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Editorial Board

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Editor's Note

Space & Defense Vol. 13, No. 1 represents our second issue since our move to a new cover and format celebrating our close partnership with University of Nebraska Omaha editing and production, and the USSTRATCOM Academic Alliance as a source for both peer-reviewed and student submissions. Vol. 13 is also our first presentation after a seismic shift in the national security landscape with Russia's full invasion of Ukraine and failed attempt at violent regime change in Kiev, at the very borders of NATO.

This spring, shortly after final exams, I had the pleasure of escorting a group of Air Force Academy cadets to Lawrence Livermore National Laboratory's Center for Global Security Research (Livermore, CA). During a national security strategy lecture for summer interns at the lab, one of our cadets asked about an enduring conundrum for U.S. policy makers. Engineers and scientists took precious time, sometimes more than a decade, to deliver new technology to U.S. forces. How, she wondered, could instruments of force, especially in expanding operational domains such as nuclear, space, and cyber, ever keep up with the demand signal from American strategists?

The cadet's query strikes us as a clear way to express the service we attempt to provide at *Space & Defense*. Here is a journal where academic researchers, officers, policy makers and students can publish their ideas and further the national conversation on future strategy. If *S&D* can help anticipate problems in space, cyber, or nuclear security, scientists and engineers serving society can benefit from at least some guidance on what technologies are required, especially by the military services for the United States and its allies.

This issue offers several starting points for important conversations on technology and strategy. The first feature article by USAF Col T. Justin Bronder (Ph.D.) analyzes four distinct approaches to the future of arms control with great power rivals Russia and China. Despite the increasing intensity of international competition, Bronder argues for a mixed strategy emphasizing his two moderate options: a) continued bilateral agreements of the kind that achieved successes with the Soviet Union during the Cold War and b) informal, non-binding confidence building measures that could open the way for new interlocutors such as China and for new arms control norms in the space and cyber domains.

The second peer-reviewed feature, by Mechanical and Aerospace Engineering Ph.D. candidate Jeffrey Taylor, takes on the question of how the United States should respond to technological advances in hypersonics, especially by Russia, which has

taken recently to saber rattling its nuclear arsenal in order to block Western aid during its war in Ukraine. Again, despite intensifying Russian aggression, Taylor argues for moderation. International agreement on hypersonics deployment, even if it did not include traditional legal commitments, would likely bring better outcomes than either quantitative or qualitative arms racing by the United States. For Taylor, not every Russian move or technology claim in hypersonics merits a symmetric response from the West.

In place of a third peer-reviewed feature article for this issue, we reprint a call to action by former U.S. State Department visiting faculty at USAFA David Epstein. In his recent piece for the *Foreign Service Journal*, Epstein urges the State Department to keep pace with its federal partners, especially in the Department of Defense, and educate a specialized cadre of Foreign Service officers in space diplomacy as a newly certified area of expertise. Space diplomats would take their place alongside other specialists working human rights issues; climate change; or defense cooperation as part of a country team or advising the Secretary's staff back in Washington, D.C.

The professional features in this issue are followed by four student contributions, all by cadets at different stages of their Air Force Academy careers. Now second lieutenant Henry Gilchrist (USAFA '21) leads off with "Madman Diplomacy," which was originally a seminar paper for his Nuclear Weapons & Strategy minor capstone. Henry polished the piece during summer work at Lawrence Livermore Lab's Center for Global Security Research and presented his argument at several professional conferences, including the 2021 Workshop of the USSTRATCOM Academic Alliance, eventually earning the USAFA Dean of Faculty Outstanding Cadet Researcher award. Henry's story demonstrates how, with the proper investment, undergraduates can contribute to the national conversation at the frontiers of defense policy. Following Henry's essay, Jesse Jenkins (USAFA, '22) presents his independent study on "Climate Change and Mass Atrocity." Max Di Lalla (USAFA, '22) in his final paper for USAFA Scholars capstone suggests reforms for DOD's National Security Innovation Network, and Noah Grady (USAFA, '24) reviews former National Security Advisor H.R. McMaster's *Battlegrounds: The Fight to Defend the Free World* (2021), a key text during the Academy's 62nd Assembly, "National Security and American Polarization."

Our issue concludes with two notes of interest to the editors at *Space & Defense*. USAFA professor and coeditor of *China's Strategic Arsenal* (Georgetown, 2021) Paul Bolt takes a retrospective look at the late news correspondent Neil Sheehan's *Fiery Peace in a Cold War* (2009), drawing lessons for today's great power rivalry in space. Finally, we include summary proceedings of the 62nd Academy Assembly, when roundtables of cadets and select students across the country examined the causes and consequences of political polarization in American democracy. As always, we are grateful for our contributors and extend special thanks to the expert

peer reviewers who volunteer their time in order to further the dialog on emerging technology and national security. Our best answer to students' exasperation at America's inability to close the strategy-technology gap is *more*—more articles, reviews, workshop proceedings, and more critical readers of *Space & Defense*.

Damon Coletta

USAFA

July 2022

Future Directions for Great Power Nuclear Arms Control

T. Justin Bronder

Extending the current New START regime can help maintain traditional strategic stability; however, such an approach fails to address destabilizing trends related to non-nuclear strategic technologies and China's expanding forces.

Introduction

Arms control in the nuclear age has proved a useful tool of national security, meeting ends as diverse as reducing the risks of nuclear war to channeling strategic competition.[1] Yet recent trends indicate arms control may be at an inflection point; the suitability of this tool in general and the viability of securing new agreements specifically are both unclear.[2] The New Strategic Arms reduction Treaty (New START) extension somewhat reverses the trend that has seen the collapse the Antiballistic Missile (ABM) Treaty and Intermediate-Range Nuclear Forces (INF) agreement. However, the pathway to a future ratified treaty is uncertain due to continued mistrust between Washington and Moscow, punctuated most notably by Russia's recent invasion of Ukraine.[3] Domestically, the politically polarized environment in the United States presents additional internal challenges to arms control.[4] Looking beyond the two nuclear superpowers, uncertainty regarding China's nuclear modernization and expansion is also challenging how U.S. leaders consider both regional and strategic stability.[5] Meanwhile, continued development of non-nuclear strategic technologies such as hypersonics and increased military competition in domains like space and cyberspace further complicate long-held views on deterrence, stability, and arms control.[6]

The unique challenges of today's dynamic security environment have prompted many expert recommendations regarding future directions for nuclear weapons policy and arms control.[7] Other works dive deeper still, providing additional qualitative or quantitative considerations to frame key questions of arms control, deterrence, and stability.[8] This study leverages these expert opinions to provide a new type of focused analysis, synthesizing and methodically comparing plausible arms control courses of action and their impacts through the decade following the end of New START, 2026 – 2036. Based on a thorough review of current literature, four distinct arms control categories, or "approaches" are proposed:

·Approach 1 "Bilateral strategic arms limitations" – maintaining bilateral U.S.-Russian strategic arms limitations at similar New START levels.

·Approach 2 "Long-term multilateral reductions" – pursuing major long-term nuclear warhead reductions in a legally binding multilateral framework.

·Approach 3 "Bilateral non-ratified frameworks" – a set of bilateral U.S.-Russia and

U.S.-China agreements based on non-ratified understandings covering a range of nuclear and non-nuclear topics.

·Approach 4 "Pursue nuclear superiority" – abandoning arms control to pursue U.S. nuclear superiority.

This study also introduces a new methodology to analyze potential impacts from these approaches, comparing their influence on U.S. national interests across six qualitative criteria: Strategic Stability, Extended Deterrence, Proliferation, Cost, Competitive Advantage, and Political Feasibility. The result is a framework that more fully investigates the interplay of both traditional and new aspects of nuclear competition and arms control. This theoretical comparison indicates that each approach produces mixed outcomes for the United States and its allies across the analytical criteria. However, these conclusions also outline important considerations within each regime that can be used to combine the benefits of each approach for a more comprehensive nuclear policy structure in a post-New START world.

Background

Historically, arms control has served goals such as managing proliferation of specific weapons, promoting general stability, and strengthening norms or institutions.[9] In the nuclear era these objectives were further shaped by the classical philosophies of Thomas Schelling, Morton Halperin, Bernard Brodie, and others to form arms control methodologies aimed at making nuclear war less likely or, should it occur, less costly.[10] This classical thinking, combined with additional political and conceptual breakthroughs, ensured arms control became a critical tool in managing U.S.-Soviet nuclear competition and nuclear risks.[11] The most significant agreements from this initial Cold War Era, such as the bilateral Strategic Arms Limitations Talks (SALT I) and ABM (both signed in 1972), or multilateral Limited Test Ban Treaty (signed in 1963) and Nuclear Non-Proliferation Treaty (NPT, signed in 1968), promoted strategic stability and risk mitigation.[12] These treaty-based efforts to manage nuclear risks were complimented by confidence building measures like the "hotline" between Washington and Moscow and long-running efforts to progressively limit explosive nuclear testing. That formal agreements such as ABM and SALT were reached with support through multiple U.S. presidential administrations testifies to the pervasiveness of classical thinking on nuclear arms control.[13] The long road to ratification for these agreements also helped solidify critical theories on deterrence and mutual vulnerability.

These trends underpinned a later "golden age" of nuclear arms control that helped precipitate the end of the Cold War and then facilitated non-proliferation and arms reductions in the years that followed.[14] The notable binding regimes from this era like the INF Treaty were supplemented by unilateral Presidential Nuclear Initiatives (PNIs) in the 1990s and the Strategic Offensive Reductions Treaty (SORT) in 2002,

both of which highlighted other avenues to enact arms-limiting agreements and illustrated the potential of mutual restraint under the right strategic conditions.[15] New START very much leveraged these classic foundations, and until 2026, the treaty will limit U.S. and Russian forces to a maximum of 700 deployed launchers (i.e., missiles and bombers with an overall cap including non-deployed systems at 800) and 1,550 deployed nuclear warheads.[16]

The continued maintenance of New START supports the notion that concepts of stability, deterrence, and mutual vulnerability developed during the Cold War still have salience. Yet even in this case, both parties to New START have a list of issues – like the lack of constraints on Russia's "non-strategic" nuclear weapons (NSNW) or U.S. European-based Ballistic Missile Defense (BMD) systems, to name two – that are seen as critical shortcomings in the treaty. The current era of great power competition, China's potential race to nuclear parity, and the continued pace of technological development present additional challenges to this legacy bilateral framework. Despite these complicating factors, the history of nuclear arms control reiterates the important links between arms control and other aspects of national security. However, interconnected topics of deterrence, stability, alliance cohesion, and defense budgets present a rich parameter space that is often not fully explored within the many proposed options for arms control. This study attempts to fill this gap, presenting an analytical framework that can be used to elucidate the costs and benefits of various arms control approaches in a more qualitative and coherent manner.

Methodology

This study focuses on some of the most important factors for nuclear weapons policy and arms control –Strategic Stability, Extended Deterrence, Proliferation, Cost and Competitive Advantage. In addition to their import to nuclear strategy, these topics lend themselves to a comparative analytical framework as they are characterized by a fairly common understanding or "baseline" in the current strategic context. This "baseline," understood from the point of view of the United States, provides a useful benchmark for evaluating relative changes from today's situation or "status quo." Note that this "baseline" is assumed from the period prior to Russia's attack against Ukraine; the full implications of this significant military escalation and global response are impossible to quantify in the few days of military action as this paper was undergoing revision. Relative changes, from the U.S. perspective and according to each criterion, can be qualitatively assessed and assigned a "rating" of either positive, negative, or neutral based on this approach. As an analytical exercise, there are likely results where strong cases can be made for multiple ratings; in such cases a "mixed" rating of the most likely results will be used. A final category of Political Feasibility is also considered to capture the likelihood of each approach.For clarity, the following definitions for each category

are used:

·Strategic stability is comprised of both "first strike stability" and "arms race stability." The widely accepted definition of "first strike stability" is essentially the absence of an incentive to initiate a nuclear strike, while "arms race stability" refers to the absence of an arms race to pursue or maintain such a capability.[17] To support a qualitative estimate of this criterion, projected strategic force structures for the United States, Russia and China that could result from each proposed arms control approach are presented, based on publicly available reporting.[18] As a baseline, rough ratios along the lines of the current 2022 status quo are assumed to be neutral while any relative changes that threaten first strike or arms race stability will be considered negative; differences that potentially improve stability will result in a positive rating.

·Extended Deterrence lacks an overarching definition due to the different regional factors affecting allies under the U.S. "nuclear umbrella."[19] This study will consider relative impacts to U.S. extended deterrence security guarantees for key relationships in Europe and East Asia. These guarantees are generally grounded in the capability and credibility of the United States to deter a nuclear or other large-scale attack on these allies.[20] Similar to the strategic stability estimate described above, the overall ratios of strategic forces and nuclear force margins over U.S. competitors will be reviewed in a more regional context to help qualitatively frame the credibility underpinning this extended deterrence criterion. Increased ambiguity or decreased commitment that could potentially stem from an arms control approach would lead to a negative assessment, for example. These negative impacts in themselves could result from force posture changes, specifically those that reduce U.S. margin against its nuclear competitors. Regional stability must also be considered, given that conflict and escalation could challenge the credibility of U.S. extended deterrence guarantees.

·Proliferation is another diverse topic that can be qualified by determining whether an arms control regime would increase or decrease proliferation pressures for existing programs (declared states such as India and Pakistan as well as rogue regimes in North Korea and Iran) or prompt the emergence of new nuclear aspirants.[21] Another important factor is the strength of the current NPT regime, particularly the influence of U.S. and Russian commitments to NPT Article VI responsibilities.

·Costs for implementing each approach will be evaluated according to impacts to U.S. budgets. This assessment will be made quantitatively by estimating the potential deviations from the most recent projected budgets as a baseline.[22] Any changes within approximately $\pm$15% will be considered neutral while higher and lower excursions will be negative and positive, respectively. This 15% threshold corresponds to the definition of a "significant" breach in an individual program's

cost over its current baseline, per Nunn-McCurdy Act Congressional reporting requirements for major defense programs.

·Competitive Advantage considers the degree to which the theoretical arms control outcomes enable a U.S. military advantage over great power competitors and how the various approaches potentially affect the direction and velocity of that competition. This criterion will take a broader view than just strategic stability, considering non-nuclear strategic impacts and other facets of great power arms racing or geopolitical tensions. Using today's global geopolitical situation between great powers, a decreased U.S. advantage in any significant area of military competition, or increased points of contention between great powers, could lead to a negative assessment assuming the United States has steady or limited resources to apply to competition in these areas. Implications from the cost analysis will also be included, assuming reduced costs for nuclear forces could provide additional resources to better compete in non-nuclear strategic areas and vice-versa.

·Political feasibility roughly estimates the likelihood the proposed arms control regime could be enacted by all parties. Specific considerations that could improve this likelihood are discussed when defining each approach, but the final "rating" within this criterion is intended to capture how likely such steps are to achieve the proposed arms deal.

Approaches

Contemporary arms control literature is rich with proposed frameworks and conditions for new U.S.-Russian bilateral arms control regimes,[23] ideas on how to incorporate America's other great power competitor in China,[24] and recommendations for ways forward without an arms control agreement at all.[25] The main themes from these disparate recommended frameworks and treaty conditions can be separated into four strategic approaches for arms control in a post-New START world – maintaining bilateral U.S.-Russian strategic arms limitations at similar levels to today; pursuing major long-term nuclear warhead reductions in a legally binding multilateral framework; a set of bilateral U.S.-Russia and U.S.-China agreements based on non-ratified agreements covering nuclear and non-nuclear topics; and abandoning arms control to pursue U.S. nuclear superiority.

There are many ways these approaches or their specific conditions could potentially overlap in a future treaty, but to facilitate more distinct analysis, each of these arms control regimes is analyzed as a separate, stand-alone agreement for this study. The following paragraphs summarize these approaches, briefly outlining the overall strategy, assumptions, and conditions for each. As this study was in final review prior to Russia's invasion of Ukraine, the basic assumptions and conditions for each hypothetical treaty framework track the geopolitical situation in the months and years prior to February 2022, but some additional considerations and notes based

on this dramatic turn in global affairs are listed where appropriate. A more complete list of potential conditions for each approach and additional references can be found in a separate publication on this same subject.[26]

·Approach 1 "Bilateral strategic arms limitations"– This approach prioritizes U.S.-Russian bilateral strategic stability in a framework like New START. Leveraging this existing framework presumably maximizes the probability of legal ratification. The New START follow-on does not reduce forces but achieves a freeze on current active stockpiles with an updated verification and monitoring regime.[27] Some tradeoffs on non-strategic issues are made to meet priority issues for both sides. For example, Russian BMD concerns could be met through transparency steps to confirm the purely defensive nature of these systems, in addition to other data sharing and confidence-building measures.[28] To meet U.S. concerns on NSNWs, Russia agrees to some mix of transparency measures, inspections, or portal monitoring.[29] By definition, force postures would remain at similar limits to today, with minor deviations based on the retirement of legacy systems and initial fielding of new ones.[30] Under this approach, China is assumed to continue along its recent, and apparently accelerating, nuclear armament growth, noting significant error bars on the size of the forces actually fielded.[31]

·Approach 2 "Long-term multilateral reductions"– This approach describes a long-term effort aimed at achieving major reductions in the number and role of nuclear weapons. This process would unfold over two major steps or milestones. Step 1 (sometime over 2026-2031) would see the implementation of a similar New START replacement as Approach 1 that includes further reductions (down to 1,000 deployed strategic warheads and 600 launchers) as well as an active stockpile warhead freeze.[32] Step 2 (enacted in 2031-2036) would follow with a U.S.-Russian agreement for additional reductions down to a limit of 500 deployed warheads with 500 launchers.[33] These major cuts are assumed to foster an expanded effort with P5 nations for a multilateral binding agreement. Presumably, China would continue the trajectory discussed under Approach 1 regarding total stockpile size but would accept similar limits to Russia and the United States for fielded systems with attendant verification measures. The focus for Approach 2 is on strategic nuclear weapons but would likely include steps to limit INF-range systems. Strategic non-nuclear technologies are not explicitly addressed to facilitate a more distinct comparison with Approach 3. A breakthrough in international relations and significant reduction in global tensions would realistically be required to precipitate such a treaty, but the proposed two-step process could help stimulate such an environment for nuclear weapons.

·Approach 3 "Bilateral non-ratified frameworks"– This approach would side-step procedural ratification issues to pursue a more flexible framework built upon bilateral U.S. political agreements with Russia and China. Such an approach would

concede some of the transparency and predictability provided by legally binding regimes but would also allow for greater U.S. freedom of action while possibly opening the aperture of cooperation with Russia and China, individually. The primary goals would be to reduce major risks through political agreements and new communication channels, providing mutual transparency on priority nuclear and NC3 topics and reinforcing agreed-upon norms in space and cyberspace. This framework could enable more transparent management of future arms racing for nuclear weapons and developing technologies by reducing ambiguity between great powers in these areas. A major assumption is that both the United States and Russia would exercise mutual restraint to remain near New START levels for deployed strategic forces. Such restraint could be motivated by strategic risk reduction considerations, NPT commitments, cost savings, or some combination of all three. Inspections and verification measures in this case would be limited, but this shortcoming could be reinforced through data exchanges, pre-notification standards, or other technological means to emulate inspections remotely.[34] Force structures would presumably remain near levels illustrated under Approach 1 for all parties.

·Approach 4 "Pursue nuclear superiority"– Under this approach, the United States would pursue the proposed benefits of strategic nuclear superiority with a more robust force structure. A benchmark for such an approach could be to achieve credible counterforce targeting against combined threats from Russia, China, and North Korea; the number of estimated deployed warheads to meet this goal at present would be about 2,300.[35] The budget impacts of such an approach would vary widely depending on the scope of increased forces and weapons programs. In the competitive environment created by this approach, potentially significant increases in non-nuclear forces, missile defense, and space-based programs would also be possible. Strategic nuclear force posture changes would be constrained in the near term due to budget and planning limitations, but the United States and Russia could increase daily deployed forces after 2026 by maximizing currently available warheads and launchers. Current triad modernization plans would continue, augmented by maximizing available ICBM silos and warhead loads on ICBMs and SLBMs. Washington would also pursue other qualitative advantages in submarine- and ground-launched cruise missiles, and hypersonics. The United States is assumed to also field expanded missile defense capabilities, including additional Ground Based Interceptor (GBI) silos at Ft. Greely, a new continental U.S. BMD site located somewhere like Ft. Drum, and additional Theater High Altitude Area Defense (THAAD) deployments. China forces are assumed to include a mix of strategic and non-strategic weapons up to the maximum "accelerating pace" described in the latest Department of Defense reporting along with a day-to-day force posture that maximizes a larger number of available warheads and platforms at the upper end of the estimates in Approach 1. The result is roughly 700 deliverable warheads for

China (under the New START-like counting rules) sometime after 2027.[36]

Analysis and Results

The results from applying this analytical framework are briefly summarized below for each approach.

Approach 1 "Bilateral strategic arms limitations"

This approach presents one of the more politically feasible paths and maintains strategic stability with Russia as currently understood, assuming a continuation or return to strategic dialogues, regardless of how the Russian attack against Ukraine concludes. As designed, it would thus have a potentially positive impact on Strategic Stability. However, continued adherence to a New START-like paradigm fails to address other important trends related to non-nuclear strategic technologies, multi-domain escalation, and China's expanding and modernizing arsenal. These shortcomings result in mixed results for Extended Deterrence with a likely negative, or, a best-case neutral, rating. This rating encompasses the likelihood that positive impacts from additional measures on Russian nuclear forces would be undermined from unaddressed escalation pathways in other domains in Europe. There would also be negative impacts from the lack of risk reduction measures – outside of direct competition – with China thus possibly undermining U.S. extended security guarantees to allies in East Asia. This negative outlook is further substantiated by the accelerating pace of China's nuclear modernization and force posture increases as presented in official U.S. estimates. These factors – unchecked competition and ambiguity in key non-nuclear domains along with a new third competitor in China racing to parity – similarly could negatively impact U.S. competitive advantage. Proliferation issues would remain in a similar state as today, with China's larger forces potentially prompting build-ups from India and then (in response) Pakistan. This Approach would continue to field a modernized U.S. triad under the currently budgeted programs, resulting in no projected cost impacts.

Approach 2 "Long-term multilateral reductions"

On the surface, Approach 2 is not feasible without a major breakthrough in international relations, the likelihood of which is particularly low, given Russia's recent military escalation against Ukraine. However, the proposed two-step process provides one potential pathway that could unfold over several years. Without assuming the appearance of the more benign security environment required to make this approach a reality, however, the resulting arms control outcomes would result in cross-cutting pressures with potentially negative changes across evaluated criteria. On the surface, the major cuts would lock in a similar, relative level of strategic nuclear parity not unlike New START; along with the attendant inspection regime, this would lead to at least neutral Strategic Stability changes. Considering that U.S.

