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# Avoiding the Brink

## Escalation Management in a War to Defend Taiwan

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## About the Authors



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## Executive Summary

**T**he United States is entering an unprecedented multipolar nuclear era that is far more complex and challenging than that of the Cold War. This report examines potential triggers, thresholds, and targets for Chinese nuclear use as well as options for the United States and its allies and partners to avoid and manage escalation. It uses the results of two exploratory tabletop exercises (TTXs) focused on how China's expanding nuclear arsenal could impact the risk of nuclear escalation in a conventional conflict over Taiwan.

From these two TTXs, the authors derived tentative insights into how nuclear escalation in a war over Taiwan might unfold and identified areas where further research is needed. First, the expansions and improvements projected for China's nuclear forces will provide it with a wider range of coercive options. With a secure second-strike capability and more diverse theater nuclear options, China may be willing to brandish its nuclear weapons to attempt to deter the United States from entering a war. There are few incentives to conduct nuclear strikes early in such a conflict, but a war over Taiwan might well lead to a protracted war between the great powers—another area where more study will be critical. The authors also found that American policymakers today might not find the PRC's nuclear threats credible because of its smaller arsenal size and historic policy of no first use (NFU). Furthermore, the authors found that attempts to degrade key conventional capabilities might lead either side to cross the other's red

lines, setting off an escalatory spiral and transforming a regional conflict into a great-power war. Both the United States and China will have to weigh the value of eliminating certain targets with the risk of crossing an adversary red line. Last, the authors found an asymmetry between the targets available to the United States and China in a Taiwan contingency. With fewer categories of targets to strike and types of capabilities with which to strike them, the United States may have fewer options to manage escalation. All these findings merit further study.

The two TTXs, conducted in summer 2022, pitted a U.S. Blue team against a Chinese Red team in a war over Taiwan. The two wargames were designed as a controlled comparison to focus on the impact of one specific variable—the size and composition of the PLA's nuclear arsenal—on the Red team's decision-making and its propensity to deliberately escalate and on the Blue team's ability to defend its allies and partners while managing escalation. By holding most other factors constant but changing Red's nuclear force structure, the authors aimed to concentrate on the role that nuclear weapons played. In TTX 1, the players had a notional 2027 order of battle with a nuclear arsenal of about 700 warheads, diverse in yield and delivery system type and range. The second TTX, set in 2030, included a similarly diverse Red arsenal of over 1,000 nuclear warheads. After analyzing the results of both exercises, the authors contextualized and expanded the findings through research on existing literature on nuclear deterrence and escalation.

## Key Findings and Recommendations

### FINDING

*A more survivable and diverse nuclear arsenal provided Red with coercive options.* A larger, more diverse nuclear arsenal not only increased the survivability of China's second-strike capability but also gave the Red teams the ability to threaten or employ nuclear weapons in a limited fashion. Neither Red team felt the need to employ a nuclear weapon early in the conflict, but both issued nuclear threats at the start of the war to dissuade U.S. involvement. In one TTX, Red employed a low-yield nuclear weapon against Guam in response to Blue team attacks on its mainland.

### RECOMMENDATION

Continue to explore how China might use nuclear weapons in a war over Taiwan and in other scenarios. Given the uncertainty about China's nuclear policy and doctrine, it is important to consider how China could use the weapons it is developing.

### FINDING

*Red saw little advantage in the employment of nuclear weapons early in a Taiwan conflict.* Because China's conventional capabilities are expanding with its nuclear capabilities, the Red teams did not feel pressured to use nuclear weapons early in a conflict, although they were willing to brandish them.

### RECOMMENDATION

Examine escalation dynamics and war termination during a protracted conflict. A growing body of evidence suggests that a short, sharp war in which China achieves a *fait accompli* or the United States defeats the initial invasion is unlikely.

### FINDING

*Neither team believed that its opponent would follow through on its nuclear threats.* Many Blue players seemed to place undue faith in U.S. escalation dominance because of its larger nuclear arsenal and secure second-strike capability. Blue players had trouble believing that Red would cross the nuclear threshold, given its current and past doctrine and posture, and underappreciated the fact that Red did not need nuclear parity to consider limited nuclear use. The Red teams were willing to consider limited nuclear use because they did not believe that Blue would respond

with a nuclear weapon in kind and thus they could keep the conflict from unduly escalating.

### RECOMMENDATION

Begin a campaign to educate national security officials about the implications of China's growing nuclear capabilities. American thinking about nuclear weapons and deterrence is shaped by the legacy of the bipolar Cold War era and outdated thinking about China's nuclear capabilities and policy, which could lead to misunderstandings and miscalculation.

### FINDING

*Attempts to degrade key conventional capabilities could trigger escalation.* To win the conventional fight, both the United States and China have an incentive to strike the other's territory, but such attacks cross Blue or Red red lines and thus came with significant risk of setting off a tit-for-tat escalation spiral.

### RECOMMENDATION

Better integrate nuclear and conventional planning to deliberately manage escalation. Since the end of the Cold War, nuclear weapons and deterrence have been siloed off from conventional military plans and operations, which should change with the implementation of integrated deterrence.

### FINDING

*Asymmetric target sets favor China and provide it with more options to manipulate risk.* The United States' force posture is distributed across the sea, allied territory, noncontiguous U.S. territories, noncontiguous states, and the continental United States; outside of the invasion force, most of China's most important military targets are located on the Chinese mainland. This fundamental asymmetry provides China with more graduated options than the United States to strike important military targets while avoiding the U.S. homeland.

