have undoubtedly saved lives and mitigated potential suffering. Safeguarding US interests aligns with consequentialist principles of promoting security and well-being; however, the unintended outcome of harming innocent civilians violates fundamental human rights and starkly contrasts with the objective of minimizing harm. Eroding trust in American operations also presents long-term negative consequences for counterterrorism efforts and regional stability.

Both cases present objectives aiming to maximize just outcomes. Yet crucial differences emerge. While al-Zarqawi's role in violence was established, the intelligence regarding the Afghan target's involvement in an imminent attack remained unconfirmed, introducing a higher degree of uncertainty in assessing the intended positive outcome. Eliminating a high-profile leader responsible for extensive harm can be argued to be more proportionate to the intended positive outcome compared with targeting individuals based on potentially incomplete intelligence. Both cases highlight the risk of unintended negative consequences, emphasizing the need for robust assessments and contingency plans.

Although determining the justness of objectives within a consequentialist framework in real-world scenarios like these remains a complex task, ensuring the justness of a potential lethal targeting action is critical and includes considerations of factors such as certainty of threat, proportionality of action, and potential for unforeseen consequences. Additionally, the ethical imperative to minimize harm remains central, requiring constant vigilance against actions that might generate undue suffering, outweighing any potential good.

Necessary?

Analyzing the two cases through a consequentialist framework helps illuminate the need to include the question of necessity in the model and the challenges of determining whether such actions were demonstrably necessary to achieve just objectives.

As discussed, the strike against al-Zarqawi was intended to neutralize a high-level threat responsible for significant civilian casualties and a symbol of terrorist violence, potentially saving future lives and disrupting AQI operations. Eliminating al-Zarqawi arguably did disrupt AQI leadership and potentially reduced subsequent violence. In terms of necessity, however, it is possible to argue that nonlethal options, like capture or intelligence gathering, might have been pursued, potentially achieving similar outcomes without risking civilian casualties.

Also as discussed, the 2021 strike in Afghanistan was intended to prevent an imminent attack on Hamid Karzai International Airport, potentially saving American lives and avoiding civilian casualties. The target turned out to be a humanitarian worker and other innocent individuals, resulting in tragic civilian casualties, contradicting the objective of minimizing harm. Though when considering necessity, one could argue that increased security measures at the airport or other security activities could have been explored as alternative approaches with lower risks of civilian harm and unintended negative consequences.

While both cases aimed for just objectives, crucial differences emerge regarding necessity. Intelligence practitioners had long pursued al-Zarqawi, whereas the information about a white Toyota represented an emerging threat stream, introducing greater uncertainty in assessing the necessity of immediate lethal action. Eliminating a high-profile leader directly responsible for extensive harm can be argued to be more proportionate to the intended positive outcome, and thus more necessary than targeting individuals based on potentially incomplete intelligence with the risk of causing civilian casualties.

In evaluating the necessity of lethal targeting, particularly in intricate counterterrorism contexts, procedural considerations emerge. First, an ethical examination is imperative to scrutinize the level of necessity, considering the challenges associated with determining whether lethal measures were truly indispensable in achieving the desired outcomes. For example, enhancing security measures or employing other nonlethal approaches could be considered to mitigate harm and minimize unintended negative consequences depending upon the scenario. Secondly, these cases highlight the importance of prioritizing high-confidence intelligence when evaluating the necessity of lethal targeting. Additionally, it is essential to recognize the importance of the potential ramifications of outcomes when determining the necessity of lethal targeting within a consequentialist framework.

Less Ethical Methods Eliminated?

Analyzing the two cases through consequentialism reveals the complexities of assessing the ethical choices made in high-stakes situations. Looking at the 2006 strike against al-Zarqawi, some potential alternatives emerge. While challenging, capturing al-Zarqawi for a legal trial might have yielded valuable intelligence, minimized the risk of civilian casualties, and generated long-term positive consequences through legal precedent. Engaging in intensified diplomatic efforts and collaborating with regional actors to isolate and weaken AQI through nonmilitary means could have been explored.