Strategic Command has consistently referenced the importance of a built-in "margin" over both competitors at New START levels, though, these vast reductions in U.S. nuclear forces could conversely negatively impact this criterion.[37] These reduced margins could also leave Russia or the United States even more vulnerable to a decapitating first strike, especially considering trends in BMD, conventional prompt-strike capabilities, and hypersonics, adding additional risks to the level of Strategic Stability witnessed today. These effects could hypothetically undermine allied assurance in U.S. Extended Deterrence, leading to negative lower bounds in these categories. This multilateral treaty regime would strengthen NPT commitments and possibly improve global Proliferation compared to today, but such improvements would be undermined by additional pressures stemming from reduced Extended Deterrence that could prompt latent powers to proliferate and pursue their own deterrent. For Proliferation, then, these cross-cutting outcomes lead to a neutral analysis result. The focus on nuclear arsenals may not adequately address new technologies in a way that positively affects U.S. Competitive Advantage, registering a neutral impact in that category as well. Conversely, the cost savings could provide additional resources to shore up competition in other arenas, prompting a partial positive rating.

Turning more attention to the cost impacts from Approach 2, the Congressional Budget Office (CBO) estimates that ICBM fleet reductions would save roughly $500M annually in the mid-2020s, growing to $4.4B later in the decade (even without reducing planned GBSD purchases at that time).[38] Around this same time, Washington could also cancel the last two planned Columbia SSBN purchases, saving an additional $21B, spread over several years.[39] In the second phase of this approach (after 2031), these savings would increase as ICBMs continue to be retired and savings from operating and sustaining a smaller triad are realized. CBO predictions of annual costs – reported according to operations, sustainment, and modernization – can be scaled by these reductions to reveal additional savings, approximately $800M annually for SSBNs and $1.1B annually for ICBMs.[40] By that point, the GBSD purchases would also be curtailed; applying the average unit costs of $53M per missile against a decrease of roughly 450 planned purchases saves another $23.8B over the early 2030s.[41]

The CBO estimated total nuclear budget over the two phases considered in this study is approximately $240B (2026-2031) and $254B (2031-2036). Combining all the savings outlined above, the total over the entire 10-year period is roughly $80B, or just over 16% of the $494B total. Although these rough estimates indicate a positive cost impact for Approach 2, Washington could instead be forced to dramatically increase spending on conventional forces to make up for any instability resulting from nuclear force reductions. The budget impacts in this regard are difficult to estimate but could offset any cost savings for a lower bound neutral rating.

Approach 3 "Bilateral non-ratified frameworks"

This approach would side-step some of the political obstacles to a fully ratified treaty. Transparency would support mutual restraint on strategic nuclear forces while also expanding dialogues on non-nuclear technologies. This improved communication could address significant issues that are not typically covered under more orthodox strategic stability frameworks. Risks abound without the backing of a legally binding regime, but these could be somewhat offset by the flexibility U.S. leaders would enjoy to respond, in terms of new weapons systems and force postures, to address new threat developments from Russia or China.

The flexibility in Approach 3 is also intended to finally bring China into bilateral discussions with the United States, further reducing tensions that could otherwise affect both regional and strategic stability. Given that the United States has never had to concurrently deter two near-peer nuclear rivals, any sort of opening to build discussion channels or actual arms control agreements with China could prove to be positive developments for Strategic Stability, Extended Deterrence, and possibly Competitive Advantage. Overall, the impacts from Approach 3 are more ambiguous to estimate through more traditional strategic stability considerations as used in this paper, but the continued dialogues with Russia, expanded relations with China, and flexibility to respond to any major changes in the strategic landscape imply this approach would do no worse than maintaining today's status quo for a neutral rating while offering benefits that could prove positive as well. These ratings are noted with a relative "asterisk" to acknowledge the assumptions regarding mutual U.S.-Russian restraint around New START levels, which though plausible, go beyond specific assumptions from the other approaches. Cost impacts could vary, but would be unlikely to lead to any major cost savings while increased demand for intelligence assets to make up for less stringent verification regimes would negatively impact both defense and intelligence budgets.

Approach 4 "Pursue nuclear superiority"

If geopolitical tensions deteriorate and obstacles to a ratified treaty remain, the augmented strategic competition as described in Approach 4 could become politically feasible. However, there would still be strong domestic pressures and a push from certain allies against abandoning arms control, indicating such a policy is somewhere between less likely and unlikely. The case that national security considerations like strategic stability and extended deterrence would be improved by these larger force postures is difficult to defend based on projected forces. These forces highlight that U.S. advantages are easily offset by Russian forces, and still further if Russia's NSNW arsenal enters the equation. Unmoored by arms control restraints, new force postures would negatively impact Strategic Stability, Extended Deterrence and Non-Proliferation. The one potential exception to these negative trends is in the context of China. Approach 4 is unique in providing improved

margins against the nation identified as today's "pacing threat." Yet, given the relatively degraded posture against a resurgent Russia and potentially exacerbated arms racing globally in this scenario, it is difficult to see how this one benefit vis-à-vis China would outweigh other significant risks. The outcome regarding U.S. Competitive Advantage would likely be negative as well due the combined pressure of expanding nuclear and missile defense needs while continuing to attend to competition in other strategic arenas. Proliferation pressures would likely be exacerbated in this more competitive landscape, especially as resumed nuclear superpower posturing degraded the NPT treaty regime.

Looking more closely at budget needs, the CBO estimates that expanding U.S. forces by maximizing deployed delivery systems and warhead uploading would not increase DoD costs relative to current plans.[42] However, the lack of a clear advantage could prompt more expensive pursuits, such as a return to START II-like levels (with $100M in one-time costs and an additional $5B in annual operating costs over the time frame considered for this study)[43] or START I-like levels at "nearly triple" current DoD modernization plans.[44] Missile defense costs would also likely grow, given that these systems would potentially have a much more important role in helping the United States compete against great power rivals in a world where nuclear superiority was a top priority. The increased BMD plans currently included in Approach 4 (adding 20 silos to Ft. Greely, installing a new ground-based interceptor base in Ft. Drum, fielding four additional THAAD systems total in Europe and Asia) would increase the missile defense budget by roughly $12B in procurement costs and another $1B in operating costs through 2036.[45]

These steps could be complemented by more technologically challenging and costly programs, encompassing anything from a new air-launched boost-phase interceptor (with or without dedicated aircraft for varying degrees of patrol coverage) to a space-based boost-phase interceptor supported by anywhere from 24 to 960 satellites.[46] The cost excursions along this spectrum of options are significant as the CBO summarizes, increasing from tens of billions to hundreds of billions of dollars over the next twenty years. At the lower end, such programs would be under the 15% increase to planned budgets, which aligns with a neutral cost impact yet could scale much higher for a solid negative rating. In Table 1, below, analytical results from all four approaches to arms control as a tool of national security appear side-by-side for comprehensive comparison.

Approach	Strategic Stability	Extended Deterrence	Proliferation	Cost	Competitive Advantage	Political Feasibility
Approach 1: Bilateral strategic arms limitations	Positive	Neutral	Neutral	Neutral	Neutral / Negative	Likely
Approach 2: Long term multi-lateral reductions	Neutral / Negative	Negative	Neutral	Positive / Neutral	Positive / Neutral	Unlikely
Approach 3: Bilateral non-ratified frameworks	*Positive** / *Neutral**	Positive / Neutral	Neutral / Negative	Neutral / Negative	Positive / Neutral	Likely / Less Likely
Approach 4: Pursue nuclear superiority	Negative	Negative	Negative	Neutral / Negative	Negative	Less Likely / Unlikely

Table 1: Comparative Analysis of Arms Control for National Security

Conclusion

After analyzing potential impacts from all four proposed approaches, Approach 2 ("long-term multilateral") and Approach 4 ("nuclear superiority") yield the most negative theorized impacts. As previously discussed, Approach 2 results in negative impacts for Stability and Extended Deterrence based on a comparison using the contemporary geopolitical context. However, a global security paradigm marked by the type of cooperation required for the leading nuclear powers to agree to major reductions would have to be more stable and feature less competition than today. In such a benign environment, the potentially negative repercussions that a reduced U.S. strategic posture could have on Strategic Stability and Extended Deterrence would be mitigated with Cost and Competitive Advantage benefits preserved. A constructivist lens applied to multilateral arms control and disarmament would add that material arms reductions might cultivate a social-psychological feedback loop and bring a more favorable international environment into being. Dynamic cooperation between nuclear powers in this manner could be initiated from reduced international tensions while catalyzing these same trends to reduce global risks, reduce nuclear program costs, and help channel competition into other non-nuclear areas.

The negative changes resulting from Approach 4 are more attributable to the approach itself rather than any underlying assumptions. No major hypothetical assertions are required to project how aggressive nuclear posture changes from the United States or Russia would have negative political reverberations in an increasingly tense international security environment. However, this analysis ignored

the potential for overt pursuit of nuclear superiority to auger an improved arms control agreement. Echoing NATO's Dual Track efforts in the 1980s, many of the negative projected impacts from Approach 4 could be turned to positives if done in conjunction with persuasive arguments to foster an improved bilateral or multilateral arms control agreement. Again, history shows that multilateral engagement is key to such an undertaking. Without buy-in from NATO or Asian allies, who would be directly affected by a dual-track approach, its chances of success would be limited. Domestic or constitutional fitness factors for each competitor in such a scenario would play a significant role as well, considering how the moribund Soviet economy proved crucial to the ultimate success of the arms race-arms control dynamic of the 1980s.[47]

Even assuming a united front for the United States and its allies and weaknesses in Russia's domestic economic or political foundation, today's geopolitical context indicates Approach 4 is unlikely to repeat the Dual Track success. Projected force postures under "nuclear superiority" do not point to a clear enough asymmetry that would motivate Russia to seek a new bargain. Statements by Putin indicate the opposite case is true and that Russia's leaders feel their pursuit of destabilizing new systems like the Status-6 Poseidon autonomous submarine or Avangard hypersonic glide vehicle put Washington at a disadvantage.[48] This thinking by Russian leaders may have contributed to the decision to invade Ukraine in early 2022. Even more distressing, Moscow could choose to employ a large fraction of its NSNWs with intermediate or short-range systems, rapidly increasing its leverage while directly threatening NATO allies. Similarly, although Approach 4 indicates the U.S. could maintain improved force margins against a steady-growth Chinese competitor in a strictly bilateral sense, there is no guarantee Beijing would not "double down" in the nuclear arena and exacerbate this arms race. China could do so by transitioning planned "demonstration" fissile material re-processing plants into full operations.[49]

Turning attention to Approach 1 and Approach 3 ("bilateral strategic" + "bilateral non-ratified"), the analysis indicates how these paradigms should be considered in tandem to make the most of their competing strengths and weaknesses. Extending the current New START-like regime provides a feasible approach to maintain strategic bilateral stability, for example, but fails to address potentially destabilizing trends related to non-nuclear strategic technologies and China's modernizing forces. Approach 3 provides necessary flexibility to make some headway on these issues, offering pathways for dialogue on a broad range of topics that could reduce multi-domain risks or strengthen stability beyond the purview of a more traditional bilateral regime. Admittedly, the best paths to address exquisite and diffuse technologies leveraging space, cyberspace, or artificial intelligence are not clear, but clarifying norms or "red lines" in these areas under something like Approach 3 could be a valuable start.[50] This flexible norms-based approach has its own

shortcomings as well, grounded in the lack of ratified legal backing and tenuous maintenance of strategic parity through mutual restraint.

Notably, Approach 1 and Approach 3 were forced to be disparate by definition in this paper to enable distinct analysis. The shortcomings for Approach 1 in addressing China and non-nuclear technologies could be addressed by combining a more traditional arms control agreement with the broader terms captured in this paper under Approach 3. Taking best elements of each in practice illustrates a fruitful path forward. The ratified nature of a New START-like regime, with accompanying verification measures, provides traditional strategic stability and keeps extended deterrence guarantees and proliferation pressures at least at levels they are at today. Meanwhile, the additional topics addressed through separate bilateral measures aimed at Russia and China provide pathways to ameliorate other important risks. Indeed, the advantages of keeping New START while working to improve it by adding further topics to independent bilateral agendas with Russia and China appear to be animating the arms control agenda for the recently inaugurated Biden administration.[51] The analysis in this paper supports the logic behind such a course of action. The more "extreme" arms control scenarios pursuing major reductions (Approach 2) or abandoning controls to achieve nuclear superiority (Approach 4) frame creative thinking in a relative sweet spot described by combined Approaches 1 & 3 (bilateral agreement supplemented with informal confidence building).

Abstracted policy categories, or approaches, and the qualitative cost-benefit methodology employed in this study can also augment contemporary deterrence analysis. For the past several years, USSTRATCOM leaders indicated their command has been integrating considerations across domains and capabilities for a broader strategic deterrence posture.[52] More recently, USSTRATCOM emphasized additional analytical tools to assess "Risks of Strategic Deterrence Failure" (ROSDF) for better-informed deterrence thinking.[53] Although the details of this revised assessment process are not publicly available, there is likely some utility in pairing the type of qualitative analysis from this study with ROSDF considerations to shape options for both arms control and deterrence. Doing so could help maximize the utility of arms control in protecting and advancing national security interests.

[1]T. Justin Bronder, Ph.D. is colonel in the U.S. Air Force and 2020 National Defense University - U.S. Strategic Command Scholar. This independently reviewed and revised article is based on a previous publication, "Future Directions for Great Power Nuclear Arms Control," Occasional Paper, No. 13 (Washington, D.C.: Center for the Study of Weapons of Mass Destruction, National Defense University Press, Oct. 20, 2021). Bronder's updated version is published here by consent of NDU Press. John Maurer, "Purposes of Arms Control,"*Texas National Security Review*, Vol. 2, No. 1, November 2018, 8-27; Timothy Crawford and Khang Vu, "Arms Control and Great Power Politics,"*War On The Rocks*, November 4, 2020,

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Contextualizing Russia's Hypersonic Threat: Perceptions, Motivations, and Strategic Stability

Jeffrey D. Taylor

Rather than specific military objectives in Europe, Russian hypersonic missile development manifests deep-rooted perceptions of the United States and NATO undermining strategic stability through missile defense.

Russia appears to be leading the world in the development and deployment of hypersonic weapons – maneuverable weapons that can travel at speeds over five times the speed of sound – which raises concerns among U.S. policymakers about Russia's capabilities and intentions in an age of great power competition.[*] Development in hypersonic weapons dates back to the Cold War, when both the United States and USSR had several hypersonic programs. However, only recently have hypersonic weapons become viable, thanks to breakthroughs in fundamental hypersonic research. Currently, the United States, Russia, and China are all advancing hypersonic research and development, creating a competitive environment that many analysts have characterized as an arms race.

To date, the U.S. response to this arms-race dynamic, and Russia's leading position in it, has been primarily focused on achieving and maintaining technological overmatch – or technological superiority – in hypersonic technology. However, as U.S. policy makers develop and implement ongoing programs related to hypersonics, it will be critical to consider how well these policies address the fundamental drivers of Russian hypersonic development and how they are likely to affect Russian hypersonic development moving forward. In order to do this, it is important that policy makers understand how Russia perceives threats from the United States and NATO and Russia's motivations for pursuing hypersonic weapons.

This paper reviews potential mechanisms by which hypersonic weapons may challenge strategic stability from a deterrence – both nuclear and conventional – and arms-control perspective and briefly reviews the global state of play of hypersonic development. The paper then narrows on Russia's hypersonic capabilities and provides an analysis of possible threat perceptions, motivations, and intentions that may be driving Russian hypersonic weapons development. Finally, the paper critiques current U.S. policy toward Russia's ongoing hypersonic weapons development and presents several forward-looking considerations for a comprehensive U.S. response aiming toward greater strategic stability.

Hypersonic Evolution: High-Speed Maneuverability

Recent advances in hypersonic technology push the limits of speed and maneuverability on the spectrum of existing missile system capabilities.[1] In the most general sense, the term hypersonic can be used to identify any vehicle that travels at or greater than Mach 5, or five times the speed of sound, including traditional intercontinental ballistic missiles (ICBM), which can travel well above Mach 20 at final reentry phases.[2] However, in the national security and defense communities, the term hypersonic is used almost exclusively to identify weapons systems that couple hypersonic speed with significant aerodynamic maneuverability. This paper uses the same naming convention.

Within the hypersonic subset of missile systems, there are two main categories: hypersonic glide vehicles (HGV) and hypersonic cruise missiles (HCM). Hypersonic glide vehicles, or boost-glide vehicles, are usually carried on ballistic missile boosters to around 100 km altitude, where they detach and maneuver through the upper atmosphere, usually unpowered, at speeds that can exceed Mach 20.[3] An HGV may have a range of over 6,000 km. Hypersonic cruise missiles are generally powered by a ramjet or scramjet (supersonic combustion ramjet) engine and typically operate between Mach 5 and Mach 10, with a range of between 500-1,000 km. Scramjet engines can only operate at supersonic speeds. Therefore, HCMs must be accelerated to high speeds before operation, which is typically done by an aircraft, a first-stage booster, or a combination of both. Using small boosters, an HCM can be air, sea, or land launched.

Several foreign countries have begun deployment of select hypersonic systems, but significant technical barriers remain that may limit the performance of current hypersonic weapons. For instance, during hypersonic flight, the air around a vehicle superheats and becomes ionized, creating a sheath around the vehicle. This superheated air can cause significant vehicle deformations, which hurt aerodynamic performance and maneuverability, and in extreme cases it can cause structural failure. The ionized sheath also creates a barrier for secure in-flight communication with the vehicle and creates challenges for sustained air-breathing propulsion. Overcoming these challenges requires the use of advanced materials, which are generally very expensive and require advanced manufacturing methods. This and other elements of hypersonic vehicle design greatly increase the development and production costs of hypersonic weapons. Due to these development challenges and production costs, large-scale deployment of hypersonic systems will likely not occur for some time. Nevertheless, ongoing foreign hypersonic development and limited deployment of foreign hypersonic systems, especially by the Russian Federation, have immediate implications on U.S. national security.

Potential Consequences of Hypersonic Weapons Technology

A comprehensive threat analysis regarding hypersonic weapons and their full strategic consequences is a complex topic that involves many facets and is beyond the scope of this paper. Instead, this paper considers key consequences of hypersonic weapons technology for U.S. national security. Those considered here fall mainly into three categories, which are often highly interrelated: technical consequences directly related to evolutionary hypersonic capabilities, strategic consequences resulting from the use of hypersonic weapons in deterrence roles, and consequences of hypersonic weapons development for strategic stability.

1. Technical Consequences

The technical advantages of hypersonic weapons center around their speed, range, and maneuverability, which complicate existing missile defense. The hypersonic advantage is typically framed in terms of a comparison of hypersonic weapons to traditional ballistic missiles. Whereas traditional ballistic missiles follow a predictable trajectory that can reach altitudes of over 1,000-2,000 km,[4] HGVs travel along unpredictable trajectories at nearly one-tenth this altitude, and HCMs can maneuver at very low altitude. Currently fielded U.S. missile-defense systems are primarily tailored to detect and target ballistic missiles using ground-based RADAR – augmented by a very small number of space-based sensors – and counter missiles during the high-altitude midcourse or relatively predictable terminal phase of a ballistic trajectory using ground- and sea-based interceptors.[5] The relatively low operating altitude and high maneuverability of hypersonic weapons in their midcourse and terminal phases make them less vulnerable to detection by ground-based RADAR sensors than ballistic missiles,[6] and once detected, they are difficult to counter with systems designed to intercept ballistic missiles. Thus, a hypersonic weapon has a much higher chance than a ballistic missile to bypass missile defense.

In addition to the threat this poses to U.S. territory and installations, this capability could also be leveraged to enhance anti-access/area denial (A2/AD) capabilities in conventional conflict.[7] For example, China and Russia have advertised hypersonic systems as effective platforms for launching A2/AD strikes against U.S. carrier groups in the Indo-Pacific and the Mediterranean from outside the range of typical air defenses.[8] Utilizing hypersonic weapons in this way could prevent the United States from effectively responding to an attempt by Russia or China to assert authority by force along their periphery, perhaps in Taiwan or the Baltics. It could also put U.S. military facilities and personnel in Europe or East Asia at risk of rapid surprise attacks in the event of a military conflict in Eastern Europe or the Taiwan Strait.

While hypersonic weapons have a marked advantage over traditional ballistic

missiles in defeating missile defenses, limiting the discussion of hypersonic weapon performance to this comparison often creates a false perception that hypersonic weapons are revolutionary. In fact, the vast majority of missile systems currently deployed by the United States and its foreign adversaries are technically non-ballistic and have capabilities, including maneuverability, decoys, and chaff, that pose a significant challenge for existing missile-defense systems.[9] Moreover, both China and Russia have a sufficient number of strategic nuclear warheads to overwhelm U.S. missile defense with a large salvo.[10] Therefore, many analysts argue that hypersonic weapons do not significantly alter the missile threat status quo.[11] It appears, though, that this view is not shared by foreign policymakers and military officials who continue to invest in the development of hypersonic weapons to defeat U.S. missile defenses. At the very least, hypersonic weapons add diversity to the range of missile threats currently facing the United States and its allies. Moreover, it is important to remember that hypersonic weapons in their current state only scratch the surface of hypersonic technology for next-generation missilery. As the technology advances, it is likely that hypersonic weapons will become faster, more maneuverable, and more reliable than current iterations. For military planners, who are tasked with anticipating threats up to 30 years in the future, considerations for hypersonic weapons should take this into account.

2. Strategic Consequences

Although some experts question the value of hypersonic weapons, a perception among government and military officials – accurate or not – that hypersonic weapons are uniquely capable of defeating missile defenses challenges the effectiveness of missile defense for both nuclear and conventional deterrence by denial, not only for the U.S. homeland, but for U.S. forces and installations around the world. Because of the challenges they pose for early detection and tracking, hypersonic weapons can compress decision-making timelines during a missile strike and increase uncertainty in the intended target. A recent RAND analysis indicates that using ground-based detection strategies, a 3,000 km-range ballistic missile could be detected 12 minutes before strike, whereas an HGV of the same range could only be detected six minutes before strike.[12] This is similar to the time frame of a close-range submarine-launched nuclear strike. The 50 percent reduction in available reaction time indicated by this analysis is significant. An independent analysis by the Nuclear Threat Initiative indicates that at least seven to eight minutes are required to locate the president and key advisers and get a response decision in the event of a missile attack on the U.S. homeland.[13] Compressed response time also challenges missile-defense targeting and interception by reducing the amount of time available to correlate data and accurately determine the target's position, thereby reducing the number of potential interception attempts.