### RECOMMENDATION

Consider whether the United States needs more conventional weapons or graduated nuclear options that can be employed against Chinese forces to provide it with more options for manipulating risk. It is not clear that different weapons will offset the fundamental distinction between the target sets, but the United States needs to develop creative concepts or additional conventional or nuclear weapons to be able to manipulate risk and manage escalation.

## Introduction

The United States is entering an unprecedented multipolar nuclear era that is far more complex and challenging than that of the Cold War.<sup>1</sup> In this environment, it must deter two nuclear great powers: a conventionally weakened Russia, which may be increasingly dependent on its large number of modernized nuclear weapons, many of which are optimized for theater use, and the People's Republic of China (PRC), with its fast-expanding nuclear arsenal and diverse delivery options. The 2022 National Defense Strategy and enclosed Nuclear Posture Review address both challenges but maintain that the PRC is the “overall pacing challenge for U.S. defense planning and a growing factor in evaluating our nuclear deterrent.”<sup>2</sup>

In recent years, the PRC seems to be moving away from a restrained nuclear posture, intended only to deter strategic nuclear attacks, toward a more robust deterrent and, potentially, warfighting capability by growing, modernizing, and diversifying its nuclear arsenal and delivery systems.<sup>3</sup> Officially, China's policy remains one of no first use (NFU) and assured retaliation, but its nuclear forces can no longer be characterized as “lean and effective,” as Beijing has historically claimed.<sup>4</sup> In

2022, the Department of Defense (DoD) reported that China had more than 400 nuclear warheads, and it has projected that China's arsenal would grow to 1,000 warheads by 2030 and 1,500 warheads by 2035.<sup>5</sup> China's comprehensive nuclear modernization not only expands

its weapons stockpiles but also improves its delivery vehicles' accuracy, survivability, and payload.<sup>6</sup> To reduce their vulnerability, some DF-41 intercontinental ballistic missiles (ICBMs) are road mobile, but the People's Liberation Army (PLA) Rocket Force (PLARF) is also constructing more than 300 missile silos for the DF-41s, which may be armed with multiple warheads.<sup>7</sup> The air and undersea components of the PLA triad are less developed but fast maturing. The PLA Air Force plans to procure more of the H-6N, a dual-capable, air-refuelable bomber that can carry an air-launched ballistic missile (ALBM), while testing and eventually fielding

its stealthy fifth-generation H-20 bomber.<sup>8</sup> To augment its currently limited undersea posture, the PLA Navy is developing the next-generation Type 096 ballistic missile submarine (SSBN), which will carry longer-range submarine-launched ballistic missiles than those on its current Jin-class SSBNs.<sup>9</sup> Moreover, the PLA is investing in improvements to early warning, strategic readiness, and command and control to support a launch-on-warning posture.<sup>10</sup>

In addition to this strategic triad, the PLA also boasts growing theater nuclear forces. Enhanced DF-21 medium-range ballistic missiles (MRBMs), DF-26 intermediate-range ballistic missile (IRBMs), and hypersonic-capable D-17 MRBMs can carry conventional and nuclear warheads.<sup>11</sup> Chinese military strategists have begun to write about the PLA's need for a lower-yield nuclear weapon, leading to speculation that the DF-26 IRBM might eventually be armed with a small warhead and used as a battlefield nuclear weapon.<sup>12</sup> The PLARF also has a robust arsenal of sophisticated short-range ballistic missiles and ground-launched cruise missiles. Currently, these shorter-range missiles are believed to have only a conventional mission, but they could potentially be modified in the future and used as nuclear delivery platforms. All these developments expand the

PRC options in a crisis or conflict, “to include nuclear coercion and limited nuclear first use.”<sup>13</sup>

Despite the changing Chinese nuclear posture, the PRC has not publicly modified its doctrine or declaratory policy since 2013.<sup>14</sup> Because the PLA's growing nuclear capabilities are arguably in tension with the PRC's nuclear policy, it is difficult

to predict how China may leverage or use nuclear weapons in peacetime or in a conflict.<sup>15</sup> The PRC might adhere to its NFU pledge and doctrine of assured retaliation, but it is developing capabilities that will give it the option to adopt new strategies and operational concepts. Given uncertainty about Chinese intentions, especially during a crisis or war, American strategists and military planners must consider what enhanced nuclear capabilities might enable the PLA to do.<sup>16</sup>

This is particularly important because some China watchers believe that the odds of China's invading Taiwan are growing as the balance of power within the

**China's nuclear forces can no longer be characterized as “lean and effective,” as Beijing has historically claimed. In 2022, the Department of Defense reported that China had more than 400 nuclear warheads, and it has projected that China's arsenal would grow to 1,000 warheads by 2030 and 1,500 warheads by 2035.**

First and Second Island Chains tilts in China's favor.<sup>17</sup> The head of the U.S. Indo-Pacific Command, Admiral John Aquilino, announced, "[T]his problem is much closer to us than most think."<sup>18</sup> His predecessor, Admiral Philip Davidson, said that China might try to invade Taiwan by 2027.<sup>19</sup> Since the end of the Cold War, the Pentagon had assumed, for the most part, that wars would remain at the conventional level and that no state would intentionally employ a nuclear weapon. The ongoing war in Ukraine has raised the specter of limited Russian nuclear use and could lead other states to conclude that nuclear threats are effective at limiting American military intervention.<sup>20</sup>

The situation in the Indo-Pacific is equally concerning, because the United States and its allies and partners are less mindful of and prepared to deal with the risks of nuclear escalation in that region. The United States and NATO have long studied Russian nuclear capabilities and doctrine and are acutely aware of the need to manage escalation. In contrast, China's nuclear weapons program is shrouded in secrecy and undergoing a significant transformation that is not well understood. All these factors significantly increase the risk that the parties might stumble into a crisis or conflict that quickly spirals.

