Disentangling from Nuclear Superiority-Brinkmanship Theory
Combating a Legacy of Bootstrapping toward Armageddon

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Abstract

This article evaluates the theory of nuclear superiority-brinkmanship proposed by Matthew Kroenig, highlighting its fatal flaws through historical evidence and strategic analysis. It emphasizes the risks of reigniting an unsustainable arms race due to the US legacy of pursuing technological developments without a cohesive strategy, known as “bootstrapping.” Assessing the impracticality of limited nuclear war and the importance of secure second-strike capabilities, it advocates for a modern US nuclear deterrent based on a balanced force of advanced nuclear systems, complemented by robust conventional capabilities and infrastructure. Prioritizing credible deterrence over compellence aligns with national interests and reduces the risk of unintentional nuclear conflict. Pursuing Kroenig’s flawed theory, given its high costs and potential catastrophic consequences, is deemed unwise for guiding US nuclear strategy.

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Few policy decisions carry higher stakes than establishing and maintaining a nuclear force posture. It is essential to acknowledge that preventing nuclear Armageddon cannot be achieved by merely returning weaponized nuclear material to Pandora’s box. Additionally, possessing nuclear weapons seems to reflect Thucydides’ observation that “the strong do what they can and the weak suffer what they must.” Matthew Kroenig further developed this notion, arguing that “a robust nuclear force reduces a state’s expected cost of nuclear war, increasing its resolve in high-stakes crises, providing it with coercive bargaining leverage, and enhancing nuclear deterrence.” Many within the US defense establishment praise Kroenig’s ideas and their potential to achieve both compellent and deterrent objectives globally. The validation of superiority-brinkmanship at the highest levels of the USAF is evident in the

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Chief of Staff’s reading list, which prominently features The Logic of American Nuclear Strategy, without offering a corresponding counterargument. Despite Kroenig’s assertions and senior-level endorsement, the benefits of maintaining raw numerical nuclear superiority cannot ultimately outweigh the associated costs and potential negative consequences.

Regrettably, the models supporting superiority–brinkmanship are reductionistic, and relevant case studies provide insufficient evidence for the viability of extended deterrence and compellence. Nevertheless, this does not suggest that nuclear weapons have no role in U.S. security. Todd S. Sechser and Matthew Fuhrman offer a more robust methodology, validating the clear link between deploying sufficiently capable nuclear forces and deterring enemy attacks on the homeland. Therefore, it is crucial for the U.S. to allocate appropriate resources to maintain a modern and credible nuclear deterrent. However, formulating a coherent and effective nuclear policy necessitates defining key terms. To this end, exposing the fatal flaws of superiority–brinkmanship theory helps delineate what constitutes a sufficient nuclear force. Furthermore, highlighting connections to the US legacy of bootstrapping reveals factors shaping current nuclear policy and illuminates pitfalls that may limit the scope of potential new strategies. Finally, a critical evaluation of antithetical strategic camps exposes the risks of attempting to engage in a limited nuclear war and the mutability of weapons systems used as a secure second strike, offering insights into what a modern and credible nuclear deterrent must encompass.

Fatal Flaws of Superiority–Brinkmanship Theory

Kroenig’s superiority–brinkmanship theory suffers from two fundamental flaws. Firstly, the models employed to validate his theory oversimplify superiority and its connections to coercion. Kroenig posited that “nuclear inferior opponents are less likely to initiate a military challenge and more likely to back down if the crisis escalates.” He contended that the greater the power asymmetry, the greater the likelihood of bargaining occurring below the threshold of military action. To quantify this, Kroenig defined superiority based on raw stockpile size, arguing that

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7 Sechser and Fuhrmann, Nuclear Weapons and Coercive Diplomacy, 4.
8 Sechser and Fuhrmann, Nuclear Weapons and Coercive Diplomacy, 133.
“there is not a better [measure].” However, David C. Logan exposed the fallacy of measuring superiority in this manner by examining the US stockpile in 1966. That year, although the United States possessed 11,232 strategic warheads, “barely half of which were assessed as loaded on delivery vehicles.” Moreover, Logan refuted the notion that raw values were adequate proxies for more operational variables—such as delivery vehicles—demonstrating a clear lack of correlation between their quantities and raw stockpile values.

