

PREVAILING UNDER THE NUCLEAR SHADOW

A New Framework for US Escalation Management

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EXECUTIVE SUMMARY

The United States has characterized today's geopolitical environment as a "long-term, strategic competition between nations."¹ This competition includes renewed emphasis on the role of nuclear weapons in international affairs by the nuclear-armed competitors of the US—Russia, China, and the Democratic People's Republic of Korea (DPRK). These adversaries view competition with the US as having a nuclear dimension that is not confined to high-end warfare. Accordingly, the US must anticipate that nuclear weapons will play a central role in a regional conflict with any of these opponents.

This reality underscores the importance of preparing policy-makers to manage escalation during a conflict taking place under the nuclear shadow. The use of nuclear weapons in a war between the US and its allies and Russia, China, or the DPRK would be not only militarily significant, but would also have major political and normative consequences. Yet practical concepts for escalation management are lacking in the post-Cold War, contemporary great power context.

To fill that gap, this report proposes foundational elements for a nuclear escalation management framework. This novel framework leverages key concepts from escalation theory and risk management literature to create a structured, analytical process for US policy-makers and planners to evaluate potential

courses of action (COAs) that could be employed to achieve favorable escalation management with nuclear-armed competitors.

CNA PROPOSED FRAMEWORK FOR NUCLEAR ESCALATION MANAGEMENT

The proposed framework outlined in this report consists of three foundational elements for developing tailored escalation management strategies.

Objectives of US escalation management

The first foundational element of the framework consists of the objectives of US escalation management. Irrespective of the adversary or scenario, in any confrontation in which the US would be seeking to manage potential escalation, there would be four objectives:

1. Limit the scope and intensity of a conflict.
2. Achieve war and overall political aims at the lowest possible cost.
3. Assure US allies and deter attacks on their vital interests.
4. Facilitate the de-escalation, and ultimately the termination, of the conflict.

EXECUTIVE SUMMARY

Tools of US escalation management

The second foundational element of the framework consists of the tools of escalation management. US decision-makers can leverage these four basic tools to achieve their goals, irrespective of the adversary or scenario. They are:

1. Deterrence operations.
2. Employment of military force.
3. Messaging.
4. Off-ramps/palatable alternative outcomes.

Although these tools and objectives, and their prioritization, will likely change based on circumstance, understanding them is a prerequisite for successful escalation management.

Five-phase nuclear escalation management process

For the third foundational element of the framework, CNA created a five-phase nuclear escalation management process that can be applied across actors and scenarios as the connective tissue between the first two framework elements. CNA designed this process because, between the objectives and tools of US escalation management, there exists a trade space for potential COAs that leverage these tools to achieve desired goals.

Each phase of the process poses a set of key questions about factors that may drive or curb escalation. These questions aim to challenge potential assumptions, spark discussion, and explore potentially under-examined escalation dynamics.

The five-phase process consists of the following steps:

1. Develop a strategic profile of the potential US adversary, US ally, and the US.
2. Conduct an “escalation audit” to identify scenario-relevant adversary, ally, and US escalation thresholds and potential flashpoints that may result from employing a selected COA.
3. Analyze the potential strategic and operational impact of the identified thresholds and flashpoints.
4. Take stock of previous answers and assess the vetted COA’s coherence with US foreign policy.
5. Where possible, implement the decided-upon COA or series of vetted COAs through simulated interactive formats such as tabletop exercises or wargames to evaluate its impact, repeating the cycle as needed and incorporating any lessons learned.

Taken together, these elements create a cohesive framework.

This novel framework should position US planners and policy-makers to judge whether planning, operational concepts, and peacetime messaging under development are consistent with the escalation management objectives named in this report and others. The framework should also help identify shortcomings in current concepts and capabilities.

Although adopting this framework cannot eliminate completely the risk of nuclear escalation, it can help US practitioners prepare to manage escalation and prevail in conflict under the nuclear shadow.

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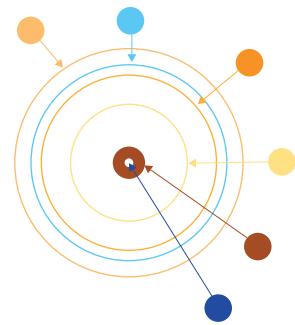
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INTRODUCTION

The US national security community is confronting the re-emergence of great power competition (GPC), which had largely subsided with the end of the Cold War. Many features of this competition are familiar from the past. At the same time, elements of today's competitive landscape have evolved from the geopolitical and technological backdrop that accompanied the nuclear competition between the US and the former Soviet Union. This evolution has manifested in two key ways.

First, there has been a prioritization of old and new US competitors. The *2018 National Defense Strategy* and *2018 Nuclear Posture Review* characterize the current strategic environment as a “long-term, strategic competition between nations.” This competition

includes renewed emphasis on the role of nuclear weapons in international affairs by the primary competitors of the US—Russia and China—which have developed asymmetric capabilities for countering US primacy in conventional weaponry.² In addition, the US focus on Russia and China does not overshadow US concerns with what it terms “rogue regimes.” Most germane of these regimes is the Democratic People’s Republic of Korea (DPRK), which is trying to compete with the US by increasing its nuclear potential and seeks regime security for its authoritarian leadership.³ It continues to make strides in developing a credible nuclear deterrent that places at risk US allies in the Indo-Pacific region and parts of the US homeland.⁴



Kim Jong-un, Supreme Leader of the Democratic People's Republic of Korea.
(KCNA-Yonhap)



President Xi Jinping of the People's Republic of China. (Chris Ratcliffe-Pool/
European Pressphoto Agency)



President Vladimir Putin of Russia.
(Alexei Druzhinin/Agence France-Presse)



INTRODUCTION

Second, despite enduring appreciation for the potential risk of low-order conflict encouraging escalation up to large-scale war or nuclear war, there is a growing availability of options for escalation at lower levels of the spectrum of conflict. These options span multiple warfare domains and may leverage new technologies to “project potentially decisive influence over an enemy at great distances.”⁵

All three nuclear-armed states of concern—Russia, China, and the DPRK—view strategic competition with the US as having a nuclear dimension not confined to high-end warfare. For these competitors, nuclear forces are a deterrence tool that plays “a foundational and active role across all phases of crisis and conflict.”⁶ Their deterrence value goes beyond preventing nuclear war by casting a shadow across US conventional operations that would impede these competitors’ strategic interests.

Accordingly, the US must anticipate that nuclear weapons will play a central role in a regional conflict. This does not necessarily mean that these weapons will be employed, rather the shadow they would cast would almost certainly be leveraged for coercion, blackmail, and brinkmanship. Limited nuclear use may also be perceived as a way to provide decisive victory either by achieving employment objectives or winning a contest of resolve.⁷

This reality underscores the importance of preparing policy-makers to manage escalation during a conflict under the nuclear shadow. The use of nuclear weapons in a war between the US and allies and Russia, China,

or the DPRK would be not only militarily significant but would also have major political and normative consequences. Furthermore, because the US lacks practical experience with nuclear escalation occurring in war between two or more nuclear-armed states, it is all the more important to prepare for such a possibility, given the current strategic environment.

Yet practical concepts for escalation management are lacking in the post-Cold War era—a critical shortcoming that must be addressed. Absent a strategic plan for checking escalation, decision-makers will inevitably conclude that the potential costs of the US confronting a nuclear-armed adversary will outweigh US interests.⁸



For these competitors, nuclear forces are a deterrence tool that plays “a foundational and active role across all phases of crisis and conflict.”

This study meets this conceptual gap by proposing a novel nuclear escalation management framework composed of three foundational elements: the objectives of US escalation management, the tools of US escalation management, and the five-phase nuclear escalation management process (which is available in an appendix as a pull out summary). This framework is designed to be applicable across a range of potential scenarios and actors. It can be used as an analytical support tool to develop operational plans by considering escalation risks to potential COAs in a methodical and organized manner that will better position the US to manage escalation successfully in a potential confrontation.

The framework is focused primarily on ensuring that nuclear escalation management is emphasized as part of war planning. It also could serve as a



blueprint for developing a similar process to address real-time escalation risks during crisis and conflict. The foundational elements proposed in this report are intended as a starting point for further research and debate on how to manage nuclear escalation effectively in this new era of GPC.

APPROACH

The CNA study team developed the nuclear escalation management framework in three phases. The first phase consisted of a literature review of nuclear escalation theory and escalation management concepts to root the framework in insights from academic writings. We reviewed recent writings on emerging technologies and domains, such as cyber and counter-space weaponry, to gain an understanding of escalatory risks to nuclear deterrence in the 21st century environment. We also conducted a literature review of a relevant (though infrequently leveraged) discipline, risk assessment and risk management.⁹ The study team determined that the field of risk management had potential value for considering other tools that minimize risk and could be applied to nuclear escalation risk.

The second phase involved semi-structured discussions with subject matter experts (SMEs), who were a mix of both current and former practitioners in the US government. We examined the challenges of nuclear escalation management, how escalatory decisions are made, and what should be included in a nuclear escalation management framework.

In the third phase, another group of SMEs, convened for this purpose, reviewed a first draft of the framework. During this roundtable session, the study team and SMEs also walked the framework through an escalatory vignette (available as an appendix) developed for the study to apply the framework to potential COAs and derive additional insights.

Section 1 of this report presents study team insights derived from the escalation and risk assessment and risk management literature in order to establish a conceptual baseline, provide background to the proposed framework, and explain how it helps contribute to the existing scholarship on nuclear escalation. Section 2 presents CNA's proposed nuclear escalation management framework and reviews its foundational elements. It also outlines how each element contributes to escalation management. Section 3 concludes by discussing prospective follow-on lines of research.

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INSIGHTS FROM ESCALATION AND RISK THEORY KEY TO 21ST CENTURY ESCALATION MANAGEMENT



In the first phase of research conducted for this report, the study team performed a literature review on escalation theory and escalation management. The study team also examined risk literature with the view that, because escalation management involves addressing escalatory risk, there may be concepts from risk assessment and risk management theory applicable to the problem of escalation. This research revealed limited existing application of these methods to the strategic concern of nuclear escalation. However, the study team found valuable insights relevant to this report from US government and Department of Defense (DOD) efforts to leverage these methods to forecast potential risks to their strategic goals and proactively develop mitigation measures.

This section provides key insights from the conceptual ideas in escalation management and risk theory that helped build this report's proposed nuclear escalation management framework.

INSIGHTS FROM ESCALATION THEORY

The study team's review of escalation theory and escalation management literature yielded six key insights described below.

- First, because escalation is a complex phenomenon, any study on this topic requires developing a working definition of *escalation*.

