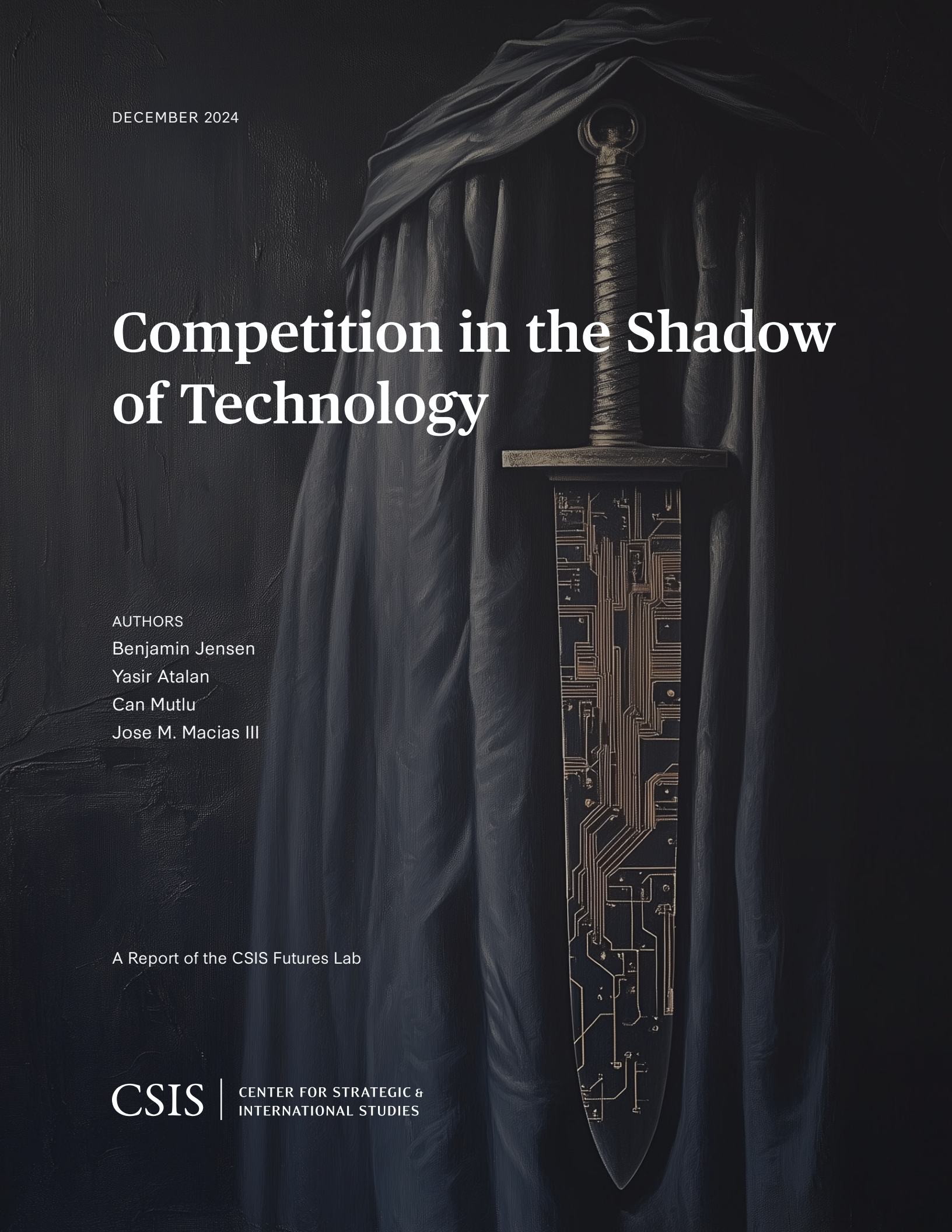
DECEMBER 2024

Competition in the Shadow of Technology



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A Report of the CSIS Futures Lab

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Acknowledgments

This report is made possible by general support to CSIS. No direct sponsorship contributed to this report.

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Introduction

Technology and Deterrence

A new era of technological competition is redefining the relationship between the United States and authoritarian regimes. From hypersonic missiles to novel space and cyber effects, this contest is no longer confined to military signaling through force posture and the deployment of carrier strike groups and bomber task forces to deter rivals. Increasingly, **modern competition involves revealing disruptive military capabilities to gain an advantage**.[1]

As a result, the art of deterrence increasingly relies on demonstrating power through signaling new technological offsets that alter the balance of power.[2] Competition is as much about engineers as it is about generals. Modern great powers all have extensive research and development labs—often concealed from the public eye—that enable them to search for novel ways to win old wars. The resulting wonder weapons that emerge from these secret labs help states coerce their rivals through altering how their rivals calculate the odds of winning future battles.

China, for example, selectively releases information on disruptive weapons and uses advanced missile tests to signal capability and resolve as part of its declared military strategy.[3] Similarly, the Kremlin perpetually makes new space threats, conducts missile experiments, and uses military journals to discuss weapons based on "new physical principles"—a practice that builds on the Soviet use of military parades to signal the West—to alter how military analysts calculate the balance of power.[4]

Yet, when should states reveal sensitive military technology during a crisis? Previous studies have established the role of selective disclosure in long-term competition, but questions about the utility of demonstrating new capabilities during an international crisis remain unanswered.[5] Multiple studies

have confirmed the importance of military signaling, but do not factor in the strategic calculus a state faces when determining whether or not to reveal new capabilities during periods of heightened risk.[6]

It is highly likely that **revealing the existence of new weapons during a crisis casts a shadow over modern great power competition and changes how states perceive the balance of military power**. This shadow makes it difficult for the national security enterprise to align ends, ways, and means in pursuit of integrated deterrence.