This report aims to begin filling that gap in understanding by exploring the risk of nuclear escalation in the context of a Chinese invasion of Taiwan. In particular, the authors examined whether the size and composition of China's nuclear arsenal influenced its propensity to use nuclear weapons. The authors also sought to identify the conditions under which China might cross the nuclear threshold. For example, would China abandon its doctrine of NFU and threaten or use a nuclear weapon early in a conflict, as a part of its counterintervention strategy? Or would China consider nuclear use only in dire circumstances—if it were, for example, on the precipice of losing a war or thought the United States was attempting to eliminate its strategic retaliatory capability? What sort of nuclear employment guidance and operational concepts might China develop? Finally, what can the United States and its allies and partners do to attempt to manage escalation favorably?

To examine these questions, CNAS ran two exploratory tabletop exercises (TTXs) focused on how China's expanding nuclear arsenal could affect the risk of nuclear escalation in the context of a conventional conflict over Taiwan.<sup>21</sup>

This report is part of an ongoing stream of research on nuclear deterrence in a multipolar world.<sup>22</sup> Previous work surveyed the nuclear landscape of the United States and nuclear rivals. This report builds on that research

by examining potential triggers, thresholds, and targets for Chinese nuclear use, as well as U.S. and U.S. ally and partner options for avoiding and managing escalation. This research, funded by the Defense Threat Reduction Agency (DTRA), draws on existing theory and the results of those TTXs. It indicates that much remains unknown about Chinese nuclear policy and doctrine, but that an

**Given uncertainty about Chinese intentions, especially during a crisis or war, American strategists and military planners must consider what enhanced nuclear capabilities might enable the PLA to do.**

enhanced posture gives the PLA coercive nuclear options in a crisis or conflict that it did not have before. The authors also found that while China's growing nuclear arsenal did not incentivize early nuclear use in a war over Taiwan, such a war could descend into a protracted stalemate, in which there might be increased pressure to use nuclear weapons as conventional weapons stocks became depleted or in an effort to end the war on favorable terms. More needs to be done to study these critical issues.

## Methodology

To explore potential Chinese triggers, thresholds, and strategies for nuclear use, as well as U.S. options for avoiding and managing escalation, the authors conducted two strategic-level TTXs in summer 2022, pitting a U.S. Blue team against a Chinese Red team in a war over Taiwan. The Blue team represented high-ranking defense officials on the National Security Council, and the Red team represented members of the Central Military Commission. Both teams were tasked with developing strategic and high operational plans. They did not make decisions about detailed theater military operations or plans.

The two wargames were designed as a controlled comparison to focus on the impact of one specific variable—the size and composition of the PLA's nuclear arsenal—on the Red team's decision-making and its propensity to deliberately escalate and on the Blue team's ability to defend its allies and partners while managing escalation. By holding most other factors constant but changing Red's nuclear force structure, the authors aimed to concentrate on the role that nuclear weapons



played. The TTXs were consistent in design and scenario except for two factors.

First, participants differed between the games, eliminating the influence of player learning on the results of the second TTX. By including different China experts on the Red teams, the authors also were able to compare and contrast their perspectives, which helped in assigning confidence to certain insights. Participants included subject matter and policy experts from industry, academia, and government, including representatives from DTRA, the Office of the Under Secretary of Defense for Policy, and the intelligence community. Second, the Chinese nuclear force structure differed between games, allowing exploration of how the size and composition of the nuclear arsenal might affect Red and Blue options and decision-making. In TTX 1, the players had a notional 2027 order of battle with a nuclear arsenal of about 700 warheads, diverse in yield and delivery system type and range. The

second TTX, set in 2030, included a similarly diverse Red arsenal of over 1,000 nuclear warheads. (For the scenario and Red nuclear orders of battle, see Appendix A and Appendix B.)

The second TTX was slightly modified and improved on the basis of lessons derived from the first TTX. To spur greater consideration of Red's nuclear capabilities and the potential role they could play, the authors provided a graphical depiction of the order of battle and emphasized its size and diversity in the opening brief. A pre-move in which Red players had to define their nuclear employment guidance while Blue players determined a theory of victory was also included. Both TTXs included three moves, with public and private outbriefs of their decisions, which were adjudicated by a white cell. Both TTXs concluded with a full-group hotwash discussion.

After analyzing the results of both exercises, the authors contextualized and expanded the findings through research on existing literature on nuclear deterrence and escalation.



CNAS ran two exploratory TTXs examining a possible United States–China war over Taiwan in the 2027 and 2030 time frames. (iStock/Getty Images)



## Findings Summary

Through two tabletop exercises, the authors found that significant additional study is needed into the multifaceted and poorly understood issue of nuclear escalation in a potential conflict between the United States and China over Taiwan. Many Blue players remained stuck in a Cold War mindset, holding on to assumptions—for example, that strategic superiority would deter limited nuclear use—that might not prove true in today’s multipolar nuclear era. Likewise, some Red players suffered from a failure of imagination, hesitant to deviate from what they knew of China’s current nuclear policy. Both of these findings indicate that there has been insufficient thinking about the role of nuclear weapons in a China contingency. During and after the Cold War, the United States accumulated decades of research on Russian nuclear weapons and doctrine, and it needs to begin a similar research agenda for China. Policymakers must test those ideas and adapt for this new age. The need for additional study was the authors’ primary conclusion.