However, acknowledging that nuclear superiority is more nuanced than stockpile numbers does not inherently discredit Kroenig’s theory. Rather, it necessitates a reevaluation of his models. Logan undertook this task, and his subsequent data indicated “that nuclear superiority was not a significant factor in crisis outcomes.” Similarly, Logan reexamined Todd S. Sechser and Matthew Fuhrmann’s models to verify their assertion that “nuclear weapons support primarily defensive—not offensive—objectives.” The outcome of this reassessment validated the conclusion that “there is little evidence suggesting a role for the nuclear balance in the outcomes of either interstate crises or compellent threats.” This analysis also supported Robert Jervis’s argument that possessing a larger nuclear stockpile than an adversary does not provide advantages because “deterrence comes from having enough weapons to destroy the other’s cities, [which] is an absolute, not a relative [capability].” Jervis further cautioned against the fervor for superiority, citing the Japanese decision to go to war in 1941 as evidence that “superior military capability [did] not guarantee deterrence.”

The second fatal flaw in Kroenig’s theory lies in the assumption of a shared belief and understanding of the relative nuclear balance during times of crisis. Managing risk and escalation during a nuclear crisis becomes untenable without timely knowledge, as disagreement about which side would prevail leaves little basis for nonkinetic adjudication. However, the US history for estimating enemy force size undermines the feasibility of possessing the necessary knowledge when it is most needed. For instance, US intelligence discovered after the Cold War that

10 Logan, “The Nuclear Balance is What States Make of It,” 182.
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their estimates for Soviet ICBMs were frequently off by as much as 20 percent. Furthermore, this challenge is compounded when adversaries do not even agree on what constitutes nuclear superiority. A notable instance is the India–Pakistan conflicts, where India likely possessed the larger stockpile, yet Pakistan “boasted that their weaponry and command and control systems were superior.” However, neither country was likely aware of the relative stockpile sizes during the conflict. These two fatal flaws in the foundation of superiority-brinksmanship theory elucidate why its adoption is ill-advised.

Connection to US Legacy of Nuclear Bootstrapping

The deficiencies within Kroenig’s superiority-brinksmanship theory extend beyond theoretical inconsistencies; its underlying impulses have permeated the legacy of US nuclear policy. However, the proliferation of large numbers of nuclear weapons has not necessarily stemmed from a deliberate policy decision. David Alan Rosenberg identified a historical precedent, which he derisively termed bootstrapping: the Strategic Air Command (SAC) practice of utilizing perceived increases in adversarial capability to justify extravagant escalatory spending. Kroenig attempted to argue that his theory did not inevitably lead to similar arms races, yet tacitly acknowledged a strong corollary trend by conceding that “winning [them] is sometimes necessary.” The origin of this trend is observable in US policy shortly after Germany’s surrender in May 1945. Germany’s defeat prompted Pres. Harry S. Truman to journey to Potsdam with the objective of aiding the Allied establishment of a postwar structure. Nevertheless, World War II persisted in the Pacific, allowing Dr. J. Robert Oppenheimer and his team to continue their sprint toward testing the first nuclear weapon.

While in Potsdam, news from New Mexico reached President Truman; the team at Los Alamos had succeeded, and the United States officially became the first nuclear-capable nation. The enormity of this new reality was captured in the president’s diary entry on 17 July 1945: “We have discovered the most terrible bomb in the history of the world. It may be the fire destruction [sic] prophesied in

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19 Sechser and Fuhrmann, Nuclear Weapons and Coercive Diplomacy, 153.
20 Logan, “The Nuclear Balance is What States Make of It,” 197.
the Euphrates Valley Era.” President Truman’s portrayal of the bomb’s creation as a fortuitous discovery, with profound potential for cataclysm, is instructive for comprehending the origins of U.S. nuclear strategy. From 1940 to 1974, America’s inconsistent engagement with strategic theorists, coupled with recurrent dismissal of varying intelligence estimates, allowed nuclear strategy to be dominated by technological development. In The Rise of American Air Power: The Creation of Armageddon, Michael Sherry captured how quickly the apprehension arising from the creation of such potent instruments of life and death buckled under the weight of technocentric fervor. The critical issue this engendered was the expansion of US nuclear force postures absent a coherent theory of victory. The pervasive influence of technological development remained a pivotal factor during three distinct periods: the race for the bomb (1940–1945), the period of scarcity (1945–1954), and the period of plenty (1954–1974).