- Second, escalation is in the eye of the beholder—whether a given act is considered escalatory is a matter of perception.
- Third, the ways that actors perceive different actions depend heavily on context and circumstance.
- Fourth, flowing from the above insights, the evidence suggests that controlling escalation is highly difficult. Thus, a more realistic goal is escalation management.
- Fifth, escalation can occur in several different ways. Therefore, understanding the different escalatory modes is useful for escalation management.
- Sixth, escalation can take several different forms—for example, vertical and horizontal. Thus, a clear conception of the different forms of escalation management is useful for escalation management.



Defining escalation

Because escalation is a complicated phenomenon, any study of the topic requires a clear working definition. In 2008, the RAND Corporation released a study titled *Dangerous Thresholds: Managing Escalation in the 21st Century*; it defined *escalation* as “an increase in the intensity or scope of conflict that crosses the threshold(s) considered significant by one or more of the participants.”¹⁰ This definition is compelling for this report because it subtly addresses concepts of perception, thresholds, and the different possible dimensionalities of escalation.

Teasing apart this definition’s components yields the next set of valuable insights unpacked below.

Escalation is in the eye of the beholder

The first of these valuable insights is contained in its treatment of perception. It states that for escalation to occur, one of the involved parties must perceive that, as a result of this increase or expansion, there has been a “significant qualitative change in the conflict.”¹¹ Building on this point, deterrence theorist Herman Kahn notes that the threat of escalation can cast a shadow over the period prior to conflict (e.g., low-level crises and disagreements) and other important decision points.¹² He concludes that not every dispute will necessarily lead to a full-blown crisis, and that often the likelihood of escalation depends on the relationship of the parties in question.¹³ Thus, it is not only the concrete military facts of a conflict but also the ways that participants perceive those facts that will shape escalatory outcomes.

Escalation is highly contextual and situationally driven

Because escalation relies on perceptions, it is a context-dependent phenomenon. Motivations to escalate, or not, will often stem from the conditions of the current environment and the historical interactions and relationship between the parties. The perception that escalation has in fact occurred is also highly context dependent and often situationally driven. A combatant’s perception that there has been a “significant qualitative change” in a confrontation is usually arrived at by crossing a “threshold” (whether explicit or implied) it has deemed significant.

This implies that perceptions hinge on thresholds. Thresholds exist situationally and are not pre-defined. Indeed, sometimes the holder of a threshold may be unaware of its existence until it is crossed.¹⁴ Yet they are real enough to shape world events. The relative magnitude—whether discretely measurable or incrementally small (i.e., gradual action)—of the step taken to cross the boundary does not matter as much as the fact the threshold was crossed.¹⁵ Even what appears to be a small incursion can be considered significant if it crosses a threshold that a combatant deems to be of strategic interest.

Escalation:
“An increase in the intensity or scope of conflict that crosses the threshold(s) considered significant by one or more of the participants”



Escalation management is a more realistic goal than escalation control

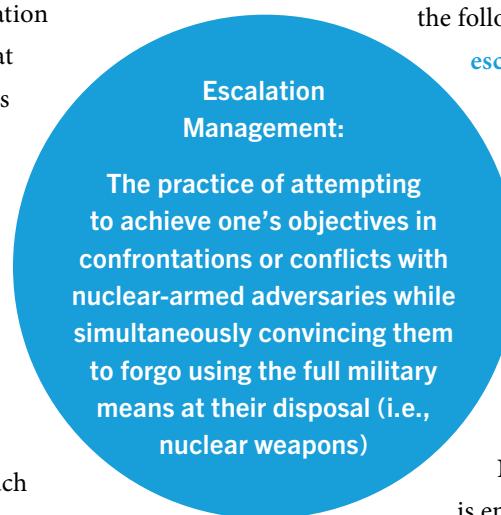
Given the exigencies of perception and misperception and the uncertainties that surround these thresholds, *controlling* escalation, in the normal sense of the word, is a difficult pursuit. Escalation is an interactive phenomenon that involves more than one party. It is not possible for one sovereign party to regulate totally another sovereign state's actions and reactions, unless the party is in the position to use force to get what it wants through enforced cooperation. When the competitors are nuclear-armed states, this approach carries significant risk.¹⁶ Even if one party enjoys a superior position over another and holds powerful coercive leverage, states may still resist in unexpected—even creative—ways.¹⁷

Although escalation cannot be controlled in the traditional sense, the risk of escalation—including up to nuclear escalation—can be *managed*. This management can involve both deterrent and coercive measures that seek to exploit an adversary's fears and expectations to manipulate its choices. A classic example suggested by Thomas Schelling is to impose on the opponent the choice to avoid the “last clear step into certain disaster” through a game of brinkmanship that compels them to back down.¹⁸ It can also involve mitigation measures that attempt to counter the potential negative impact from an escalatory action on the party's ability to fulfill objectives. The success of escalation management strategies will hinge at least

partially on how well one party shapes an opponent's perceptions through these measures.

Taking this into consideration, as well as the study's scope of considering escalation in the context of potential nuclear weapons use, this report will use the following working definition of

escalation management: the practice of attempting to achieve one's objectives in confrontations or conflicts with nuclear-armed adversaries while simultaneously convincing them to forgo using the full military means at their disposal (i.e., nuclear weapons).



Nuclear escalation management is enormously complex. It requires a state to take steps simultaneously to increase the risks of escalating in the mind of an opponent and mitigate the potential consequences of those risks, while facing an adversary seeking to do the same. This occasionally might require constraining US operations to convince a potential adversary to forgo a dangerous escalation that may provide them a strategic or operational advantage, while simultaneously communicating through words and deeds that US restraint is contingent upon adversary restraint.

Striking such a balance is a strategic challenge; there is no clear set of instructions for doing so. Because each instance of escalation can vary because of its contextual dependency, previous experience may prove inapplicable. Nonetheless, there are clear conceptions of the ways escalation can manifest that do hold relatively constant across scenarios.



Manifestations of escalation

The fifth insight from escalation theory centers on what some researchers call the mechanisms of escalation. The study team believes they are better termed as modes of escalation because, ultimately, these characterizations are decided upon by how they are experienced and how they are intended to be executed. These modes are **deliberate, inadvertent, and accidental escalation**. Our final insight concerns the forms of escalation, or **vertical, horizontal, political, and cross-domain** escalation.¹⁹

Modes of escalation

Deliberate escalation is the crossing of an opponent's threshold with intentional action. It is a motivated choice and usually has a set of specific goals catalyzing it. The most common goals behind deliberate escalation are exemplified by instrumental and suggestive escalation. Instrumental escalation is the decision to take an escalatory action with the expectation (or at the very least, the hope) that it will improve one's standing or advantage in a confrontation. This choice seeks tangible tactical and operational benefits. Suggestive escalation is the choice to escalate to send a signal to an opponent and communicate the risk of consequences to deter potential behavior and actions. These two motivations can, and do, tend to overlap in practice.

Inadvertent escalation is the act of crossing an opponent's threshold with an intentional action that brings unintended and unexpected escalatory reaction.

For example, an air campaign designed to cripple an enemy's conventional military command and control systems could have the unintended consequence of degrading collocated nuclear command and control systems. Believing that their nuclear forces are under attack and might soon become unusable, the enemy might escalate to nuclear use. Because the enemy's escalatory decision was driven by an unintended consequence of the US air campaign, it would be termed as inadvertent.

Accidental escalation occurs through unintended events and actions. It can result from mechanical failure or human error, or even from intentional but unauthorized action by subordinates in the chain of command against the direction of national leaders. For example, technical failure leading to false warning of an incoming nuclear attack could cause accidental escalation.²⁰

Distinguishing between the different modes of escalation is useful because it demonstrates that escalation can be both something that someone does and something that happens.

Distinguishing between different modes of escalation is useful because it demonstrates that escalation can be both something that someone does and something that happens.²¹ Understanding this idea is fundamental to developing any escalation management strategy. To suggest that, with any outbreak of crisis or war, escalation is inevitable ignores

that states are autonomous actors with the agency to make decisions about whether an available escalatory action is worth the risk or costs or would be worthwhile because it may offer only a slight strategic advantage or marginal improvement to their current position.²² However, to view escalation as purely a



series of deliberate actions is also fallacy, as it does not properly account for unintended consequences that come with the fog of war. Achieving the management of escalation requires attendance to both.

Forms of escalation

Another key insight emerges when considering the potential forms of escalation. These include vertical, horizontal, political and cross-domain escalation, particularly as they relate to the various challenges to stability.²³

Vertical escalation is defined as an increase in the intensity of conflict. An example would be the employment of more lethal weapons that were previously not used, or an increase in the amount of strikes conducted. Escalation tends to be thought of most commonly in these terms, and there is some theory on why escalation is innately vertical.²⁴

Horizontal escalation is defined as an expansion in the scope of the conflict, by action such as pushing the war, either temporarily or permanently, into new territories or theaters.²⁵ *Political escalation* can be best thought of as an expansion or increase of objectives, such as shifting from seeking surrender or concessions from an enemy's political authority to full regime change. This is analytically distinct from vertical escalation, which seeks to achieve the same objectives with more vigorous means.

Although horizontal escalation historically has embodied the idea of this increase in scope occurring primarily geographically, there is also potential for a similar widening of scope through domains of warfare versus geography. An example

is *cross-domain escalation*, which can be viewed through two attack lenses. The first is according to the platform from which an actor launches an attack and the platform on which the intended target resides (e.g., an attack launched from a sea-based asset to a land-based asset). In this sense, most US military assets' missions are inherently cross-domain, and any complex campaign will involve cross-domain action. The second and most compelling lens is defined by the effects of an operation. In other words, the intended consequences of the attack unfold in a different domain. A previously cited example is the asymmetric targeting of support assets that enable capabilities such as long-range precision strike weaponry. Although an actor might be unable to defend against the precision strike delivery vehicle itself because of high speeds, it could attack a space-based asset that supports guidance systems needed to destroy its intended target and achieve the same effect.²⁶

These escalation forms may overlap and occur simultaneously. Ultimately, the divides between these different forms of escalation are not absolute; a cross-domain escalation into a new domain of battle may also be viewed as an increase in the intensity of a conflict or a widening of political or military objectives under some circumstances. There is potential for warfare in some existing and emerging domains to blur the distinction further between these different forms of escalation.²⁷

In particular, warfare domains such as outer space and cyber space afford escalation potential for actions that could be viewed as vertical and/or cross-domain escalation. Attacks in these domains during a conventional conflict could be perceived as



an expansion of the conflict if they are viewed as a shift to a different domain. Further, because of their “entanglement” of the support structures of nuclear and non-nuclear forces including nuclear command, control, and communications (NC3) assets and components, a cyber or counter-space attack could even be seen as an increase in the intensity of such a conflict and therefore be interpreted as a type of vertical escalation.²⁸

This point is underscored when considering the reversibility of cyber operations. Although many tactics for cyber attack are reversible, non-lethal, and cause limited kinetic damage (challenging the notion that escalation tends to be vertical), it is still probable that a low-damage, reversible cyber attack could be seen as an increase in “intensity” (or a vertical escalation) by the attacked. In this case, the attacked party might respond in ways that would further

escalate the conflict.²⁹ However, it is equally probable that the attack will still not be viewed as escalatory depending on the situational context. Much of this perception will come down to an interpretation of intent, which is not always fully understood or known.