### **There has been insufficient thinking about the role of nuclear weapons in a China contingency.**

From these two TTXs, the authors also derived tentative insights into how nuclear escalation in a war over Taiwan might unfold: First, the expansions and improvements projected for China’s nuclear forces will provide it with a wider range of coercive options. With a secure second-strike capability and more diverse theater nuclear options, China may be willing to brandish its nuclear weapons to attempt to deter the United States from entering a war. There are few incentives to conduct nuclear strikes early in such a conflict, but a war over Taiwan might well lead to a protracted war between the great powers—another area where more study will be critical. The authors also found that American policymakers today might not find the PRC’s nuclear threats credible because of its smaller arsenal size and historic policy of NFU. Furthermore, the authors found that attempts to degrade key conventional capabilities might lead either side to cross the other’s red lines, setting off an escalatory spiral and transforming a regional conflict into a great-power war. Both the United States and China will have to weigh the value of eliminating certain targets with the risk of

crossing an adversary red line. Last, the authors found an asymmetry between the targets available to the United States and China in a Taiwan contingency. With fewer categories of targets to strike and types of capabilities with which to strike them, the United States may have fewer options to manage escalation. All these findings merit further study.

## Analysis

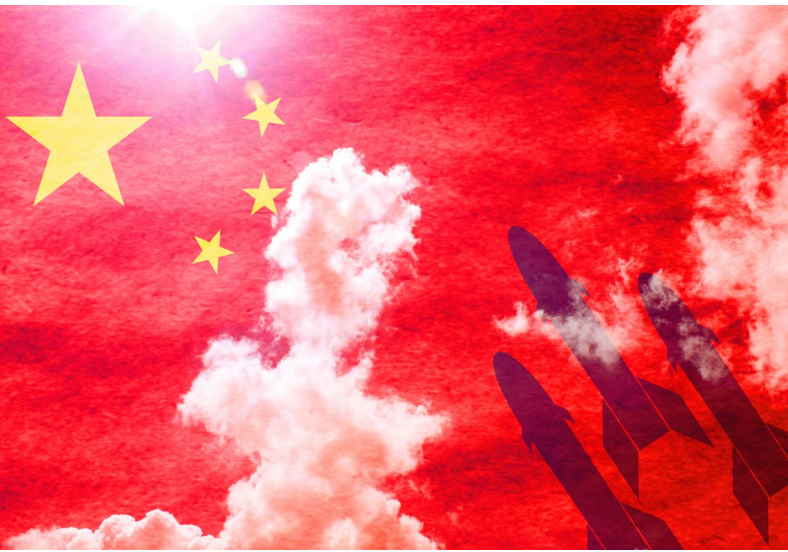
Games are not predictive but rather, indicative. The authors developed an exploratory game to consider how China *could* use its growing nuclear arsenal to its advantage in a conflict over Taiwan, not how it *will* or currently plans to act. Particularly, because there were only two iterations of the exercise, these findings should be viewed as tentative insights that point to issues where further research and analysis are needed.

### **A Nuclear Arsenal That Was More Survivable and Diverse in Yield and Delivery System Type and Range Provided Red with More Coercive Options**

By the Red players’ estimation, the notional 700-warhead nuclear arsenal of the first TTX (see Appendix B) was sufficient to provide a secure second-strike capability and options for limited theater nuclear strikes, allowing them to brandish their nuclear weapons coercively and employ them if necessary.<sup>23</sup> This was also true in the second TTX, in which the Red team wielded a 1,000-warhead arsenal. The size of both arsenals and the diversity of delivery systems and warhead sizes (5 to 300kt) expanded the types of attacks Red could threaten and the set of targets that Red could credibly hold at risk.

Whereas Blue players often focused on the quantitative inferiority of even an expanded Chinese nuclear arsenal to that of the United States or Russia, Red players did not believe they needed parity to insulate themselves from American nuclear coercion and to be empowered to issue nuclear threats or even employ nuclear weapons.<sup>24</sup> A more survivable, credible, and ready nuclear posture allowed the Red teams to threaten nuclear use in an attempt to limit third-party intervention, although it did not tempt them to use these weapons at the outset of the conflict.

In the first TTX, the Blue team assessed that its own second-strike capability remained intact, and it was not threatened by Red’s expanded nuclear arsenal. Blue never found Red’s nuclear threats credible, even when Red conducted a nuclear test. Ultimately, in the first TTX Red did not use a nuclear weapon because it believed that it was winning conventionally.



China is expanding its nuclear arsenal by building diverse delivery systems and a larger stockpile of nuclear warheads. (iStock/Getty Images)

Similarly, in the second TTX, the Blue team did not fully appreciate the possible use of a nuclear weapon up until Red launched in the second move. A Red player noted that in this fictional 2030 world, “Nuclear weapons are not black and white. We are using them in a gray zone.” Another agreed that there were “multiple escalation steps,” and that it was not a choice between “all-out nuclear war or nothing.” A third stated that with a “wider gamut of forces with variety of range and yield, we can achieve whatever we want to achieve” and that Red was “better positioned to use nukes than [Blue].” Perhaps for these reasons, the Red team did not worry much about the vulnerability of its nuclear weapons or dual-use systems to U.S. attacks. Much to the Blue team’s surprise, the Red team eventually did employ a very low-yield nuclear weapon, against Guam, in retaliation for Blue’s strikes on Red’s mainland and in an effort to shock the Blue team into ending the war.