**The Race for the Bomb (1940–1945)**

Interpreting the pursuit of the bomb as a technologically driven race helps elucidate the “fragmentary and oblique character of the official record.” While it was likely not Los Alamos’ intention, their prioritization of swiftly fielding a demonstrably successful bomb before the war’s end “significantly narrowed the choices open to policymakers in the summer 1945.” The emphasis on rapidly deploying a technologically viable bomb accounts for the complete reversal of the military’s May 1943 strategic concept, which targeted “an isolated naval base rather than a large city.” Persistent concerns about the morality of intentionally targeting cities could not reverse the strategic course set by the “accumulated momentum of previous technical decisions.” Even intelligence reports regarding potential POW camps housing allies had little impact on the revised target selection and employment concepts. The negligible influence of these reports underscores how the erratic suppression of facts fostered the cognitive dissonance necessary to deliberately select targets that could devastate civilian population centers or allied POWs—under the guise of military necessity.

28 Summation of the military’s early attitude towards nuclear targeting was captured in the Military Planning Committee (MPC) meeting on 5 May 1945 and recounted in Malloy, “The Rules of Civilized Warfare,” 484.
Technical development considerations took precedence because national-level discussions on nuclear targeting strategy virtually ceased by mid-1943, resulting in an “absence of firm direction from above.” Los Alamos’ relative autonomy meant that Oppenheimer’s concerns about concurrently pursuing five distinct bomb designs were only assessed from a technical standpoint. This had significant implications for the viability of certain designs. The greater technological complexity of underwater weapons (UW) led to the recommendation to suspend the effort, despite UW being the most aligned with the strategic concept of 5 May 1943. The confirmation that technical considerations had become predominant at all levels was evident when the UW programs were officially paused in December 1943.

With a reduced number of weapon designs, Los Alamos shifted its focus to constructing a weapon optimized against cities “without consulting high-level officials in Washington.” The primary factor in that decision was neither moral nor strategic but was driven by technical constraints inherent in a blast-focused weapon design. A blast weapon had to be dropped from high altitude to avoid fratricide and would be ineffective “against hardened targets such as bunkers, dugouts, armored vehicles, or warships.” Additionally, the scarcity of materials, which would come to characterize the subsequent period, rendered the practicality of a show of force drop unfeasible. These factors converged against last-minute changes to the design or recommended deployment methods; on 6 and 9 August 1945, the first two atomic bombs were dropped on Japanese cities.

The Period of Scarcity (1945–1954)

Scarcity governed the interplay between technological development and US nuclear strategy following World War II. Scarcity encompassed four key elements: strategic guidance, usable nuclear material, available delivery systems, and adversary parity. The enduring aspect of scarcity throughout the early periods was the absence of US strategic guidance, allowing technologically driven capabilities to become “the most critical determinant in strategic and operational planning.” The subsequent elements of scarcity limited the feasible targets, as “the nuclear stockpile was still too small and the weapons too large and unwieldy to be used against true...”

tactical targets.”\textsuperscript{38} Despite these limitations, initial efforts were made to integrate the ideas of strategists like Bernard Brodie into crafting a coherent approach to countering the Soviet ascent as a nuclear peer adversary.\textsuperscript{39}

However, the continued erratic nature of the US’s engagement with strategists derailed the plan after only one month. General Curtis E. LeMay successfully advocated for the abandonment of the effort, focusing on its impact on readiness.\textsuperscript{40} The exclusion of impartial strategists resulted in cementing SAC as the “dominant force in operational planning for nuclear war.”\textsuperscript{41} Their focus remained steadfast on “the development of innovative technology to increase [its] readiness.”\textsuperscript{42} This was reinforced by the practice of bootstrapping, using intelligence estimates to justify high levels of spending on acquiring capabilities in an escalatory cycle.\textsuperscript{43} Essentially, SAC utilized self-produced intelligence estimates as bargaining chips for resources that furthered their predetermined objectives, namely countering the challenges of nuclear defense by accumulating preemptive capabilities that leveraged technological advancements.\textsuperscript{44}