This report analyzes the logic of revealing secret military capabilities during a crisis. Consistent with the prevailing trend in strategic studies, this study treats interactions between states as a complex bargaining process. Understanding this process requires novel approaches to analyzing great power competition that go beyond case studies and illustrative scenarios. Given that most states conceal or exaggerate their military power, the historical record is uneven and often subject to sampling bias. As a result, understanding when states should reveal secret military capabilities requires different approaches, including formal models designed to replicate the logic of coercive bargaining. These abstract mathematical models help reveal key tradeoffs and offer insights to policymakers seeking to understand the full range of responses open to a government during crises with rival great powers.

According to a formal model of crisis bargaining in the shadow of technology developed by the CSIS Futures Lab, there are three reasons a state might reveal a new capability during a confrontation.[7] First, states can **reveal to substitute** and signal new military capabilities in lieu of direct military pressure. This flexible deterrent option forces the adversary to reassess their estimates of military power, thus increasing the odds rational actors back down. Second, leaders can **reveal to reduce risk**, using the display of new technology to check brinkmanship by risk-acceptant rivals. Here again, the signal is used to adjust expectations about the odds that pushing a crisis to conflict will deliver the anticipated political gain. Third, states can **reveal to compensate**, using demonstrations of emerging and disruptive technology to make up for battlefield setbacks in peripheral conflicts. These demonstrations force rival states to discount evidence from other wars that lowers their estimate of military power.

These model insights suggest several policy imperatives. U.S. leaders should look at the design of the national security apparatus and identify ways to better synchronize strategic planning. Building on novel experiments with artificial intelligence and machine learning (AI/ML) and concepts like integrated campaigning, Washington needs a more connected interagency system capable of adjusting competitive measures based on preplanned crisis response options. This system will need to be supported by an expansion of the intelligence community and the development of new analytical tradecraft. Absent reforms to the current national security planning system and framework for both managing long-term competition and responding to crises, decisions to reveal disruptive military capabilities during a crisis will fall flat—or worse, trigger unintended consequences.

The Shadow of Competition

Modern literature on deterrence depicts how otherwise rational actors can find themselves taking the irrational gamble of threatening force in pursuit of political objectives.[8] Most of these studies evaluate the logic and character of crisis interactions in terms of bargaining, a framework introduced during the Cold War by the economist Thomas Schelling.[9]

This perspective characterizes states as constantly competing with each other and manipulating costs, benefits, and risks to gain advantages.[10] In this light, war is a costly gamble that rational states only pursue for three reasons:

1. An information asymmetry about capabilities and/or resolve leads to suboptimal bargaining and risk-taking.
2. Commitment issues force action in the present to avoid higher costs later.
3. The dispute involves an indivisible issue that makes bargaining less attractive.[11]

By this logic, the Chinese Communist Party would only risk a war with the United States over Taiwan, for example, if it:

- underestimated the military capability and resolve of Taiwan and possible defenders like Washington;
- saw a window of opportunity in which gains would be easier to achieve now than in the future; or
- viewed the conflict, regardless of estimated costs, as required to sustain the legitimacy of the party.

Short of war, states use competition to reduce private information and signal their resolve. Through coalition and joint exercises, changing force posture, and investments in military technology, states seek to alter information about the military balance. China, for instance, uses a mix of increased air, naval, and rocket force exercises around Taiwan to test its rivals' capabilities and resolve. It complements these measures by revealing new military means—from hypersonics to sensor networks and electronic attack capabilities—to gain leverage and signal the costs of war to the United States. These techniques extend to the nonmilitary realm, from diplomatic messaging to cyber operations and propaganda designed to reinforce perceptions of strength. This process can be overt or hidden, and subject to what scholars call "covert communication."[12]

Bargaining processes shape general deterrence.[13] While wartime crises force states to focus on demonstrating resolve, long-term competition turns states' attention toward concealing and revealing military capabilities to shape rivals' perceptions of the balance of power.[14] This process is especially important given the challenge of correctly estimating military capability.[15] Therefore, a central challenge facing decisionmakers in modern strategic competition is the choice of when to reveal new military technology to a rival. Disclose a new system too soon, and one gives away critical information to an adversary, allowing them to either copy the innovation or design a countermeasure. Keep a wonder weapon hidden for too long and you lose an opportunity to support your competitive strategy.

CRITICAL TECHNOLOGY AREAS

Biotechnology

Quantum Science

Future Wireless

Advanced Materials

Trust AI and Autonomy

Integrated Network Systems-of-Systems

Microelectronics

Space Technology

Renewable Energy Generation and Storage

Advanced Computing and Software

Human-Machines Interface

Directed Energy

Hypersonic

Integrated Sensing and Cyber

For decades, defense officials and scholars have argued that certain military technologies alter the balance of power and produce a strategic advantage. These novel capabilities—from atomic weapons and precision-strike warfare to current experiments with autonomous systems and AI/ML—are inherently disruptive to traditional calculations of the correlation of forces.[16] As a result, they have the potential to influence strategy and statecraft.[17] This dynamic implies that these capabilities should carry particular importance for bargaining in the shadow of technology and modern great power competition.

In the early 1990s, the term du jour was the Revolution in Military Affairs (RMA).[18] Back then, advances in information technology had recently made it possible to connect global networks and conduct long-range precision strikes. More broadly, embracing the RMA was a form of strategic behavior defining how nations mobilized and employed military power.[19] In the early 2010s, the term "offsets" emerged to describe bundles of disruptive technologies that defined the

search for a competitive advantage from the Cold War to the new confrontation between the United States and China.[20] These technologies were "game changers" that altered how states planned and fought wars, and, by extension, deterred rivals.[21]

Increasingly, offsets are seen as central to long-term competition. In a February 2022 memorandum, the under secretary of defense for research and engineering provided an overview of a new era of technology competition defined by 14 critical technology areas (CTAs).[22] The memorandum was published in the same week as the *Critical and Emerging Technologies List Update*, a biennial report by the National Science and Technology Council.[23] Through its Science and Technology Organization, the North Atlantic Treaty Organization (NATO) uses the term "emerging and disruptive technologies" (EDTs) to describe the large technological trends that create new ways of waging war.[24] As a result, **the race to maintain technological supremacy is at the heart of modern strategy**.