INSIGHTS FROM RISK ASSESSMENT AND MANAGEMENT THEORY

Risk management is another thread of academic literature that bears on escalation. War is permeated with risk, which, for the purposes of this report, we define as the potential impact of events given their estimated consequences and probabilities.³⁰ In war, commanders and decision-makers make difficult choices despite deep ambiguity and limited time for weighing options and debating alternatives. Despite these challenges, they must hedge against multiple

negative outcomes, including the risk that their plans could fail, that they could incur higher losses than expected, and that escalation (deliberately by an adversary, or inadvertently/accidentally by either party) rather than restraint could result.

Much of DOD’s formal application of risk methods has its origin in



Escalation hinges on perception. Whether or not escalation has occurred will depend on the other side's interpretation of their opponent's actions. Even actions not intended to be escalatory may still be viewed as such. (Shutterstock)



other governmental and engineering and industrial contexts, such as the space program and nuclear power. Although still complex, these are “closed” systems whose key variables and operations are typically frequent and repetitive, and whose input and output parameters remain largely constant. These systems allow for the development and encouragement of standard practices and habitual patterns of behavior that can be codified across an organization and imparted to newcomers. In addition, their potential risk of failure generally can be determined through actuarial and probability methods. For DOD processes that involve similarly frequent and repetitive actions, there is already a strong and current basis for the application of these methods.

Managing the risks of escalation involves different challenges than those presented by closed systems. As discussed above, the context of conflict matters.

Pre-developed war plans may prove inappropriate in the moment.

Moreover, one is dealing with an intelligent adversary that is capable of adapting or changing course as circumstances and its threat perceptions change. Finally, given that escalation to nuclear war between two (or more) nuclear-armed states is an unrealized phenomenon, the use of predictive analysis using actuarial or probabilistic methods is inhibited.

There have been some efforts to apply formal risk methods to escalation involving nuclear weapons use, although the application appears from this study

research to be limited and also heavily indebted to a systems-analysis outlook. In addition, the existing research focuses largely on the probability of large-scale nuclear exchange that arises following accidental or inadvertent escalation that triggers the early warning systems of the US or Russia. This focus is narrow, given the numerous characterizations of escalation we reviewed in the preceding paragraphs, leaving the field open and application methods thus far unrefined.³¹

Despite these divergences between nuclear escalation risk management and other forms of risk management, risk management and assessment literature can inform nuclear escalation management practices in at least two significant ways—by highlighting the value of calculated risk taking and by demonstrating the utility of feedback loops that can guide future decisions.

Accounting for risk acceptance

“Because war exists in the domain of chance,” a retired US Army colonel has argued, “every decision involves some form and level of risk. Among key elements of the art of command are deciding how much risk to accept and minimizing the potential negative effects of accepting risk.”³²

In other words, to pursue mission objectives successfully, commanders cannot engage in the (relatively) straightforward business of reducing risk as much as possible. Rather, they need to identify appropriate times to engage in calculated risk taking. They must ultimately make decisions that



balance those risk costs with mission benefits and the ability to secure objectives.³³ An analogue to this engagement with calculated risk can be found in the field of investment and financial portfolio analysis, where there are methods for both seeking opportunity (i.e., profit) and buying down negative risk, or risk that brings more costs than benefits and involves the acceptance of unnecessary risk(s).³⁴

This perspective is essential to successful escalation management. Just as it is necessary for commanders occasionally to accept and take calculated risk to secure military gains, it is critical that both the military and civilian elements of the US decision-making apparatus not focus solely on minimizing the prospects of escalation and assume that self-restraint is inherently good or sufficient to minimize risk. Being too restrained can have negative consequences, including misleading an adversary to believe that you are reluctant to fight, preemptively conceding a strategic objective, or finding yourself in a position where, because of an overreliance on restraint, you now have to respond more forcefully than originally preferred to push back sufficiently on an adversary.³⁵

Avoiding these negative consequences through effective escalation management means occasionally taking calculated risks. Acting aggressively may, at times, prevent more dramatic escalation such as nuclear use from taking place later by shaping an adversary's perception of risk. Effective escalation management also requires drawing from the full suite of available tools, including engaging in prudent risk taking by leveraging suggestive and instrumental escalation that is created through deterrence and the use of military force. Deliberate escalation (both

instrumentally and suggestively motivated) can be important for signaling credibility of one's strategic interests, and countering potential escalation from an opponent, by communicating that the costs of action may be higher than the prospective benefits, and therefore the consequences of restraint are comparatively low. The Joint Chiefs of Staff call this a "deterrence calculus." It includes three elements:³⁶

- The *perceived benefits* of a course of action
- The *perceived costs* of a course of action
- The *perceived consequences* of restraint

This calculus is the core of what escalation management strategies will seek to influence. As with deterrence operations, the central goal for US escalation management strategies should be to drive down the adversary's perceived benefits of a potential nuclear escalation and perceived potential consequences of exercising restraint while simultaneously driving up the perceived costs of the nuclear escalation.³⁷

Creating a feedback loop

Another insight from the risk management and assessment literature is the value of a rigorous risk management process that prioritizes feedback and adaptation. A structured, uniformly applied process that guides the development of COAs and strategies can be an important tool for decision-makers and their advisors who need to manage escalation and its consequences by providing a shared analytical mechanism for considering prospective outcomes and their consequences. A structured process that follows a continual process or cycle provides even more benefit by helping close a self-evaluation gap.³⁸



Because of competing priorities and time constraints, evaluating policy after its implementation is a critical but often overlooked part of the process of making policy choices. Nevertheless, it has been demonstrated to be of value in other areas of government policy.³⁹ For considering potentially escalatory COAs that one might want to execute in conflict with a nuclear adversary, once COAs (and any associated countermeasures for identified risks) are designed, they can be implemented in simulated interactive forums such as tabletop exercises, wargames, or red teaming sessions to monitor their performance. The Office of the Under Secretary of Defense for Policy and the Joint Chiefs of Staff can then take these results and place them into a “feedback loop” that allows for any necessary adaptations that more effectively navigate the trade space between taking calculated risk and avoiding or minimizing negative risk in the execution of a potential COA.

THE CASE FOR AN ESCALATION MANAGEMENT FRAMEWORK

The previous insights provide useful characterizations of how escalation might manifest, illustrate the importance of both accepting and minimizing risk when engaged in a conflict, and the value of using a structured process that includes a feedback loop to help guide decision-making.

These insights from escalation literature, although individually valuable, singularly do not form a strategy for influencing an opponent's decision-making calculus in a manner that discourages escalation.

Although they are useful for developing situational awareness and gaming the ways escalation might run its course, by themselves the characterizations of escalation are insufficient for a nuclear escalation management framework. These insights from escalation literature, although individually valuable, singularly do not form a strategy for influencing an opponent's decision-making calculus in a manner that discourages escalation. They also do not offer a way to triage the competing priorities that will inevitably arise through the realization of these different situational dynamics. In addition, they do not provide a solution for balancing the occasionally paradoxical goals of escalation management: achieving one's objectives in conflicts with nuclear-armed adversaries while *also* simultaneously convincing them to forgo the use of the full military means at their disposal.

It is also not enough simply to recognize and account for potential escalation thresholds and hope that your actions do not cross a tripwire. Past applications of risk literature demonstrate the value in taking calculated risk in times of crisis and war. Therefore, for any escalation management framework to be valuable, it must illuminate appropriate moments to take calculated risk and points at which policy-makers and planners need to buy down negative risk.

The CNA framework for nuclear escalation management seeks to leverage these various insights in a tool that is functionally useful to US policy-makers



INSIGHTS FROM ESCALATION AND RISK THEORY

and planners. It fills a gap that the conceptualizations of escalation, both definitional terms and models (e.g., Kahn's escalation ladder), alone are incapable of filling. It also provides a means for considering the utility of calculated risk taking while also acting as a "pre-surgery checklist" to curb potentially negative risk resulting from military operations. Finally, it uses a feedback loop to strengthen the strategies being developed before they are executed.

There will never be a perfect approach for assessing and managing escalatory risk because uncertainty will remain a dominant feature of conflict and escalation. However, by leveraging the key insights reviewed above, the proposed framework takes the critical first step toward proactively managing the risk of escalation prior to conflict. The next section introduces the framework and discusses its key foundational elements.

CNA PROPOSED FRAMEWORK FOR NUCLEAR ESCALATION MANAGEMENT



As emphasized previously, escalation management is a difficult pursuit. At the top level, the central challenge lies in managing the tension between two lines of effort: achieving one's objectives *and* simultaneously encouraging an adversary to remain restrained. Any US strategy that seeks to deter a state from escalating will require a certain level of compliance from that state. Soliciting this compliance might even require an exercise of conditional restraint on the part of the US, which could affect the US ability to achieve its military and/or political objectives.

Working through the potential implications of a proposed COA on achieving these lines of effort is valuable but can also be a time-consuming mental exercise absent boundaries on the discussion. Even in peacetime, military and policy staffs can be pressed to finalize plans in order to balance duties and address other important matters. As emphasized by a SME discussion, the “only resource we don’t have unlimited amounts of is time.”⁴⁰

To simplify this exercise, this report proposes an escalation management framework that contains three foundational elements, which serve as building blocks for developing tailored escalation management strategies. They include a five-phase process for evaluating the ability of potential operational plans and COAs to support these strategies. Taken together, these elements create a cohesive framework that can serve as a decision-making aid during planning by vetting COAs’ ability to enable the US to achieve its

objectives, while also keeping a crisis or conflict from escalating past the nuclear threshold.

The framework elements outlined in the upcoming paragraphs are not the only means for organizing such a framework and are also not the only method for breaking down these issues into manageable sub-components for addressing and managing escalation. Imperfect information, time pressures, and other unpredictable factors may compel decision-makers to adapt this framework on the fly. Regardless, we believe the proposed elements provide practitioners a baseline while also being adaptable to potential situational demands.