Yet capture and prosecution might have been significantly more time-consuming and fraught with logistical challenges, potentially delaying the desired outcome of disrupting AQI operations. Diplomatic pressure, while potentially minimizing immediate harm, might have proved insufficient in dismantling a violent organization such as AQI.

More ethical approaches to the problem of the potential 2021 ISIS-K attack against the airport also emerge. The US and its Allies and partners could have implemented heightened security protocols and intensified intelligence gathering to pinpoint

specific threats to potentially mitigate the need for immediate lethal action. As a non-military measure, the relevant actors could have engaged in direct communication with Taliban representatives or local intelligence sources to avert the perceived threat. The relevant actors could have adjusted the withdrawal timeline to allow for further investigation with a potential for a de-escalation of the situation.

Conversely, implementing stricter security measures might not have guaranteed perfect protection against a determined attack, and relying solely on intelligence to pinpoint specific individuals in a chaotic situation comes with inherent risks. Diplomatic negotiations, while potentially preventing immediate harm, might have been misconstrued as weakness and could have emboldened the attackers or extended the American presence in Afghanistan. Evacuation and delay might have compromised the mission objectives, potentially eroded trust with Allies and partners, and left American personnel vulnerable for an extended period.

Evaluating whether planners eliminated less ethical methods in these two instances of lethal targeting is inherently challenging and open to interpretation but necessary. While both cases offer potential alternative approaches that might have yielded different, more positive outcomes, the relative feasibility and effectiveness of these remain debatable. Yet the analysis highlights key considerations for planners in support of eliminating other, more ethical approaches. These considerations include prioritizing robust intelligence gathering in support of thorough risk assessments, exhaustively considering nonlethal methods and diplomatic solutions before resorting to lethal force, and ensuring the scale of the chosen action aligns with the severity of the perceived threat and minimizes harm to all individuals involved.

Conclusion

This research enriches the discourse on lethal targeting within foreign policy by adopting a consequentialist perspective, thus complementing existing ethical theories. By examining the anticipated and actual outcomes—negative and positive—of two instances of lethal targeting conducted by the United States, this study seeks to discern ethically defensible courses of action.

In a realm fraught with moral and legal complexities, the consequentialist approach—which looks at the proportional amount of good—offers a valuable tool for evaluating specific scenarios. This consequentialist perspective emphasizes maximizing positive outcomes against threats in a national defense context. As demonstrated by the *DoD Law of War Manual* and DoD Instruction (DoDI) 3000.17, *Civilian Harm Mitigation and Response*, minimizing harm remains a primary objective at both the individual and societal levels for military operations.⁴⁶ As such, it is essential to weigh the potential consequences of civilian harm among the various options open to planners in these situations.

46. Office of the Under Secretary of Defense for Policy, *Civilian Harm Mitigation and Response*, DoD Instruction 3000.17 (Washington, DC: DoD, December 21, 2023), <https://www.esd.whs.mil/>.

The Israel-Gaza Strip bombing campaign and the release of DoDI 3000.17 in December 2023 underscore the timeliness of this discussion. The four-element lethal targeting assessment model offers valuable insights for civilian national security decisionmakers who choose to include lethal targeting as an option and for warfighters tasked with executing such actions. By applying a critical consequentialist lens, US decisionmakers can progress toward ethical frameworks that prioritize harm reduction and preservation of human life, promote continued reflection, and facilitate informed, open discourse about using lethal force in a world where unintended consequences and unforeseen complexities are unfortunate realities of military and counterterrorism operations. Æ

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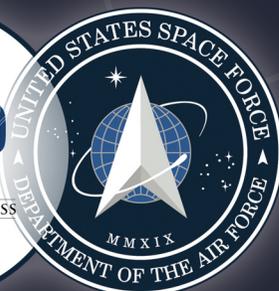
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