Previous studies have cataloged competing logics for when states choose to reveal new offsets and game changers amid long-term competition.[25] First, in 1987, researchers at RAND proposed the "deliberate capability revelation" strategy, an approach used by Washington during the Cold War to exploit deeply rooted Soviet fears about U.S. technological superiority.[26] These fears produced a bargaining advantage by increasing Soviet uncertainty, forcing the Kremlin to manage the risk of strategic surprise. Alternatively, political scientist Robert Axelrod saw little utility in the revelation of new military capabilities. The utility of new technologies, in his view, lay in maximizing military impact during wartime, thus reducing incentives to undermine this future advantage in peacetime.[27] Political scientists Brendan Rittenhouse Green and Austin Long proposed that the strategic calculus of a state was defined by the costs of revealing sensitive military capabilities to gain a bargaining advantage. Specifically, the less unique the military capability—and the harder an adversary found it to develop countermeasures—the more rational it became for a state to reveal.[28] More recently, in a seminal study, Thomas G. Mahnken proposed that the selective disclosure of military capabilities—including bluffing and manipulating information—was a central feature of long-term competition. The decision of how and when to reveal, according to Mahnken, was linked to desired adversary reaction and the type of competition the revealing state was trying to shape to impose costs.[29] Real-world examples of game-changing technologies—both concealed and revealed—are offered below.[30]

While these historical examples illustrate how states reveal capabilities to serve specific strategic purposes—such as degrading an adversary's strength or deterring key enemy capabilities—the underlying logic driving the decision remains underexplored. Existing literature examines the motivations behind revealing or concealing military power, focusing on the benefits of either demonstrating strength to deter adversaries (i.e., revealing) or maintaining secrecy (i.e., concealing) to gain a strategic edge in long-term competition. **Analysis of the conditions that compel states to reveal new military capabilities in times of crisis remains a critical gap in the literature**.

Long-term competition tends to result in periodic international crises and militarized disputes.[31] Even though states use force posture and exercises, as well as other operations, activities, and investments to compete short of war, uncertainty and fear of losing advantage can pull adversaries into high-risk scenarios where the possibility of armed conflict is higher and the escalation risk

Table 1: Concealing and Revealing Case Examples

Technology	Description	Purpose
B-1 Lancer	A heavy bomber featuring advanced supersonic speed and low-altitude penetration capabilities	Defeat Soviet air defense; was openly showcased by the United States as a deliberate tactic to challenge and potentially overwhelm Soviet air defenses
F-117 Nighthawk	A retired U.S. aircraft with stealth capabilities	Reduce radar cross-section, noise, infrared signature, and visibility for stealth; prevent Moscow from modernizing air defenses
XB-70 Valkyrie	High-altitude and high-speed U.S. aircraft	Outpace Soviet MiG-25 and SA-5 surface-to-air missiles
Homing Overlay Experiment	U.S. research program on missile-defense interceptors	Deny ballistic missiles atmospheric reentry
Avangard Hypersonic Glide Vehicle	Russian vehicle developed in secrecy to achieve strategic surprise and to delay adversarial response time	Deliver strategic nuclear payloads at hypersonic speeds, evading missile defense systems
Tacit Blue	Stealthy U.S. experimental aircraft designed to operate close to the forward line of a battlefield without being detected by enemy radar; remained classified until 1996, well after its retirement	Use stealth technology for battlefield surveillance
Anti-Submarine Warfare	U.S. operation during the Cold War focused on detecting and tracking Soviet submarines	Detect, track, and potentially neutralize Soviet submarines, particularly ballistic missile submarines
Stuxnet	A virus potentially developed by the United States and Israel to degrade Iranian nuclear centrifuges	Sabotage Iran's nuclear infrastructure

Source: Adapted from Thomas Mahnken, *Selective Disclosure: A Strategic Approach to Long-Term Competition* (Washington, DC: CSBA, November 2020), https://csbaonline.org/research/publications/selective-disclosure-a-strategic-approach-to-long-term-competition; and Brendan Rittenhouse Green and Austin Long, "Conceal or Reveal? Managing Clandestine Military Capabilities in Peacetime Competition," *International Security* 44, no. 3 (January 2020): 48–83, https://direct.mit.edu/isec/article-abstract/44/3/48/12283/Conceal-or-Reveal-Managing-Clandestine-Military?redirectedFrom=fulltext.

more acute.[32] As a result, policymakers need insights into when it is sound strategy to reveal the existence of game-changing weapons and offsets in modern great power competition.

From the Cuban Missile Crisis to the Third Taiwan Strait Crisis, bargaining has always defined how great powers interact—but the stakes, and risks, are higher.[33] These situations are best characterized as immediate deterrence dilemmas, in which states expend resources and signal resolve to gain near-term advantages.[34] In these crises, states need to maximize power to strengthen their bargaining positions. One way they do this is by reducing private information about military capabilities, thus ensuring that their opponent understands the actual balance of military power.[35]

Conceal/Reveal Dynamics

To analyze when revealing new military capabilities might benefit a state strategically, the CSIS Futures Lab constructed a formal model.[36] Formal modeling is a mathematical representation of interactions, expectations, strategic choices, and explicit assumptions.[37] These models provide a structured way to analyze and predict behaviors and outcomes in various scenarios. Models play a crucial role in the field of International Relations (IR) by offering logical descriptions of complex interactions between states, institutions, and individual actors.[38] While anecdotal evidence and descriptive cases provide valuable insights, they often fall short of supplying generalizable inferences. For instance, the outbreak of World War I—despite being a seminal case study—cannot explain the onset of all great power conflict, just as every crisis between nuclear states isn't reducible to the Cuban Missile Crisis. **Overgeneralizing from historical cases risks bad strategy**.