This section introduces the framework’s first two foundational elements—the objectives and tools of US escalation management. Next, we walk through the third framework element: a five-phase process for US nuclear escalation management that connects the tools of escalation management to the overall objectives for US escalation management. This process consists of the following phases:

1. **Develop a strategic profile** of the potential US adversary, US ally, and the US to gain an understanding of the strategic balance and each party’s decision calculus.
2. **Conduct an “escalation audit”** to identify scenario-relevant adversary, ally, and US escalation thresholds and potential flashpoints that may result from undertaking a selected COA.

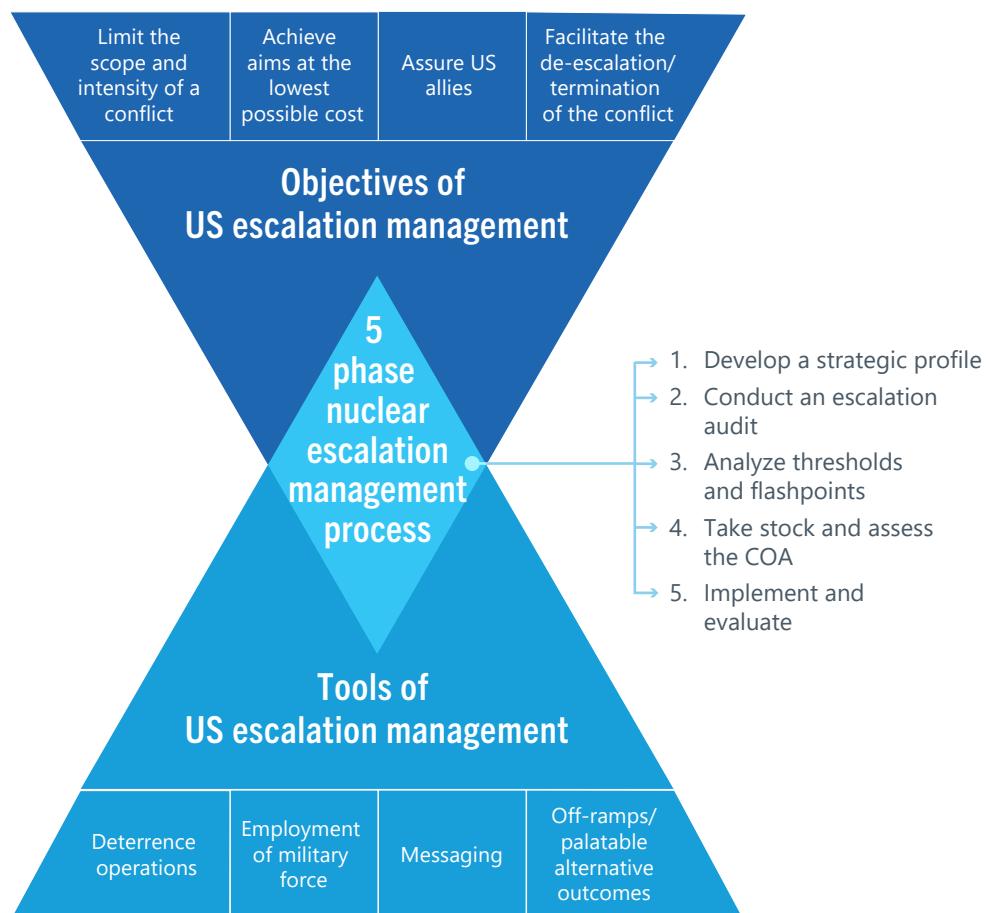


FRAMEWORK FOR ESCALATION MANAGEMENT

3. **Analyze the identified thresholds and flashpoints'** potential strategic and operational impact.
4. **Take stock** of previous answers and consider if there are potentially under-examined assumptions. **Assess** the coherence of the selected COA with overall US objectives and goals.
5. Where possible, **implement** the decided upon COA or series of vetted COAs through simulated interactive formats such as tabletop exercises (TTXs) or wargames to **evaluate** its impact, repeating the cycle as needed and incorporating any lessons learned from its implementation.

Figure 1 depicts the framework and demonstrates how the five-phase process acts as connective tissue between the objectives and tools of US escalation management.

FIGURE 1. CNA PROPOSED FRAMEWORK FOR NUCLEAR ESCALATION MANAGEMENT



Source: CNA.



OBJECTIVES AND TOOLS OF US ESCALATION MANAGEMENT

A useful escalation management framework begins with a clear understanding of the enduring US objectives for managing escalation and the tools that the US can use to achieve those objectives. Irrespective of the adversary or scenario, any confrontation in which the US seeks to manage potential nuclear escalation would have four objectives. They are:

1. Limit the scope and intensity of a conflict.
2. Achieve war and overall political aims at the lowest possible cost.
3. Assure US allies and deter attacks on their vital interests.
4. Facilitate the de-escalation, and ultimately the termination, of the conflict.

Likewise, US decision-makers have four basic tools that they can leverage to achieve these goals. The selection of tools and the way each tool is used will depend on the given scenario and can be decided using the nuclear escalation management process that follows. These tools are:

1. Deterrence operations.
2. Employment of military force.
3. Messaging.
4. Off-ramps/palatable alternative outcomes.

Although these tools and objectives, and their prioritization, will likely change based on circumstance, understanding them is a prerequisite for successful escalation management.

Objectives of US escalation management

The first objective of US nuclear escalation management strategies is to *limit the scope and intensity of a conflict*. For several reasons, it is an understatement that the adoption of a total war approach by nuclear-armed states is less than desirable. Aside from the potential damage from a total war between nuclear-armed states, another reason is that threatening total nuclear war to achieve desired ends that are relatively limited has been found to lack credibility. Thus, the US has moved away from such a policy and adopted a different approach to potential warfare between nuclear-armed states—limited war.⁴¹

To this end, this objective stems from the need for the US to be able to threaten consequences credibly to the maximum commensurate with the national interest or objective it is seeking to protect.⁴² The parallel implication of shifting from a total war approach to limited warfare is that to successfully keep war limited, the US must alleviate or contain pressures (e.g., the desire to attain an advantage or the desire not to lose) to escalate further once a conflict begins.⁴³ Thus, US escalation management strategies' primary purpose is to identify and control such pressures for all combatants where possible, thereby limiting the scope or intensity of a conflict. Nested within this objective is the crucial task of minimizing the possibility of a failure of strategic deterrence.⁴⁴



The second objective of US escalation management strategies is to *achieve war aims, and overall political aims, at the lowest possible level of cost.*⁴⁵ This objective helps flesh out this study's conceptualization of escalation management: the practice of achieving one's objectives while simultaneously convincing a nuclear-armed adversary to forgo using the full military means at its disposal.

This objective also accounts for the fact that states generally enter conflicts with specific military and political goals in mind. Although specific objectives will vary with each circumstance, the means of achieving them can include, and may even at times require, deliberately escalating to improve one's ability to reach these goals (while also denying an adversary its own aims where possible).⁴⁶ Naturally, this can sometimes be in tension with the first objective of limiting the scope and intensity of a conflict, and balancing the two is a fundamental challenge for escalation management. However, this does not mean that crossing a threshold to achieve tactical and military requirements is always the best choice, particularly if doing so would potentially bring consequences that ultimately run counter to one's overall political aims.

This further underscores that escalation is not an entirely unconstrained force.⁴⁷ Assuming they are acting rationally, the US and its allies, as well as potential adversaries, have strong cost-benefit incentives and strategic motivations to keep escalation potential in check through a military campaign.⁴⁸ This objective seeks to direct calculated risk taking by military commanders to help achieve operational and strategic victory while also encouraging the minimization of negative risk.

The third objective of US escalation management strategies is to assure *US allies and deter attacks on their vital interests.* It is easy to fall into the trap of envisioning escalation as occurring in a cyclical, action-reaction dynamic between two powers. However, any potential confrontation between the US and Russia, or the US and China, or the US and the DPRK will directly or indirectly involve regional US allies and partners. If the US goes to war with any of these adversaries, it must be prepared that any such conflict will likely involve the defense of key regional allies and their vital interests. Moreover, as independent actors, allies and partners can also have their own influence on escalation dynamics. Accordingly, escalation management strategies must aim to undercut any attempts to coerce or blackmail the US by threatening escalation against an ally or partner. They must also account for vital ally interests and thresholds to successfully reinforce deterrence around those thresholds and mitigate potential escalation.⁴⁹ It is critical that any escalation management framework include mechanisms for accounting for potential risks to and from allies.

The fourth objective for escalation management strategies is to *facilitate de-escalation, and ultimately the termination of a conflict.* This objective is distinct from limiting the scope or intensity of a conflict. The latter does not necessarily require de-escalation or termination of the conflict to occur. In some cases, it may actually be necessary to escalate to discourage an opponent from exceeding the current levels of conflict. Indeed, this is the idea that drives the thinking behind the value of engaging in suggestive escalation, or deliberately escalating to signal to an opponent and communicate potential consequences of undesired behavior and actions.⁵⁰



Achieving this objective will require cooperation from both sides.⁵¹ It may also require the use of conciliatory or mediation measures (which may or may not be necessary for limiting the scope/intensity of a conflict) to de-escalate. It is critical that planners and policy-makers mind the timing and sequencing of pursuing this objective to de-conflict with other objectives and their associated lines of effort.

Successful US escalation management will require balancing these objectives and potentially shifting their prioritization over time as the situation demands. It will also require tapping into a range of tools to support these objectives and counter escalation.

Tools of US escalation management

In addition to the objectives of US escalation management, there are several supporting tools for these objectives that can be derived from escalation literature and concepts. As with the objectives above, these tools can also be adopted simultaneously, occasionally overlap and be in tension with one another, and undergo shifts in reliance as a conflict unfolds. These means are:

1. Deterrence operations.
2. Employment of military force.
3. Messaging.
4. Off-ramps/palatable alternative outcomes.

There are also other means of US national power, particularly prior to the outbreak of war, that can be leveraged to discourage potential escalation. They include diplomatic and economic instruments, such as sanctions and trade embargos.⁵² For this framework,

which is intended to be used as a tool for addressing escalation dynamics in war planning, we focus on the military and diplomatic tools, listed below, that leverage defense assets and postures.

These tools are intended to be levers against an opponent's escalation calculus, primarily by influencing judgements regarding the potential benefits and costs of either escalating or exercising restraint. All four of the tools of escalation management intertwine with one another and hold potential for influencing these various aspects of an opponent's decision-making calculus by imposing costs, creating risk, and suggesting favorable alternatives to escalation.