The maneuverability of hypersonic missiles means that in the event of a hypersonic

attack, the intended target may not be known until near the end of the flight trajectory.[14] Some analysts argue that this target uncertainty may encourage nations to adopt a "strike-on-warning" nuclear deterrence policy by which a nation launches a retaliatory strike in response to an enemy nuclear strike before the enemy missile detonates.[15] During the Cold War, the United States adopted such a policy to deter a surprise submarine-based attack on U.S. nuclear missile sites. The rise of new potential nuclear delivery platforms including hypersonic weapons has revived debates over strike-on-warning policies. Although such policies are not universal, Russia, at least, appears to have joined the United States in adopting a strike on warning stance.[16]

Target uncertainty and compressed timelines may result in a higher chance that a misinterpreted missile test or missile launch may result in retaliation and increase the risk of inadvertent escalation in a crisis. For a ballistic missile, the flight trajectory can often be predicted with relatively low uncertainty only minutes into the flight, giving time to assess the origin and likely target of the missile. This information is critical in deciding whether or not to retaliate and whether retaliation should involve non-kinetic, conventional kinetic, or nuclear action. Hypersonic weapons pose a challenge for predicting intended targets, and since many hypersonic delivery vehicles can be armed with either conventional or nuclear warheads, they may pose a challenge for identifying whether an incoming strike is nuclear or conventional. This may increase the likelihood that, under a strike-on-warning policy, a state may misinterpret an attack and take action that inadvertently escalates a crisis.

Hypersonic weapons may also be used in conjunction with other precision-strike weapons for conventional deterrence. Both Russia and China are advancing their conventional deterrence capabilities, apparently to preclude a large-scale kinetic engagement with what they perceive as a superior U.S. conventional military force. Both Russian and Chinese concepts of conventional deterrence involve the possibility of precision strikes on critical military infrastructure to confuse and disable the enemy and prevent or force a cessation of hostilities. Because of their speed and maneuverability, hypersonic weapons can complement other precision-strike platforms in conducting these deterrence strikes, even in the presence of robust air and ballistic missile defenses.

3. Strategic Stability

The perception of novelty surrounding hypersonic weapons has contributed to a growing arms competition that threatens strategic stability at a time when arms-control agreements are deteriorating. In 2019, after several alleged Russian violations,[17] the United States pulled out of the 1987 Intermediate-Range Nuclear Forces treaty (INF),[18] meant to prohibit U.S. and Russian development of intermediate range missiles, including tactical nuclear weapons. In 2020, the United States withdrew from the 1992 multilateral Open Skies agreement,[19] which

facilitated aerial monitoring and data collection of U.S. and Russian weapons programs. This leaves New START (Strategic Arms Reduction Treaty), recently extended to 2026, which caps U.S. and Russian strategic weapons, as the only remaining arms control agreement in force between the United States and Russia. Efforts to involve China in trilateral arms-control agreements have so far been unsuccessful. As arms agreements break down, the United States, Russia, and China's pursuit of hypersonic weapons has often been characterized as an arms race. Although some analysts refute this characterization, Russia's hypersonic development appears, in many respects, to be caught in an action-reaction cycle with U.S. missile-defense development. Chinese hypersonic investments also appear somewhat influenced by the United States and Russia's development of hypersonic weapons and other high-technology warfighting capabilities. Meanwhile, it seems clear that the U.S. push for hypersonic weapons is driven, in large part, by the desire to maintain overall technological superiority over Russia and China.[20]

Global State-of-Play in Hypersonics

Russia and China lead the United States – and the world – in hypersonic arms development and deployment, which contributes to the perception of a hypersonic "missile gap" between the United States and its competitors. Because of the cost and technical challenge associated with hypersonic technologies, the majority of hypersonic weapons development takes place in these three countries. Both Russia and China report numerous successful tests of hypersonic weapons over the last five years, and both are expected to increase funding for hypersonic R&D.[21] Russia has reportedly fielded three or four hypersonic weapons systems, and China has fielded at least one. The United States is not expected to field any systems until the mid-2020s.[22]

China has a robust nationwide hypersonic program that includes advanced hypersonic testing infrastructure.[23] Most known Chinese systems in testing or in operation are theater-range HGVs, including the DongFeng 17 (DF-17), which is reportedly operational.[24] China has tested an HGV known as WU-14 (DF-ZF)[25] and is in advanced stages of testing the XingKong-2 (starry-sky) HCM.[26] China leads the world in open-source hypersonic research,[27] and it appears to have made significant advances in sustained hypersonic propulsion.[28]

Russia leads the world in deployed hypersonic technology, including the Avangard HGV, two hypersonic aeroballistic missiles known as the Kh-32 and the Kinzhal, and the air-to-air R-37 hypersonic missile. Russia has also touted several successful tests of the Tsirkon HCM over the past few years.[29] Although most contemporary Russian hypersonic research is classified,[30] Russian hypersonic weapons programs are supported by a long history of research, and Russia is known to have several strong ongoing hypersonic programs involving nearly 40 government laboratories.[31]

Russia also collaborated with India on the BraMos II anti-ship hypersonic missile,[32] and Australia works with the United States on the Southern Cross Integrated Flight Research Experiment (SCIFiRE), which intends to demonstrate an operational hypersonic scramjet engine capable of sustained thrust.[33] Several additional countries, including France, Iran, and North Korea,[34] are pursuing, or are known to have pursued, hypersonic capabilities.[35]

US hypersonic research and development has a long history, but consistent funding for research did not begin until recent years. U.S. policy focuses now on development of conventionally armed hypersonic weapons including both HGVs and HCMs. There are at least eight major hypersonic weapons programs (Table 1) currently underway in the United States, involving the U.S.Navy, Army, Air Force, and the Defense Advanced Research Projects Agency (DARPA).

Each of the programs aims at prototyping hypersonic platforms for future acquisition by the Department of Defense. The United States plans to have at least one hypersonic weapon in operation by the mid-2020s, although recent testing setbacks and cost concerns may postpone delivery.[36]

The perceived "missile gap" between Russian, Chinese, and U.S. hypersonic weapons may be, in part, due to a difference in objective.[37] Whereas Russia and China appear focused on nuclear and dual-use – both nuclear and conventional – hypersonic weapons, the United States pursues conventional systems only. Hypersonic flight poses unique challenges for accurate targeting.[38] Therefore, conventionally armed hypersonic weapons are more difficult to produce than their nuclear counterparts, which compensate for low accuracy using large blast radius. Thus, some analysts argue that Russia and China's focus on nuclear hypersonic weapons may be an attempt to compensate for deficiencies in accuracy and capability due to unresolved technical challenges.[39] Additionally, although Russia and China have fielded hypersonic weapons, analysts note that support systems required to operationalize hypersonic weapons systems at large scale have not emerged, suggesting that hypersonic use by either country will be limited for the near term.[40]

Nevertheless, it seems clear that hypersonic weapons development is of high priority to both Russia and China. To craft a U.S. defense policy response, it is important that U.S. policymakers consider the reasoning behind Russian and Chinese hypersonic programs. In light of recent events in Ukraine and Eastern Europe, this paper focuses on Russia's hypersonic development. The following sections examine Russia's current hypersonic capabilities, possible motivations for Russian hypersonic development, and the implications of Russian and U.S. policy related to hypersonic weapons for U.S.-Russian strategic stability.

Russia's Hypersonic Capabilities and Motivations

In order to understand Russia's motivations for hypersonic weapons, it is critical to understand the capabilities Russia is pursuing, major Russian threat perceptions, and key deterrence concepts in Russian strategic thinking. Important aspects from each of these areas are discussed in the following sections.

Russian hypersonic weapons development appears to have direct historical links to U.S. missile-defense development efforts. Both Russia and the United States engaged in various forms of hypersonic research as early as the 1940's. However, Russian hypersonic missile development does not appear to have begun in earnest until the 1980's, in response to the U.S. Strategic Defense Initiative (SDI). In response to SDI, the vice president of the USSR Academy of Sciences, E. P. Velikhov, proposed a program known as "asymmetric response" aimed at developing capabilities, including advanced missilery, to ensure U.S. vulnerability in the face of missile defense.[41] Several hypersonic missile programs emerged through the 1980's, but many were discontinued after the fall of the Soviet Union during the 1990's, likely due to high cost and lack of military funding.[42] However, since 2002, in response to the United States' withdrawal from the Anti-Ballistic Missile (ABM) Treaty, Russian hypersonic development has again accelerated.[43] Within the last 20 years, several Soviet hypersonic programs have been revisited, and some of these, in turn, have led to Russia's current hypersonic weapons systems.

Russian Hypersonic Weapons Systems

Russia has reportedly deployed more hypersonic weapons systems than any other country. Although Russia appears to purposefully keep the exact details of its programs hidden, some details of Russia's hypersonic platforms can be obtained from open-source information, as summarized in this section.

1. Avangard (Iu-71) HGV

The Avangard HGV was publicly announced by Putin in a 2018 address.[44] Russia has deployed at least two nuclear-armed Avangard units in the southern Urals[45] and reportedly plans to deploy ten additional units in the near future. From tests, it appears that Avangard is capable of carrying a two-megaton nuclear warhead with countermeasures[46] over 6,000 km at speeds of up to Mach 27.[47] Although it is currently deployed, it appears that Avangard is still in final stages of testing and is not yet fully operational.

2. Kinzhal (Kh 47-M2) Aeroballistic HCM

Kinzhal is an air-launched aeroballistic cruise missile that can travel at hypersonic speeds between Mach 5 to Mach 10.[48] Kinzhal is currently deployed on MiG 31 fighters, but it may be deployed on upgraded versions of the TU-22M3M bomber in

the next few years.[49]

3. Kh-32Aeroballistic Missile

The Kh-32 is a dual-capable (nuclear and conventionally armed) aeroballistic missile similar to the Kinzhal that can travel about 1000 km with a top speed between Mach 4 and Mach 5.[50] Like Kinzhal, the Kh-32 is reportedly intended to be deployed on both Su-30 fighters and upgraded TU-22M3M bombers.[51]

4. Tsirkon (3M-22)HCM

The Tsirkon is a new, dual-capable ship-launched HCM. Although there are some conflicting reports, Tsirkon likely has a range of between 600-1000 km.[52] In October 2020, Tsirkon reportedly traveled nearly 500 km, reaching speeds of around Mach 8, before hitting a floating target.[53] It appears that Tsirkon is planned to be deployed by 2022 on Russian vessels in the Asia-Pacific region.[54]

5. R-37 HCM

The R-37 is a hypersonic air-to-air missile with a reported range of up to 300 km and a top speed of around Mach 6. It is expected to be mounted on MiG 31BM fighters and the new Su-57 fighter.[55]

6. Additional systems

Russia appears to be developing several additional hypersonic systems. Although the true nature and state of these systems is generally not known, reports suggest that these systems include a small version of Kinzhal [56] to be mounted on the new Su-57 fighter, air- and land-launched versions of the Tsirkon [57] HCM, and at least one new HGV similar to the Avangard that is compatible with ICBM boosters other than the SS-19 and Sarmat.[58]

President Putin announced that Russia plans to develop capabilities to mass-produce hypersonic weapons in the coming years. However, most analysts argue that such capabilities will likely remain financially infeasible for the foreseeable future, particularly as Russia grapples with the severe economic fallout resulting from its recent invasion of Ukraine.[59]

Russian Threat Perceptions

Key to understanding Russia’s motivations for pursuing hypersonic weapons is to understand Russia’s world view and preoccupation with perceived threats from the United States and NATO, which is characterized by Russia expert Dima Adamsky as a “siege mentality.” According to Adamsky, the siege mentality “incorporates a sense of inferiority, reflecting a feeling of persecution and oppression, coupled with a feeling of superiority and grand strategic aspirations.”[60] Many Russian officials

view recent NATO and EU expansions as an active attempt to contain Russian interests[61] and undermine Russia's global influence.[62] This concern is compounded by a long history of costly foreign invasions of Russia, many of which came from the West.[63] In response, Russia works to create a buffer along its western periphery, often by coercion and sometimes by force, as evidenced by Russia's recent military actions in Ukraine. Russia's sense of vulnerability has likely been triggered as NATO military personnel and equipment extend into former Warsaw Pact nations. In 2014, Russian military doctrine indicated that the "build-up of the power potential" and "military infrastructure of NATO member countries near the borders of the Russian Federation" was the top external risk.[64] Russian political scientist Alexei Arbatov explains that Russia likely views even limited NATO forces in Eastern Europe as a "forward echelon" that may threaten Russian territorial sovereignty.[65]

Coupled with this "siege mentality" is a firmly established reliance on nuclear weapons in Russian strategic culture and defense strategy. Despite recent military modernization efforts, Russia maintains a sense of conventional military inferiority to U.S. and NATO forces.[66] Russia historically relied on nuclear weapons as an asymmetric means to compensate for military inferiority and preserve Russia's status as a world power. This reliance cemented the position of nuclear weapons in Russian strategic culture as a vital symbol of Russian statehood and Russian power.[67] Moreover, as noted by Adamsky, Russian nuclear weapons appear to have become intertwined with significant cultural and religious beliefs, which may further solidify their importance.[68] Although recent military modernization efforts have reduced Russia's reliance on nuclear weapons,[69] the most recent Russian military doctrine retains nuclear weapons as part of a holistic military strategy that incorporates conventional, informational, and nuclear technologies into a single approach.[70] Many in Russia still seem to view nuclear weapons as the only effective means for deterring a debilitating conventional attack by the United States and NATO.[71]

In the context of these perceptions, is not surprising that Russian officials would view U.S. missile defense as an underhanded attempt to weaken, or even nullify, Russia's nuclear deterrent.[72] In a 2015 address, Russian President Vladimir Putin said, "Recently the United States conducted the first test of the anti-missile defense system in Europe. What does this mean? … It was about an attempt to destroy the strategic balance, to change the balance of forces in their favor not only to dominate but to have the opportunity to dictate their will to all."[73] Putin also expressed concerns that U.S. missile-defense installations in Europe could be used in an offensive role against Russia. Noting the United States' clear superiority in precision-guided munitions and aerospace power, some Russian military experts and government officials connect U.S. missile defense to a larger perceived strategy intended to neutralize Russia's nuclear deterrent with massed aerospace attacks[74]

and precision strikes on nuclear weapons and command & control infrastructure,[75] relying on missile defense to defeat any remaining attempt to retaliate.[76] This connection between precision-strike and missile defense was likely exacerbated by the timing of the U.S. conventional prompt global strike program, which coincided with the U.S. withdrawal from the ABM treaty. Russia has long pushed back against U.S.missile defense by seeking asymmetric means to defeat missile defense and dissuade the United States from pursuing additional missile defense development.

Russian Motivation: Strategic Deterrence

Russian military strategy involves a cross-domain approach, incorporating both conventional and nuclear weapons, that reinforce concepts of "strategic deterrence"– or *sderzhivanie*– which encompasses both prevention and containment of conventional and nuclear aggression.[77] Russia's 2015 National Security Strategy defines strategic deterrence as a series of interrelated political, military, military-technical, diplomatic, economic, and informational measures to prevent the use of force against Russia, defend sovereignty, and preserve territorial integrity.[78] Russia military expert Michael Kofman explains, "The Russian goal has been to find deterrence answers to problems that do not have good warfighting solutions, to manage escalation, and to address the escalation dilemmas resulting from a force structure too inflexible to deter a strategic-level conventional attack or a regional conventional conflict against a militarily stronger adversary."[79]

Russian military and deterrence strategies involve influencing adversaries' decision-making indirectly through threats and directly through force.[80] In Russian military literature, deterrence is discussed not only in terms of fear inducement but also in terms of limited use of force with both conventional and nuclear weapons.[81] Russia often uses nuclear threats for coercive purposes.[82] Russian nuclear signaling may involve indirect nuclear threats, large-scale nuclear exercises, and weapons development. Use of fear-inducement tactics for deterrence is viewed by Russia as a continual process, intended for both peacetime and war for deterrence and coercive purposes. However, deterrence by limited use of force, or "forceful deterrence,"[83] is envisioned only for large-scale conflict scenarios. In this sense, deterrence by limited use of force includes elements that are more closely aligned with Western conceptions of compellence and coercion.[84] Forceful deterrence strategies in Russian military literature generally call for tailored strikes to impose progressive levels of "deterrent damage"[85] – or the minimum level of damage required to achieve a given deterrence aim – on critical enemy infrastructure to alter an enemy's cost-benefit analysis.[86] The purpose is to contain the spread or scope of an existing conflict, provide opportunities for de-escalation, and leverage an asymmetry of stakes to discourage further conflict.

Forceful deterrence is mentioned specifically in the 2014 Russian military doctrine

and supported by discussion of strikes using conventional high-precision weapons for coercive purposes.[87] Typically, during a military conflict, damage would be inflicted in a dosed manner, beginning with conventional strikes. However, many Russian analysts emphasize that conventional weapons will not necessarily replace nuclear weapons for regional and global deterrence.[88] In Russian military thought, conventional deterrence is intimately tied with nuclear deterrence. Some Russian military writers note that using conventional weapons gives more credibility and flexibility to Russia's nuclear deterrent.[89] Many Russian discussions on forceful deterrence strategies envision the use of nuclear weapons at certain phases of conflict.

Russia's preoccupation with countering missile defense is also likely heavily influenced by fundamental differences between Russian and Western deterrence thinking. Missile defense is an integral part of U.S. strategy of deterrence by denial, intended to deter a nuclear strike by convincing a would-be adversary that any such strike could be defeated once launched. However, Kofman notes that the idea of "denial" is seldom discussed in Russian deterrence literature. Instead, Russian deterrence thought tends to focus on preventing threats from arising, rather than defeating a threat after it arises.[90] This is consistent with what some analysts describe as a Russian preoccupation with preemption over defense.[91] According to Kofman, Russia retains a "lingering fear of strategic surprise…and the belief that if escalation is likely, then Russia should take the lead rather than attempt a costly defense."[92] While Putin has denied that preemption is part of Russia's nuclear doctrine,[93] it is possible that through mirror imaging, this thinking may be contributing to Moscow's fear that missile defense is part of an offensive U.S. decapitating strike capability intended to neutralize Russia's nuclear arsenal.

The Role of Russian Hypersonic Weapons

Russia seems to view hypersonic weapons both as an important conventional warfighting capability and as an effective tool to enhance and safeguard Russia's deterrence capability and preserve strategic stability in the face of perceived efforts by the United States and NATO to undermine Russian influence and destabilize the strategic landscape. Nearly all of Russia's hypersonic platforms are dual-capable, or capable of carrying both nuclear and conventional payloads. Because Russia's military doctrine adopts a holistic strategy in which conventional and nuclear weapons are tied together, hypersonic weapons, even when conventionally armed, are likely tied to Russian nuclear thinking.

Details about the development of the Avangard HGV, coupled with statements by Russian officials, suggest that Avangard was specifically motivated by a desire to protect Russia's strategic nuclear deterrent from U.S. missile defense and discourage future missile defense development.[94] In 2019, Putin justified the development of Avangard by saying that it was preferable to permitting the United States "to secure

some serious strategic advantage for themselves" with missile defenses.[95] He characterized Avangard as "unstoppable" by U.S. missile defense. Since Moscow views missile defense as an underhanded and destabilizing attempt to nullify Russia's deterrent, it is likely that Avangard is intended to "restore" strategic stability between the West and Russia, not only by providing a nuclear delivery option that can easily bypass missile defense, but also by dissuading the United States from pursuing missile-defense technologies altogether. This strategy is consistent with the intent of the Soviet "asymmetric response" to SDI in the 1980's, which was to disincentivize U.S. missile-defense development by developing advanced weapons. In fact, development of Avangard began with Russia's "asymmetric response" to SDI, before it was reinstated in the 1990's as project 4202 and accelerated in the early 2000's.[96] Putin referred to Avangard as an"asymmetric, but very serious response"[97] to U.S. missile-defense policies.The idea that the development and use of advanced weapons by Russia may incentivize rather than discourage U.S. weapons development is rejected by Moscow.[98]

Russia possesses many missile systems in quantities or with capabilities that allow them to overwhelm or bypass missile defense. It is possible that Russian leadership recognizes this but also recognizes the psychological and deterrence advantage of Avangard as a symbol of Russian superiority. This may shed light on why Avangard appears to have been deployed before it was fully operational. It may be that Russian leaders saw early deployment of Avangard as a chance for Russia to reap some of its deterrence benefits while completing final phases of testing. The idea of Avangard as a symbol of superiority may also explain Russia's recent decision to fund Avangard at the expense of delaying the Braguzin rail-mobile ICBM launcher, which arguably has greater deterrence capability and value than Avangard under traditional Western deterrence principles.

Russia's dual-capable regional- and theater-range hypersonic systems, such as the Kh-32, Kinzhal, and Tsirkon, could be used to advance Russia's deterrence and coercion capabilities by threatening critical NATO targets. These hypersonic weapons complement conventional precision-strike capabilities by adding speed, range, and flexibility to Russia's conventional and non-strategic nuclear missile arsenal. Based on the ranges reported by some Russian officials, conventional or nuclear-armed versions of Kinzhal based in Russia could threaten U.S. or NATO targets in Turkey, Syria, Iraq, Israel, East Asia, and points as far west as Paris, as far south as Dubai, and as far east as Anchorage. Holding targets such as these at risk could enhance Russia's ability to project its influence in Eastern Europe and prevent NATO intervention in military actions along its periphery. In a Russia/NATO conflict scenario, Russia's hypersonic weapons could also expand the range of possible targets that could be held at risk as part of a forceful deterrence strategy.

Some analysts suggest Russia may perceive conventionally armed hypersonic

weapons as a means to achieve the benefits of low-yield nuclear weapons without the same implications.[99] Because of their speed and high inertia, hypersonic weapons are capable of delivering higher intensity strikes than other conventional missiles. By leveraging this capability, Russia may be able to neutralize targets in a conventional conflict that were once only vulnerable to nuclear strikes. However, it appears that Russian hypersonic weapons have principally been deployed as part of Russia's deterrence forces.

United States Response: Technological Superiority

The U.S. response to Russian hypersonic development has primarily been based on establishing and maintaining technological superiority.[100] Although this is important to U.S.strategy, it appears to be stoking Russia's fears that the United States will gain a strategic advantage that will destabilize the deterrence landscape in Europe.