Formal models, on the other hand, create a degree of abstraction that enables researchers to construct and test general principles that can then be applied across different contexts. A formal model of the Cuban Missile Crisis, for example, lends itself to a general analysis of bargaining based on key parameters of action, reaction, and counteraction. The structured nature of formal models provides a consistent method for evaluating various hypotheses and theories, exactly what policymakers need when debating options for responding to a military crisis.[39] The transparency of the formal models' assumptions makes them easier to critique and improve, enhancing their reliability over time. Despite neglecting some facets of reality, formal models have an ability to isolate key variables and relationships, making them uniquely valuable.[40]

Historically, formal models—especially game theory—have played a significant role in national security and policy circles, particularly since the advent of nuclear weapons.[41] There has also been a strong tradition of formal modeling in international relations scholarship.[42] Starting with British educator Lewis Fry Richardson's arms race model and extending to Thomas Schelling's game-theoretical approaches during the Cold War, these models have been used to explain a wide range of phenomena related to bargaining and deterrence.[43] The prisoner's dilemma, for example, provided a framework for understanding noncooperative behavior, while the repeated prisoner's dilemma highlighted pathways to cooperation due to the presence of future retaliation threats.[44] Similarly, incomplete (private) information games—particularly bargaining models—have provided insights into deterrence, alliance politics, arms racing, the onset of war, and democratic peace theory.[45]

The use of military threats to deter adversaries has been a central focus of formal modelers for generations. This is particularly the case within rational deterrence theory, which examines how states use the threat of force to persuade potential attackers that initiating conflict will be costly and ultimately unsuccessful.[46] In doing so, states engage in actions that are credible to their adversaries.

While the literature has not reached a consensus on the precise conditions under which deterrence is most effective, there is broad agreement on key factors such as military balance, reputation, the signaling of resolve, and the interests at stake.[47] First, according to research focusing on military balance, when a territory is at risk, the deterring state must demonstrate that it has sufficient military power to defend it if attacked. Similarly, the aggressor state needs to show offensive capabilities to signal that an attack is going to be decisive. Second, scholars who specialize in the study of signaling resolve argue that states may engage in costly signaling or "tying their hands" to credibly commit to their intentions.[48] For example, they might incur audience costs by publicly committing to a specific course of action; they might also sink costs by undertaking actions that are expensive to reverse.[49] The Cuban Missile Crisis of 1962, in which both the United States and the Soviet Union signaled their resolve through public and covert actions, is a classic example of such a signaling case. The third important aspect of rational deterrence theory is the role of reputation. According to this view, a state's past behavior sends signals about its future actions, reinforcing its credibility in the eyes of adversaries.[50]

Despite extensive research on signaling resolve during a crisis, formal models for signaling military power itself are less developed. Most studies have focused on how states signal intentions and resolve, particularly during crises, rather than explicitly examining the logic of when to reveal secret military capabilities.[51] This analytical gap is a disservice to policymakers who find themselves increasingly grappling with great power competition in the shadow of technology.

Modeling Contemporary Great Power Crises

To understand state behavior in a crisis short of war between great powers seeking to leverage technological offsets, the CSIS Futures Lab constructed a formal model depicting two states—an aggressor and a defender—locked in long-term competition.[52] Each side sees this competition as zero sum, leading to a bargaining dynamic in which each side seeks to gain better information about the opponent's military capabilities, resolve, and intentions. This information is central to strategy, as the competition—consistent with rationalist explanations—is defined by private information, commitment issues, and often involves disputes over issues seen as indivisible.[53]

For example, consider the United States and China. The Taiwan Relations Act states that the United States will provide Taiwan with the ability to maintain "sufficient self-defense capacity" and retain the ability to "resist any resort to force or other forms of coercion that would jeopardize the security, or social or economic system, of the people of Taiwan."[54] While the United States does not formally recognize Taiwan, it is bound by this act of Congress to help the nation retain its sovereignty. Alternatively, a 2022 white paper disseminated by the Chinese Communist Party (CCP) states as an indisputable fact that Taiwan has always been part of China.[55] According to the paper, this "fact" has been evident since at least the Three Kingdoms period, based on archeological evidence. According to the CCP, it was foreign interference—from the arrival of the Dutch in 1624 to the First Sino-Japanese War in 1894—that changed the status quo. The paper argues that external interference remains a "prominent obstacle" to China's reclaiming of Taiwan, with the United States inciting the island's separatist forces and denying the CCP's attempts at national reunification.[56] **In short, the position of the world's two largest military actors is indivisible with respect to**

Taiwan creating a crisis atmosphere in which each side is seeking to maximize its interests relative to its adversary short of triggering a conflict.

Consistent with bargaining theory, rational states prefer to avoid the high cost of war if they can maximize the tangible benefits of long-term competition. The problem is that neither side has perfect information. China doesn't know the full extent of the United States' advanced weapons programs or its willingness to use force to counter, for example, a joint blockade or firepower strike operation against Taiwan.[57] While the U.S. intelligence community collects large amounts of information on secret Chinese capabilities, they cannot be confident they accurately assess China's military given its rapid modernization. The resulting error terms on estimates of military power are likely large and subject to updating, as each side gains new insights through espionage or public demonstrations (i.e., reveals) while attempting to retain secrets (i.e., conceal) and even bluff, all while filtering information through large bureaucracies.[58] As a result, information asymmetry remains at the heart of crisis bargaining and modern deterrence.