Deterrence operations, the first of these tools, have a strong and enduring relationship with escalation.⁵³ This relationship between deterrence and escalation is shown with the idea of leveraging and engaging in "coercive diplomacy," whereby parties engage in a "bargaining process" with one another through threats of violence and shows of force to coerce the other to take a desired action (e.g., accept an off-ramp) or deter them from taking an unwanted action (e.g., escalate).⁵⁴

Military operations aimed at bolstering deterrence can be executed through all phases of conflict including peacetime. As deterrence operations are fundamentally operations being conducted to discourage action, they can include operations aimed at deterring escalation past the current status quo or preventing further escalation following the crossing of a threshold. They can take the form of threats and operational actions spanning posturing or exercising forces, to the actual use of force, as we expand on below. Engaging in



deliberate escalation can signal credibility of one's strategic interests and raise the perception of potential costs to an opponent, thereby bolstering deterrence. These deterrence measures can counter potential escalation and therefore limit the scope and intensity of a conflict and encourage de-escalation.

A related tool for supporting escalation management is the *employment of military force*. The ability to fulfill the second escalation management objective of achieving one's war aims will occasionally require the execution of kinetic military operations to make tactical and operational gains.

Consequently, reaching this objective may require instrumental escalation, or deliberately escalating with the intent of improving one's own strategic position and/or achieving specific tactical or operational advantages or benefits.⁵⁵

Simultaneously, the use of military force can also be a tool for implementing deterrence through suggestive escalation. This tactic leverages an idea of Schelling's that he famously termed the "threat that leaves something to chance." This is essentially the deliberate generation of risk that both sides may be pulled over the brink (also referred to by Schelling as "brinkmanship").⁵⁶ This "game of chicken," whether conducted through threats or military action, can drive up the perceived costs and drive down the perceived benefits of action. The use of military force toward this end is particularly salient following an outbreak of violence, when one would seek to prevent further escalation and restore deterrence and may have to rely on increasingly stronger uses of military force to realize these aims.

The use of military force in this suggestive manner also points us to our next tool, *messaging*. In nuclear escalation management, messaging is a component integral to the other tools named here. It can be wielded in two formats: messaging through actions and messaging through information.

In their execution, deterrence operations inherently seek to send or convey a message.

In their execution, deterrence operations inherently seek to send or convey a message. The employment of force with the goal of suggestive escalation previously mentioned is another form of messaging. Both involve messaging through actions. Another such example is the formation of a military alliance such as the North Atlantic Treaty Organization, which involves a political and a military cost by tying one's interests to an ally or group of allies, sending a message that one's stake is intertwined with the stake of other alliance members.

Messaging through information can be executed in conjunction with these actions, such as public messaging surrounding a deterrence operation (e.g., US Strategic Command's Twitter profile publishing photos from a successful port call by a ballistic missile submarine), or it can involve separate lines of effort. Messaging through information can also take the form of diplomatic exchanges and dialogues, public statements by government officials, and publication of military doctrine (e.g., US Nuclear Posture Review documents) that outlines national objectives or publicly announces thresholds or "redlines" to bolster deterrence, communicate intent, or convey strategic interests.



The above picture is an example of a deterrence operation seeking to convey a message of the continued US commitment to its NATO allies. An Ohio-class ballistic missile submarine, USS Alaska (SSBN 732), makes a port call at Her Majesty's Naval Base in Clyde, Scotland, in July 2019. (Official Strategic Command photo by LPhot Stevie Burke)

Messaging can be used throughout peacetime, crisis, and conflict and can be applied to all four objectives of escalation management. It can also play an important role in communicating US willingness to restrain actions conditionally in exchange for an adversary demonstrating restraint.

Deterring further escalation, and influencing an adversary's perceptions that the consequences of restraint are bearable compared to the potential costs, requires more than just the communication of threats through messaging and deterrence signaling. US adversaries need to be able to compare the potential consequences

of escalation against the potential benefits of not escalating. The final tool of US escalation management, *off-ramps/palatable alternative outcomes* to continued conflict or further escalation, is critical to shifting the perception that the potential benefits of exercising restraint will be comparatively

better than the potential costs of escalating. By providing off-ramps/palatable alternatives to further escalation, the US can create conditions for the adversary to avoid further unwanted escalation and also provide itself an opportunity to back down if the risks of escalation outweigh the potential reward.

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Escalation tends to have an innately upward dynamic not only because of tactical and operational military requirements but also because as events progress, national leaders' political stakes in the final outcome rise. Accordingly, off-ramps are most effective when they are tailored to an opponent in a way that can help save face and provide logical reasoning to international audiences and the adversary's domestic constituency as to why there will be a shift from conflict to cooperation.

This is underscored by evidence that former Soviet Premier Nikita Khrushchev found it "easier to get missiles into Cuba than to get them out" during the Cuban Missile Crisis because he had to consider not only what signal he may send the Soviet Union's primary adversary but also the challenges to his position at home that may arise.⁵⁷ The crisis was de-escalated only when *both* sides were able to give one another what could be presented as strategic victories to domestic and international audiences.⁵⁸ This anecdote illustrates the criticality of providing palatable alternatives or off-ramps that include a shared understanding of what is at stake for all those involved and accurate communications on the new status quo.

Escalation tends to have an innately upward dynamic not only because of tactical and operational military requirements but also because as events progress, national leaders' political stakes in the final outcome rise.

earlier in this report. They provide options for affecting an opponent's escalation calculus in a manner that can support US escalation management objectives. Some means might be better suited for the achievement of certain goals over others in certain contexts. Ultimately, this judgement will come down to one's risk-taking propensity and a careful assessment of an opponent's calculus, as well as its ability to formulate a response or continue to mount a resistance.

Between the objectives and tools of escalation management, there exists a trade space for a variety of potential COAs that leverage these tools. However, in any given situation there will be a wide range of factors and variety of available COAs that could influence the success of operations. Consequently, US escalation management strategy does not easily lend itself to a set of universal COAs that are applicable across scenarios and adversaries, as do the objectives and tools. Although it is possible to develop in advance a playbook of potential COAs, their utility will be fairly context dependent.

Nonetheless, it is possible to take existing or prospective COAs being developed for such a playbook and evaluate how well they help reach those escalation management objectives. These COAs can be assessed through a stepped process we introduce in the upcoming paragraphs that is applicable across actors and scenarios, although the answers to the questions and the issues they raise may vary.

THE STRATEGY OF ESCALATION MANAGEMENT

As demonstrated by preceding paragraphs, the universal objectives and tools of US escalation management provide the foundation for a functional framework applying the escalation concepts discussed



A structured approach, such as the one explained below, is useful in combatting information overwhelm and challenging cognitive biases by posing a series of questions that help uncover assumptions and highlight underexplored lines of inquiry. Additionally, a structured approach channels supporting analysis and information in a way that ensures discussion includes a simultaneous consideration of both “carrots” and “sticks” and how they might meet one’s objectives.⁵⁹

DEVELOPING COAs THAT SUPPORT ESCALATION MANAGEMENT

The proposed five-phase process seeks to provide a structured method by which planners and policymakers can formulate and evaluate potential COAs for achieving escalation management with a nuclear-armed competitor. It also seeks to identify key escalation dynamics that may manifest in a potential conflict between the US and a nuclear-armed competitor. It does so by posing a structured set of key questions for consideration with the implementation of each phase. The first set of questions aims to cultivate understanding around the US, a potential US adversary, and a US ally to establish a critical baseline of key strategic drivers that will affect escalation dynamics. The second phase

walks prospective scenario-based operational COAs across one another to illuminate where key escalation thresholds lie and where flashpoints may emerge.

The next phase analyzes these thresholds and flashpoints to build an informed understanding of the strategic and operational impact of potentially escalatory decisions. It asks how the tools of escalation management might be put in play to discourage potentially escalatory behavior that might occur at these flashpoints. Next is a take-stock phase that encourages users of the framework to step back and evaluate their previous answers and root out potentially harmful assumptions.

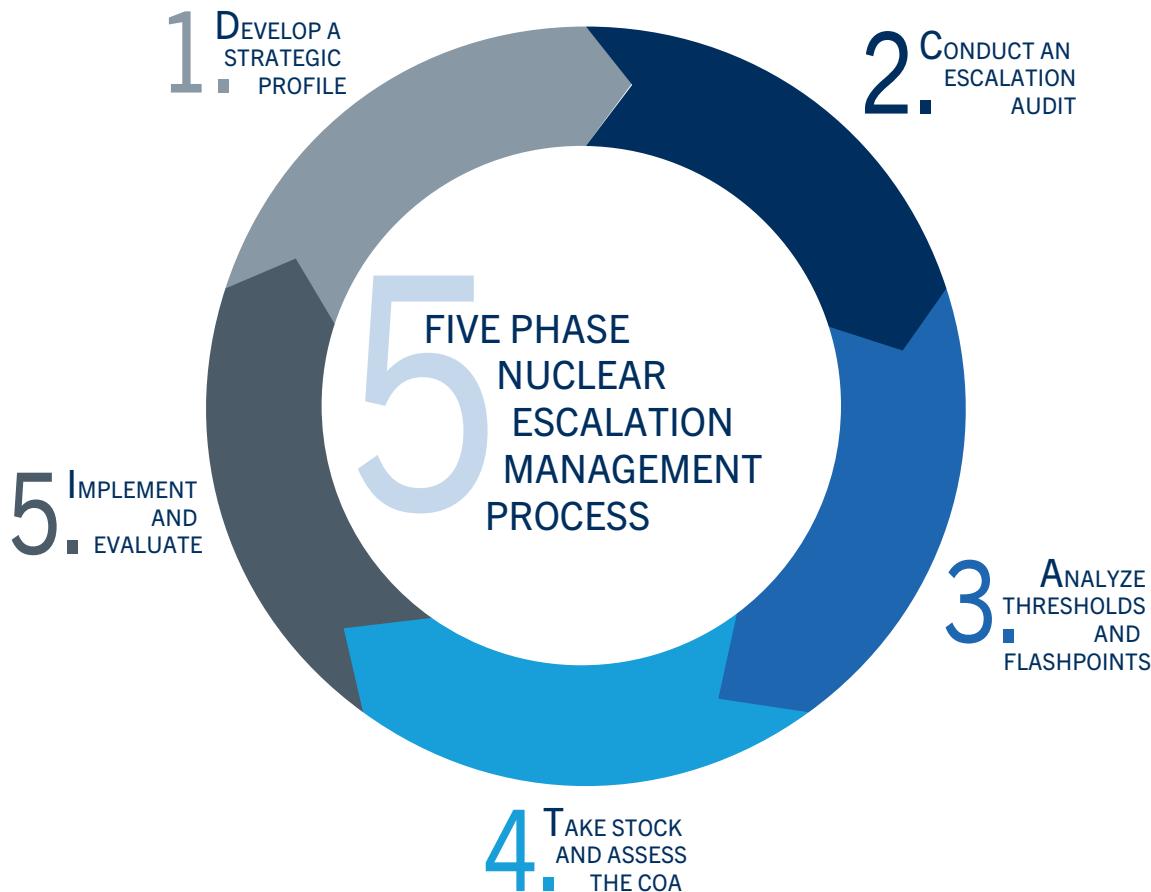
The last phase involves introspection and considering lessons learned through implementation of the selected COA through interactive hypothesis testing with exercises and gaming. This phase facilitates an additional opportunity for policy-makers and planners to evaluate rigorously the original analysis conducted in phases 1–4 and identify points of departure, shortcomings, assumptions, and unknowns that require more research, ultimately serving to improve the developed strategy prior to crisis or conflict. This five-phase process is illustrated in Figure 2.