\textbf{The Period of Plenty (1954–1974)}

As SAC gained increased resources under Pres. Dwight Eisenhower, the relationship between nuclear strategy and technological development shifted from one defined by scarcity to one characterized by plenty. However, the existence of nuclear plenty did little to alleviate the situation. Instead, the rapid deployment of more potent thermonuclear weapons, longer-range B-52 bombers, and SAC-owned advanced computer targeting systems only served to compound the complexity of the issue.\textsuperscript{45} Each technological advancement fueled an expanding target list, necessitating more weapons, additional delivery vehicles, and enhanced capabilities.\textsuperscript{46} Similarly, the Soviet pursuit of innovative delivery systems significantly reduced their previously technologically constrained 30-day nuclear force projection timelines, prompting corresponding efforts by US leadership.\textsuperscript{47} This entailed the deployment of ICBMs, IRBMs, and SSBNs, whose nuclear military attributes—such

\textsuperscript{38} Rosenberg, “The Origins of Overkill,” 16.


\textsuperscript{40} Rosenberg, “The Origins of Overkill,” 18.

\textsuperscript{41} Rosenberg, “The Origins of Overkill,” 19.


\textsuperscript{44} Rosenberg, “The Origins of Overkill,” 31–35.


\textsuperscript{46} Rosenberg, “The Origins of Overkill,” 50.

\textsuperscript{47} Rosenberg, “The Origins of Overkill,” 38
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as CEP, yield, retargeting—were driven by technological deployment timelines rather than a comprehensive strategic vision.  

Implications for Kroenig’s Theory

The concentration of American resources into nuclear technological development persisted despite presidential dismissal of intelligence estimates. Additionally, numerous strategic studies advocating for the United States to abandon city targeting in favor of a more optimal mix of targets had little effect on mitigating the excessive expansion of the nuclear stockpile.  

Ultimately, President Eisenhower “realized that his attempt to set limits had failed.” The president’s failure and SAC’s success in their endeavor to deploy as many ready forces as possible stemmed from their exploitation of technological advancements and the abundance of nuclear resources. Once the course was set for the US legacy of bootstrapping, subsequent administrations grappled with the formidable challenge of undoing it. This dynamic tragically confirms the enduringly erratic nature of US engagement with strategic theorists. Moreover, Rosenberg’s historical analysis effectively rebuts Kroenig’s assertion that nuclear superiority–brinkmanship does not necessarily lead to arms races—illustrated by how virtually nothing could deter SAC from exploiting an alleged bomber and missile gap. 

In reality, the US legacy of bootstrapping underscores how expanding stockpiles only fueled SAC’s voracious appetite for ever-increasing numbers of weapons and delivery systems. Therefore, if Kroenig’s theory were implemented consistently, it would almost certainly resurrect this legacy. The crucial difference today is that the US no longer operates in a relatively simplistic bipolar world. While Russia remains an active nuclear rival, China, Iran, and North Korea are developing nuclear capabilities to challenge US interests. Pursuing superiority in this context would deplete limited US resources, encourage nuclear proliferation, and “raise the danger of catastrophic destruction as a result of miscalculation, terrorism, or sabotage.”

56 Sechser and Fuhrmann, Nuclear Weapons and Coercive Diplomacy, 17.
Lessons from Antithetical Strategic Camps

Two opposing camps emerged as alternative frameworks to bootstrapping: proponents of limited nuclear war and proponents of the sufficiency of a secure second-strike capability. Henry Kissinger asserted that “the most fruitful area for current strategic thought is the conduct and efficacy of limited nuclear war.” Despite the early advocacy, “scholars and strategists grew increasingly skeptical regarding the feasibility of limited nuclear war.” Nevertheless, limited nuclear war has resurfaced as a compelling concept, despite its numerous flaws, owing to the intricacies of a multipolar world that includes doctrines like escalate-to-deescalate. Conversely, some argue that the United States should solely maintain a limited second-strike capability.

However, Austin Long and Brendan Green effectively argued how this stance disregards the mutability of all weapon systems. During the Cold War, even SSBNs and mobile ICBMs were made vulnerable by significant US investments in acoustics, SIGINT, and UAVs. Examination of theories concerning limited nuclear war reveals risks associated with nuclear proliferation and the potential breach of the tradition of non-use, while consideration of solely maintaining a second-strike capability exposes issues with relying on a small number of sophisticated systems.