Based on the CSIS Future Lab's formal model, there are three scenarios where it is rational to reveal a previously secret military capability during a crisis.

Reveal to Substitute

REVEAL TO SUBSTITUTE

The use of new military capabilities to alter perceptions about the balance of power

Requires a large power imbalance; not optimal when rivals have comparable capabilities

Requires that the adversary "sees" the reveal and recalculates the military balance

First, a state seeking to challenge the status quo (i.e., undermine general deterrence) will reveal a new capability when there is an information asymmetry in which the defending state behaves as if it has a more favorable military balance than is actually the case. In other words, **revealing information can be a way of signaling an actual gap in military capabilities—and thus a state's advantage—without incurring the costs and risks of a direct military confrontation**. A state thus *substitutes* the reveal of game-changing military capabilities for the unnecessary cost of war. The first key condition for such a strategy is that one state must have a significantly larger military capability than the other. Second, it requires that the rival state "see" and assess the capability as indicative of a gap in military power. This condition puts a premium on a state's understanding of its rival's intelligence collection and strategic decisionmaking enterprises. It also requires that a state must accompany "reveal" episodes with diplomacy, deliberate crisis communication, and information operations to ensure that strategic disclosures are picked up by rival intelligence.

In a potential crisis over Taiwan, for example, the United States would likely be confronted with a complex air and naval quarantine of the area, involving hundreds of aircraft and a mix of maritime militia, coast guard, and naval vessels surrounding the island.[59] This blockade would likely include

PLAN aircraft carriers and strike groups deployed east of Taiwan and integrated with space capabilities, offensive cyber teams, and electronic attack aircraft.

According to the logic implied by the formal model, this situation would be an opportunity to reveal a sensitive capability only if the United States was confident it had a military advantage, either directly or via commitments from coalition members willing to confront China. U.S. military planners would require the ability to combine the reveal with a larger integrated campaign to signal key audiences in the Chinese Communist Party. Revealing a new military capability would be a mechanism for reducing information asymmetry about the actual military balance. As such, it could substitute for a more direct display of military power and offer political leaders time to find an off-ramp amid the crisis.

The same logic applies to China. Consider, for instance, a standoff in the South China Sea between the Philippines and China involving the Chinese Coast Guard backed by a PLAN carrier strike group. If Manila continued to use military signaling to challenge Beijing, the formal model suggests that it would be an opportune time for the CCP to reveal a new military capability and to correct imperfect information about the military balance. Again, revealing could substitute for more confrontational displays of military power in this particular long-term competition.[60]

Reveal to Reduce Risk

REVEAL TO REDUCE RISK

The use of new military capabilities to force rational thinking in a risk-seeking rival

Assumes comparable power balance between rivals

Requires extensive intelligence about leadership dynamics and civil-military relations

The logic shifts, however, when rival great powers find themselves in a situation where their military capabilities are comparable. Here, a state seeking to challenge the status quo through brinksmanship is likely engaged in risk-acceptant behavior. Leaders are gambling that they can pressure a rival and undermine deterrence short of incurring the costs and risks associated with war against an equally armed peer. In this case a logic similar to that of prospect theory applies: the state challenging the status quo is likely in a loss frame and is willing to accept high levels of risk to gain a bargaining advantage.[61] In this logical framework, the defender reveals a previously hidden military capability to correct the aggressor's irrational assumptions about the military balance. This signal forces the aggressor state to reconsider its original risky gambit, thus buying time for the two actors to negotiate and find an off-ramp. **Revealing previous secret technological offsets becomes a way of reducing risk-seeking behavior in a rival**.

Consider again the Taiwan scenario above. If the United States assesses that China is in a loss frame and risk acceptant, it changes the bargaining calculus and how policymakers assess options for countering the air and naval quarantine around the island. A state's level of risk acceptance can be a function of leadership psychology and/or domestic politics.[62] China's risky gamble in Taiwan may have more to do with palace intrigue and economic decline than sound

military judgment. Regardless of the origin of this behavior, the formal model indicates that such a moment is opportune for revealing a sensitive capability as a substitute for more direct displays of military power that could trigger an escalatory spiral. The United States can reveal new technological offsets to remind China of the risks it is incurring by challenging the status quo. Instead of deploying aircraft carriers and bomber task forces, the United States uses a reduced military footprint alongside a demonstration of a technological offset previously concealed to reassure Taiwan and signal the Chinese Communist Party that its leaders underestimated the balance of military power. Again, this situation requires significant investments in leadership intelligence and understanding civil-military relations as well as palace politics in Beijing. U.S. policymakers need to tailor the signal to the audience to ensure they accurately assess the balance of military power. Similar to the "reveal to substitute" logic, this approach also requires complementing the signal with a broader, integrated campaign as envisioned in the joint concept for competing.[63] The logic is more risk imposition than cost imposition. By showing policymakers in a rival state the risks they are incurring, revealing sensitive military capabilities alongside other flexible deterrent options alters an adversary's planning assumptions, thus buying time to reconsider risky gambits.

The same logic applies to the South China scenario. If Beijing were to assess that Manila was engaged in excessive risk-acceptant behavior, it could correct errant assumptions by revealing a new capability as a substitute for more aggressive displays of military power that might trigger U.S. involvement. As a form of coercion, this approach would look more like testing a new hypersonic missile or space capability, rather than current efforts involving swarming Filipino waters with maritime militia and coast guard vessels.[64] Understanding when and how to counter China in this scenario would require better integration between technical intelligence and global campaigning activities, as well as better understanding of China's strategy and national security enterprise.