### **Because of Its Enhanced Conventional Capabilities, Red Had Little Reason to Employ Its Expanded Nuclear Arsenal Early in a Conflict**

Throughout both TTXs, the pressure to consider nuclear use remained minimal. Although PLA military doctrine emphasizes striking quickly and aggressively, this emphasis has not traditionally translated to its nuclear doctrine.<sup>25</sup> As of 2022, China’s nuclear forces were postured for retaliatory strikes,<sup>26</sup> although changes in the nuclear arsenal such as those posited in this TTX may indicate a shift away from that posture. The authors instructed the Red teams to revise the PLA’s doctrine

by developing nuclear employment guidelines that could help China to achieve its goal of forcibly unifying with Taiwan.

In neither exercise did the Red teams feel the need to employ nuclear weapons in the opening days of the conflict as the ultimate counterintervention weapon. Red believed it could seize the initiative and cause enough pain to Taiwan and the United States without early nuclear strikes. Red’s expanded conventional capabilities gave Red players confidence that they could subjugate Taiwan through non-nuclear means (conventional, space, electronic warfare, and cyber) such that they would consider nuclear use only if the war became a stalemate. Because these TTXs were focused on the opening stage of a war, game play did not progress far enough to result in a protracted stalemate. In TTX 1, Red did discuss preemptive nuclear strikes, but the idea was quickly dismissed, and players resolved to “prioritize the conventional” fight. The Blue team felt confident in its ability to defend Taiwan and manage escalation using its conventional capabilities. In TTX 2, Blue expressed confidence in its conventional superiority but worried about the effects of this on escalation with one player noting:

*If [Red players] think they’ll lose conventionally, they’ll start thinking about whether nuclear options are needed. That puts us in a tough spot if we start winning the war conventionally. So once we decide we’re fighting for Taiwan we have to accept that risk.*

Another later worried: “We want to position ourselves to avoid being backed into using nukes because China has sufficiently degraded our conventional capabilities.”

Even in the later stages of the first TTX, pressure to employ nuclear weapons remained low, as both teams remained optimistic about their chances of prevailing conventionally. Blue believed it was winning the information war, controlling the narrative by painting Red as a pariah state holding Taiwan hostage. Moreover, Blue had avoided its worst-case outcome because Red had not attacked all its forces and bases throughout the region. For its part, Red believed it was winning because PLA forces had established a lodgment on Taiwan and it had installed a puppet government.

Although Red did not conduct an early nuclear attack, it did immediately brandish its nuclear weapons as a part of its coercive strategy toward the United States. In both games, the Red teams took a page from Russian President Vladimir Putin’s playbook, brandishing their growing nuclear arsenals to deter the United States from

coming to Taiwan's defense in the first move. To complement these threats, the Red teams publicly alluded to changes in their nuclear employment policies. One of the Red teams even conducted an atmospheric nuclear test over its own territory to enhance the credibility of its threat. The authors cannot draw many conclusions about the effectiveness of Red efforts to deter U.S. involvement, because the game rules required the Blue team to intervene, but in their deliberations, the Blue teams did not heed these threats or seriously worry that the Red team might quickly escalate to limited nuclear use.

In part, this was because both teams doubted the utility of nuclear weapons in shifting battlefield dynamics. In TTX 1, both teams concluded that nuclear weapons were valuable primarily for their coercive qualities. This remained true of both teams in TTX 2; even as Red launched a nuclear strike in its second move, it did so in a very limited way and primarily for psychological and coercive effect. For its limited nuclear strike, Red chose a military target—U.S. bases on Guam—primarily because it made the threat to conduct follow-on nuclear strikes against additional military targets more credible and limited escalation, while still shocking the Blue team by attacking a noncontiguous U.S. territory. One Red player described this attack as primarily an attempt to, “wrong-foot the opponent” even though it would not “materially change” the military balance. The teams, therefore, saw nuclear weapons primarily as tools for brinkmanship—that is, a classic “competition in risk taking, characterized not so much by tests of force as by tests of nerve.”<sup>27</sup>

From these two TTXs, which represent a small sample size, the authors tentatively conclude that once a conflict begins, if both parties have conventional military options available and they do not believe that they are on the verge of losing, the likelihood of significant nuclear escalation is low. In both TTXs the Red teams were quite willing to resort to the threat of nuclear use in an attempt to intimidate the Blue team and limit Blue's support to Taiwan. Nevertheless, Red's actual use of nuclear weapons was very circumscribed: it tested a nuclear weapon on its own territory and launched a very low-yield strike on Guam in response to Blue attacks on the Chinese mainland. If the war had devolved into a costly stalemate with one or both sides suffering significant attrition, this calculus might have changed.

### **Neither Team Believed That Its Opponent Would Follow through on Its Threat to Use Nuclear Weapons**

Red teams in both TTXs had difficulty convincing the Blue teams of the credibility of Red nuclear threats.

Blue teams tended to discount the possibility that Red might actually use a nuclear weapon, because of Blue's larger nuclear arsenal. Most Blue players were stuck in what was termed a “Cold War mindset,” in which they assumed that U.S. nuclear superiority and escalation dominance precluded adversary use of a nuclear weapon. One TTX 2 Blue player said, “We have escalation advantage at the top end for nuclear.” Because of these assumptions, Blue concluded that it could not be coerced. This Blue bias was rooted in a specific view of China's current nuclear capabilities and policy and a reticence to explore how Chinese policy might evolve with the capabilities provided to Red in these games. This failure of imagination was mirrored on the Red side in the first TTX, when players hesitated to deviate from what they knew of China's current nuclear policy.<sup>28</sup> Of course, Blue's escalation dominance did not prevent Red from employing nuclear weapons coercively for suggestive purposes and on the battlefield for instrumental purposes.