Untenability of Limited Nuclear War

The resurgence of old adversaries and the emergence of new nuclear-weapon states (NWS) have expanded the scope of plausible nuclear “next use” scenarios. Many of these scenarios revolve around what could be termed as limited nuclear war. However, before delving into the feasibility of constraining a nuclear conflict, it is imperative to delineate what is meant by limited. Specifically, it denotes the constrained employment of nuclear weapons within a broader scheme of attack.

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60 Morgan, “Dancing with the Bear,” 44.


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This differs from the broader concept of “a limited war, fought for limited gains.”

Given this definition, it may be acknowledged that limited nuclear war is technically feasible; however, the significant risk of escalation following any departure from the tradition of non-use renders the concept impractical as an offensive US strategy. Kahn’s assertions regarding technical feasibility fall short because they fail to address the complexity stemming from proliferation, the anticipated repercussions of deviating from the tradition of non-use, or the uncertainty surrounding escalation during a conflict. Nevertheless, the US cannot dictate adversarial pursuits and must therefore draw lessons on how to prudently shape its own force posture and how to operate through a wide range of nuclear scenarios.

Insufficiency of Technical Feasibility. Kahn endeavored to debunk misconceptions regarding the feasibility of limited nuclear war. His aim was to refute what he termed as a strategy of “mutual-homicide.” Kahn argued that the adoption of mutually assured destruction only served to create a more perilous world, failing to prevent the possibility of miscalculation.

To this end, he effectively demonstrated that concerns regarding genetic effects, medical issues, economic repercussions, and other factors resulting from nuclear war were largely exaggerated. Kahn’s exploration of the technical feasibility of operating within and through nuclear war led to the formulation of his escalation dominance theory. However, his theory “suffers from several serious defects when one attempts to apply it in real-world strategy making.” These defects can be categorized into three areas: a lack of commonly understood discernible rungs by all parties, the distortion of escalation as a one-dimensional progression when viewing it as a ladder, and the rarity of attainable offsetting counter moves in the chaotic context of warfare.

Each of these highlights critical issues with directly translating technical feasibility into a justification for pursuing a strategy of offensive limited nuclear war.

Complexity of Proliferation. The nuclear multipolarity of the strategic environment further exacerbates the challenges associated with escalation dominance and the concept of limited nuclear war. The inclusion of more NWSs only serves to obscure the underlying dynamics of game theory. It must be acknowledged that theorists like Kroenig and Thomas Schelling argue that complexity is beneficial and that “uncertainty is a virtue.” Kenneth Waltz echoed this sentiment, stating

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64 Morgan, “Dancing with the Bear,” 44.
69 Morgan, “Dancing with the Bear,” 15.
70 Morgan, “Dancing with the Bear,” 16.
that “the effectiveness of nuclear deterrence rests on uncertainty.”

Nevertheless, the high-stakes version of game theory required to effectively employ brinkmanship or escalation dominance reveals a common flaw. Specifically, desperation can drive governments to take additional risks, leading to a nuclear “prudence that still leaves room for war.” Hence, it must be conceded that proliferation heightens the likelihood of “deterrence failures and deliberate or accidental war.”

Furthermore, proliferation amplifies the inherent risks associated with nuclear safety limitations. Even dissenters about the complexity of new NWSs acknowledge that proliferation has “increased risk of nuclear weapons accidents and accidental war.” Risk increases because “imperfect humans inside imperfect organizations control their nuclear weapons.” The Cuban missile crisis highlighted the deficiencies of both hawkish and dovish approaches in addressing “the possibility that an accidental nuclear war could have occurred during the crisis.” The crisis exposed flaws in the belief that accidental war was virtually impossible. The fundamental assumption that nuclear war could only occur if political leaders deemed it in their best interest became untenable. Scott Sagan’s recognition of the heightened risks led him to conclude that “more nuclear-armed states may be our fate; it should not be our goal.” Likewise, the principle of increased risk of unintentional nuclear war resulting from accidents can be linked to expanded stockpile sizes.