Reveal to Compensate

Furthermore, conflicts can reveal information that changes how states calculate the costs and benefits of revealing new military capabilities, even when the conflict is not central to the competition between rivals. Because private information about military power and political resolve is central to bargaining and deterrence calculations, any action that provides new insights will also shape decisionmaking. If two great powers are locked in long-term competition, any battlefield performance provides a feedback loop, even indirectly.

REVEAL TO COMPENSATE

The reveal of new military capabilities to compensate for declining power

Assumes states are in the process of adjusting their assessments of the military balance

Conflicts present unique moments for updating beliefs

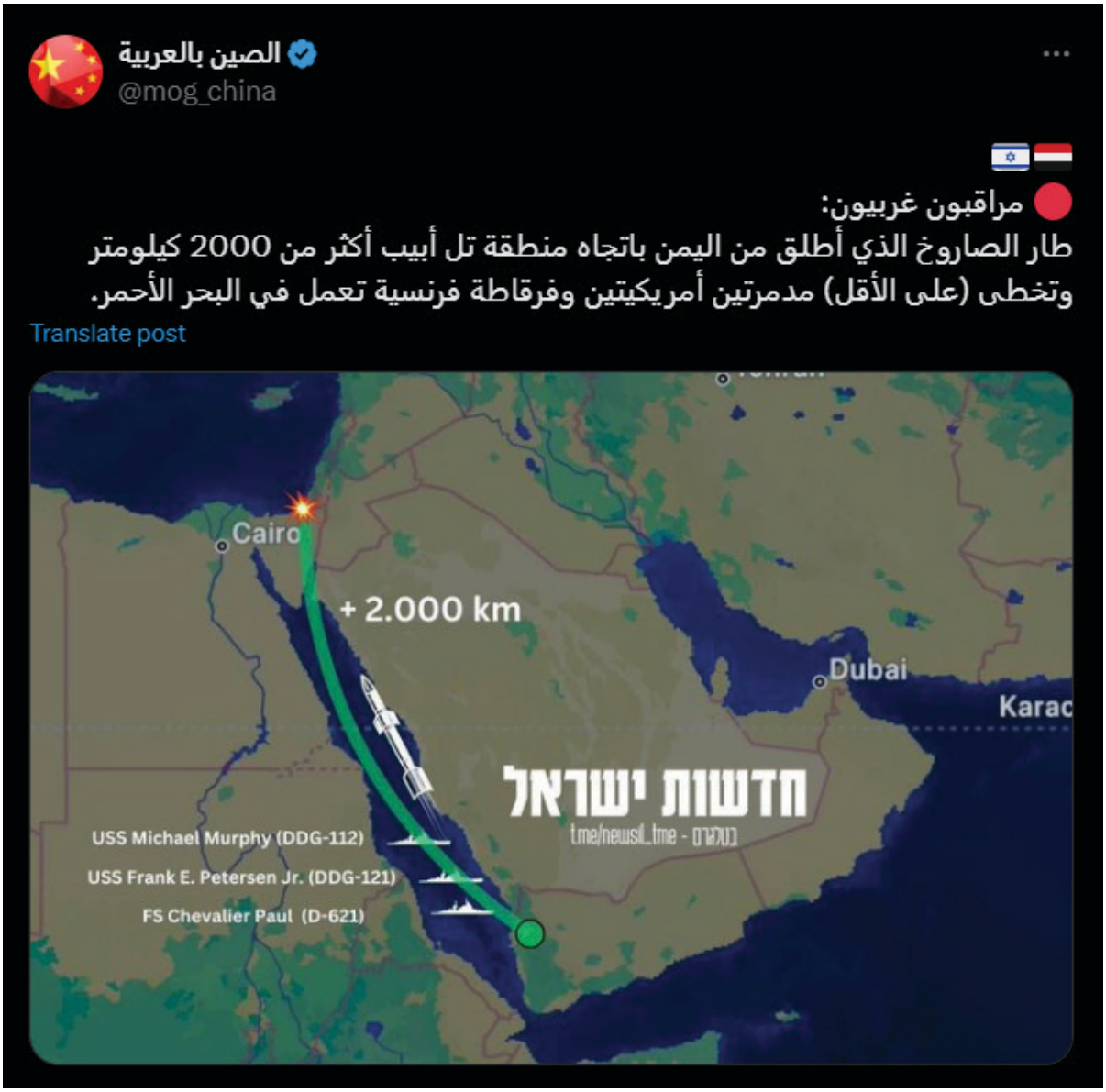
For example, consider Russia, Ukraine, the United States, and other major NATO powers. As Moscow sees the performance of old, surplus Western military kit destroy even its newest

formations, leaders have to adjust their assessment of the military balance. Similarly, as the United States witnesses Russian prison assault units, missile barrages that are less accurate than advertised, and a defense industrial base that cannot produce electronic components on its own, leaders in Washington adjust their understanding of the military balance. Despite the significant growth of Russian ground forces, this situation puts a premium on signaling to adjust NATO's understanding of Moscow's actual war potential. This suggests that Russia will be more likely than the United States to showcase new capabilities in the coming years. Leaders in Moscow need to "reveal" new military technologies to compensate for poor battlefield performance.

The same logic could extend to the United States and its long-term competition with China, albeit with a twist. Chinese military doctrine tends to focus on how the United States, in the late twentieth century, perfected an approach—namely during the Gulf War—involving the synchronization of joint effects to increase military power.[65] In this approach, technology and connectivity are critical combat multipliers, changing the correlation of forces.[66] This way of analyzing the military balance shapes both the process of military innovation—particularly emulation—and the approach states take toward long-term competition.[67] If a state understands its adversary's reference point for assessing military power, it gains a better understanding of how the enemy will approach bargaining, particularly during a militarized crisis.