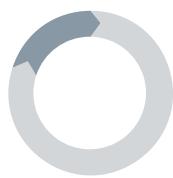
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FIGURE 2. FIVE-PHASE NUCLEAR ESCALATION MANAGEMENT PROCESS



Source: CNA.



Phase 1: Develop a strategic profile

This first step is a critical foundational phase for the

remaining analysis of this process. In semi-structured discussions between the study team and current and former practitioners, the study team asked for their views on the most challenging aspects of nuclear

escalation management. A consistent response was understanding adversary intentions and interests and predicting how they might perceive and interpret future events.

Successfully anticipating and managing potential escalation will depend heavily on cultivating this understanding not only in a general sense but also “under specific and often difficult-to-predict



conditions that will shape the opponent's perceptions and responses.”⁶⁰ Discerning what might shape an opponent's perceptions and responses means figuring out what an adversary fears and values and what actions will bring about a violent response versus restraint.⁶¹

Another often overlooked component of achieving nuclear escalation management is developing an understanding of *ourselves* as well as US adversaries. Just as there is a risk of mirror imaging or making incorrect assumptions in trying to understand and predict adversary behavior, a similar risk can exist between actors on the same side. For example, one practitioner recounted the experience of facilitating wargames where one group plays the US and the other plays an unspecified US opponent. Despite all of the participants being from the US, at the conclusion of the games the practitioner consistently heard the question “Why didn’t you understand what I was doing?” being posed by these teams to one another.⁶²

Such anecdotes drive home the potential to take for granted the probability that even US planners and policy-makers and US allies can misperceive or misunderstand interests and intent despite strong commonalities or shared goals. Although it is likely that most users of this framework will already have a strong understanding and awareness of many of these dynamics and goals that would form a strategic profile, such a story emphasizes the need to ensure that this understanding becomes part of a shared mindset.

To avoid potentially harmful assumptions, this phase seeks to create an understanding of not only a potential US adversary but also of the US and its relevant allies. It aims to call out explicitly the

long-term interests and objectives of these actors and their potential thresholds in a crisis or conflict to place US policy-makers and planners on the same page with one another and relevant US allies. It also seeks to uncover “national differences in emphasis, style, and priorities so that a common basis of workable understanding and threats can develop.”⁶³

At the conclusion of the first phase, policy-makers should have formed what is essentially a working strategic profile of each actor. Having a grasp of the balance of interests, who the decision-makers are, and their potential expectations and objectives will provide a foundation for the next step of the analysis.

Phase 1 key questions

First, what is the **balance of strategic interests**, or, in other words, what are the stakes of the US, the potential adversary, and relevant allies in the given scenario? The answers will depend on myriad factors. There may be important historical context to take into account along with political, economic, and geographical issues.⁶⁴ Identifying the balance of interests is important as it will likely influence each side’s perceptions of escalation thresholds relative to one another, as well as their risk tolerance and willingness to accept costs to protect these interests.⁶⁵ If one side knows that their relative stake in this balance is less compelling, this may change the way they choose to signal in order to communicate resolve and bolster their credibility, or it may make them more likely to seek a face-saving off-ramp following a strong show of force from an opponent.

Second, given this assessment of each party’s stakes, what are the identifiable **goals** of the US, the potential



adversary, and relevant US allies? What might their perceptions be of other's goals?⁶⁶ What political or military objectives do they hold (both near-term and long-term) that would support the realization of these goals? Are there existing goals that may compete with managing escalation? It is necessary to separate out and identify where certain national or strategic objectives may force the acceptance of tradeoffs between these and avoiding significant escalation.⁶⁷ It is also important that, before proceeding with the rest of this process, these specific goals be known for the US to avoid giving into the temptation to act first and understand the why behind the action later.

Third, who are the *key decision-makers* inside these three governments whose escalation calculus we are seeking to influence? Can we also identify their key advisors who may have an impact on their assessments, and therefore will also need to be targeted? Are they risk-averse or risk-acceptant actors?

Fourth, what are the *potential expectations concerning the future trajectory* of a confrontation of the US, the adversary, or the ally?⁶⁸ Can the US identify actions undertaken by an adversary or ally prior to the scenario that may provide insight into how they intend to shape a potential war?⁶⁹ Asking this may help illuminate motivations for crossing a threshold, uncover potential messaging taking place and points where latent objectives may become activated, and identify points where the use of off-ramps may become

It is important to understand what an opponent might be expecting from the US and an ally/partner, as they may have already factored that into their decision-making...

viable. It is important to understand what an opponent might be expecting from the US and an ally/partner, as they may have already factored that into their decision-making, meaning the US might need to do something unexpected to affect their escalation calculus.⁷⁰

Fifth, what saliences or *thresholds* can already be identified for each contesting party based on our expert assessments and the information we have from the US Intelligence Community? Are there any thresholds that may not be visible or obvious? Are the ones capable of being identified actually exaggerated, and are they a bluff on the part of the US adversary to gain early concessions?

What factors concerning known potential *escalatory risks might influence escalation dynamics*? What impact do emerging capabilities and domains such as cyber, space, or precision-strike have on escalation dynamics in the context under consideration?⁷¹ How do they support potential escalation strategies that may be leveraged against a US opponent?⁷² What ambiguities in the US posture, the adversary posture, and an ally's posture might affect these parties' willingness to escalate and their risk tolerance?⁷³

How does each actor *think about escalation*?⁷⁴ Are the potential US adversary's views on escalation theory or strategies unique to them? How do these views differ from those held by the US and allies?



Finally, *what level of confidence* do we have in the data and information being discussed in this phase? This measure of confidence would benefit from standardization and measurement, where possible. This could be achieved by using the gradations of “high,” “reasonable,” or “low” confidence to inject nuance into this assessment.⁷⁵ An additional follow-on question to this could be, are there areas where we need more information or could benefit from more insight from the Intelligence Community?



Phase 2: Conduct an escalation audit

This next step, the escalation audit phase, seeks to take the strategic profiles of the US, potential adversary, and ally developed in phase 1 and apply them to plausible scenarios in which a potential adversary would challenge US and ally interests. This phase begins with US planners and policy-makers selecting a COA or operational plan—either an existing COA or one under development—that they believe may be useful in their given scenario. A simple example of this would be a scenario in which the US is considering a response to a precision-strike attack against US early warning systems based overseas in a conflict with either China or Russia. The US has a set of overarching response options available—respond in kind, respond asymmetrically, or no response at all. Each overarching response would have potential operational COAs associated with it.

After selecting a COA that appeals to framework users in this context, we then take this COA through the below series of questions to:

1. **Identify where key escalation pressure points may emerge**, (e.g., when a planned US COA would blatantly cross an adversary threshold and encourage potential escalation); and
2. **Uncover potential escalation dynamics**, including potential points where inadvertent or accidental escalation may manifest.

It is important to note that this audit would not seek to make a definitive judgement on exactly how the US, a US adversary, and/or an ally might respond to a hypothetical situation. Nor does it seek to articulate precisely when and how these escalation decision points may manifest, as there will never be total certainty regarding future events. Answers to these questions will need to be treated with the caveat that these are probabilities as is current practice.⁷⁶ In addition, this deliberation would be an iterative process that would let these findings evolve with further discussion.

Phase 2 key questions

Considering the selected US COA, what is the *range of available response COA(s) to the adversary and US allies* in the context being considered?⁷⁷ In other words, what are all the possible responses from the potential adversary and relevant US allies to the US COA being considered?

Second, what are the meaningful *thresholds that the US wants to establish* in the scenario being considered? Do these thresholds enable the achievement of US objectives at a reasonable cost?⁷⁸



What lessons can be learned from the current state of affairs? Are there *any previous or current conditions* in place in this scenario that are preventing tensions from escalating that may be leveraged for mitigating escalation?⁷⁹

Taking the selected US COA(s), can we engage in *early identification of potential adversary thresholds* that may be at risk of being crossed, or of being perceived as crossed with the execution of a selected COA, resulting in the perception that escalation by the US has occurred?

What *key decision points* for a potential adversary and ally might arise during execution of a US COA that would prompt deliberate, inadvertent, or accidental escalation?

Of the potential adversary COA(s) identified as responses to the selected US COA(s), *can we identify potential US or ally thresholds* that may be at risk of being crossed, or of being perceived as crossed with the execution of the selected COA, resulting in the perception that escalation by the adversary has occurred?

Of the identified potential ally COA(s), can we *identify potential adversary thresholds* that may be at risk of being crossed, or of being perceived as crossed with the execution of a selected COA, resulting in the perception that escalation by the US ally has occurred?

Will any *alliance politics* and ally objectives compete with the US goal of managing escalation?⁸⁰

What *asymmetries in capabilities exist* between the three parties that may be translated into a dangerous vulnerability and motivate another to escalate?⁸¹

What *asymmetries in objectives/motivation* between the US, a potential adversary, or US ally may lead another to escalate because they believe that they have the strongest interests?⁸²

Are there any potential *unexpected events* that may raise the risk of escalation?⁸³

Finally, considering some of the answers to the previous questions, do the identified US COAs have any nascent *positive or negative tradeoffs* with one another?



Phase 3: Analyze thresholds and flashpoints

The central premise of the previous phase is to develop a clear and realistic understanding of where important escalation flashpoints may reside in a given situation for the US and its allies as well as an adversary. After crosswalking the US, ally, and adversary interests and objectives, thresholds, and potential COAs to identify potential decision points that would prompt escalatory action, this next phase would seek to assess the potential impact of acting on these escalatory decision points on US strategic and operational goals.