Breaking the Tradition of Non-Use. The United States should refrain from pursuing an offensive strategy of limited nuclear war because deviating from the tradition of non-use would eliminate a crucial safeguard against nuclear escalation. The connection between this safeguard and the avoidance of limited nuclear war is evident in elite war games, while the opposite trend is observed among non-elites. Advocates of a nuclear taboo cite war games like DETEX I as evidence supporting their argument. In this particular war game, MIT attempted to promote the feasibility of a limited nuclear strike during escalation, but the prevailing “tendency [was] for escalation to occur only along a spectrum of conventional arms . . . before

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72 Morgan, “Dancing with the Bear,” 17.
the use of even a single tactical nuclear weapon.”81 This consistent pattern of steadfast adherence to non-use persisted in nearly all elite player war games.82 However, in one of the rare instances where an elite war game ventured into the realm of nuclear conflict, the initial limited usage quickly spiraled out of control after just three rounds. This underscores the notion that any nuclear deployment during wartime would unleash uncontrollable devastation. Secretary of Defense Colin Powell echoed this sentiment when questioned about the practicality of developing tactical (limited) nuclear war plans.83

Conversely, the restraint exhibited by elites sharply contrasts with non-elite war games. In such instances, “Pentagon officials were surprised by how readily their guests were to go nuclear.”84 However, this outcome is supported by data indicating that the majority of Americans endorse the use of nuclear weapons against an adversary’s civilian population if it saves American lives.85 The disparity between elites and non-elites is succinctly captured by Reid Pauly’s quip, “if you want thermonuclear war to break out in a game, you just get some high-school students.”86 The implication is that if nuclear non-use is recognized as a taboo, it “function[s] more by a mechanism of conformity than morality.”87 This elucidates why adherence to the norm dissipates when non-use is violated in war games. Regardless of whether one adheres to the nuclear taboo or not, it must be acknowledged that reinstating the stigma would be considerably more challenging than upholding the tradition of non-use, and thus “it is vitally important to err on the side of preventing any violation.”88

The Fog of Escalation. The data presented above illustrates how swiftly deviating from safeguards against nuclear Armageddon can descend into an ambiguous haze of uncontrolled escalation. Consequently, refraining from offensive strategies of limited nuclear war does not overlook national self-interest. Rather, its avoidance acknowledges that “breaking the precedent might ultimately do more long-term

damage . . . than the short-term military advantage could justify.”

Even defensive nuclear use could be misconstrued and result in unintended escalation. Hence, a primary safeguard against an uncontrolled pattern of escalation must be to steer clear of entering the cycle in the first place.

That acknowledgment does not dismiss scenarios where an existential threat exists, which might necessitate nuclear deployment. Rather, it acknowledges that limited nuclear war is not a viable option despite the American tendency to grant their “leaders wide latitude on the decision to use nuclear weapons.” Instead, the possibility of escalating to all-out war should prompt all states to proceed with utmost caution if nuclear-weapon states NWSs are involved. This holds true regardless of any specific measure of relative superiority. The historical instances of the Cuban Missile Crisis, the Schlieffen Plan, and the Franco-Prussian War serve as examples demonstrating the difficulty of containing war during the fog of escalation. The technical feasibility of limited nuclear war does not alleviate the complexities associated with proliferation, the risks of deviating from the tradition of non-use, or the uncertainty of escalation when assessing its viability as a strategy. Therefore, the United States should refrain from pursuing an offensive strategy of limited nuclear war while developing resilient options for its deterrent capabilities.

Mutability of a Secure Second Strike

The key lesson learned from assessing exclusive reliance on a secure second-strike capability is that no weapon system is impervious to change. Adversaries will persist in seeking strategic offsets and counters, thus rendering enduring silver bullets nonexistent. While discussions about secure second-strike capabilities have traditionally centered on SSBNs and mobile-ICBMs, the modern reliance on limited numbers of stealth bombers highlights the broader applicability of this lesson. Following the Cold War, exponential advancements in SIGINT, detection, and surveillance technologies have continued to expose nuclear forces to risk.

Consequently, Long and Green concluded “that simple numerical differences or ratios are a poor way to measure nuclear superiority; the ability to find, track, and

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92 Posen, “Inadvertent Nuclear War,” 32.
93 Posen, “Inadvertent Nuclear War,” 57.
surprise nuclear targets is far more important.”94 The risk becomes particularly acute if the United States adopts a strategy reliant on low numbers of sophisticated weapon systems.