Consider the context of a hypothetical crisis in Taiwan. China will base its decision of whether or not to use a strategic reveal of technology to dissuade the United States from supporting Taipei on what benchmark it is using, including both the performance of Western military equipment in Ukraine and ongoing contingencies in the Middle East. If China's reference point is Russia's easy jamming of missile and artillery strikes, or the United States' difficulties in countering drone attacks in the Middle East, Beijing would adjust its estimate of U.S. capabilities downward.[68] If this were the case, there would be little incentive to reveal a previously concealed technological offset.

Beijing could also leverage other instruments of power to signal U.S. military weakness. These messages could direct computational propaganda at specific audiences to shape long-term competition at regional, national, and even subnational levels.[69] For example, consider the September 2024 Houthi missile strike on Israel. Social media accounts likely linked to the Chinese Communist Party circulated messages in Arabic highlighting the fact that the new Houthi missiles were able to bypass multiple U.S. destroyers and a French frigate on the flight path of a new hypersonic missile.

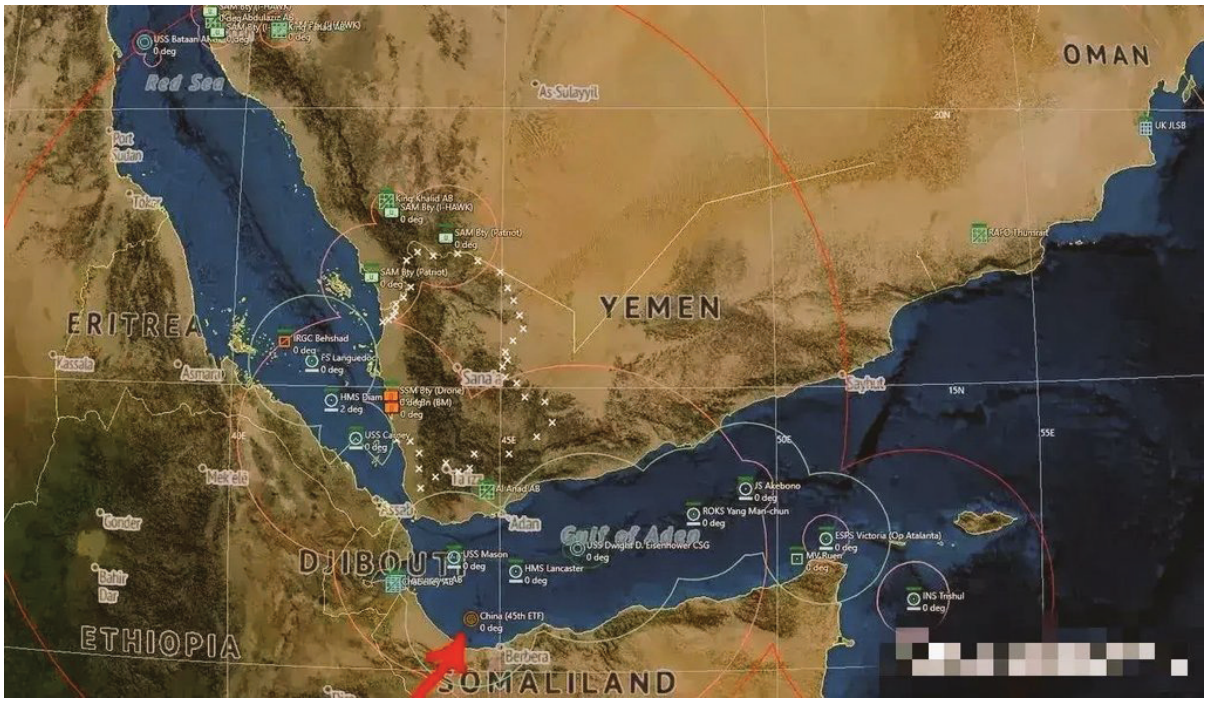


A Houthi missile bypasses U.S. destroyers.

Source: (@mog_china) on X.[70]

As seen in the X post below, Chinese social media accounts have broadcasted the failure of Western military assistance in Ukraine and how "powerless" Washington is in responding to Houthi attacks on Israel. These accounts use Command—a commercial wargaming software—to show a hypothetical battle featuring the Chinese 45th Expeditionary Task Force supporting Houthi anti-ship missile batteries and IRGC Behshad—a known Iranian spy ship—in the Red Sea. Of note, this is the same Chinese task force that operated in the Red Sea over the spring of 2024.[71] In other words, the CCP has used simulated battles to undermine perceptions of U.S. military capability. Seen in terms of the

formal model, this reduces the need to reveal new offsets and game-changers, giving Beijing more time to modernize its military and deny the United States the ability to invest in countermeasures.



X post showing how China could support Houthi and Iranian activity in the Red Sea to further erode U.S. missile defense.

Source: (@mog_china) on X; Google translated.[72]

Alternatively, if the reference point for Beijing was the ease with which the U.S. military has countered Houthi anti-ship cruise missiles and loitering munitions—or the role of the United States in helping to blunt the Iranian attack on Israel in April 2024—then Chinese leaders would face a different dilemma.[73] In that case, the new information would push Beijing to consider revealing new technology to rebalance the military ledger and dissuade Washington from intervening in a crisis. The new benchmark would incentivize revealing as a substitute for a more direct confrontation.

The United States would be driven by the same calculations. For instance, if leaders in Washington used the presence of systemic corruption and poor maintenance in the People's Liberation Rocket Force as a reference point, this would shift U.S. leaders' approach to crisis bargaining.[74]

The challenge is understanding how a rival state analyzes foreign military conflicts and uses them as reference points for both crisis bargaining and long-term innovation.[75] Often, intelligence communities are focused on studying capabilities, as opposed to looking at how leaders talk about foreign wars. Furthermore, decisions to keep offsets concealed during a crisis—especially when an adversary is seen to be expanding and modernizing its military arsenal—require a degree of strategic patience that is hard to sustain in a bureaucracy. A natural tendency toward threat inflation and worst-case-scenario bias creates an atmosphere that undermines rational bargaining by skewing

how analysts report on foreign military leaders and programs. Political leaders and competing factions inside national security establishments tend to seize on any threat report that backs their position. In this environment, pressure to reveal offsets risks triggering escalation—or worse, giving an adversary time to develop countermeasures to negate the new capability.