Even when Red conducted an atmospheric nuclear test to coerce Blue and to bolster the credibility of its nuclear threats in TTX 1, Blue players dismissed it. Public pressure and congressional outrage, which were not modeled in the TTX, might have forced the Blue players to respond differently to Red's test. In the hotwash discussion, one Blue player said, “The test was not terribly significant, because it didn't tell me anything I didn't already know.”<sup>29</sup> Furthermore, in TTX 2, when Red actually crossed the threshold and struck Guam with



*This picture shows a 2020 test of a U.S. Minuteman III ICBM. In the TTXs, the Red players did not believe that the United States would respond to a limited nuclear strike with its nuclear weapons. (Clayton Wear/U.S. Air Force)*



a nuclear weapon, Blue was surprised and held off on a counterstrike. At least one Blue player worried about a loss of Blue credibility if Blue did not respond in kind, but the team eventually decided to conduct an asymmetric conventional attack on the PLA's nuclear force, sinking the nuclear-armed submarines it was tracking. A Blue actor explained that such an action would "make the threat of Blue follow-on more credible by making [Red's] nuclear force less survivable." Blue did not fully believe just because Red had crossed the threshold that Red would escalate further. Even after the strike on Guam, Blue believed it could successfully manage escalation with Red and defend Taiwan. The Red team did not immediately respond with additional nuclear strikes, but it is unclear whether escalation could have been controlled had the game been continued.

Blue players were insistent that they not "self-deter," which resulted in their failing to heed credible Red nuclear threats. Despite knowing that Red's arsenal included small-yield weapons, Blue players either did not believe that a limited Red nuclear strike would be decisive or costly enough to change the course of the war or did not believe that Red would dare to cross the nuclear threshold. Blue either miscalculated, opening the door to inadvertent escalation, or determined that it was worth accepting the risk of limited Red nuclear use to execute its conventional war plans to defeat Red's invasion. Ultimately, Blue was surprised by the limited nuclear strike on Guam, and existing U.S. doctrine provided little guidance for how to respond.

Conversely, Red questioned the credibility of Blue's nuclear threat, even in response to limited nuclear use. Red players did not believe that Blue players would respond to a tactical nuclear strike with a nuclear weapon, which contributed to Red's decision to strike Guam in TTX 2. Red players anticipated that Blue would be unwilling to respond decisively and take on increased nuclear risk, and saw this situation as a political win, showing the United States to the world "as the paper tigers they are." Red was surprised with Blue's decision to strike Red SSBNs, another suggestive and instrumental move.

### **Attempts to Degrade Key Conventional Capabilities Unintentionally Set Off Escalatory Spirals and Transformed a Limited War over Taiwan into a Great-Power Conflict**

In a fight over Taiwan, the United States and China both have incentives to strike the other's territory. Most of the Chinese military capabilities that would support a Taiwanese invasion and threaten allies and partners in



*This U.S. Army Terminal High Altitude Area Defense battery defends Guam. In one TTX, the Red team launched missile strikes at Guam, including a low-yield nuclear weapon, which overwhelmed U.S. defenses and destroyed the air and naval bases on the island. (Adan Cazarez/U.S. Army)*

the region are based on the Chinese mainland, including various PLA headquarters, the intelligence, surveillance, and reconnaissance (ISR) assets that enable China's long-range precision-strike complex, and PLA air and naval bases. The easiest place to find the Chinese fleet is in port, and the easiest place to strike at Chinese aircraft is on the ground. Thus, advanced conventional precision-strike capabilities can provide the first mover with a decisive advantage, creating significant pressure to escalate early in a conflict.

For China, much of the same is true of the United States and the handful of critical nodes through which the United States projects power in the Indo-Pacific. Guam is a key American military hub, hosting U.S. air and naval forces and providing command and control, logistics, and ISR support to the East and South China Seas. In addition, Guam is politically significant as a U.S. territory. All of this makes Guam an operationally tempting but highly escalatory target for China. Similarly, China views any strikes on its mainland as extremely escalatory. The perception is partly due to the dual-use nature of many of its systems, including its command and control systems. Attacks by either side on such targets can set off a spiral of escalation.

The first TTX proceeded very gradually, with no Red mainland attacks or strikes on U.S. territory. Escalation was controlled and the conflict remained quite restrained through all three moves. In the second TTX, Red players began with a series of aggressive but conventional

opening strikes, against U.S. bases in Japan, Australia, the Philippines, and Guam, to prevent American forces from effectively intervening on the side of Taiwan. Blue players also launched early strikes, on the Chinese mainland after the Chinese invasion had begun. One Blue player explained the imperative for this escalatory action, saying, “This is the U.S. problem: to stop an invasion of Taiwan, we have to hit the Chinese homeland, which opens up our mainland to attack.” While Blue hoped to convey some restraint in target selection on the mainland, Red players did not appreciate (or chose not to appreciate) the distinction. In response to Blue attacks on the Chinese mainland, the Red team escalated to conventional strikes on the U.S. mainland and employed a low-yield nuclear weapon against Guam. Both sides were surprised by the early aggressive attacks and quickly felt locked into a tit-for-tat pattern of escalation.

The local fight over Taiwan quickly fell away as most of the players on both teams focused on a broader contest of wills. One Blue player said, “We were actually talking so much about the mainland, we had to remind ourselves about Taiwan.” This may be due in part to the fact that players were told to represent National Security Council-level decision-makers, as opposed to theater commanders. Yet even as the white cell briefed out the state of the war in Taiwan and highlighted developments on game maps, the Red team in particular focused its discussion and actions on imposing and threatening costs to compel its adversary to back down, rather than on how to win the conventional fight in Taiwan.