Therefore, the United States cannot afford to remain passive and allow adversarial technology to progress unchecked, potentially rendering its nuclear forces obsolete. This raises the question: what capabilities must the U.S. pursue to maintain a credible nuclear deterrence? From a USAF standpoint, Secretary of the Air Force Frank Kendall testified to Congress that the sophisticated nature of the nuclear-capable B-21 will drive the USAF to reduce the ratio of fighters to bombers.95 While the B-21 offers clear advantages, there are also evident risks associated with relying on relatively small numbers of advanced strategic attack platforms for deterrence. Instead, the United States needs to pursue a force structure that incorporates some advanced systems alongside high quantities of more affordable platforms and investments in auxiliary support platforms. The validity of this concept will be demonstrated by highlighting both the appeal of constructing a modern battleplane—such as the B-21—and outlining the value gained from quantity in a threat-rich environment where adversaries may potentially neutralize any deployed system.

**Allure of Building a Modern Battleplane**

The threat posed by the People’s Republic of China (PRC) must shape US policy assessments regarding the types of nuclear and conventional forces to be deployed. This is because the PRC is actively deploying capabilities that “will make survival increasingly untenable for massed ground combat formations, air bases, and surface warships.”96 When combined with their capabilities to detect and track SSBNs, changes in the operational landscape jeopardize US credibility to deter PRC aggression effectively. Besides uncertainties surrounding whether nuclear deterrence can extend to allies and partners, the overall weakening of US deterrence is evidenced by “the mere existence of widespread doubt about Taiwan’s ability to survive an onslaught.”97 Nevertheless, solutions must consider the inherent limitations posed by the PRC’s formidable antiaccess forces.

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 Appropriately, the primary appeal of constructing modern Douhetan battleplanes, exemplified by the B-21, stems from the belief that airpower is ideally suited to evade enemy attacks while en route to strategic targets. While Giulio Douhet’s theory is not without flaws, the emergence of stealth technology has breathed new life into his vision. Stealth aircraft revitalize the notion that airpower can “go far behind the fortified line of defense without first breaking through them.” The Gulf War’s successful utilization of stealth aircraft appears to validate and reinforce this hypothesis. The F-117’s limited numbers were compensated for by their capability to penetrate deep into Baghdad. Despite accounting for only two percent of the total strike sorties, they “struck nearly 40 percent of the targets identified as ‘strategic’ by planners and commanders.” Moreover, the F-117’s capacity to elude Iraqi antiaccess/area denial (A2AD) capabilities obviated the necessity to expose “large support packages of other non-stealthy aircraft.” This alone elucidates the appeal of constructing a stealth nuclear bomber.

Moreover, another appealing aspect of the B-21 is its extended range, which addresses basing challenges by operating beyond PRC threat rings. Modern aircraft have complicated basing logistics and created more conspicuous targets; “the advent of faster, heavier, and more sophisticated aircraft meant a concomitant needed for longer runways, stronger materials, and all-weather facilities.” This limitation prompted Secretary of Defense Lloyd Austin III to commend the B-21 for its ability to use extended “range to prosecute targets without the need for bases close to enemy territory.” Hence, it is evident how the B-21 offers a significant advantage in the United States’ efforts to maintain credible deterrence against PRC aggression. However, the enduring challenge remains the lesson emphasized by Long and Green regarding the mutability of all weapon systems.

The Quality of Quantity. Since the advent of airpower, there have been proponents of the notion that the bomber will always penetrate enemy defenses—but at what costs?

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102 Tirpak, “Kendall,” 2.
105 Speaker, “The Past, Present, and Future of Airpower” (lecture, Air Command and Staff College, Maxwell AFB, AL, 5 December 2023).
and expenditure. In World War I, daylight bombing resulted in such substantial casualties and aircraft losses that the practice essentially ceased by the end of 1916.\textsuperscript{106} In World War II, both the US and British forces incurred significant losses because they assumed their modern bombers would invariably penetrate enemy defenses.\textsuperscript{107} However, the existential threat necessitated production levels to match requirements, and the human toll was reluctantly paid.\textsuperscript{108} Subsequently, during the Vietnam War, the prospect of losing bombers to enemy fighters and A2AD systems led to the withholding of B-52s from “Rolling Thunder strikes deep inside [enemy territory].”\textsuperscript{109} Consequently, the price was paid in terms of compromised mission effectiveness rather than human lives or aircraft losses. Presently, any of these three expenditures would be hard pills to swallow, particularly given that each of the 100 planned B-21s costs approximately USD 750 million.\textsuperscript{110}