The United States is accelerating funding in offensive hypersonic weapons research. Michael White, head of hypersonic development in the Department of Defense's (DOD) Office of the Undersecretary of Defense for Research and Engineering, indicated that the United States plans to spend $14 billion in hypersonic research and development over the next several years.[101] In FY 2021, the DoD requested $3.2 billion for hypersonic research,[102] with $207 million devoted to hypersonic missile defense;[103] this increased to $3.8 billion for hypersonic strike maturation[104] and nearly $250 million for hypersonic missile defense during FY 2022.[105]

The three current U.S. missile defense systems – the Ground-Based Interceptor (GBI), Terminal High-Altitude Area Defense (THAAD), and Aegis – are all either outdated, provide limited protection area, or employ a limited number of interceptors. Each is designed to intercept the ballistic missiles during midcourse or in the terminal phases of flight, when not only hypersonic weapons, but many other maneuverable missiles, can maneuver and evade interception. Moreover, even with a 1:1 intercept ratio, which is highly optimistic, current U.S. systems do not have enough interceptors to counter a large salvo launched by Russia or China.[106] Thus, the current U.S. missile defense system is best suited to counter threats from rogue states with relatively small arsenals of less-advanced ICBMs rather than larger nuclear powers such as Russia or China. However, Russia's focus on defeating U.S. missile defense highlights vulnerabilities in the U.S. missile defense system that could be exploited by rogue states with hypersonic weapons.

Therefore, the United States is working hard to update existing missile defense systems to counter hypersonic and other new missile threats. In 2018, the Missile Defense Agency (MDA) began an effort to develop counter-hypersonic weapons systems called the Hypersonic Defensive Weapons System (HDWS).[107] In 2019,

MDA announced a new counter-hypersonic weapons prototype program called the Regional Glide Phase Weapon System (RGPWS).[108] In the past few years, MDA also placed an emphasis on upgrading existing GBI, THAAD, and sea- and land-based Aegis missile defense systems. In fact, the FY 2021 budget for MDA included $1.9 billion for support and expansion of the Ground-based Mid-course Defense (GMD) system, $1.8 billion to upgrade the Aegis weapon system and procure additional interceptors, and $1 billion for upgrades and interceptor procurement for THAAD.[109]

Because of their maneuverability and unusual altitude, detection and tracking of hypersonic weapons is best accomplished by space-based sensors. Once separated from the booster, hypersonic weapons are typically 10-20 times dimmer than ICBMs.[110] Therefore, such a space-based system requires advanced infrared sensors for tracking. The United States is developing such a system for tracking both hypersonic weapons and ICBMs as a partnership between MDA and the Space Development Agency (SDA).[111]

In November 2020, MDA conducted the first successful ICBM intercept test of its Aegis sea-based interceptor, prompting a predictable condemnation by Russia. Given Russia's ongoing fight against missile defense, it is likely that the continued advancement of missile defense by the United States will spur reciprocal advancement of hypersonic weapons in Russia. A continued action-reaction cycle between U.S. missile defense and Russian hypersonic development could lead to an arms race that challenges strategic stability and heightens tensions between Russia and the West.

Balancing Technological Development and Arms Control: Recommendations for the United States

Safeguarding U.S. assets, personnel, operations, and domestic security, while preventing action-reaction dynamics that could fuel an offense-defense arms race requires a comprehensive response that balances research and development of hypersonic strike and missile defense capabilities with confidence building, restraint and multilateral arms control to prevent proliferation of hypersonic technology. Such an approach can be facilitated by coordinated actions from the Department of Defense (DoD), the State Department, Congress, and the Intelligence Community, as described in this section.

As hypersonic military technology advances, particularly among peer and near-peer competitors, continued research and development of hypersonic offensive strike weapons will be valuable to ensure national security and maintain military credibility moving forward. United States hypersonic development has been focused on high-accuracy conventional strike, and in light of the limited effect that nuclear-armed hypersonic weapons are likely to have on the deterrence status quo,

continued focus on conventional strike appears to be prudent. DoD funding and collaboration between DARPA, the Navy, the Air Force, and the Army on existing prototype programs is key to closing the perceived "missile gap" between the United States, Russia, and China.

In order to efficiently develop and field hypersonic offensive strike capabilities, it is critical that DoD establish a clear doctrine for hypersonic weapons. Currently, it appears that the mission requirements and objectives of hypersonic weapons are not well defined. Since hypersonic weapons are under development by all branches of the U.S. military, these systems would benefit from creation of military doctrine by the Joint Chiefs of Staff (JCS) regarding use of hypersonic weapons for strategic and tactical purposes. To frame hypersonic weapons in their appropriate context, the JCS could include in joint hypersonic doctrine a taxonomy for missile systems that abolishes outdated missile categories and defines new ones spanning the spectrum of near-term range, speed, and maneuverability.[112]

It is also important that the United States continue to focus funding and development on hypersonic missile detection & tracking and research & development of alternative hypersonic missile defense strategies, including evasion, hardening, point-defenses, and military deception. Effective detection & tracking requires updating of space-based sensors for early hypersonic detection. Although existing Space-Based Infrared (SBIR) sensors sense and track hypersonic glide vehicles, additional development is needed to track smaller and dimmer hypersonic cruise missiles. The Hypersonic and Ballistic Tracking Space Sensor (HBTSS) under development by MDA and SDA is meant to detect and track hypersonic glide and ballistic missiles.[113] Sensors for hypersonic cruise missiles could be added to this program. Efforts by DoD to advance U.S. hypersonic missile detection & tracking capability and alternative missile defense strategies will require Congressional approval. While Congress acquiesced to DoD's funding requests in the recent past, it will be critical that Congress sustain funding even as administrations change and defense priorities shift.

The threats posed by Russian nuclear-armed hypersonic weapons and the potential for hypersonic arms-race instability could be addressed to some degree by working to build confidence with Russia through dialogue and a careful mixture of restraint and targeted development of certain missile-defense components. This first requires that U.S. officials recognize and acknowledge Russia's deep-rooted perceptual lens. In light of Russia's longstanding concerns surrounding U.S. missile defense, clear effort should be made to reopen dialogue with Russia and reemphasize, by both word and action, the primary purpose of missile defense, which is to counter threats from rogue states and non-state actors.[114] This stance could also be clarified in joint doctrine regarding missile defense.[115] This would enhance continuity between official military doctrine and statements of purpose in the 2019 Missile

Defense Review and provide a clear foundation from which the U.S. could engage with Russia in arms-control discussions.[116]

However, since Russian preoccupations stem from strategic and cultural elements, it is unlikely reassurances will allay Russian concerns without real U.S. concessions on missile defense. These could be accomplished by considering concessions on deployment and fielding of hypersonic interceptors, perhaps limiting current funding for hypersonic interceptors to research & development only. United States officials concede the U.S. nuclear arsenal, not missile defense, remains the main deterrent against a nuclear hypersonic attack from Russia or China. Since the stated purpose of missile defense is to defend against rogue states and non-state actors and the lion's share of foreign advanced hypersonic weapons development is likely to be in Russia and China, concessions on mid-course hypersonic interceptors may alleviate Russian concerns without exposing the United States to any significant new vulnerability from Russia or China. Smart concessions could be used in arms-control and non-proliferation discussions to provide a powerful incentive for Russia and China to engage in multilateral agreements.[117]

For such concessions to be feasible, however, the United States would need commitments from Russia, China, and any other country involved in hypersonic research to prevent proliferation of hypersonic technologies and equipment to rogue states or non-state actors. Advancing hypersonic non-proliferation measures under the Missile Technology Control Regime (MTCR) is one possibility that could limit spread of hypersonic technologies and provide common ground from which the United States and Russia could engage China. If Russia or China were unwilling to enter arms arrangements, the United States could partner with international allies, including NATO or UN Security Council members. International hypersonic arms-control and nonproliferation agreements, perhaps in conjunction with the nuclear Non-Proliferation Treaty (NPT), could become part of an international pressure campaign to push Russia and China toward compliance. Because nearly all of Russia's hypersonic delivery platforms are dual-capable, it may be valuable to seek an inspection and verification agreement for warheads on dual-capable weapons systems, including hypersonic weapons. Such an agreement could include warhead verification and storage location requirements to reduce warhead ambiguity, prevent unintentional escalation, and mitigate potential crisis instability. These verification provisions would likely require joint efforts among government agencies, including the State Department, the Department of Energy, and the Intelligence Community. The idea would be to expand strategies for alternative HUMINT, SIGINT, and FISINT collection and analysis of Russian and other foreign weapons programs; develop novel strategies for warhead verification; and ensure safe operation of national technical means (NTM) to ensure agreement compliance.

Finally, interagency analyses regarding cultural motivators shaping development of

hypersonic and other advanced weapons in Russia, China, and other nations of interest should be ongoing. Understanding these motivations is critical to assessing the threat that hypersonic weapons pose to U.S. national security. Analyses could be included as a standalone report or amendment designed to complement government documents such as the Department of Defense *Nuclear Posture Review* or the Defense Intelligence Agency *Military Power* publications.[118]

Conclusion

Russia's hypersonic weapons development appears to be tied to a desire for technologies that ensure U.S. targets remain vulnerable regardless of advances in American missile defense. Russian concerns about U.S. missile defense are driven in turn by longstanding strategic and cultural beliefs that amplify Russia's threat perception from the West. Based on Russian military doctrine and literature, Russian hypersonic weapons appear to be meant to enhance Russia's conventional and nuclear deterrence strategies, both psychological and kinetic, with respect to the United States and NATO. The United States is responding to Russia's hypersonic weapons development by seeking superiority in this technology through development of both hypersonic offensive strike and hypersonic missile defense capabilities. However, if unrestrained, and if pursued in the absence of other confidence-building measures, this approach will simply fuel foreign hypersonic development. Instead, to discourage a destabilizing hypersonic offense-defense arms race and safeguard U.S. national security, the United States can consider focusing missile-defense funds on hypersonic detection & tracking and alternative missile-defense strategies other than hypersonic interceptors. In addition, hypersonic research & development should be paired with multilateral non-proliferation and verification agreements to prevent the spread of hypersonic weapons, especially to rogue states and non-state actors operating outside any arms control context.

Table 1: Major U.S. Hypersonic Weapons Programs[119]

Program Title	Primary Agency
Tactical Boost Glide (TBG)	DARPA
Advanced Full-Range Engine (AFRE)	DARPA
Operational Fires (OpFires)	DARPA
Hypersonic Air-breathing Weapon Concept (HAWC)	DARPA
Intermediate Range Conventional Prompt Strike Weapon (IR CPS)	US Navy
Land-Based Hypersonic Missile (Long Range Hypersonic Weapon)	US Army
Hypersonic Conventional Strike Weapon (HCSW)	US Air Force
AGM-138A Air Launched Rapid Response Weapon (ARRW)	US Air Force

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Boosting Space Diplomacy at State

David A. Epstein

Space diplomacy remains an esoteric speciality at State.

With ever-increasing speed, humanity is expanding the scope of its activities in outer space, thanks to private enterprise as well as via national pursuits.[*] In the last two years alone, for example, the number of active and defunct satellites in low Earth orbit has increased by more than 50 percent, to around 5,000, with plans to add tens of thousands more in the coming years. Equally surprising, these satellites are owned and operated by nearly 100 different countries and organizations around the world—not just the small but growing number of nations with domestic satellite launch capabilities—and involve a wide range of commercial, scientific and security and defense endeavors. Dangers lurk, however, and U.S. diplomacy must be prepared.

The United Nations took steps in December 2020 and November 2021 to reduce space threats and establish norms, rules, and principles of responsible behavior in outer space. The importance of such efforts was demonstrated by Russia's Nov. 15, 2021 anti-satellite missile test, which caused a massive and dangerous debris field that threatened space assets and forced astronauts and cosmonauts aboard the International Space Station to take refuge in emergency escape capsules.

The 2019 establishment of the U.S. Space Force is tangible recognition that humanity's future lies among the stars, representing as it does an acute awareness that where human beings venture, conflict often follows. In January, NATO released its formal space policy that recognizes space as a new operational domain, alongside air, land, sea and cyberspace. At the same time, much positive bilateral and multilateral work has occurred in space. From U.S.-Soviet space cooperation dating to the 1970s, to the International Space Station and now the Artemis lunar program, collaboration has proven more the rule than the exception.

It is imperative that the State Department, too, be in space. Today's diplomats, not tomorrow's, must develop a deep understanding of the interdisciplinary legal and policy aspects of outer space and a firm grasp of national priorities, interests, opportunities, and policy constraints in space. State must invest in space as an increasingly vital element in all the various areas in which we work.

Everything from agriculture and the environment to commerce and defense will be

influenced by humanity's expansion into the cosmos. Space activities and operations may take place in their own separate domain for cooperation and for conflict, but satellites and other space assets will also serve as platforms that affect and are affected by terrestrial developments, as well. The Department of State and the Foreign Service are uniquely situated to help address the cross-cutting and interconnected nature of the opportunities and challenges of this activity.

DIPLOMACY IN THE SPACE AGE

Thus far, much of U.S. space policy and diplomacy is limited to a small cadre of subject matter experts. However, the positions dealing with space are few and far between and often represent a one-time career flourish. Quite simply, State does not have generalists who can engage on space regardless of posting and develop these skills over time.

Understanding space issues and opportunities begins with education, training and awareness raising. Our Department of Defense colleagues are preparing this generation of national defense professionals for careers involving space operations; the State Department must do the same. While on detail as Department of State Visiting Professor at the United States Air Force Academy, I had the honor and privilege of being part of a team to consider and devise curriculum for cadets graduating into the United States Space Force. As part of this effort, I directed and taught a course on space policy in the Political Science department. Alongside DoD, NASA, Commerce and other agencies, State will join interagency discussions and policy making that will increasingly demand proficiency in the language of space.

America's diplomats must become fluent in this language like any other, though to varying degrees depending on the role space plays in individual portfolios. The Foreign Service Institute should consider a course—brief and online, at first—to introduce Foreign Service officers to space law, history, and policy. Subsequently, FSI can develop a tiered approach, with topic-specific modules to prepare FSOs to integrate space into their work.

We must also become familiar with what our interagency colleagues are doing in space, along with allies and partners around the globe. While most people consider the European Space Agency or nations such as Russia, China, and India, as "spacefaring nations," few are aware, for example, that NASA engages with more than 100 countries conducting space exploration and research. We have professionals in embassies in each and every one of these countries working in areas that intersect with this international space cooperation. We need diplomats who can engage on space to build on this cooperation and expand its potential for bringing peace and prosperity. Unfortunately, we must also become better attuned to the actions of adversaries that utilize and exploit space to advance their interests at the expense of our own.

The Department of State must have professionals who understand the enduring interests, policies, and procedures of the United Nations and NATO, as well as NASA and the Department of Defense, on space issues but also those of commercial enterprises such as SpaceX, and the aspirations of allies, partners, and adversaries around the globe.

The department and the Foreign Service cannot subcontract this knowledge to others within the interagency, the private sector, or the international community; nor can we rely exclusively on a small corps of Civil Service colleagues. It is no exaggeration to say that, increasingly, such knowledge will be vital to our ability to do our jobs on behalf of the United States and for the peace and prosperity of planet Earth. Just as we have Foreign Service officers who develop expertise in human rights or energy policy, the State Department will require specialization in space as well as general, introductory exposure for all officers, no matter their cone or location.

Many Civil Service colleagues already possess impressive backgrounds and institutional knowledge regarding space, and the U.S. State Department has numerous talented professionals working on space-related matters at any one time. But such talent and resources need to be expanded and coordinated across the department because space increasingly affects all aspects of U.S. foreign policy and our collective work to advance America's interests and values. A deliberate, organized approach to space at State will ensure that talent and experience are expanded, retained and applied where needed, and not lost or neglected throughout individual careers.

The synchronization of our space-related work will allow State to lead U.S. efforts with global allies and partners and to support other more targeted undertakings throughout the interagency, as well as within the scientific, commercial, and academic realms.

THE FUTURE IS NOW

Space already plays a critical role in so many aspects of life and in so much of what we do as diplomats. The role it can play in aiding democracy protesters, for instance, to communicate via uncensored commercial satellite communication technology should be just as important to and just as well understood by human rights officers as it is to the interagency colleagues and the private sector firms seeking to protect those satellites from attack or disruption by malign actors. It seems self-evident that the State Department has a role to play in supporting and advancing these objectives.

Public affairs officers, too, must be able to tell the story of why outer space is

important in what we do, and share that message alongside the other essential communication roles they perform. More broadly, cell phone communication, e-commerce, and other aspects of our daily, digital lives rely on space and have interagency interests that intersect with nongovernmental equities as well.

Additionally, there are aspects of humanity's future in space we have not yet considered nor fully addressed from a legal or policy standpoint that will depend on State's interdisciplinary expertise and perspective to ensure U.S. interests and values are secured. Existing agreements such as the Outer Space Treaty contain significant gaps in coverage and ambiguities in verification that can lead to misunderstanding and conflict without constant awareness of developments in civil, commercial, and military space capabilities. Alternatively, though, filling these gaps and clarifying such ambiguities can serve as a framework for communication and cooperation.

Unforeseen circumstances and scenarios, to say nothing of technologies, will require space expertise to craft the next generation of agreements, alliances, and partnerships for and in space. Humanity's future in space, in other words, presents the same challenges and opportunities for conflict or cooperation as in other domains, but the stakes will soon be far greater than ever before.

Future cooperation, and potential conflict in space, will not be limited to purely political or scientific realms but cover the full spectrum of human and international interests and disciplines. The United States Department of State and the Foreign Service represent the greatest combination of experience and expertise to help lead American and global efforts for a peaceful and bountiful future of extraterrestrial innovation and achievement.

LOOKING AHEAD

In time, various positions at our missions around the world should expand their portfolios to include space, depending on the contours and needs of the relationship. Environment, science, technology, and health (ESTH) and political-military (PolMil) officers seem a natural fit, but so too are public affairs officers. So many of us work in countries where space is or is becoming a part of the relationship with the United States that the variety of participants in such programs appears limitless. In the future, certain posts may require a dedicated space portfolio officer or even a unit or section within the mission. The Bureau of Global Talent Management's Professional Development Unit may one day offer programs or other support that leads to an M.A. or LLM in space-based studies for officers demonstrating a dedication to space diplomacy.

The State Department is represented on the reestablished National Space Council and has a select number of positions dealing with space at multilateral missions. Foggy Bottom also has positions in the bureaus of Arms Control, Verification, and

Compliance and Oceans and International Environmental and Scientific Affairs, among others, focused on space activities. Our Civil Service and Foreign Service colleagues in these positions have already made tremendous contributions to international treaties and agreements. It may be time, however, for more FSOs and members of the Civil Service to be aware of space and prepared for space-related policy decision-making. Satellite imagery will, for example, aid the work of State Department officials focused on alleviating humanitarian and refugee crises just as much as it serves officers engaged in energy and security issues.

Highlighting the importance of outer space in our future diplomacy may require a special envoy or ambassador-at-large or even a functional bureau down the line. For now, however, introducing space to as many members of the Civil Service and Foreign Service as possible would be a tremendous beginning.

State will be needed in space. Now is the time to prepare.

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No Method to Madness: The Failures of Madman Diplomacy in All Its Forms

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Madman diplomacy fails to work as advertised. Internal contradictions of the strategy in its ideal form reduce the chances it will succeed in future crises.

Introduction

Effective deterrence requires an actor to pair powerful capabilities with a believable will to use them. The world of United States' dominance has relegated the question of will to the periphery. However, the U.S. is emerging from its hegemony with enough self-awareness to acknowledge the painful consequences of this relegation. Democratic restraint has historically played an important role in nuclear deterrence for obvious reasons, and the issue of will deficit is not new. The deterrent demand for credible will has encouraged some policymakers to consolidate their executive power toward the strategy of "madman diplomacy" as a possible solution. Intentionally or not, the Trump administration's international style resembles a return to this strategy as a response to the current U.S. crisis of will. Evidence of madman diplomacy's modern popularity is present on both sides of recent U.S.-North Korea standoffs as well as Russian threats of low-yield escalation. This paper will explore madman diplomacy from a theoretical standpoint to argue why all forms of this strategy are too dangerous to employ.

The allure of madman diplomacy claims to artificially inflate deterrent capacity, but the strategy is a false promise that will only yield ineffective or counterproductive results. The theory behind madman diplomacy relies on inherent contradictions that are irreconcilable with a credible madman persona. As a result, the demands of pursuing the strategy will force the madman diplomat to sustain a contradictory persona that will inevitably either collapse the strategy or negate its potential advantages. The logical contradiction that awaits any madman practitioner will force one of four outcomes based on the two variables of practitioner response and adversarial perception. To prove that each outcome invariably leads to weaker or failed deterrence, this paper will define the goals and process of madman diplomacy, analyze the theory's inherent contradiction, examine the failure of all four outcomes, and warn of the dangerous implications for any application of madman theory.

Definition

At its heart, madman diplomacy is an attempt to make escalation threats more credible by appearing irrational. The strategy specifically refers to irrationality where the madman diplomat cannot be deterred by appeals to reason, making their threats more credible because the adversary believes them crazy enough to follow through. This irrationality or volatility is meant to provoke fear of the madman diplomat and prompt adversaries to be more cautious. The concept of intimidation through irrationality surfaces throughout historical realism, as even Machiavelli recommended that it could sometimes be "a very wise thing to simulate madness."[1] Realism's resurgence during the Cold War prompted theorist Herman Kahn to hypothesize that an adversary might back down if their opponent "looks a little crazy."[2] While Kahn's proposal was actually intended as a warning about Soviet leader Khrushchev, the strategy was also popular among select U.S. politicians. Nixon incorporated elements of madman diplomacy to attempt a more advantageous settlement to the Vietnam war based on his belief that Eisenhower had accomplished a similar feat in Korea.

Madman diplomacy occurs in the context of Robert Jervis's observations that nuclear capabilities simplify the security dilemma into a game of chicken by raising the cost of war far above the potential gain from victory. Even standoffs between nuclear states over non-nuclear issues occur in this context, as each side is aware that they must achieve resolution before the issue escalates to a scenario of mutually assured destruction. Because an adversary is aware of this dilemma, madman diplomacy hopes to force a concession by feigning ignorance or willingness for these consequences. If the adversary concludes they are the only one capable of averting nuclear destruction, they will concede victory to the madman diplomat.