This phase is crucial to enabling action on the part of US and allies while also building an awareness of the potential risks and tradeoffs of certain COAs. It aims to increase understanding of how to posture, both diplomatically and militarily, in a way that both deters the violation of US thresholds while avoiding crossing an opponent's thresholds.⁸⁴ It encourages the consideration of all the tools of escalation management and their potential to guide the trajectory of a conflict



An unarmed Minuteman III intercontinental ballistic missile launches during a developmental test at 12:33 a.m. Pacific Time Wednesday, Feb. 5, 2020, at Vandenberg Air Force Base, Calif. (US Air Force photo by Senior Airman Clayton Wear)

to stay within one's preferred boundaries.

This phase also intends to help develop an understanding of *why* an adversary may make the choices to cross a threshold, despite efforts on the part of the US and/or an ally to signal that such a violation would be seen as a threat to an interest. Asking questions with this aim can then help the US better tailor its initial COA and follow-on responses to restore deterrence and encourage restraint (thereby influencing the escalation calculus of an opponent).

There are four categories of potential escalatory COAs that must be evaluated in this phase. They include:

- US COA(s) that are likely to be perceived as crossing an adversary threshold.

- Adversary COA(s) that are likely to be perceived as crossing a US threshold.
- Ally COA(s) that are likely to be perceived as crossing an adversary threshold.
- Adversary COA(s) that are likely to be perceived as crossing key ally thresholds.

The next paragraphs pose another set of questions that consider each of these categories. The first set of questions can be asked for all four categories of COAs, and the remaining questions are broken down by each listed category.

Key questions for all four COA categories

The first question to ask when considering all four of the above categories is what goals does the potential crossing of a threshold serve? In other words, why



are the US, ally, or adversary acting on the potential COA despite the risks? Would crossing a threshold serve *military operational goals*? Or does it serve *suggestive goals* aimed at encouraging restraint? Does it serve both?

Key questions – US COAs crossing an adversary threshold

Does the US *want to cross an identified adversary threshold* to impose an unexpected cost on an adversary and ensure an impact on their escalation calculus?⁸⁵

What *message about escalation* would the US aim to send by crossing a potential threshold? What does the US want to put in the mind of the adversary? In the mind of allies?⁸⁶ Does this COA convey this message?

How might the *adversary respond* to the US decision to cross a threshold? Are there potential *latent objectives* that might be activated if escalation proceeds?⁸⁷ What form may they escalate in (e.g., vertical or horizontal) response?

How might the US employ the tools of escalation management—deterrence, employment of military force, messaging, or off-ramps/palatable alternative outcomes—to *mitigate the risk of adversary escalation* in response to the potential COA?

If considering forgoing the potential COA because of predicted negative risk, what would be the *strategic/operational risks of forgoing this COA* and seeking the same objectives via other means?

Key questions – adversary COAs crossing a US threshold

Are there any *US thresholds that can be reinforced* via the tools of escalation management prior to conflict that can serve to keep the conflict limited?⁸⁸

How can the US employ the tools of escalation management in peacetime, crisis, and conflict to *shape an adversary choice to potentially escalate*?

How might these tools be leveraged to create a sense of risk in the mind of the adversary to encourage restraint?⁸⁹

If likely to cross a threshold, *what objective do we believe the adversary would be pursuing*? How can the US shape its decision-making calculus on the costs and benefits of pursuing this objective?

How can the US shape the *opponent's perception of US perceptions*?⁹⁰

If the threshold is crossed, what might be the *operational/strategic impact to the US*?

If the threshold is crossed, how might the US and allies employ the tools of escalation management to *restore deterrence and discourage further escalation*?

Key questions – ally COAs crossing an adversary threshold

If likely to cross a threshold, *what objective do we believe the ally would be pursuing*? How can the US shape its decision-making calculus regarding the costs and benefits of pursuing this objective?

If the potential allied COA is viewed as too risky by the US, can the US *persuade the ally to forgo the COA*?



If unable to convince an ally to forgo a COA, how can the US employ the tools of escalation management *to mitigate the risk of adversary escalation* in response?

If an ally were considering forgoing a potential COA that the US supports, what would be the *strategic/operational risks of forgoing this COA* and seeking the same objectives via other means?

Key questions – adversary COAs crossing an ally threshold

Are there any *ally thresholds that can be reinforced* via the tools of escalation management prior to conflict that can serve to keep the conflict limited?

How can the US employ the tools of escalation management to *shape an adversary choice to potentially escalate* and convince them not to cross an ally's threshold?

If the threshold is crossed, what might be the *operational/strategic impact to the US ally*? To the US?

If the threshold is crossed, how might the *ally respond*?

How can the US *persuade its ally* to avoid conducting responses that would undermine US objectives?

If the threshold is crossed, how might the US employ the means of escalation management to *restore deterrence* and *discourage further escalation* by either the adversary or ally?



Phase 4: Take stock and assess the COA

Following the identification of escalatory thresholds and the examination of the potential strategic and operational impact that may result from their crossing, phase 4 of this process encourages those using this technique to take a step back and consider some of the answers to the previously posed questions, take stock of the overarching picture, and challenge potential assumptions. In addition, this phase seeks to force the question of how this progressing tailored escalation management strategy is integrating with overall US foreign policy.

Phase 4 key questions

Given what we know from the first three phases of this assessment, is the selected COA discussed in phase 2 and 3 still the *best COA* for achieving US objectives and supporting escalation management?

What is our *level of confidence* in our assessment? (This question is critical to pose to ensure that these potential risks and successes are considered as probabilities.)

Are there any *key uncertainties* that we must be aware of on the road ahead? Do we need more information on these uncertainties before we can adequately boost our confidence level to where it needs to be to proceed?

Are there any *assumptions* that we may have under-examined, particularly in our analysis from phase 1?

Are we potentially assuming *counter-escalation to a COA is inevitable* when it may in fact not be?⁹¹



Given the potential risks and consequences explored in the previous phase, *where do our stakes stand* in relation to others? How does the stake affect our ability to pursue our objectives, including escalation management?

Is the selected COA coherent with *US foreign policy*? Is there a risk of it becoming contradicted by other policies, ultimately losing or diminishing its intended effect?⁹² These questions should facilitate a discussion around being able to use one's full suite of tools (the carrots and the sticks) and ensuring that messaging is reinforced across the wider DOD and interagency.

Are there *fundamental points of departure*, where either an ally's or adversary's objectives become incompatible with keeping escalation manageable that will ultimately require a different approach?

Should the US *explore changes to its posture, capabilities, or plans* to reduce escalation risks?

Are there potential adversary or ally *perceptions that the US needs to work on shaping prior to conflict* (i.e., peacetime) to curb potential escalation risk?



Phase 5: Implement and evaluate

As highlighted by the wargaming anecdote shared previously, one cannot dismiss the possibility that an opponent or ally may misconstrue, or even completely miss, US intentions even after careful implementation of COAs that are seeking to support nuclear escalation management. It is impossible to know how the developed COAs will be perceived and whether the attempts to leverage the tools of escalation

management will be successful. However, it is possible to conduct some preliminary testing of these decisions and incorporate lessons from experience gained through tabletop exercises, wargames, and red team sessions to improve the analysis undertaken with each phase.

Accordingly, this report proposes an implementation and evaluation phase that uses such simulations. This phase shapes the framework structure to mimic accepted cyclical risk management frameworks that involve a “continual process or cycle in which risks are identified, measured and evaluated; countermeasures are then designed, implemented and monitored to see how they perform, with a continual feedback loop for decision-maker input to improve countermeasures and consider tradeoffs between risk acceptance and risk avoidance.”⁹³

Phases 1–4 of this process similarly attempt to manage risk—in this case a risk of nuclear escalation—by identifying and evaluating potential escalation risks and then asking questions aimed at anticipating these risks and facilitating the design of countermeasures. Incorporating an implementation and evaluation phase that leverages simulated interactive formats creates an opportunity to probe for changes in US/adversary/ally leadership, strategy, and forces that may change the original analysis conducted in phases 1–4, ultimately improving the developed strategy prior to crisis and conflict.

Below are some proposed questions for this phase that can be posed after a TTX or wargame that use the vetted COA or series of COAs to identify potential lessons and implications.



Phase 5 key questions

From the exercise/wargame's proceedings, what were the *actual goals* of the US adversary and US allies?⁹⁴ Were they more limited or expansive than we originally believed?

What were the *actual expectations* of the trajectory of conflict for the US, the adversary, and relevant allies? Were they what we expected, and were palatable US alternatives and off-ramps tailored accordingly?

If escalation did occur, *how* did it manifest (e.g., vertically? inadvertently?)? Did it take place as we expected?

What were the *expectations concerning the consequences* of escalation?⁹⁵ Did the US adversary or ally believe that the risks of escalation were low relative to the stakes?

Should our *objectives change or be modified*? Do we have a more refined understanding of potential adversary/ally objectives that should change or modify the original analysis?

Based on the exercise/wargame's proceedings, do we need to make *adjustments to the strategic profiles* developed in phase 1?

Are there potential *adjustments for the COA(s)* that will increase chances of future success?

Is there *new information* or analysis available that helps us better understand adversary and ally decision points and thresholds?

CREATING COHESION THROUGH A FRAMEWORK FOR US ESCALATION MANAGEMENT

To review, we proposed the objectives and tools of US escalation management as the foundational elements of this functional framework. Between these foundational elements is a five-phase process that serves as connective tissue between the objectives and tools by supporting the creation and evaluation of COAs that leverage the tools toward the objectives.

Together, these three elements, the objectives and tools and the proposed five-phase nuclear escalation management process, come together to support the development of a cohesive and tailored strategy for escalation management that affects the escalation calculus of a potential US adversary or, when necessary, US ally. It does so by posing lines of inquiry that can help de-bias practitioners through challenging potential assumptions and rigorously evaluating and organizing varying information streams.⁹⁶ In addition, it offers ways to anticipate and consider mitigating measures to potential inadvertent and accidental escalation by considering potential unexpected events, crosswalking thresholds with potential COAs to anticipate as many flashpoints and thresholds as possible, and cultivating understanding of how certain actions might be perceived based on factors such as historical relationships and force postures.