### **Asymmetric Target Sets Favored Red and Gave It More Options for Risk Manipulation**

Discussions of escalation dynamics often compare two states’ nuclear weapons with a focus on their yield and accuracy.<sup>30</sup> If nuclear forces can be located, precision-guided weapons can accurately target them, thereby enabling counterforce strategies that aim to destroy an enemy’s nuclear retaliatory capability.<sup>31</sup> Moreover, accurate weapons armed with low-yield nuclear warheads can significantly reduce collateral damage, thus enhancing the credibility of an actor’s deterrent threat.<sup>32</sup> The 2018 Nuclear Posture Review, for example, argued that the United States needed flexible and low-yield nuclear weapons so as to have credible options to respond to limited nuclear use and “help ensure that potential adversaries perceive no possible advantage in limited nuclear escalation.”<sup>33</sup>

Escalation, however, is also associated with the target sets.<sup>34</sup> Typically, military targets are viewed as more legitimate and less escalatory than civilian targets.

Counterforce strikes against an enemy’s nuclear forces are an exception and may be viewed as highly escalatory because they may be interpreted as the leading edge of a disarming first strike. Also, there is often a red line drawn between strikes outside of and on a nation’s territory.

The United States and China present asymmetric targeting sets, which have implications for escalation management and the manipulation of risk. China has a varied and graduated set of targeting options when it looks at U.S. force posture, including American bases on allied territory (e.g., Japan, Australia), noncontiguous U.S. territories (e.g., Guam, the Northern Marianas), noncontiguous states (Alaska and Hawaii), large warships (e.g., carriers and amphibious ships), and the continental United States. Although conventional attacks against a third party that hosts U.S. forces, such as Japan or Australia, are escalatory and could cause those nations to enter the conflict as belligerents, they are less likely to elicit an American nuclear response. In contrast, the

**In both TTXs, the Blue and Red teams believed that attacks by the opponent on their territory crossed an escalation threshold, but viewed their own conventional strikes on enemy territory as limited and necessary.**

United States has few options beyond targeting a Chinese invasion force crossing the Taiwan Strait or hitting the small, isolated islands in the South China Sea, Hainan Island, or mainland China. The biggest difference is that China does not have any allies hosting PLA forces that could be targeted by conventional strikes. As a Red team player in the second TTX observed, “They [Blue] don’t have that luxury against us unless they want to attack the Chinese homeland, giving us greater options.”

In both TTXs, the Blue and Red teams believed that attacks by the opponent on their territory crossed an escalation threshold, but viewed their own conventional strikes on enemy territory as limited and necessary. Yet as discussed previously, conventional military requirements pushed each side to risk escalation by undertaking strikes on the other’s territory. The difference was that Red attacked a territory, believing such an attack less escalatory than attacking one of the 50 states, whereas Blue launched strikes against Red military targets within China’s mainland.

Despite being separated from the Chinese mainland, Hainan Island, which is a formal Chinese province, was viewed as essentially mainland territory by both Blue and Red teams. The Blue team tried to differentiate Red's coastal military targets from inland targets, but Red refused to accept the distinction. Because most of Red's forces were based in its homeland, Blue had few options for gradually escalating and manipulating risk in an effort to compel Red to back down. Moreover, while Red had conventional and nuclear weapons for all potential Blue targets, Blue did not have the appropriate seekers that its nuclear weapons needed to discriminatingly and effectively sink Red's invasion fleet. As a result, in one TTX, Blue eventually availed itself of one of the few options it had that Red did not: sinking its opponent's SSBNs.

## Key Findings and Recommendations

### FINDING

***A more survivable and diverse nuclear arsenal provided Red with coercive options.*** A larger, more diverse nuclear arsenal not only increased the survivability of China's second-strike capability but also gave the Red teams the ability to threaten or employ nuclear weapons in a limited fashion. There did not seem to be a difference in the Red teams' behavior based on whether they had 700 or 1,000-plus nuclear weapons, nor did it change Blue's views on Red. Neither team in either TTX felt the need to employ a nuclear weapon against an enemy early in a Taiwan conflict, because they also had improved conventional capabilities. Both Red teams issued nuclear threats at the start of the war to dissuade the United States from getting involved. One Red team eventually used a low-yield weapon against Guam in response to Blue attacks on China's mainland. In short, the Red teams felt that they had a secure second-strike capability and were better positioned to brandish nuclear weapons coercively and employ them if necessary. China does not need to quantitatively match the United States' nuclear capabilities for it to become a far more significant nuclear threat.

### RECOMMENDATION

Continue to explore how China might use nuclear weapons in a war over Taiwan and in other scenarios. Given the uncertainty about China's nuclear policy and doctrine, it is important to consider how China could use the weapons it is developing. Although China may claim that it does not intend to employ nuclear weapons except in retaliation for a nuclear attack, its policy and doctrine could change. The United States has built up decades of

accumulated research on Russian nuclear weapons and doctrine, and it needs to begin a similar research agenda for China.

### FINDING

***Red saw little advantage in the employment of nuclear weapons early in a Taiwan conflict.*** Because China's conventional capabilities are expanding with its nuclear capabilities, the Red teams did not feel pressured to use nuclear weapons early in a conflict, although they were willing to brandish them. In their view, nuclear weapons were best used to shift the balance of resolve and compel the United States and Taiwan to capitulate.