In order to define the relationship between deterrence and madman diplomacy, it is important to examine the broader concept of deterrence as a psychological process. Deterrence occurs when an actor decides not to pursue a course of action that would have been harmful to their adversary. While deterrence strategists seek to influence their adversary toward this decision, deterrence is ultimately a process that occurs solely in the mind of the deterred actor. Therefore, madman diplomacy can be treated as an independent variable that a madman diplomat employs as an attempt to produce the dependent variable of deterrence. Madman diplomacy is often defined and categorized by the madman's adversary, and is still treated as a variable if an actor uses it unintentionally to produce deterrence. The relationship between madman diplomacy and deterrence exists in a scenario if an adversary backs down or deescalates a confrontation due to their fear of the madman diplomat's irrational response. While madman diplomacy can sporadically produce deterrence, this paper proves that the relationship between the two variables is inconsistent and unsustainable.

General Critique

The central issue with madman diplomacy is its reliance on contradictory relationships to risk and trust. While elements of madman diplomacy can occasionally produce individual successes, the strategy is unsustainable and ultimately relies on concepts that negate its potential advantages. The demands of credibly conducting madman diplomacy will either force the strategy to implode or lead to a weaker deterrent than otherwise possible.

The madman diplomat's relationship with risk condemns the strategy in two ways: it prevents the madman diplomat from controlling the outcome, and it requires unsustainable amounts of risk to maintain credibility. In order to be seen as irrational, a madman diplomat's escalations or other policies must exceed the rational tolerance for risk. Not only does excessive risk force this strategy to absorb or at least embrace more failures, it relies on failure for credibility through "costly signals." An actor uses a costly signal to indicate their resolve through a willingness to lose control over the escalation process.[3] Nixon's nuclear alert of 1969 exemplifies this principle with his unprovoked launch of several bombers toward Russia carrying live nuclear warheads. While Nixon ended the exercise before the bombers reached their Russian targets, he assumed enormous risk of failure as several factors outside of his control could have plunged the world into nuclear war. For example, if he was unable to recall the bombers in time the pilots—unaware that this was an exercise—would have started a war. Russian officials were focused on extreme tensions with China at the time, and outposts could easily have panicked and shot down the approaching bombers. The whole operation would have been catastrophic if one of countless junior officers on either side had failed in a small aspect of this incredibly delicate operation. However, this risk is exactly what madman diplomacy relies upon to develop credibility. Because Nixon appeared unperturbed by placing the risk of nuclear war out of his control, his costly signal indicated an irrational resolve for nuclear war that he hoped would intimidate his enemy. The willingness to embrace failure is central to the image of a madman diplomat whether they intentionally create this persona or not.

By relinquishing control of a nuclear standoff, madman diplomacy's embrace of failure dooms the strategy on its own, as risking nuclear war requires only one failure to undo any of the strategy's potential successes. However, the strategy contains further failures as it requires increasing levels of risk and chance of failure that undermine its strength. Madman diplomacy's cavalier treatment of dramatic consequences constantly alienates risk-averse supporters, advisors, and administrators. Few individuals are willing to trust a leader that openly rejects rationality and casually threatens to drag them into a nuclear conflict.[4] It is impossible to implement any strategy without the support of junior or mid-level officials, especially when frequently ordering them to risk their own destruction in a

nuclear war.[5] A madman diplomat must overcome this resistance, but attempts to do so risk turmoil and deposition. This reluctance was evident in Nixon's 1969 alert, as Strategic Air Command and the Secretary of Defense both resisted Nixon's apparent embrace of oblivion and executed less drastic orders.[6] Madman diplomacy surrenders international leadership and weakens its alliances because the strategy casually threatens to embrace enormous costs for irrational reasons. Alliances are one of the most powerful tools for deterrence as they augment resources and allow power projection, and no strategy has enough comparative advantage to justify jeopardizing the deterrent advantage of organizations such as NATO.

Madman diplomacy contains a further contradiction regarding trust, as it attempts to produce deterrence based on an untrustworthy persona. Madman diplomacy tries to use an irrational and untrustworthy image to force an adversary to concede in a standoff by claiming they are willing to escalate and embrace irrational costs such as nuclear war. However, deterrence relies on the same principles the madman diplomat undermines. An adversary's concession is predicated on the assumption that their concession will restrain the madman diplomat from further escalation. All negotiations and agreements rely on rational self interest; an agreement only succeeds if both sides trust that abiding by the terms is more beneficial than deviating. However, the madman diplomat seeks to force such an agreement by convincing their adversary they are prone to act irrationally and are willing to accept the cost of nuclear destruction even if it is irrational to do so. By indicating a lack of rational restraint, the madman diplomat prevents their adversary from trusting any agreement between them. Even if the agreement is in the best interest of the madman diplomat, they forced the concession by claiming to ignore rational self-preservation. Paradoxically, a more effective madman persona means an adversary is even less likely to trust that a concession will restrain their interlocutor's "mad" behavior.

The madman diplomat's disability for conflict resolution is especially relevant for disarmament negotiations. Disarmament agreements center on trust and communication, as they usually require a disproportionately weaker adversary to dismantle their capabilities even further. If the more powerful actor invokes madman diplomacy to demand a better settlement, it is even less likely that the weaker adversary will trust the madman enough to accept the increased vulnerability of disarmament. Rather, the exchange is more likely to prompt the weaker adversary to act irrationally out of desperation.[7] Therefore, madman diplomats face an unresolvable contradiction: they are either credible enough madmen that no adversary will risk vulnerability by trusting the restraints of a concession, or their irrationality is not credible enough to intimidate an adversary into conceding at all.

Supplemental, unpublished data analysis alongside this piece revealed that madman

diplomacy failed when it was applied throughout history. Threats issued by madman diplomats were less likely to succeed and more likely to damage the madman diplomat's standing in a confrontation. While conventional threats are not a very powerful tool to change the status quo without escalation, they demonstrated mediocre effectiveness. On the other hand, madman diplomacy has no record of improving an actor's position and actually harmed the actor's interests in 73.33% of cases. This evidence reveals the survey-level fact of madman diplomacy's historical failure. The remainder of this paper explains that phenomenon as the unavoidable fallout of the previously outlined contradictions within madman theory.

Madman Outcomes in a 2 X 2 Table

The general critique implies four possible outcomes for the application of madman diplomacy based on the madman diplomat's response and their adversary's perception of resilience. This produces a 2x2 table of outcomes based on the two variables, and the strategy fails in each instance. Like Jervis's (1978) table for the outcomes of security dilemma cooperation, the actor's actions dictate the two columns and their adversary's perception dictates the two rows.[8]

		Madman Response	
		Embrace	*Hide*
Perceived Resilience	*High*	Immune Madman	Jekyll and Hyde
	Low	Desperate Madman	Gambler

The four categories encompass the possible outcomes of madman diplomacy and the nature of their determination makes them mutually exclusive. This paper will examine the role of each variable before condemning individual failure of all four outcomes.

Madman Response: Hide or Embrace

Madman diplomacy's contradiction and the strategy's inevitable failure force the madman diplomat to choose to either embrace the irrationality of their path or attempt to mitigate the potential harms. Even if the madman diplomat is unaware of the strategy or its contradiction, they will react toward the same two options as they encounter the harms of their approach. Confronting weaker alliances and unable to form lasting agreements, the madman diplomat will either continue in their irrational persona or proceed cautiously while still attempting to harness aspects of the strategy's allure. These two options are defined as "embracing" or "hiding." All

invocations of madman diplomacy select one of the two responses even if the process occurs subconsciously. Individuals that are actually irrational or unaware of the dangers they face will pursue the embrace response simply through the nature of their situations. It is also possible for an unaware madman diplomat to choose the hide response as a natural reaction to the strategy's dangers. Ultimately, every form of madman diplomacy can be categorized based on whether the madman diplomat tries to mitigate the strategy's harms or not.

Should the madman diplomat embrace the flaws in their strategy and continue to rely on irrationality for deterrence, they will be unable to resolve the theory's contradictions and their persona will either collapse or continue to undermine their deterrent capacity. Madman diplomats that embrace the strategy believe their adversaries will always concede at the threshold of rational restraint, and they trust that continuing to be irrational will eventually make the strategy successful. The embrace response often disregards potential dangers by assuming that the adversary will be even more deterred by these risks, and therefore the risks will never manifest. This response reassures the madman diplomat that greater impending danger only increases the likelihood of adversary concession as long as the madman maintains their reckless advance. The desperate madman embraces the risks of madman diplomacy because they believe they have no better option. In contrast, the immune madman believes their disproportionate advantage makes them an exception to the theory's risks, as it will force their adversary to concede long before the failures arrive. Both options under the embrace response do not solve the theory's fundamental problem, as these madman diplomats either ignore or dismiss the inevitable failures.

The alternative to embracing the destructive irrationality of madman diplomacy is the "hide" response that seeks to mitigate the strategy's harms while still harnessing some form of advantage. This strategy attempts to avoid the theory's failures by carefully guiding international perceptions to reassure allies separately from irrationally deterring enemies. This approach can be uniquely attractive to world leaders whose arrogance or sense of exceptionalism leads them to believe they can avoid the failure of others by carefully controlling the strategy's application. A common way to attempt this response is for the madman diplomat to alienate themselves from the irrational persona they threaten. This type of madman diplomat claims to be currently capable of rational negotiation and agreement, but threatens an inevitable proclivity for irrationality if the adversary refuses their demands. An example of this approach is when Nixon tried to escape the trust dilemma of invoking madman diplomacy while achieving durable success in Vietnam by claiming he would be pushed to irrationality if the agreement did not hold. While this response can delay or mitigate the harms of madman diplomacy, it is still not viable because it cannot escape the strategy's contradictions. The same aspects of irrationality that could produce deterrence condemn madman diplomacy to

inevitable collapse; the strategy is still only as effective as it is foredoomed. The two outcomes of the hide response are dictated by adversary perception, and their unique failures will be analyzed individually.

Adversary Perception: Resilient or Vulnerable

Adversary perception of the madman diplomat's resilience plays a central role in the outcome of their effort and is outside the madman diplomat's control. Perceived resilience dictates why the adversary believes the madman diplomat is irrational and informs the adversary's contribution to the final policy outcome. From an adversary's point of view, irrational escalation threats only make sense in context: the madman diplomat has either superior or inferior resilience to the nuclear exchange they threaten. Superior resilience would explain reckless treatment of nuclear consequences because a powerful madman diplomat must assume that the less resilient adversary will concede first. Inferior resilience indicates that the madman diplomat is acting irrationally out of desperation and lends a different form of credibility to their escalation threats. While it is possible for a madman diplomat to exist without an enormous disparity in nuclear resilience, perfect parity does not exist. As a result, an adversary will assume the madman diplomat's situation is dramatically different as the only explanation for their irrational behavior. The comparative strength of the madman diplomat is a powerful factor to determine the outcome of their strategy but is even more important through the lens of adversary perception in order to account for factors outside the madman diplomat's control.

Combining the two variables of madman response and adversary perception produces the four negative outcomes noted in the earlier table: immune madman, desperate madman, Jekyll and Hyde, and gambler. Each category has unique aspects of failure as well as their common inability to resolve the fundamental contradictions of madman diplomacy. Each theoretical result contains multiple historical examples of failure and informs modern attempts to confront madman diplomats.

Immune Madman

The Immune Madman is aware of the consequences they risk but disdains them. This can come from a firm conviction that the Immune Madman will win or survive any conflict. Often the presence of such conviction can be enough to convince an adversary of its validity, or at least generate sufficient uncertainty for effective intimidation. Kennedy's hardline stance during the Cuban missile crisis could be considered an example of this strategy along with Eisenhower's willingness to use nuclear weapons against Chinese/North Korean forces in the Korean War.[9] Both presidents based their threats on contemporary U.S. nuclear superiority and ultimately caused the adversary to back down or reach a settlement. However, the best illustration of this mentality is Mao Zedong's declaration that he was not

worried about a 1:1 nuclear exchange with the U.S. because "we have 600 million people, and if we lose 300 million of them, what of it?"[10] Mao's comment shocked the other Communist members of the strategy conference, specifically the leaders of communist Czechoslovakia (Novotny) and Poland (Gomulka), that later expressed private concerns to Khrushchev. The two leaders expressed widespread fear among allied communist powers that could not survive such an exchange like China, and they urged Khrushchev to prevent China from leading the alliance in this direction.[11] China's reckless willingness to escalate proved to be a significant factor that condemned the already eroding relationship between China and the Soviet bloc—a relationship that has not yet recovered.

The Immune Madman's embrace strategy under conditions of high perceived resilience is the most extreme form of madman diplomacy and has several unique problems in addition to madman diplomacy's general faults. Even if an actor is correct in their assumption that they will survive a nuclear exchange better than their opponent, nuclear war is not a winnable scenario. Surviving a nuclear war would have rendered Mao's China in far worse a situation than conceding whatever conflict prompted the exchange. As a result, the Immune Madman still assumes a nuclear exchange will never happen and relies on their opponent's concession. This gamble accepts an enormous amount of risk on the assumption that an adversary will concede in every confrontation. Forcing this standoff so frequently promises eventual failure due to either miscommunication, human error, unpredictable events, or merely an adversary's refusal to concede. Furthermore, if the disparity in capabilities or survivability is enough for immunity to truly exist, the immune madman will likely provoke the adversary into a desperate madman scenario that further increases the risk of failure.[12] While this argument does not preclude the possibility of occasionally invoking madman immunity during a standoff, each invocation makes the strategy less likely to succeed. It is standard practice for world powers to make demands based on their comparative capabilities, but it is nevertheless incredibly dangerous for the most powerful world leaders to hold the world, including allied states, hostage at every standoff.

Desperate Madman

The Desperate Madman feels backed into a corner by circumstances or an adversary they cannot defeat. They therefore see escalation as their only form of defense and attempt to deter the adversary by convincing them that even military victory would be too costly to pursue. The Desperate Madman attempts to compensate for lack of capabilities by using irrationality to inflate the will component of their deterrence. Even if the Desperate Madman is aware of the danger in their strategy, they embrace irrationality because they believe it is their only option to avoid crushing defeat or regime change. This path can be especially tempting for weaker states that desire a way to increase their deterrence despite their

disadvantage. The most recent example of this strategy is the North Korean attempt to use nuclear belligerence as insurance to counteract their isolation and disproportionate vulnerability.

The Desperate Madman is unable to escape the overall flaws of madman diplomacy and faces additional unique dangers. Threatening to wage an irrational war will only further isolate the Desperate Madman and thereby increase the power disparity they could have compensated through alliances. This outcome is especially precarious because it links the nation's survival to the credibility of the madman persona. While the Immune Madman only risks losing confrontations over individual conflicts, the Desperate Madman can only survive as long as their adversary is sufficiently wary of their irrational response. Rather than thwart their adversary indefinitely, the Desperate Madman cements their reputation as a permanent threat to international stability and only ensures that their adversaries search for different ways to undermine their regime.

Finally, the Desperate Madman does not escape the danger they will intimidate their supporters as much as adversaries. As the situation becomes increasingly dire, equally threatened supporters or government officials may lose trust in their Desperate Madman. The madman is more likely to be deposed by an uprising or internal opposition that would rather compromise with the enemy than risk destruction. While madman diplomacy can be the understandable result of desperation, it either lacks the credibility for results against the adversary or exceeds supporters' desire to gamble with their own destruction.

Jekyll and Hyde

The Jekyll and Hyde outcome is the safest option as a strategy of moderation, but it still fails to increase deterrence for weakening the madman persona and only somewhat mitigating the strategy's harms. Jekyll and Hyde centers on the madman diplomat's claim, under high perceived resilience, to be in a present state of rationality while threatening to become irrational if their demands are not met. This threat of irrationality is strongest when it seems the inevitable result of an adversary refusing to concede. The best example of this outcome is Nixon's invocation of madman diplomacy when he claimed to be capable of rational settlement in Vietnam but threatened he would be forced to pursue nuclear escalation against the small country if the agreement failed. Nixon deliberately crafted an unstable persona by maximizing secrecy and attempting to micromanage his international image.[13] Nixon hoped that events like the 1969 nuclear alert would communicate he was sufficiently concerned about losing the next election that he was unstable enough to resort to irrational escalation if his adversaries pushed him too far.[14] Nixon used such a claim to explain his unpredictable nuclear alerts and escalation threats, telling his chief of staff, "I want the North Vietnamese to believe I've reached the point

where I might do anything to stop the war."[15] In this way, Nixon hoped to force them to meet his current demands by making them fear he would devolve into irrationality if they refused.

Even if the Jekyll and Hyde persona achieves its requirements for unrealistically precise diplomacy and an impossible level of international self-awareness, the strategy can only hope to slightly mitigate the harms of madman diplomacy. The Jekyll and Hyde madman cannot escape the strategy's fundamental flaw of off-putting allies and supporters equally to deterring adversaries. The strategy is only as effective as it is flawed. Madman diplomacy requires a threshold of credibility to be effective, so the Jekyll and Hyde madman can only produce deterrence if they communicate sufficient irrationality or instability. If the Jekyll and Hyde madman does not consistently threaten they are at the precipice of irrationality, then they lose credibility for deterrence. However, every instance of threatened irrationality contributes to the problems outlined earlier in the paper of jeopardizing alliances and undermining any lasting deterrence outcome. By relying on a leader's complex personality for enforceable deterrence, the strategy also faces inevitable expiration, as it cannot outlive that leader's administration. Nixon's attempt at madman diplomacy demonstrated this fact, as the North Vietnamese simply waited until he left office to invade South Vietnam.[16] Therefore, the Jekyll and Hyde outcome is constantly a race against time where the strategy can only postpone failure until the madman is deposed or allies abandon Mr. Hyde.

In short, the Jekyll and Hyde madman only gains a higher level of control over how badly the strategy fails. In this outcome, the madman diplomat can choose to be a less credible madman that produces a weak and limited deterrent but preserves alliances and allows for legitimate concessions, or they can be as credible—and flawed—as other outcomes in this paper. While hiding irrationality under conditions of high resilience presents the safest option for madman diplomacy, it still ends in failure.

The Gambler

The Gambler outcome of madman diplomacy involves pursuit of high risk for the potential of high reward by refusing compromise from a weak position of perceived low resilience. In a similar way as Jekyll and Hyde, the Gambler alienates their normal self from the irrational persona they threaten. However, unable to escape the condition of perceived weakness, the Gambler threatens irrationality by claiming their situation is desperate enough that they cannot compromise on certain issues and would become irrational if forced to do so. By claiming irrational escalation is only marginally worse than crossing one of these "red lines" in an otherwise rational negotiation, the Gambler threatens enormous cost to an adversary that does not meet their requirements. Despite glaring vulnerability to a

nuclear exchange or large conflict, the Gambler hopes to deter an adversary by making their own defeat—the Gambler's loss in all-out conflict—messy and far costlier than the adversary can tolerate. While the Desperate Madman invokes constant irrationality to make demands, the Gambler claims to be capable of rational negotiation as long as their "red lines" are not crossed.

The Gambler faces the same failures of the Jekyll and Hyde outcome and more, as the Gambler is equally unable to resolve the contradiction between credible irrationality and durable deterrence. The most significant difference between the two outcomes is that the adversary's perception of the Gambler's weak position makes the adversary less likely to accept Gambler's threats. The Gambler's commitment to future escalation is less intimidating than a more powerful madman diplomat's and can actually increase an adversary's incentive to invade, executing regime change before the Gambler has a chance to go irrational. The Gambler's weaker position makes them vulnerable to invasion and their irrational threats only encourage the adversary to attack before their advantage shrinks. Furthermore, Gambler's deterrence is even less sustainable than the Jekyll and Hyde outcome. While a Jekyll and Hyde madman is powerful enough to invoke the strategy for limited issues, the Gambler relies on madman diplomacy's weak deterrent for survival. As a result, the Gambler must perfectly maintain credible irrationality and their entire deterrence posture will only survive as long as the persona succeeds. This is even risker than relying on conventional deterrent strategies: claims of irrational escalation advertise the Gambler as a constant threat to more powerful adversaries and global stability. Therefore, the Gambler will be isolated in their weakened state, encouraging the international community to facilitate their destruction.

Notable examples of the Gambler outcome include the destruction of Saddam Hussein's Iraq and Gadhafi's Libya. Gadhafi exercised irrational escalation with his threat to raze his own city of Benghazi if NATO intervened against him during the Arab Spring uprising.[17] This only validated the need for intervention and accelerated the approval of NATO Operation Unified Protector that aided the Libyan rebels in deposing Gadhafi. Similarly, Saddam Hussein's willingness to accept war rather than allow nuclear investigators into Iraq only incentivized the U.S. to invade before his nuclear program grew. The Gambler strategy of delaying irrationality for some future red line is clearly dangerous because of Gambler's disadvantaged opening position; pursuing madman diplomacy from there only accelerates Gambler's demise.

Policy Implications

The flaws of madman diplomacy warn against employing the strategy and enable policymakers to defeat potential madman diplomats. The strategy's failures and contradictions demonstrate that pursuing deterrence through madman

diplomacy is a false promise. Pursuing the strategy is especially dangerous for the U.S. hegemon. The impossibility of maintaining leadership in powerful alliances as a madman country would rapidly erode U.S. extended deterrence. Threatening irrational escalations would spread international and domestic discord that is especially poisonous for a leading democracy. Furthermore, madman diplomacy is incompatible with U.S. objectives. Because madman diplomacy undermines the credibility of its practitioners, it would be counterproductive for the U.S. to pursue the strategy in order to achieve disarmament agreements or negotiate to preserve the current balance of power. Rather, madman diplomacy accelerates the security dilemma; it would only destabilize the U.S. position.

Meanwhile, there are two primary examples of modern U.S. adversaries incorporating madman diplomacy toward their deterrence objectives, and the strategy's flaws can guide a more informed U.S. response. The Kim Jong Un regime was included earlier as an example of a madman diplomat, and Russian President Putin demonstrates many qualities of the Gambler strategy. Specifically, Putin's threats to use low-yield nuclear weapons if a Russian invasion of the Baltics failed conventionally resembles a Gambler's threats that they might be pushed to the point of desperate irrationality if certain objectives fail. The threat also resembles the Gambler persona because it tries to augment Russian deterrence by using future desperation to make a more credible claim about Putin's will to resist coercion or remain firm in his demands, today.