The perceived immutability of modern stealth bombers to enemy attacks offers little reassurance. Recent events serve as stark reminders of their vulnerability to enemy cunning and advancements in countermeasures.\textsuperscript{111} During Operation Allied Force, Serbian forces demonstrated that a combination of tactics, intelligence, and luck could enable an inferior force to down sophisticated stealth aircraft.\textsuperscript{112} Their tactics mirrored those employed by the British during the Battle of Britain, leveraging a network of spotters and human intelligence assets to overcome technological disadvantages.\textsuperscript{113} Utilizing these tactics, Serbian ground battery commanders gained precise knowledge of the force composition, mission schedules, and entry/exit routes, enabling them to shoot down an F-117.\textsuperscript{114} While luck played a role in the downing of the F-117, contemporary developments in tactics and countermeasures by more sophisticated adversaries, such as the PRC, present a


\textsuperscript{110} Tirpak, “Kendall,” 3.

\textsuperscript{111} Conversino, “The Changed Nature of Strategic Air Attack,” 37.


\textsuperscript{113} Samir Puri, “The Role of Intelligence in Deciding the Battle of Britain,” \textit{Intelligence and National Security} 21, no. 3 (2006), 427, https://doi.org/.

\textsuperscript{114} Leone, “An In-Depth Analysis of How Serbs.”
more substantial threat today.\textsuperscript{115} Given the high cost and prolonged production timelines associated with sophisticated systems, the United States must prioritize the benefits derived from large numbers of less expensive conventional assets. These assets can complement strategic deterrence efforts and provide additional layers of defense below the nuclear threshold.

**Implications for US Nuclear Strategy**

Recognizing that the PRC or Russia might draw similar conclusions today as Japan did in 1941 should sensitize US policymakers to the potential catastrophic outcomes of deliberately pursuing a strategy of superiority-brinksmanship. The erosion of deterrence against these formidable adversaries would stem from a perceived lack of credible military capability to thwart their aggression.\textsuperscript{116} Reversing this trend demands astutely deploying forces that instill doubt in adversarial leaders regarding the feasibility of a fait accompli–style attack. In contrast to superiority-brinksmanship, Robert McNamara’s wisdom remains relevant: “it’s not clear that we have to fight them. So for God’s sake, let’s try to avoid it.”\textsuperscript{117} This sentiment applies to each adversary currently positioned at the proverbial gates. Therefore, the United States should conclude that the potential costs and risks outweigh any perceived benefits. Ultimately, Kroenig’s theory falters both in theory and in practice due to its inherent flaws and its failure to mitigate the risks of hastening nuclear Armageddon.

That acknowledgment falls well short of advocating for nuclear disarmament. Instead, it underscores the reliability of deterrence as a coercive function of nuclear weapons compared to their effectiveness in compellence.\textsuperscript{118} In this light, Jervis’ assertion over 40 years ago that deterrence represents an absolute capability, rather than a relative one, remains pertinent.\textsuperscript{119} When combined with insights derived from an examination of limited nuclear war and the perils of overreliance on a second-strike capability, a more nuanced foundation for shaping US nuclear strategy emerges.

The first pillar of this strategic framework involves deploying advanced nuclear capabilities that are adaptable and less susceptible to adversary countermeasures (such as Sentinel, B-21, LRSO, and Columbia SSBNs), thus mitigating the inher-


\textsuperscript{116} Haddick, *Fire on the Water*, 164.


ent mutability of all weapon systems by incorporating iterative open architectures into new weapons’ designs.\textsuperscript{120} The second pillar recognizes that amassing increasingly large numbers of nuclear systems solely for numerical superiority is counterproductive. Instead, it emphasizes the importance of maintaining a robust and capable quantity of conventional forces, which possess its own inherent quality. Finally, the third pillar prioritizes the development of supporting functions (such as NC3, survivable infrastructure, and conventional forces) crucial for instilling doubt in adversarial leaders regarding the success of a fait accompli attack on the US homeland. Failure to establish a sufficient, modern, and credible nuclear deterrent guided by these pillars would leave the United States and its allies vulnerable to aggression.

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