### RECOMMENDATION

Examine escalation dynamics and war termination during a protracted conflict. A growing body of evidence suggests that a short, sharp war in which China achieves a fait accompli or the United States defeats the initial invasion is unlikely. Instead, if the Taiwanese strongly resist an invasion, a Chinese amphibious assault could turn into a protracted conflict, in a scenario that has been underexamined.

### FINDING

***Neither team believed that its opponent would follow through on its nuclear threats.*** Many Blue players seemed to place undue faith in U.S. escalation dominance because of its larger nuclear arsenal and secure second-strike capability. Blue players had trouble believing that Red would cross the nuclear threshold, given its current and past doctrine and posture, and underappreciated the fact that China did not need nuclear parity to consider limited nuclear use. The Red teams were willing to consider limited nuclear use because they did not believe that Blue would respond with a nuclear weapon in kind and thus they could keep the conflict from unduly escalating. In an effort to make its nuclear threat more credible, one of the Red teams tested a nuclear weapon. However, even this test did not alter the calculation of the Blue team, which viewed the test as posturing—more of a bluff than a signal that Red was willing to run significantly greater nuclear risk.

### RECOMMENDATION

Begin a campaign to educate national security officials about the implications of China's growing nuclear capabilities. In particular, efforts should focus on individuals in the Office of the Secretary of Defense, the Joint Staff, Strategic Command, the Indo-Pacific Command, the Defense Threat Reduction Agency, and the National



Security Council. This effort needs to be part of a broader campaign of learning to understand nuclear deterrence in a multipolar world. American thinking about nuclear weapons and deterrence is shaped by the legacy of the bipolar Cold War era and outdated thinking about China's nuclear capabilities and policy, which could lead to misunderstandings and miscalculation.

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#### FINDING

***Attempts to degrade key conventional capabilities could trigger escalation.*** To win the conventional fight, both the United States and China have an incentive to strike the other's territory. Other than the invasion force, most of the Chinese military capabilities supporting the attack are on the mainland. This includes headquarters, intelligence, surveillance, and reconnaissance assets that enable China's long-range precision-strike complex, and air and naval bases. Moreover, it is easier to find the Chinese fleet when it is in port than when it is transiting the strait. From China's perspective, Guam is such a critical American power projection node that it needs to be disabled early in the conflict to give the Chinese invasion a chance of succeeding. The problem is that attacking Guam or the Chinese mainland crosses Blue or Red red lines and thus comes with significant risk of setting off a tit-for-tat escalation spiral.

#### RECOMMENDATION

Better integrate nuclear and conventional planning to deliberately manage escalation. Since the end of the Cold War, nuclear weapons and deterrence have been siloed off from conventional military plans and operations. Although integrated deterrence aspires to incorporate all tools across the full spectrum of conflict, American military planning still segregates and ultimately de-prioritizes nuclear operations. The DoD needs to better integrate planning across the full spectrum of conflict to better account for and manage escalation risks.

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#### FINDING

***Asymmetric target sets favor China and provide it with more options to manipulate risk.*** The United States force posture is distributed across the sea, allied territory, noncontiguous U.S. territories, noncontiguous states, and the continental United States; outside of the invasion force, most of China's most important military targets are located on the Chinese mainland. This fundamental asymmetry provides China with more graduated options than the United States. In the TTXs, the asymmetry was especially acute because Blue did not have nuclear weapons with the appropriate seekers for targeting ships,

leaving it little choice but to quickly cross the threshold of attacking the Chinese mainland if it were to employ nuclear weapons.

#### RECOMMENDATION

Consider whether the United States needs more conventional weapons or graduated nuclear options that can be employed against Chinese forces to provide it with more options for manipulating risk. It is not clear that different weapons will offset the fundamental distinction between the target sets, but the United States needs to develop creative concepts or additional conventional or nuclear weapons to be able to manipulate risk and manage escalation.

Appendix A: TTX Scenarios

The TTX 1 scenario, set in 2027, and the TTX 2 scenario, set in 2030, both posited that the People’s Republic of China (PRC) had not only failed to force Taiwan to unify through political, economic, and military coercion, but had strengthened the Taiwanese pro-independence movement, leading to a crisis. While helping to reshape Taiwan’s military in the mold of Ukrainian self-defense forces, the United States countered the PRC by creating an informal coalition with Australia, the United Kingdom, and Japan and strengthening the resiliency of its posture. The PRC’s People’s Liberation Army (PLA)

invested in logistics and training for large-scale joint combat operations, while building more ships, aircraft, and missiles. The PLA also continued to grow and diversify its nuclear arsenal, which comprised more than 700 warheads for TTX 1 and more than 1,000 warheads, including many non-strategic delivery systems and very low-yield warheads (<5 kilotons), for TTX 2. Each exercise began on the precipice of war, as Taipei refused to capitulate to PRC demands for unification talks while the PLA built up a large invasion force in the Eastern Theater Command.

Appendix B: TTX Orders of Battle

RED NUCLEAR ORDERS OF BATTLE

Type	TTX 1 Missiles (2027)	TTX 1 Warheads (2027)	TTX 2 Missiles (2030)	TTX 2 Warheads (2030)
Short-Range Ballistic Missile	650	100	650	100
Medium-Range Ballistic Missile	620	55	900	65
Air-Launched Ballistic Missile	40	20	40	20
Intermediate-Range Ballistic Missile	300	50	500	90
Intercontinental Ballistic Missile	203	328	428	578
Ground-Launched Cruise Missile	600	50	1,000	50
Air-Launched Cruise Missile	500	50	2,000	50
Submarine-Launched Ballistic Missile	84	96	122	172

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