The flaws in madman diplomacy help clarify more effective U.S. responses to adversaries that invoke the strategy. While different approaches will obviously be more effective based on unique circumstances, the consistent weaknesses of madman diplomacy offer several options to counter the gambit. Because madman diplomacy naturally concerns the madman's allies, adversaries should respond by trying to isolate madman diplomats from the international community. Labeling North Korea as a rogue nation has proven to be an effective way to undermine the threat the nation poses to its enemies. Continuing this response would seek to increase Chinese concerns about the potential for North Korea to escalate irrationally. If Chinese leaders worry that North Korea will drag them into irrational and costly commitments, desperate threats from North Korea will pose an even weaker concern to the international community. Madman diplomacy also creates an opportunity for adversaries to sow discord among the madman's supporters and important officials. A madman's adversary can certainly weaken a regime and potentially precipitate a deposition if they can augment internal fear that the madman will drag the nation into an irrational conflict that is unnecessary and costly. Finally, it is important for a madman diplomat's adversaries to be patient. It is difficult for the threat of madman diplomacy to continue in successive administrations because it bases a nation's deterrence posture on the personality of their current leader. Furthermore, madman diplomacy can only be successful while

reactionary adversaries panic. Conventional deterrence will prevail against a madman diplomat if their adversaries have the patience and discipline for long-term strategy.

Conclusion

Reason has a purpose, and norms do not exist by chance. Rationality is a precious commonality for humanity across history, cultures, languages, and forms of government. Systems of communication must succeed because failure of deterrence is unimaginable, and rationality and predictability succeed when communication cannot. The ability to understand and predict based on an adversary's rationality is a fundamental security that guards against nuclear accident and prevents the need for war amidst even the most egregious tensions. Rationality preserves the possibility of building and sustaining resolution without nuclear detonations. Whenever the possibility of nuclear war approaches, rationality acts as humanity's parachute—policymakers should not try to unravel it.

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Climate Change as a Dangerous Accelerant of Mass Atrocity

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Investigating potential connections between mass atrocity and climate change reveals that the vulnerability of food systems may be a valuable predictive factor in understanding which states will respond to climate change with violence.

"Food is the basis of the empire. Yellow gold and ten thousand strings of cash cannot cure hunger. What avails a thousand boxes of pearls to him who is starving of cold?"[1] - King Senka

Introduction

An ongoing study by Dr. John Riley and Lt Col William Atkins shows that strong states tend to be able to cope well with the effects of climate change and not turn to violence.[2] They also argue that the weakest states are already broken and on the path to committing a mass atrocity regardless of the effects of climate change.[3] This leaves a middle section of states who are not too weak and not too strong. When some of these middle states experience the impacts of climate change, they turn to mass atrocity.[4] These climate change-induced mass atrocities may occur due to the state's inability to provide for a displaced and needy population or the unwillingness of their leaders to deal with the situation. Whatever the reason may be, the response seen in the middle section is inconsistent; two states may appear similar by certain broad metrics, but only one of them commits a mass atrocity. The next question at hand is why we see this inconsistent response in this "Goldilocks zone."[5]

Literature Review

This study will rely heavily on qualitative analysis that I will complete in two sections. The first section is a historical case study from the following three books: H.H. Lamb's *Climate, History, and the Modern World*, David Keys' *Catastrophe: An Investigation into the Origins of the Modern World*, and Michael Coe & Stephen Houston's *The Maya*. Relevant excerpts from these works provide us with a basic understanding of what other factors have historically been present in times of climate change-induced devastation. From this, I will build a working theory that attempts to explain the factors that must be present for climate change's effects to be magnified. Second, I will conduct a case study of Nigeria, South Sudan, and Syria.

These three states have experienced violence in the wake of climate change. I will work to identify whether or not the factors from my historical review are present in these case studies. These two qualitative endeavors will form a more substantiated theory, which will finally be tested through a quantitative analysis.

Climate Change and the Modern World

Lamb outlines a comprehensive history of climate change and the effects it has had on humanity. From his work, we observe numerous examples of climate change affecting food sources. Regardless of whether the food shortage is caused by drought or overpopulation, we see how food insecurity exacerbates whatever conditions are present at that point in time. Closely related to food security is the population. Fast-growing populations in the past have found themselves especially vulnerable to climate change-induced famine when the food source fails to grow at similar rates.[6]

Lamb's first example of climate change affecting food supply comes with the Black Death. The drought that preceded the epidemic served to spark famine that left the British population especially vulnerable to the deadly disease. "Before the arrival of the Black Death, there were large numbers of villages with uncultivated land in every part of England, mostly said due to shrinkage of the population since the famine years."[7] While not a climatic catastrophe, the Black Death was indeed a catastrophe, and here we see the preexisting conditions of famine as magnifying the carnage that the epidemic caused. The effect of famine on the Black Death is far from an isolated incident. "The summers of 1555 and 1556 and the harvests they produced certainly came as a severe shock after the easier times that preceded them…Whether the outcome should be described as famine is debatable, but presumably, malnutrition aggravated the influenza epidemic of 1557-8 in which whole families died…deaths exceeded the number of births for several years."[8] While it appears that drought and famine only serve to aggravate existing conditions, the inverse may also be true. Bountiful agricultural periods have served as a buffer from tough times. An example of a bountiful period acting as a buffer can be observed in late-17th century Ireland. "The potato, discovered in South America and grown in Ireland…, may have been largely responsible for sparing the Irish the famine which afflicted Scotland so directly in the 1690s."[9]

Another theme found in Lamb's work that is tangential to the above is that populations can easily be lulled into complacency in good times and therefore become overly dependent on a single crop, making themselves vulnerable to catastrophe. This is seen with the very case referred to above, Ireland. "They provided ideal conditions for the potato blight fungus… In Ireland, where the potato was the staple crop on the multitudes of small farms, 80 percent of them under 6 hectares and many only a fifth of that size, the effect was devastating.

Despite relief measures, particularly large imports of maize from the United States, enormous numbers of the people died."[10] This is seen again following WWII. "The increase of population and modern political and organizational developments since 1950 have made these safeguards largely impossible. Governments prefer to organize cash cropping, taking in larger areas which were formerly used for grazing, and concentrating on few varieties if not only a single crop."[11] What is different between the post-WWII world and Ireland is that another factor has mitigated the potential negative effects of food insecurity. This factor is a lowered sensitivity to climate change. Therefore, by the 20th century, states have prioritized cash cropping and profit, but they have also grown strong enough to be able to do so.

In sum, what are the key takeaways from Lamb's work in regards to climate change and food security? Primarily, we see the importance of a society's food security. A civilization that has been adversely affected by famine will almost certainly feel the effects of climate change more than they would have otherwise. Second, we see that overpopulation tends to be a contributing factor to agriculture failures. "The Irish potato famine…was surely the most horrifying example in Europe of a well-documented climatic disaster…Its consequences were greatly aggravated by the fast-growing overpopulation."[12] Additionally, we observe that technological advancements in agriculture have prioritized profits over food security; however, states have grown and developed to become more resistant to the effects of climate change. This growth was not the same for all states, so sensitivity to climate change must also be considered as a potential causal factor.

Catastrophe

Similar to Lamb, Keys conducts a comprehensive historical review of man's connection with climate change. What makes his piece unique is that Keys is specifically interested in a mysterious climatic crisis that took place during 535-536 C.E., described as, "the sun gave forth its light without brightness like the moon during this whole year…people were terrified that the sun would never shine properly again. In some parts of the empire, there were agricultural failures and famines."[13] Keys is curious to find the origins of this event as it is recorded in history by several individuals, only on the effects, not the causes. Another recording of these events describes it as such, "The sun became dark and its darkness lasted for 18 months. Each day, it shone for about four hours, and still, this light was only a feeble shadow. Everyone declared that the sun would never recover its full light again."[14] This climatic event did not incite the same response from populations across the board. We see that certain areas were able to cope while others were either ill prepared or crumbled under the stress.

Keys provides valuable insight into how climate change affects food security. He finds that disease combined with preconditions such as drought leads to food

insecurity. “He saw fields abundant in grain which was becoming white and stood erect yet had no one to reap or gather it in.”[15] Keys also observes how famine can interact with overpopulation. “Typically, famines force their desperately hungry victims to move around, often traveling substantial distances, in search of food—and then to congregate at those few places where food or water is still available.”[16]

Similar to Lamb, Keys’ focus is on food security. He highlights the devastating effects of famine and how it contributes to violence. “A similar multiregional famine also struck in 1789-1792 and seems to have contributed to the French Revolution. In those years, crops failed in France, the northern United States, northeast Brazil, and most appallingly in India, where the resultant mass starvation-known as the “Skull Famine” caused so many deaths that it was impossible to keep count of the bodies."[17]

From Lamb, we gather that not all states are equally resistant to climate change, famine sometimes exerts an interactive effect on overpopulation (which often leads to violence), and therefore, we must focus heavily on food security.

The Maya

Michael Coe’s *The Maya* is another historical work focused on the ancient Mayan civilizations. While the piece is not directly related to climate change, he offers one piece of valuable insight while discussing the downfall of the ancient empire.

We know from the downfall of past civilizations, such as the Roman and Khmer empires, that it is fruitless to look for single causes. But most Maya archaeologists now agree that three factors were paramount in the downfall: endemic internecine warfare, overpopulation (and accompanying environmental collapse), and drought.”[18]

First, “it is fruitless to look for single causes.” When addressing the issue of climate change and food security, I am not under the impression that there will be a clear-cut connection between the dependent and a single independent variable. Next, drought acting as a factor in the Mayans’ downfall indicates that the society was not resistant to climate change. It is unclear whether or not overpopulation interacts with this drought, but it nevertheless contributes to its downfall. Finally, violence in the presence of these two factors supports my general theory.

Lessons Learned

We say we study history to not repeat our mistakes. When we talk about the Holocaust, we say never again. This is precisely why I base this study so strongly on historical context. The lessons learned from our past will inform this research *vis-`a-vis* the following takeaways. 1) While overpopulation does not directly cause

famine, it serves to strain the present food supply and exacerbate any preexisting conditions. 2) Many countries may feel the effects of climate change, i.e., drought; however, some are more sensitive than others to these effects.[19] 3) Food insecurity can be a brutal and self-perpetuating cycle that magnifies any existing unfavorable conditions. 4) These factors are all strongly interconnected but can aid in identifying which states will feel greater pains from climate change and therefore be more likely to experience violence from these effects.

Theory

"Because conflicts are rarely, if ever, attributable to single causes, conflict analysis and concomitant efforts at reducing the risks of conflict must consider a multitude of complex relationships and contributing factors."[20] Recall, the purpose of this research is to understand when a state will experience violence in the wake of climate change. I am seeking to understand what factors contribute to a state feeling extreme strain in the presence of climate change. This theory views climate change as an accelerant to mass atrocity. Referencing the study from The Stimson Center, climate change theoretically serves to exacerbate any preexisting conditions.[21] Each of my potential causal factors is viewed from this perspective.

Overpopulation, sensitivity to climate change, and food security are three factors that have often been observed in the presence of climate change induced devastation. Additionally, I base my theory on Sayne's framework. Sayne looks at "(1) the country's likely climatic shifts, (2) how these shifts could contribute to resource shortages, (3) the possible secondary impacts of shortage, and (4) how shortages and their secondary effects could fuel violence."[22] I theorize that food insecurity, overpopulation, and climate change sensitivity serves to aggravate any political tensions and increase the likelihood that a government will respond to its citizenry with violence.

Overpopulation and food insecurity are commonly understood terms; however, it is important to explain how sensitivity to climate change differs from these factors. Vulnerability and adaptation compose the variable of sensitivity to climate change. "Vulnerability is the potential to be adversely affected by an event or a change and the ability to cope with or recover from its impacts."[23] Adaptation is the adjustment in natural or human systems in responses to actual or expected climatic change or their effects."[24] While some states may be very vulnerable to climate change, they may possess the ability to adapt to these effects very well. Some states may not be relatively vulnerable to climate change but lack the capacity to adapt. A qualitative assessment of both factors will serve as a measure of a state's general sensitivity to climate change.

Methods

My independent variables of interest are overpopulation, food security, and sensitivity to climate change. Overpopulation will be viewed as a recent increase in an area's population to exceed what the region is used to and able to support. There is no quantifiable metric to determine when overpopulation has been reached, as certain areas can handle more increase in population than others, but indications of overpopulation can be seen as government statements, increased conflict over scarce resources, and statements of resentment from local population leaders. Food security will be seen as a region's ability to produce food for the existing population. Poor levels of food production and distribution will largely contribute to poor food security. Considerations will be made if a region has low food security. Low food security is similar to climate change sensitivity in many ways but can be seen in a region that is largely dependent on one crop or if their crops are highly sensitive to drought. Finally, sensitivity to climate change is a qualitative evaluation of a region's vulnerability and ability to cope with climate change.

As previously noted, these independent variables are highly interactive with one another. Overpopulation may be triggered by food insecurity of a neighboring region; it may be triggered by a state's poor response to climatic events. Food insecurity may be magnified by overpopulation or poor agriculture adaptation to climate change. Finally, a state will be more sensitive to climate change as food insecurity and overpopulation serves to make it more vulnerable. That said, I have kept these three independent variables separated, as they are distinct from one another in many ways. Overpopulation may in fact be caused by a multitude of other reasons such as ethnic/political conflict or a promise of economic opportunity. Food insecurity may be caused by crop-killing disease and fungi. An area may also be vulnerable to climate change due to ineffective authoritarian regimes. Due to this, these three variables cannot be lumped together, but we must simultaneously be aware of the interactive effect at hand.

The primary dependent variable I am interested in is mass atrocity. In this study, I am considering mass atrocity to be any "large-scale, systematic (extensive, organized, widespread, sustained) violence against civilian populations and other noncombatants"[25] that results in 1,000 or more civilian deaths.[26] With these variables and theory in mind, my hypothesis is the following: A state that experiences relative overpopulation, food insecurity, and climate change sensitivity will be more likely to experience a mass atrocity in the presence of climate change compared to a state not experiencing these independent variables.

Case Studies

Utilizing this working theory and hypothesis, I will conduct case studies of Nigeria, South Sudan, and Syria while paying close attention to overpopulation,

climate change sensitivity, and food security.

Nigeria

Nigeria has been identified as a climate change hot spot by the Intergovernmental Panel on Climate Change.[27] When identifying particular regions, Northern Nigeria is feeling the effects of climate change the worst. Rains have decreased by 25 percent in the past 30 years, and temperatures are reaching 105 degrees Fahrenheit and beyond.[28]

Nigeria is a state that experiences overpopulation as "[a] nation of 150 million people shoehorned into an area twice the size of California."[29] The worsening climatic conditions of the north have triggered large migrations in the region, contributing to overpopulation in the southern Delta region.[30] Specifically, the thirty-year drought in the Sahel has been partially responsible for feed and water shortages. These shortages have displaced nomadic pastoralists into the south.[31] Nigeria's sensitivity to climate change stems from poor responses to climatic shifts; the state's inability to react, in turn, leads to shortages of critical supplies that could otherwise be avoided.[32] The UN Food and Agricultural Organization rates Nigeria's water use and conservation practices as poor; these preexisting factors only serve to magnify climate change-induced drought.[33] In terms of food security, Nigeria could be worse off. While the food supply at present is adequate, eighty-five percent of its crops are rain-fed and highly sensitive to shifts in precipitation and temperature.[34] Therefore, while food security is adequate, food actually serves to increase Nigeria's sensitivity to climate change, as extant food sources are fragile.

Does Nigeria experience mass atrocity? The answer is uncertain at best; however, conflict over contested resources accounted for at least 10,000 deaths in the past decade.[35] Drought and increased temperatures forced farmers to cultivate more land each year, furthering scarcity and competition for grazing land among displaced nomads.[36]

South Sudan

When considering specific regions in South Sudan, "[f]lood Plains, namely Western and Eastern, located in most of former Jonglei, Upper Nile, Unity, Warrap and Lakes States, get hard hit by frequent floods and droughts. It is therefore unsurprising that the Eastern Flood Plain experiences more conflicts in response to climate shocks."[37] South Sudan has experienced decreased rainfalls, increased temperatures, and increased prevalence of drought and floods as a result of climate change.[38] This has caused resource scarcity that may not have resulted directly in overpopulation but has led to migration, which sparks violence in the competition for scarce natural resources.[39] "Examples of a migration to a new area as a result of climate-induced displacements include migration of Jonglei Agro-pastoralists to

Equatoria region, which has caused conflicts with farmers in the region since the 1990s. Scarcity of resources in rural areas as a result of drought and floods has forced people to migrate to towns, in turn increasing socio-economic stresses that sometimes fan political upheavals."[40]

Food security interacts very closely with overpopulation in the case of South Sudan. In South Sudan, we see a case where there is not a population issue, but a consistent food shortage caused by climatic events and poor response from the government. In South Sudan, conflict tends to occur following a flood or drought, indicating the exacerbating effect that these events have on preexisting conditions.[41] "Neo-Malthusians use resource scarcity theory as the main tool to explain the connection between climate change and conflict. They argue that environmental changes, due to their ability to cause scarcity through degradation or destruction of resources, pose great danger to human security through conflicts."[42]

Syria

In 2012, Syria's population peaked at 22 million, more than seven times its size compared to 1950.[43] This increase in addition to decreased water flow from the Ataturk dam earned existing water sources a scarce designation.[44] Increased population also decreased the state's adaptability to the effects of climate change and was accompanied by significant drought, described as the "worst long-term drought and most severe set of crop failures since agriculture civilizations began in Fertile Crescent many millennia ago."[45]

Syria's food security is very weak in that it is highly vulnerable to climatic shifts. "In the Mediterranean environment of northern Syria, crops are largely dependent on the use of growing season rainfall (very little water is stored from season to season)."[46] In addition to this fragile food source, Syrian agriculture also relies on highly inefficient irrigation methods. "Most of Syrian irrigated agriculture is in need of modernization, still relying on highly inefficient flood irrigation."[47]

To make matters worse, Syria possesses a very weak infrastructure that is often targeted by terrorist organizations. "Water-related conflicts occur in many forms, including disputes over access to water and the control of water systems, the targeting of water infrastructure and systems during conventional conflicts and terrorist actions, and the use of water as a weapon."[48] This fragile infrastructure proves the government very unadaptable, making the state sensitive to climate change. "[T]he regime's failure to put in place economic measures to alleviate the effects of drought was a critical driver in propelling such massive mobilizations of dissent."[49]

In the case of Syria, we see the factors of food insecurity leading to high levels of migration and overpopulation in certain areas. "The combination of very severe

drought, persistent multi-year crop failures, and the related economic deterioration led to very significant dislocation and migration of rural communities to the cities. These factors further contributed to urban unemployment and economic dislocations and social unrest."[50]

Table 1: Climate Change Relates Risk Factors on Mass Atrocity

	Nigeria	South Sudan	Syria
Over Population	Yes (South)	No	Regional
Climate Change Sensitivity	High (North)	High	High
Food Security	Adequate	Low	Low (Fragile)
Mass Atrocity	No	Yes	

Results

The results from the triple case study are condensed in table 1. They are not entirely conclusive but do go so far as to show that the independent variables in question are present in the three states above, which all experience climate change and all experience violence/mass atrocity. The qualitative assessment of these states attempts to assert that this is more than a mere correlation. There is an element of causation that must be recognized, as each of these risk factors appears to worsen the effects of climatic events, which then increase the chance of mass atrocity.

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Efficacy of the National Security Innovation Network's Hacking / Designing for Defense Programs

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The National Security Innovation Network requires further reform to achieve its hoped for long-term effects on defense innovation.

Introduction

The National Security Innovation Network (NSIN) was created in 2016 after a rebranding of the MD5 National Security Technology Accelerator and is actively charged with the mission to "build networks of innovators that generate new solutions to national security problems."[1] NSIN is just one of the plethora of government organizations tasked with some form of "innovation." As the world begins to change and the United States no longer enjoys a period of unrivaled growth and security, government, military, and private leaders have begun to push for less red tape and more efficient processes when it comes to innovating for security. NSIN, in particular, is responsible for creating networks of industry and government leaders interested and willing to work with the DOD while, at the same time, connecting innovators and companies to those in the DOD who can use their products and expertise. It is less concerned with producing end products than it is creating relationships that can hasten the rate at which products are made and problems are solved. One of its programs, Hacking for Defense (H4D), is run at universities and aims to take high performing students and put them in small groups charged with solving DOD problems with advisement from sponsors, mentors, and instructors. H4D is an innovative program that produces value for the sponsors, students, and the universities where it is run, but NSIN lacks mechanisms to measure efficacy and needs to improve its long-term tracking of former students.

Background

1.1 Hacking for Defense and Designing for Defense Overview

One of the ways that NSIN goes about doing this is running the Hacking for Defense program (called Designing for Defense, or D4D, at CU Boulder). The program started at Stanford University in 2011 and has grown into the curriculum at fifty top-tier universities across the country.[2] The course is designed to select a

diverse group of high caliber graduate and undergraduate students through an application process and pool them in small teams that are then assigned a sponsor and a set of mentors. The sponsor is a DOD/Intelligence Community representative that brings a difficult technical or policy challenge to the team and helps them work through it throughout the course of the semester. The mentors are typically experts in different fields that attend the course remotely and help guide the students as well as provide them with connections.

1.2 Designing for Defense Overview

This research is focused mostly on the D4D course run at CU Boulder. Some nuances make each university's program different from one another. However, the lessons learned and suggestions are certainly applicable to the program as a whole.

With their support network over the course of one semester, each team is expected to conduct 60-80 interviews with industry leaders, legal experts, stakeholders, and other insightful persons that allow them to gain an understanding of the problem. They look to discover what gives the users of their product or those desiring a new policy directive problems and what would provide value to them. Additionally, they work to discover dual uses of their product and find how it might be used to solve similar problems. Around the halfway point in the term, students transfer their focus to developing a minimum viable product (MVP) to be pitched to their sponsor at the conclusion of the semester. The problems, as well as the sponsors, are different for each team and, as a result, MVPs vary across the small student teams. Students are also encouraged to continue their work beyond the end of the semester by applying for funding, forming startups, and pitching their products to the dual-use targets. NSIN states on their website that they have funded eighteen solutions following the semester and students have formed fifty-three start-ups from the solutions they found.[3] That number continues to grow with the increase in participating universities and students while the universities become more proficient in running the program.

However, as stated earlier, the goal of NSIN is not necessarily to create innovative products. The projects they have funded are merely a positive byproduct of the effort to engage these students in DOD problems with the hope that they will pursue a career or some level of work on defense problems. These students are purposely targeted because of the assumption that high caliber students from top-tier universities are most likely to be leaders of government and industry in the future. Giving them a positive experience working for and with the military and intelligence organizations is one way to help ensure they keep security interests in mind throughout their hopefully prosperous careers.

Positives of D4D

D4D is a unique course that provides students with life skills like improved public speaking and pitching, developing business models, and critical thinking. It also exposes them to new people and problems. Finally, it gives students a chance to create a company with little threat to their finances. The programs run around the country are beneficial for students but also for NSIN and the sponsors.