Conclusion

Revealing with Intent

Competition in the shadow of game-changing technology will continue to define great power rivalry in the twenty-first century.[76] While new military capabilities don't automatically lead to escalation, they do affect estimates of military power.[77] The resulting signaling dynamics shape crisis bargaining.

Formal models suggest that there are distinct moments when a rational actor should reveal new military capabilities. First, states can "reveal to substitute," using the demonstration of a previously concealed weapon to impact a rival's assessment of the costs and benefits of challenging the status quo. Second, a state can "reveal to reduce risk," using a display of novel technology to encourage an otherwise risk-acceptant rival to see the costs of pursuing a hostile course of action. Third, a state can "reveal to compensate," choosing to overcome a perceived imbalance in capability by showing an emerging disruptive technology.

Taken together, these different reveal logics suggest the need for reforms across the U.S. national security enterprise. These reforms should focus on developing processes and capabilities that support managing great power competition in the shadow of game-changing technology. Specifically, U.S. policymakers need to develop interagency campaign plans, integrate artificial intelligence and machine learning (AI/ML) into national security deliberations, and modernize analytical tradecraft.

DEVELOP INTERAGENCY CAMPAIGN PLANS

First, it is impossible to separate strategic reveals of new military technology from larger competitive strategy, namely integrated campaigns, which require building processes and planning tools that synchronize interagency activity. The current national security bureaucracy is neither

connected in a manner that supports information exchange and collaborative analysis nor designed to support dynamic planning and assessments. Worse still, there aren't interagency playbooks with preplanned–and legally reviewed–flexible deterrent and response option menus that could expedite crisis management. Absent more interagency support for integrated campaigning, decisions to reveal will likely be suboptimal, if not outright self-defeating.

The alternative is to **build integrated interagency campaign plans for managing long-term competition**. These plans would synchronize major defense plans with development and regional diplomacy. Most importantly, they would provide a large inventory of options for managing a crisis that would help determine if the uncertain benefits of revealing a technological offset during a crisis are worth the potential costs. Bridging interagency divides sets the conditions for strategic patience and more prudent management of great power competition. It allows leaders to choose an optimal time to "reveal to substitute" and consider how best to complement the demonstration of new technologies in order to check a risk-acceptant rival.

INTEGRATE AI/ML INTO NATIONAL SECURITY DELIBERATIONS

This vision is as much about aligning bureaucratic processes as it is about integrating AI/ML and running iterated experiments that help national security professionals synchronize their efforts. This integration should include expanding the current Global Information Dominance Experiments (GIDE) in the Office of the Secretary of Defense (OSD) to an interagency effort that tests different competition scenarios linked to military signaling–including the reveal of new capabilities–alongside sophisticated diplomatic and "inform and influence" activities.[78] These experiments could, in turn, lead to entirely new designs–from the way the National Security Council is structured to the adaptation of the Joint Strategic Planning System.[79] According to the formal model, a decision to reveal needs to be amplified and synchronized in order to properly signal to a rival and cause a desired adjustment in that state's cost and benefit calculation. **The United States can no longer afford loosely coupled, "coordination at the speed of bureaucracy" responses to great power competition**.

Integrating AI/ML into the national security enterprise is not difficult.[80] It just requires a willingness to optimize models and train the workforce on how best to work alongside algorithms. Human judgment will still remain central to strategic analysis, but analysts will gain efficiencies and save time, while policymakers will benefit from a wider range of alternative analysis.

MODERNIZE ANALYTICAL TRADECRAFT

Moreover, there is a large intelligence cost associated with efforts to estimate military power. Understanding when and how to reveal new military technologies requires detailed mapping of the national security enterprises of rival states, as well as an understanding of how different political and military leaders think about competition. This will likely require growing the range of methods applied to assessments and modernizing analytical tradecraft used in the intelligence community (IC). For too long, there has been a culture of forensic reporting in the IC. Military analysts count missiles; political analysts divine insights based on the profiles of key leaders. Too often, these estimates are not sufficiently integrated with advances in social science techniques, such as regression analysis and formal modeling. Worst is a phenomenon known as "truth by the tear line,"

in which more classified assessments are deemed to correspond most closely with reality. Analytical standards should evolve alongside academic research methods.

The IC is primed for a renaissance that embraces more rigorous analytic methods, opening the aperture of analysis to large data sets, formal models, and other novel techniques for testing assumptions and triaging competing hypotheses. This framework has to pivot from imagined wars based on worst-case scenarios to dynamic assessment of day-to-day competition using a novel mix of Bayesian analysis and data science. Understanding when and how to counter China and other authoritarian states will require better integration between technical intelligence and global campaigning activities, as well as a better understanding of the strategies and national security enterprises of partners. It will also require the creation of new processes for educating policymakers on how to consume intelligence. The stakes are too high to oversimplify complex findings and preface small sample conjecture for more rigorous assessments. The IC needs to use a deeper mix of models and methods to analyze competition.

The decision of when to reveal an offset during a crisis with a rival state is a deeply strategic one. It must be nested within robust intelligence estimates and linked to a strategic planning framework that includes preplanned interagency responses that amplify the signal and assess its efficacy. The current design and processes of the U.S. national security enterprise are up to the task. As it is, there are smart people struggling inside a broken bureaucracy, making any decision to reveal subject to diminishing strategic returns.

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