2.1. Benefits for NSIN: Exposure to DOD Culture and Problems

As a whole, D4D is a fantastic opportunity for students of all backgrounds to get out of their comfort zone, get exposed to DOD problems, and work with those they never would without the course. Many people enter the program with zero exposure to the DOD; they come in with nothing but movie stereotypes about what the DOD does, the people in it, and how it operates. By becoming immersed in one problem while also following the progress of multiple other teams throughout the semester, each student becomes aware of some of the intriguing things the DOD works on. Additionally, students get to travel to their sponsor's physical site and see all that goes on and the possibilities that come along with working in the defense sector. It is often their first time on a military base or other DOD installation.

These opportunities are not available for the general student. Without this kind of exposure and knowledge of the diverse array of problems, people, and places that the defense sector has, students are likely to continue with preconceived notions that can limit their interest in DOD down the line. As a result of this experience, students express a much higher general interest in working for and with DOD according to surveys conducted by the instructors. This interest and general open-mindedness about working for DOD is exactly what NSIN is hoping to create in the nation's future leaders.

2.2 Benefits for Students: Entrepreneurship, Life Skills, and Networking

Not only are these students already identified as highly capable but they are also at high-level universities with promising careers ahead of them. NSIN is effectively betting on these students to become leaders. To improve their odds, D4D helps them further by forcing them to give over fifteen presentations, field tough questions, and receive feedback. Throughout the course, they become substantially better speakers and on-their-feet thinkers. This will help them immensely in job interviews and throughout their careers as they communicate with co-workers and bosses.

The multitude of interviews students conduct with experts provides exposure to multiple lines of thought. More importantly for these students, many of whom are looking for job opportunities, they are effectively getting interviewed as well as interviewing. They are networking throughout the semester. If they do well, they are likely to be able to find a job with their sponsor, mentor, or those they spent time interviewing. It gives them a hiring advantage that other students are unlikely to receive. This compounds the other valuable experiences they receive and makes them even more likely to have a successful career whether inside or outside of DOD.

Furthermore, the number of startups coming out of D4D/H4D teams is something both the universities and NSIN are proud to report. The students have a plethora of advisors critiquing their product, instructors with decades of entrepreneurship experience to guide them, and a multitude of funding sources. These resources typically cost more money than young innovators have to spend. Instead of failing and learning on their own, D4D students can learn from the collective experience and failures of the instructors, mentors, and sponsors. Then, when the semester ends, they can start a business at practically no cost to them and turn it into a moneymaking opportunity. All of these are unique benefits of D4D programs and can drastically improve the chances of students doing great things in the future.

2.3 Value for the Sponsor

D4D does not exist without support and research topics from sponsors. Consequently, it is important to analyze the value D4D brings to the sponsor. While they do get very inexpensive MVPs provided for their difficult problems, the real value of supporting these projects often does not come from the product. Most MVPs, in fact, are not used by the sponsor. Nonetheless, D4D is a unique opportunity for the sponsor to get a diverse group of smart people to spend a considerable amount of time learning and thinking about a problem. Following them throughout their process gives the sponsor a new set of perspectives and ideas on how to approach a problem.

For example, the National Security Agency faces numerous difficult problems and can task groups of like-minded people to work on them. Unfortunately, it is difficult to get lawyers, international security strategists, and computer scientists to work together on a single policy challenge. As a result, agencies often get problem solvers looking through a keyhole rather than seeing the whole picture. Just as often, government task forces overlook potential solutions. D4D convenes people who are open-minded, diverse in background as well as thought, and willing to work with people who think differently. This meshing of individuals produces useful ideas on how to approach problems, which helps direct more in-depth efforts to solve them. In short, sponsors appreciate the holistic way these students think about the

problem and use their ideas to create unconventional yet efficient solutions.

Limitations

While D4D is without question providing benefit to students in the form of skills and experience as well as to NSIN by having these future leaders immerse themselves in DOD problems, there are limitations as well. The short timeline, lack of technical resources and experience, and classification of key data limits the success of teams.

3.1 Short Timeline

Regardless of ability or resources, one semester is simply not a sufficient length of time to fully understand a complex problem and produce a product ready to be implemented. As instructors begin to adapt to this relatively new program, they are implementing supplements like opportunities for continuation and further funding to prevent potentially good solutions from fading before coming to market as a result of the limited timeline. For now, the semester limit is still hindering D4D output.

3.2 Lack of Resources and Experience

Although the students are bright, highly motivated, and capable, many of them do not have in-depth work experience. They are tasked with highly technical problems requiring software development and/or engineering expertise, which is a rarity in their demographic. As a result, MVPs are commonly not to the level of practicality that would be implemented by the sponsor. While this is often the case, again, a workable MVP is not the goal of the program. The intent is to get students interested in working on DOD problems in the future. While lower level MVPs are a limitation and may turn sponsors away from the program, they are not showstoppers that need to be resolved immediately.

3.3 Classification

Many of the problems the teams work on are very interesting, modern, and challenging.

Unfortunately, the same adjectives describe many of the classified projects being worked on in DOD. Given the short timeline, diverse backgrounds of students including foreign nationals, and funding restrictions, getting students the proper clearances to work on these problems is simply infeasible. As a result, D4D students

occasionally struggle to understand their defense problem as well as the resources available to help solve it. Not only this but MVPs they produce are unlikely to mesh well with preexisting infrastructure inaccessible to them.

Suggestions for Improvement

Overall, D4D is a great program for students that provides value to the sponsor and NSIN. As aforementioned, it has limitations and can certainly be improved. Some methods of improvement are as follows.

4.1 Improvements for the D4D Course

D4D can improve in ways that it has already started by allowing more opportunities for continuation to teams, including more time, funding, and guidance. It can also make each week less redundant. Many times, teams found presenting each week to be more of a chore than an opportunity. While they were provided valuable feedback and their progress in public speaking was noticeable, it may be beneficial to draw back the presentation requirement, shorten the length of the Wednesday class, and spend more time directly critiquing products and providing contacts for interviews.

On top of that, the screening process at the university could be tailored toward the goal of NSIN by focusing on students who do not already have jobs or a career outside of the defense industry. If the intent is to create leaders of industry interested in working on DOD problems, targeting those who are yet to find a career or are in the late stages of their study (and are beginning to look for work) would provide the greatest odds of them choosing the defense industry.

Another way instructors can better achieve the goal of immersing students in DOD problems is to have sponsors rotate through teams during the semester and give them an in-depth overview of their organization, different careers within it, and the kinds of problems they work on. This would allow students to get a broader sense of opportunities in the defense sector. If they only work on one problem and are not overly fond of their singular sponsor organization, they may be discouraged from working in defense in the future. On the other hand, if they are exposed to several organizations and problems, they may find an opportunity they never knew existed and pursue it. This would also serve as a wonderful recruiting opportunity by having sponsors ready to bring in recruiting directors for people in D4D who may be interested in something they discuss in an overview.

4.2 Improvements for NSIN

While the program is great for the people involved, NSIN has a lot of room to improve H4D/D4D. For example, the opportunity to work with DOD inherently attracts students with prior military experience. One goal is to expose those with little or no DOD experience to defense problems; this is countered by enrolling many students with an existing DOD connection. The screening process should limit enrollment of those with such a background. That is not to say the program should not admit those with prior experience. On the contrary, having those who are currently serving or have served on the H4D team is a great way to expose other teammates more intimately to DOD members. It allows first-timers on the team to build relationships with DOD members and remove stigmas they may have about the military. Such experiences will generally make H4D veterans more open to working with DOD in the future. Ideally, one former DOD member per team would balance the goals of taking non-military applicants and giving students enough exposure to DOD. This could also be supplemented by assigning cadets from military academies to work on the teams remotely and go through the process with them.

The area where NSIN needs not just to improve but start is in tracking and data collection on their students' careers. As of now, there are no internal studies on the efficacy of the H4D/D4D programs; there is no mechanism for NSIN to determine how effectively they are promoting defense work and encouraging careers in DOD. To determine if the programs are working, they need to examine exactly how much more likely the products of H4D and D4D are to succeed in the defense sector compared to the general population. Now, their programs seem like they would promote this and that they are at least marginally effective. However, without long-term tracking of students, there is no way to confirm this hypothesis. If NSIN wishes to continue to receive funding and grow its efforts, it would behoove them to provide metrics illustrating past success. Not only would studying this allow them to confirm their programs' work, it would also give H4D/D4D more connections to potential future sponsors and funding sources as well as feedback on how to improve the course. It should not be up to the hosting university to conduct their own short-term and small-scale research on students' sentiments about DOD work.

If the D4D course at CU Boulder is reflective of the other H4D programs around the country, NSIN should encourage sponsors and mentors to seek employment opportunities for the students. It should be made clear to sponsors that part of the intent of the course is to get students into a career in the defense sector. This would compound the improvement of taking in more students without other jobs as well as the reform to make all sponsors meet and brief all other team members. Overall, NSIN needs to stress to students, mentors, instructors, and sponsors the fact that this course is meant to create enduring networks of people in the defense

sector—not just immediate product solutions—in order to have more H4D graduates go directly into DOD work.

Conclusion

In sum, the H4D/D4D program is a fantastic introduction to the world of defense projects for future leaders of the nation. It grants students unique opportunities to experience the kind of work they could participate in should they choose the defense route versus other industries. It is not only good for the students. The sponsors, too, get value out of having a bunch of intelligent and dedicated students from different backgrounds spend considerable time researching and thinking about a problem and providing thoughtful solutions. The program is very likely to achieve, to some extent, the goal of NSIN.

However, there is currently no official mechanism for verifying this assertion or improving the program based on feedback. This must change. Program instructors, mentors, and sponsors can all work to improve how they encourage their students to enter a career in the defense industry. Through a number of relatively minor changes, they could succeed in this. Whether NSIN remains the lead government agency, H4D/D4D is worthwhile for students and private sponsors alike. The educational program on defense design should continue.

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McMaster's Master Work on Geopolitics and the Future of America: A Review of *Battlegrounds: The Fight to Defend the Free World* (NY: HarperCollins, 2020)

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In his most well-known work,*Vom Kriege*, Carl von Clausewitz suggested war is a continuation of policy. He proposed governments primarily use warfighting to achieve political ends. Since America's independence in 1776, geopolitics have shaped the nature of America's conflicts overseas. In the last century, the U.S. endured several different geopolitical phases. Despite Woodrow Wilson's reelection slogan, "He kept us out of war," America involved itself in an eruption of imperial interests in Europe during the Great War. Two decades after the First World War, on December 7, 1941, the Japanese Naval Air Service attacked Pearl Harbor. President Franklin D. Roosevelt called upon Congress and the country to activate the mighty "Arsenal of Democracy" against the Axis Powers. After the Second World War, a new era opposing communism began, and America waged the Cold War – in which the Soviet Union (USSR) and the United States vied for global hegemony. After the collapse of the USSR in 1991, America wished for a stable unipolar world, one that some suggested was "the end of history." The infamous attacks on America, on September 11, 2001, nevertheless drove the U.S. headlong into a new era of engagement, the Global War on Terror.

America continues to be involved in fighting terrorism, but its real attention has shifted to a reemerging Russia and growing threats from China. In his book, *Battlegrounds: The Fight to Defend the Free World*, H.R. McMaster makes a case for how the U.S. should work to secure its interests moving forward as we move to address this new era of Great Power Competition. McMaster, a retired Army lieutenant general and former National Security Advisor, presents his policy prescriptions utilizing his "Strategic Narcissism" argument. McMaster describes Strategic Narcissism as, "the tendency to view the world only in relation to the United States and to assume that the future course of events depends primarily on U.S. decisions or plans." To cure Strategic Narcissism, McMaster proposes "Strategic Empathy," which draws from Sun Tzu. "If you know your enemy and know yourself, you need not fear the result of 100 battles." Strategic Narcissism, McMaster contends, rather leads to successive political administrations indulging in either overconfidence or resignation in their foreign policies. Both extremes make it impossible to defend the Free World.

Russia and the Kremlin

McMaster's first focus in the book is the reemerging threat from Putin's regime in Russia. McMaster applies his Strategic Narcissism argument as he analyzes political relations between Russia and the United States. McMaster argues that U.S. policy toward Russia's government has been one of overconfidence. The books details how consecutive U.S. administrations have been soft-peddling Putin since he took power in Russia in the year 2000. For instance, in the summer of 2001, President George W. Bush met with Putin and stated, "I looked the man in the eye. I found him to be very straightforward and trustworthy. We had a very good dialogue. I was able to get a sense of his soul; a man deeply committed to his country and the best interests of his country. And I appreciate so very much the frank dialogue." The Obama administration continued the tradition of Strategic Narcissism throughout its eight years in the White House. Seven months after Russia unilaterally invaded Georgia, Secretary of State Hillary Clinton met with Foreign Minister Sergey Lavrov and presented him with a "reset button." This button represented the start of a new friendship between Washington and Moscow. Then, during his reelection campaign, President Obama mocked Mitt Romney for calling Russia a serious adversary: "The 1980s are now calling to ask for their foreign policy back. Because the Cold War's been over for 20 years." Over-optimism in the Obama administration vanished when Russia annexed Crimea, invaded Ukraine, intervened in Syria, hacked the DNC, and meddled in the 2016 election. President Trump's administration only furthered America's overconfidence when dealing with Putin's regime. Despite confirmation from the Intelligence Community that Russia had indeed interfered in the 2016 election, Trump affirmed Putin's innocence. "He said he didn't meddle. I asked him again. You can only ask him so many times. But I just asked him again, and he said he absolutely did not meddle in our election. He did not do what they're saying he did." McMaster contends that all three of these administrations pursued overly optimistic policies, which allowed Russia to undermine U.S. interests over time. Applying McMaster's analysis to 2022, it seems possible this over optimism contributed to Putin's decision to invade the rest of Ukraine.

Despite Russia's success in its aggressive policy and its ability to leverage Strategic Narcissism in the White House, McMaster details several problems Russia has, which both the U.S. and NATO should exploit. Putin's presidency, despite fabricated election numbers, is not popular with everyone in Russia. When Putin returned to the presidency after his stint as prime minister, he encountered massive protests. Since 2019, protests and domestic unrest have become routine in some areas within Russia. Internal issues as well as the imprisonment of opposition party leader Alexei Navalny and other leaders stirred up discontent. McMaster also discusses Russia's economic and demographic problems. In 2019, Russia's GDP was roughly equivalent to the state of Texas and less than Italy's. Russia's population decreased

by roughly four million between 1991 and 2018; it is expected to decline from 144.1 million to 132.7 million by 2050. McMaster contends that the U.S. should press these weaknesses against Russia instead of avoiding conflict. Without tight authoritarian control of information and political capital, the Putin regime will likely become rather floppy and is liable to face serious problems due to its many faults. Putin understands these weaknesses and uses aggressive foreign and military policy to distract Russia's population (and the world) from these domestic realities. If Putin recognizes that he is at the helm of a declining totalitarian state, he may be open to risky military options in spite of his desire to restore and preserve a multiethnic empire reminiscent of the Soviet Union. It is more important than ever that America work with its allies to strengthen and promote robust deterrence against Russia and the current Kremlin.

China and the Chinese Communist Party

Battlegrounds also extensively covers Xi Jinping and the Chinese Communist Party (CCP). In 1978, under the rule of President Deng Xiaoping, reforms were initiated, which suggested to the world that China would liberalize, respect the rights of its people, and play by international norms. This free market reformation, McMaster contends, only made China stronger economically while the CCP continued its hardline authoritarian stance towards government. This reform ultimately damaged American interests and flummoxed U.S. foreign policy, which has fallen victim to Strategic Narcissism since the 1990s. McMaster suggests the international community stood idly by while the CCP employed economic and political coercion abroad to achieve its aims.

The book details three key overlapping policy foci the CCP is concentrating on to advance its imperialist interests. These policies are Made in China 2025, One Belt One Road (OBOR), and Military-Civil Fusion. The first policy, Made in China 2025, is an initiative to make China mostly independent with regard to science and technology innovation power. The party has been creating high-tech monopolies and stripping foreign companies of intellectual property through theft and the forced transfer of technology. China has a history of coercing foreign companies into joint ventures with the CCP in which those companies have to sell their products in China. Secondly, the OBOR policy seeks to further the China Dream, which Xi Jinping described as the "great rejuvenation of the Chinese nation." OBOR proposes over a trillion dollars in infrastructure investment across the Indo-Pacific, Eurasia, and Africa. The international community saw OBOR as a humanitarian program before it was exposed as a coercion scheme. China uses unsustainable debt burdens and corruption to control countries and politicians across these regions. The CCP builds infrastructure to aid in Chinese trade routes, or it coerces governments to provide them access to expedient routes – such as the Strait of Malacca. By 2020, China created debt traps in thirty-three countries around the world. As an example,

the book cites, in 2018 and 2019, Australia and New Zealand. During the same period, the CCP launched influence campaigns designed to augment China's economic leverage through the purchase of influence within universities, the bribing of public officials, and the harassment of Chinese diaspora to support policies favorable to the CCP. In line with this policy, the CCP continued a campaign of expansion in the South China Sea, transporting upwards of 30% of the world's trade. China's burgeoning military occupation and expansion into this region is concerning and threatens regional stability. Finally, the Military Civil Fusion policy allows the state to better control private Chinese companies. Under Article 7 of China's National Intelligence law, all organizations and private citizens must collaborate with the CCP in intelligence work and guard state secrets. Chinese companies have essentially become an arm of the party, which controls sectors of the global economy, develops dual-use technology (technology which has civilian and military applications), and modernizes the People's Liberation Army (PLA). Also under this policy, China has used Chinese companies to conduct cyber espionage and theft against foreign countries. A U.S. Council of Economic Advisors study estimated that in 2016 the U.S. economy could have lost as much as $109 billion to Chinese cyber theft.

McMaster makes several suggestions as to how the U.S. and allies can combat the growing threat of China in the future. His policy prescriptions draw upon the idea of Strategic Empathy, or understanding China's history, motivations, emotions, and goals. One suggestion he makes is that the U.S. should work with likeminded countries to counter China's economic aggression. As an example, McMaster touches on trilateral meetings between himself, South Korean ambassador Chung Eui-yong, and the Japanese national security advisor Yachi Shotaro. The three-way conversation, as it becomes institutionalized and more robust, can make it harder for China to reference colonial history when it tries to widen rifts between U.S. allies South Korea and Japan. Bolstering alliances with Australia, India, and Southeast Asian countries such as Vietnam will also help contain China's aggressive expansion into the South China Sea. The U.S. should work with allies to support free and open press to encourage Chinese citizens to question the CCP and their rule of China. A free and open exchange of ideas would undermine negative aspects of the OBOR policy by giving countries the tools to expose corrupt CCP deals. Uganda is an example of how this process can work. In 2015, Uganda's government agreed to a $1.9 billion deal with a Chinese bank to build two dams. A 2018 investigation revealed that the dams were poorly constructed and the CCP bribed African officials during this project. After this, Ugandan leaders asked a U.S. oil consortium to bid on a new oil refinery project, which it won. Free and open press could also report China's humanitarian abuses of its citizens to the international community. Finally, America should work with allies to crack down on China's theft and reverse engineering of American technology.

The Greater Middle East

The conflict in the Middle East and South Asia is the final focus area in McMaster's *Battlegrounds*. He covers America's relations with Iran, Iraq, and Afghanistan. He also discusses Russia and China's interest in the region. Since the Iranian revolution and the overthrow of the Shah in 1978, Iran has made increasingly more aggressive moves against its neighbors. Since the withdrawal of U.S. troops from Iraq in 2011, that fledgling democracy has destabilized and fallen into sectarian violence. This has allowed Iran to exert control in its longtime geopolitical rival through direct action or proxy influence and complete the "Shia crescent" by connecting supply lines through Iraq, Syria, and Palestine. The instability of Iraq, Syria, and now Afghanistan plays directly into Iran's goals to become a regional hegemon. McMaster faults American Strategic Narcissism with regard to Iran policy, stating that U.S. administrations since the Iranian Revolution kept alive a folly notion that there is a viable moderate wing of the Iranian regime. For instance, The Joint Comprehensive Plan of Action, commonly referred to as the Iran Nuclear Deal, courted moderates to prevent Iran from procuring nuclear weapons. Although still heavily debated in the U.S. along partisan lines, many argue the Deal rather empowered Iranian radicalism in the Middle East. For the critics, JCPOA strengthened Iranian hardliners with an infusion of cash to bankroll state-sponsored terrorism while Iran comfortably waited out temporary restrictions on further nuclear weapons development.

Rather than chase hapless moderates within the Iranian regime, McMaster proposes working with friendly countries in the region to deter Iranian expansionism. He does sometimes want, however, to have it both ways. McMaster expects the U.S. to condemn human rights abuses while also working with regimes who perpetrate them. For example, his treatment of ally Saudi Arabia is confounding because he praises Trump's recognition of Mohammed bin Salman as a reformist at the same time he criticizes Trump's minimizing the murder of journalist Jamal Khashoggi. McMaster scoots around the fact that if you want to shake the devil's hand to do God's work, there are going to be horrifying reversals. To borrow from McMaster himself, it is Strategic Narcissism to assume that allies such as Saudi Arabia with the common incentive to deter Iran will comport themselves according to American values of a free and open society. That said, McMaster is right in highlighting the need to work with Arab partners in the region such as Iraq, the UAE, and Saudi Arabia alongside Israel; forward leaning American diplomacy, backed by military strength, will remain an important balancing act for future security in the Middle East. While intensity of conflict may shift from the Global War on Terror toward Great Power Competition, most fail to realize the strong role the Middle East will continue to play in this new era. Similar to the Cold War, America and rising superpower China will battle for hegemony in strategically important regions around the world. As an example, a year after *Battlegrounds* was published and

very shortly after the U.S. withdrew from Afghanistan in August 2021, China rushed to recognize the Taliban as a legitimate government and trading partner. China may even one day soon replace the U.S. military presence in Afghanistan. Because of the mineral and oil export capacity of so many countries in the greater Middle East, the region will no doubt garner attention in future conflicts of interest between Washington and Beijing.

Conclusion

McMaster's book, *Battlegrounds: The Fight to Defend the Free World*, is an essential read for anybody interested or concerned with what the future will look like as America moves into an increasingly complex global environment. Here at the United States Air Force Academy, it would be prudent to include McMaster's book in debates on the core curriculum. As cadets ponder the future fight, discussion of a book like *Battlegrounds* in the Academy's core MSS 251 class or similar strategy course would benefit strategic thinking—for cadets and faculty alike. Published in 2020, the book uncannily foreshadows issues America is struggling with today. For example, McMaster anticipated the messy, humiliating withdrawal from Afghanistan and problems it would cause in the region. McMaster's analysis of Strategic Narcissism with regard to Russia presaged the present conflict in Ukraine and its relationship to global power competition. *Battlegrounds* explains why Strategic Empathy is important with regard to China. Nations fight wars when they disagree with each other about their relative strength. China and the U.S. disagree in part due to low strategic empathy on both sides, and this has led to intensifying major power competition.

To fashion effective national security policies in this new era, America may have to relearn lessons from the Cold War. As a start, we could draw strength from Cold War resolve to remain engaged in international affairs. From there, America might develop and refine foreign policy so that it incorporates strategic risk and leans into the future fight. Air Force Chief of Staff Charles Q. Brown's directive to "accelerate change or lose" is relevant, here. General Brown recalls what German Field Marshall Von Moltke recognized over a century ago, "No plan of operations extends with certainty beyond the first encounter with the enemy's strength." As America polarizes domestically, politicians will face strategic imperatives to reach across the aisle, shoulder political risk, and do what is best for the nation as a whole. *Battlegrounds* offers a guide, a way forward, for the current divided generation to protect American security across the globe. McMaster counsels it will be easier for leaders to accomplish this from a position of strength rather than withdraw from affairs and abandon in the field, on sundry battlegrounds, America's founding ideal of Freedom.

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REVIEW: *A Fiery Peace in a Cold War: Bernard Schriever and the Ultimate Weapon* by Neil Sheehan (New York: Random House, 2009)

Paul Bolt

A Fiery Peace in a Cold War is a fascinating book that focuses on the life of Air Force General Bernard Schriever and his competition with the Soviets to develop an ICBM that would prevent a nuclear Pearl Harbor.[*] The story is wide-ranging, covering development of the bomb in both the United States and Soviet Union; the dynamics of the Cold War; Soviet and American espionage successes and failures; defense politics in the Eisenhower administration; and the Cuban Missile Crisis. Sheehan dives into the personalities, military officers and scientists, who contributed to the research and development of American weapon systems, including the German Wernher von Braun and Hungarian John von Neumann. Heroes of the book are engineers, scientists, and visionary program managers guided by a clear strategic imperative.

A Fiery Peace recounts technological races driven by military necessity. One such race is the effort to develop atomic and hydrogen bombs. While the Germans were defeated in World War II before they could develop an atomic bomb, German scientists played a major role in weapons development in both the U.S. and Soviet Union after the war. After 1945, the Soviets raced to develop the bomb and succeeded more quickly than the United States expected, due in part to Soviet moles in the Manhattan Project. Other races include the struggle between the Air Force and Army to develop intermediate-range ballistic missiles (IRBMs) first, and the ultimate competition between the United States and Soviet Union to field nuclear-tipped ICBMs.

Integral to these races is bureaucratic politics. Within the Air Force, Curtis LeMay attempted to undermine the ICBM program in order to protect the centrality of bombers in the Air Force mission. Schriever and his team constantly fought to overcome obstacles that constrained their work and limited their budgets. Eventually Schriever's allies maneuvered for him to give a direct presentation to President Eisenhower on the nascent ICBM project. Eisenhower's enthusiastic endorsement and the ensuing NSC Action No. 1433 cleared away numerous impediments, but even then, Schriever struggled for resources as Eisenhower tried to limit defense spending and competing priorities arose within DOD.

Sheehan pulls no punches in his assessments of the events and personalities of the time. Sheehan clearly believes American strategic luminaries such as George Kennan and Paul Nitze misread Stalin and Soviet intentions, leading to American excesses that made the Cold War rivalry more dangerous than necessary. He holds particular disdain for Nitze, calling him a "polished, articulate man with a knack for convincing himself and others that he had knowledge of a subject when he, in fact,

had little or none" (104). However, Sheehan also gives credit where he sees it is due. He admires Schriever for his leadership, vision, and ability to overcome major obstacles to achieve technological breakthroughs. His portrayal of LeMay as a Schriever foil is, as might be expected, complicated. Sheehan views LeMay's wartime innovations in airpower as brilliant but sees him, later in his career, as turning arrogant and unwilling to listen to the viewpoints of others.

In covering Schriever's personal life, *A Fiery Peace* is less even. While Sheehan discusses important elements of Schriever's boyhood and upbringing, the focus then turns almost solely to Schriever's career. Nevertheless, the book does allude to family sacrifice when someone in Schriever's position is racing to achieve military-technological breakthroughs while under tremendous professional stress.

In sum, Sheehan tells a sophisticated story of missile development that is both constrained and enhanced by military operating procedures and national politics, all in the context of extraordinary Cold War pressures. The book has lessons relevant to today. One is that rivals do not always act as one expects from simple mirror imaging. For example, while many believed the Soviets would develop a bomber force during the early days of the Cold War that would rival SAC, the Soviets instead limited the number of bombers they deployed and focused instead on missiles. Another lesson emphasizes the importance of higher education for Air Force officers. Many of the heroes in ICBM development first earned higher degrees in science and engineering, particularly at California universities and MIT. Now, when the United States struggles in new technological competitions with military applications such as hypersonics, AI, and satellite defenses, it is worth noting some of these previously understood lessons of the Cold War.

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Report of the 62nd Air Force Academy Assembly

National Security and American Polarization: The Competition for Truth

In partnership with the Olmsted Foundation, ARDI—The Academic Excellence Foundation, United States Air Force Academy Endowment, USAFA Department of Political Science, and USAFA Association of Graduates, the United States Air Force Academy Department of Political Science hosted the 62nd Air Force Academy Assembly, 13-14 October, 2020 in Colorado Springs.

A total of 122 undergraduates from twenty-two colleges gathered virtually and in-person to engage experts from academia and civil society on American politics and national security. The event featured three plenary panel discussions and a Keynote Address by Lt. General (ret.) H.R. McMaster, published in *Space & Defense* Vol. 12, No. 2 (Summer 2021): 67-74. The focal point of the conference was the ten immersive student roundtables, where student delegates engaged in discussions aimed at understanding forces contributing to political polarization in the United States and the effects that such civil discord has on national security. The roundtable discussions and recommendations are summarized below.

Roundtable 1: To Deceive or Mislead? The Information Crisis

Executive Summary: In the 21st century, information technology has become an integral part of American life. It possesses an ever-expanding potential for disseminating news stories and daily information to Americans quickly and efficiently. This roundtable sought to differentiate between misinformation and disinformation in order to mitigate threats they pose within society. Society faces an information crisis when truth is transformed into a product for strategic manipulation. The end result of selective truth can be just as harmful to the

American public as "fake news." Americans gravitate toward polarizing news sources that disseminate information crafted in a way to promote their party's platform and influence their audience accordingly.

Main Discussion Points: This discussion began by clarifying that misinformation constitutes untruthful information spread without the intent to harm or confuse others. On the other hand, disinformation is the spread of data with deliberate intent to harm. *The delegates concluded that the information crisis stems from misinformation rather than disinformation.* While many Americans have recognized and brought attention to this issue, there is no consensus on how to overcome the information crisis. Some segments of the media continue to provide biased content rather than objective truth. This misinformation contributes to polarization.

Key Takeaways and Recommendations: Despite general consensus on what constitutes fact versus opinion, the truth remains elusive. In order to maintain its global status, the United States must capitalize on analyzing information for accuracy and educate its citizens to interpret what is truthful and what is not. The inability to recognize both misinformation and disinformation contributes to the United States' secular decline. Delegates determined that the best way to combat this threat is through implementation of three lines of effort: educate American youth; fact-check and conduct independent research as information is released; and encourage openness to differing perspectives.

Roundtable 2: New Tech and Its Impact on Democracy

Executive Summary: This roundtable centered around the unrealized potential of artificial intelligence (AI) and its impact on democracy. As the world becomes more reliant on information technology, the influence of AI has continued to advance. Swarms of internet bots and other artificial intelligence tools are actively manipulating public discourse on politics and world events. Although AI has benefits, these bots and associated techniques contributed to a form of polarization that envelops America.

Main Discussion Points: AI was not designed with consideration of all the dangers it presents, including information manipulation by foreign adversaries. AI algorithms can create individualized echo chambers of opinions, contributing to political polarization. Furthermore, the American public's reliance on these platforms provides opportunities for adversaries to disseminate harmful disinformation. *Delegates recognized that the United States is no longer the dominant global power in technological advances.* As China makes great technical strides, the United States in certain instances is forced to follow and match China's progress. Part of regaining technological leadership can be accomplished by addressing the communications gap between Silicon Valley and the United States Government.

Key Takeaways and Recommendations: While there is a need to develop AI within the United States, a balance must be established between increasing reliance upon these systems and the vulnerabilities they produce. Delegates highlighted the challenge of harnessing AI to support rather than undermine foundations of American democracy.

Roundtable 3: The Death of Expertise

Executive Summary: This roundtable sought to clarify what constitutes expertise and to define the role of experts within American politics. As the entry level to expertise becomes less defined and more accessible through media and higher education, articulating what qualifies as expertise becomes more difficult.

Main Discussion Points: The definition of an expert and their role in a polarized democracy (i.e., rule by non-experts) are constantly in flux. Working definitions range from researchers that achieved higher education, people who enjoy public trust, and influencers on social media. Despite these varying interpretations, delegates agreed an expert should be reputable and able to provide unbiased recommendations to governing officials when needed.

Key Takeaways and Recommendations: Experts must be careful to not overstep their responsibility and polarize the public with their recommendations to policymakers. The role of the expert in a polarized environment should be to provide accurate, unbiased information, enabling legislators to make the best decisions for the greater good of society. Social media inherently creates a "low barrier of entry" allowing non-expert opinion leaders to feed "fake news" into the conversation. Therefore, it becomes the responsibility of true experts and policymakers to find accurate facts in order to make appropriate unbiased recommendations. *Delegates concluded that expertise is not dead, but trust in so-called experts' recommendations and judgment may be.*

Roundtable 4: "Fake News" and the Media

Executive Summary: This roundtable explored elements of "fake news" and its harmful impact on United States' citizens and media. Discussion focused on the cognitive bias of motivated reasoning, a founding concept for political psychology. Motivated reasoning enables misinformed conclusions based on the desirability of an outcome, rather than relying on facts. Such thinking provides an entry for fake news into mainstream discussion.

Main Discussion Points: Within the context of motivated reasoning, political misinformation can be a problem. Delegates discussed how fake news produces a dangerously misinformed public, which then has the potential to elect an unqualified public official. Delegates also considered how the spread of fake news

erodes the foundation of trust. Participants agreed that differing interpretations of the same set of facts are not necessarily fake news but may simply indicate a difference of opinion.

Key Takeaways and Recommendations: The inability to agree on a common set of facts when discussing a political issue fuels polarization and further divides the population. Delegates emphasized that it is vital to empathize with others and demonstrate a willingness to have potentially triggering conversations. Without those actions, mistrust of others with differing political ideologies will prevail. Ultimately, empathy and building trust among individuals are key for changing the political views of one another to reduce polarization. However, it is notably difficult to change someone's mind when that person subscribes to fake news.

Roundtable 5: A Non-Partisan Bureaucracy: Necessity or a Luxury?

Executive Summary: This roundtable sought to investigate the unique relationship between bureaucracy and partisanship. Within the United States government, unelected bureaucrats are expected to participate in the policy process in a nonpartisan manner, yet they are required to implement laws and obey leaders that have clear partisan motivations. This roundtable considered how bureaucracies are a crucial component for the development and execution of rational strategy and policy in coordination with political leadership.

Main Discussion Points: Bureaucracies are a necessity but need to be utilized correctly in order to avoid undermining democratic norms. The bureaucrat's subject expertise is crucial to inform policy and for execution of the bureaucracy's function. It is the responsibility of a bureaucracy to apply this expert knowledge in order to contribute and shape discussions, which surround policymaking. Such collaboration between expert and politician can avert constitutional hardball and political warfare that results in political gridlock. The fundamental challenge facing bureaucrats is accepting that policymakers whom they serve may not agree with their expert advice.

Key Takeaways and Recommendations: The conflict between bureaucrats and partisans presents a threat to national security when critical expertise from bureaucrats is ignored in order to advance partisan interests. The delegates concluded that the priority of civil servants should be to honor their constitutional oath. Bureaucracies should accept elected leaders' authority while continuing to dialogue with them to bridge gaps in understanding.

Roundtable 6: Civil-Military Expertise on the Battlefield of Truth

Executive Summary: This roundtable addressed the need for collaboration and balance between the military and civilian sectors. The nation's increasing partisan

divide is one of many modern factors that create new challenges for a healthy civil-military relationship. While the U.S. military is increasingly growing separate from civilian society due to its isolation from the public, this civil-military gap does not prevent military members from developing their own partisan beliefs. Increasing partisanship in the military tests the restraint of U.S. military members to remain subordinate as they fulfill civilian directives opposed to their individual views.

Main Discussion Points: This roundtable identified a gap that exists between civilian society and the military. This divide is widened by demographic differences between the military and society, to include socioeconomic class, geographical background, gender, race, sexual orientation, religious beliefs, and ideological differences. These differences lead to concerns that the professional norm of non-partisanship found within the U.S. military may be eroding. The modern force presents a unique threat to the rest of the federal government, as professionalization of the application of violence concentrates political power in a relatively small portion of the population.

Key Takeaways and Recommendations: It is reasonable to conclude that in order to preserve civilian control of the military, the burden placed on the military to uphold aggressively nonpartisan social norms is greater than for other institutions. Presently, the military accomplishes this by placing a significant emphasis on tradition and the ritualization of oath taking, which is not nearly as established within other agencies. It may be prudent for other groups within the United States government to look to the military as an example of how to properly enforce and emphasize these norms. In regards to closing the civil-military gap, delegates suggested making introductory courses available in school systems. In addition, the media could aid in civilian understanding by providing balanced coverage of military life and its role within society.

Roundtable 7: Elections: Opportunities and Responsibilities

Executive Summary: This roundtable investigated whether legislators were more loyal to the views of their party or the interests of their constituents. The delegates also considered whether American electoral methods generate political polarization. Electoral integrity is the cornerstone of democracy but requires constant vigilance. The electoral process gives political parties enormous influence, fulfilling many of James Madison's early fears. United States political parties influence which politicians gain prominence and funding, often determining the support a candidate will receive from the public.

Main Discussion Points: In today's elections, candidates no longer seem to represent the district they came from, but instead adhere to the demands of their party leadership. Politicians are becoming more comfortable supporting their party even though its platform and policies may not be in their constituents' best interests. The demands of party loyalty make it difficult to elect politicians who are subject matter

experts able to provide knowledge on what is objectively best for the country outside of party politics. As Washington warned in his farewell address, polarization may threaten the foundations of American democracy.

Key Takeaways and Recommendations: Political polarization creates a divide between the needs of the American people and the responsiveness of the United States government. This issue presents a threat to national security, as the current process of elections may not hold politicians accountable to the people they represent. *Delegates did not believe alternative electoral methods would eliminate polarization from politics, as countries that have alternative methods of election such as Mexico with its national popular vote are still affected by polarization.*

Roundtable 8: When the Truth Hurts: Dissolving Democracy's Foundations

Executive Summary: This roundtable addressed the issue of how polarization is eroding democratic processes and creating gridlock, which threatens the functioning of American government. Pluralism has been an important part of American democracy since its founding, but extreme polarization threatens to undermine the benefits of political diversity. America has not always been able to resolve its internal differences peacefully, and modern divisions test the strength of democratic institutions.

Main Discussion Points: Despite the intent of the Founding Fathers to facilitate differing opinions in government, the increased polarization of the American democratic process has decreased the ability for the government to address national issues. Although events like 9/11 demonstrate that a common enemy can temporarily reduce polarization, reliance upon an external foe is not a lasting solution for American disunity. The delegates discussed how the United States is riven by polarization so that national unification in the future is becoming increasingly difficult. This is a consequence of people's identity being more closely connected to their political party. No longer is civil discourse about political issues. Instead, Americans only consume media that confirms partisan beliefs they already possess.

Key Takeaways and Recommendations: Polarization within the media creates an environment of political extremes in order to appeal to voters' party identities. The inability of the public to discern facts from opinions and make informed decisions contributes to political gridlock. The extreme polarization of beliefs, combined with distribution of disinformation in mass media, makes it difficult for United States citizens to decipher the truth. In order to combat this issue, delegates proposed that voters elect individuals who serve the people instead of their own political fortunes; more servant leaders in office could decrease national political polarization. Due to existing polarization, which enhances electoral influence of party organizations, such candidates may be impossible to find within our political sphere. Ultimately,

polarization traps Americans in their own system, threatening the country with further erosion of democratic processes.

Roundtable 9: Foreign Policy: Exporting and Importing Truth

Executive Summary: This roundtable illustrated the struggle of the United States to balance its values and interests as U.S. foreign policy bounces between polarized administrations. The United States' approach to alliances, treaties, and trade policies can swing back and forth unpredictably. While there is merit in assimilating both sides of a debate, the United States risks creating a dangerous image as an unreliable and inconsistent world power.

Main Discussion Points: This roundtable addressed balancing values and interests in foreign affairs while maintaining America's image abroad. There are numerous benefits to forming alliances overseas to secure the United States' interests and values. The United States' strategic alliances help to maintain U.S. hegemony as well as its status as a global power. However, the United States, in defending its values everywhere, is spread dangerously thin, and the nation must reevaluate its priorities with a more realistic approach. *Delegates asserted that America should be doing more abroad to advance humanitarian efforts that simultaneously forward the U.S. national interest.* An example of such an approach would be to protect and promote women's rights in Afghanistan when negotiating peace with the Taliban.

Key Takeaways and Recommendations: All delegates agreed that the United States should produce well-defined objectives before committing itself abroad. Through use of strategic empathy—prioritizing involvement in areas that can benefit U.S. national security—the United States can strengthen its international position. Considering its former dependence on allies and prioritization of aid such as the Marshall Plan, the United States should be concerned with increased Chinese influence in Asia, Africa, and South America. While China continues to present a united, credible front, the United States falters. The country must maintain its alliances by rebuilding and maintaining its credibility on a global scale. Rebuilding credibility abroad may in turn require reducing polarization at home.

Roundtable 10: Two Houses on the Hill: The Polarization Paradox of National Security

Executive Summary: This roundtable explored the negative effect political polarization has had on Congress's conduct of national security policy. Historically, national security was characterized by bipartisan cooperation. The United States' political system was designed to accommodate division within public opinion to produce dialogue and consensus building between parties.

Main Discussion Points: However, the current state of polarization has reached the

point of gridlock, inaction, and failure to compromise. This presents a particular challenge for matters of national security. The direct effects of polarization affect national security in how quickly the United States responds to foreign and domestic crises. Additionally, polarization negatively affects relationships with adversaries and allies alike. While adversaries take advantage of our division, allies lose confidence in the American system. Importantly, rhetoric is just about as important as action on the international stage. Research confirms that allies' populations pay much more attention to what our leaders say than to U.S. policies. Members of Congress pursue their personal interests simply due to the preservation of partisan reputation in pursuit of reelection. Social media provides the opportunity for politicians to appeal directly to their bases, without a deeper understanding from citizens of conveyed content.

Key Takeaways and Recommendations: While seemingly a domestic issue, political polarization presents a threat to national security and allows adversaries to take advantage of our division. Delegates suggested that the effects of polarization can be mitigated through continuous dialogue between opposing parties with the goal of producing understanding and resulting in compromise rather than gridlock.

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Space & Defense seeks submissions that will contribute to the intellectual foundation for the integration of space into overall security studies. Indeed, the emergence of space as a unique and critical element in national security, economic security, homeland security, cyber security, nuclear security, environmental security, and even human security has persuaded us that this line of inquiry is vital to innovation for international security.

Contributions are welcome from academic scholars and policy analysts at think tanks and research institutes; senior management and policy officials from international and governmental agencies and departments relevant to space and security issues; senior management and policy officials from organizations responsible for critical national and international infrastructures that rely upon space; major aerospace corporations; scientists and engineers interested or involved in space and security policy issues; and military officers and operators in relevant units, commands, staff colleges, and service academies.

The journal welcomes submissions of scholarly, independent research articles and viewpoint essays. There is no standard length for articles, but 7,500 to 10,000 words, including notes and references, is a useful target for research articles, and viewpoint essays should be in the range of 2,500 to 5,000 words. The opinions, conclusions, and recommendations expressed or implied within Security Studies Inquiry are those of the contributors and do not reflect those of the Eisenhower Center for Space and Defense Studies, the Air Force Academy, the Air Force, the Department of Defense, or any other agency of the United States Government.

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Details of the author's institutional affiliation, full address, and other contact information should be included in a separate file or cover sheet.

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All manuscripts submitted to *Space & Defense* need to be double-spaced with margins of 1 inch or 2.5 cm, and all pages, including those containing only diagrams and tables, should be numbered consecutively. It is the author's responsibility to

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TABLES AND FIGURES

All maps, diagrams, charts, and graphs should be referred to as figures and consecutively numbered and given appropriate captions. Captions for each figure should be submitted on the same page as the figure to avoid confusion. Tables should be kept to a minimum and contain only essential data. Each figure and table must be given an Arabic numeral, followed by a heading, and be referred to in the text. Figures and tables are not to be embedded in the text. Each table and figure should be clearly labeled. In the text, make sure and clearly explain all aspects of any figures or tables used.

STYLE

Authors are responsible for ensuring that their manuscripts conform to the style of *Space & Defense*. Please follow the Chicago Manual of Style.

Listed below are some additional style and writing guides:

• Dates in the form: 1 January 2009.

• Headings (bold, ALL CAPS, title case and centered).

• Subheadings (bold, italic, title case and centered).

• Acronyms/abbreviations should always be spelled out in full on first use in the text.

• The 24-hour clock is used for time, e.g., 0800, 1300, 1800.

• Use percent rather than % except in figures and tables.

• For numbers, spell out numbers less than 10.

• Make use of 21st style where appropriate.

• Keep capitalization to a minimum.

• Concise paragraphs and sentences are desirable.

• Avoid a paper that is just descriptive; rather engage the literature and provide analytical rigor and assessment.

• Avoid policy recommendations in the analysis part of paper; leave this, if applicable, for a separate section at the end of the paper. Define all new terms used in paper.

• Avoid hyphenated words when possible (e.g., low Earth orbit).

• Avoid the use of passive voice when possible.

• Footnotes are numbered consecutively with a raised numeral in the text; use the Insert-Preference-Footnote function of MS Word.