This proposed process also forces the consideration of the full suite of tools at the disposal of US: actions that may bring risk or create risk (e.g., employing military force) and actions that may mitigate



FRAMEWORK FOR ESCALATION MANAGEMENT

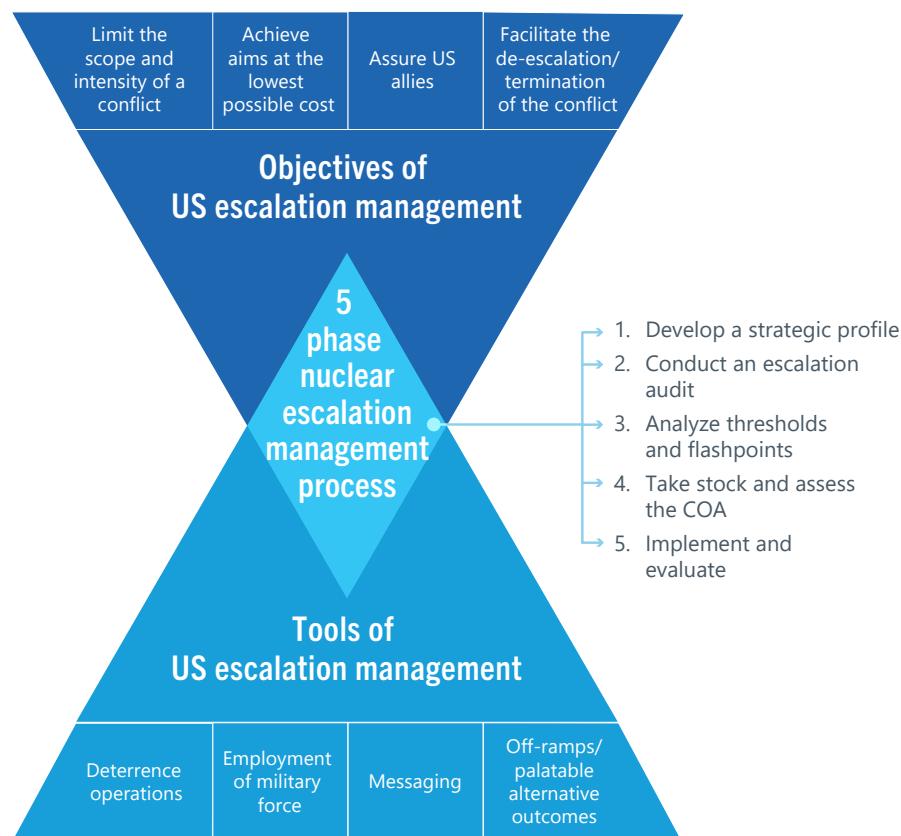
risk (e.g., off-ramps) and how they support escalation management. The research conducted for this study indicates that such a comprehensive examination is critical to achieving escalation management and minimizing the overall impact to US strategic objectives.

The primary result from leveraging this framework and the process it contains should be for US planners and policy-makers to judge more confidently whether planning, operational concepts, and peacetime messaging currently in place and under development

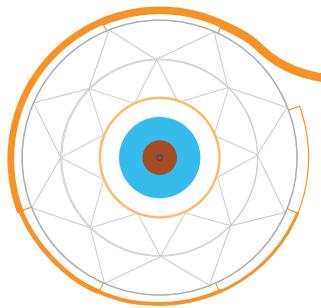
are consistent with the escalation management objectives named in this report and any others. It should also help identify shortcomings in current concepts and capabilities.

In Figure 3, we have re-introduced the graphic illustration of the proposed framework shared at the beginning of this section for easy reference. It depicts how the proposed tools and five-phase process for US escalation management work together to influence an escalation calculus, and ultimately work toward the realization of the objectives of escalation management.

FIGURE 3. CNA PROPOSED FRAMEWORK FOR NUCLEAR ESCALATION MANAGEMENT



Source: CNA.



CONCLUSIONS

This report has proposed elements for a framework that leverages escalation concepts in a way that is functionally useful to planners and decision-makers. These elements are drawn from escalation literature and the relevant academic discipline of risk management and assessment. The key elements of this framework are the objectives and tools of US escalation management, and a five-phase process for assessing and developing COAs that leverage these tools toward meeting these objectives. Together these three elements support the development of COAs and operational plans that not only achieve operational success but also manage escalation more effectively and curb potential nuclear use.

However, similar to former Department of Homeland Security Secretary Michael Chertoff's statement that "management of risk is not elimination of risk," management of escalation will not totally eliminate escalatory risk in conflict.⁹⁷

There will always be motivations to escalate that will not be anticipated or cannot be countered. Inherent uncertainty will always challenge any escalation management framework.

Despite these considerations, policy-makers and planners should not view escalation management as

a futile pursuit. After all, the best time to think about how to deal with potential nuclear escalation is well in advance of confronting it. CNA's proposed framework facilitates this preparation by helping US practitioners proactively define the US' desired boundaries prior to a potential conflict with its nuclear-armed competitors. It also aids early consideration of how best to handle the inevitable uncertainty and potential nuclear escalation risks that will arise in such a confrontation. This type of critical thinking and planning is important to prepare the US to deal with the escalation challenges being posed by Russia, China, and the DPRK. The more proactively the US works to improve its escalation management strategies in peacetime, the more effectively it can fight for its political and military objectives while simultaneously constraining potential nuclear escalation during conflict.

**Similar to
former Department
of Homeland Security
Secretary Michael Chertoff's
statement that "management
of risk is not elimination of risk,"
management of escalation
will not totally eliminate
escalatory risk in
conflict.**

PROSPECTIVE NEXT STEPS

This framework is intended to serve as a starting point for further research and analysis that test and refine the hypothesized questions and elements. To this end, additional analysis that road tests this framework would be valuable. Such follow-on research could include the use of the framework in an interactive setting, such as



CONCLUSIONS

a tabletop exercise or wargame. These forums would be beneficial for further refining the proposed process and its associated questions with each phase.

There is additional work to be done in developing methods for taking lessons learned and insights gained from the use of this framework and operationalizing them. The forums mentioned previously could be springboards to exploring the requirements for translating these insights into guidelines, warfighting concepts, and operational plans.

These follow-on research ideas also point to the need to explore what other facets of the planning process may need to evolve to ensure that escalation management becomes institutionalized within DOD and the wider interagency. This line of effort will be critical to ensuring that this framework does not simply run parallel with existing processes but intersects with them.

PREVAILING UNDER THE NUCLEAR SHADOW

SUMMARY: KEY QUESTIONS FOR NUCLEAR ESCALATION MANAGEMENT

PHASE 1 KEY QUESTIONS

- What are the stakes for the US, the potential adversary, and relevant allies in the given scenario?
- What are the identifiable goals of the US, the potential adversary, and relevant US allies?
- Who are the key decision-makers inside these three governments whose escalation calculus we are seeking to influence?
- What are the potential expectations concerning the future trajectory of a confrontation of the US, the adversary, or the ally?
- What thresholds can already be identified for each contesting party based on our expert assessments and the information we have from the US Intelligence Community?
- What impact do emerging capabilities and domains, such as cyber, space, or precision-strike, have on escalation dynamics in the context under consideration?
- How does each actor think about escalation?
- What level of confidence do we have in the data and information being discussed in this phase?
- Are there areas in which we need more information or could benefit from more insight from the Intelligence Community?

PHASE 2 KEY QUESTIONS

- What are all the possible responses from the potential adversary and relevant US allies to the US course of action (COA) being considered?
- What are the thresholds that the US wants to establish in the scenario being considered?
- Are any previous or current conditions in place in this scenario that are preventing tensions from escalating that may be leveraged for mitigating escalation?
- Taking the selected US COA(s), can we engage in early identification of potential adversary thresholds that may be at risk of being crossed, or of being perceived as crossed?
- What key decision points for a potential adversary and ally might arise during execution of a US COA that would prompt deliberate, inadvertent, or accidental escalation?
- Of the potential adversary COA(s) identified as responses to the selected US COA(s), can we identify potential US or ally thresholds that may be at risk of being crossed, or of being perceived as crossed?
- Of the identified potential ally COA(s), can we identify potential adversary thresholds that may be at risk of being crossed, or of being perceived as crossed?
- Will any alliance politics and ally objectives compete with the US goal of managing escalation?
- What asymmetries in capabilities exist between the three parties that may be translated into a dangerous vulnerability and motivate another to escalate?
- What asymmetries in objectives/motivation between the US, a potential adversary, or a US ally may lead to escalation because one government believes it has the strongest interests?
- Are there any potential unexpected events that may raise the risk of escalation?
- Do the identified US COAs have any nascent positive or negative trade-offs with one another?

PREVAILING UNDER THE NUCLEAR SHADOW

PHASE 3 KEY QUESTIONS

Key question for all four COA categories

What goals does the potential crossing of a threshold serve?

Key questions – US COAs crossing an adversary threshold

- Does the US want to cross an identified adversary threshold to impose an unexpected cost on an adversary and ensure an impact on its escalation calculus?
- What message about escalation would the US aim to send to the adversary and/or ally by crossing a potential threshold? Does this COA convey this message?
- How might the adversary respond to the US decision to cross a threshold?
- How might the US employ the tools of escalation management to mitigate the risk of adversary escalation in response to the potential COA?
- What would be the strategic/operational risks of forgoing this COA?

Key questions – adversary COAs crossing a US threshold

- Are there any US thresholds that can be reinforced via the tools of escalation management prior to conflict?
- How can the US employ the tools of escalation management in peacetime, crisis, and conflict to shape an adversary choice to potentially escalate?
- If likely to cross a threshold, what objective do we believe the adversary would be pursuing?
- How can the US shape the opponent's perception of US perceptions?
- If the threshold is crossed, what might be the operational/strategic impact to the US?
- If the threshold is crossed, how might the US and allies employ the tools of escalation management to restore deterrence and discourage further escalation?

Key questions – ally COAs crossing an adversary threshold

- If likely to cross a threshold, what objective do we believe the ally would be pursuing?
- If the potential allied COA is viewed as too risky by the US, can the US persuade the ally to forgo the COA?
- If unable to convince an ally to forgo a COA, how can the US employ the tools of escalation management to mitigate the risk of adversary escalation in response?
- If an ally were to forgo a potential COA that the US supports, what would be the strategic/operational risks?

Key questions – adversary COAs crossing an ally threshold

- Are there any ally thresholds that can be reinforced via the tools of escalation management prior to conflict?
- How can the US employ the tools of escalation management to shape an adversary choice to potentially escalate and convince the adversary not to cross an ally's threshold?
- If the threshold is crossed, what might be the operational/strategic impact to the US ally? To the US?
- If the threshold is crossed, how might the ally respond?
- How can the US persuade its ally to avoid conducting responses that would undermine US objectives?
- If the threshold is crossed, how might the US employ the means of escalation management to restore deterrence and discourage further escalation by either the adversary or ally?

PREVAILING UNDER THE NUCLEAR SHADOW

PHASE 4 KEY QUESTIONS

- Given what we know from the first three phases of this assessment, is the selected COA discussed in phases 2 and 3 still the best COA for achieving US objectives and supporting escalation management?
- What is our level of confidence in our assessment?
- Are there any key uncertainties that we must be aware of on the road ahead? Do we need more information on these uncertainties before we proceed?
- Are there any assumptions that we may have underexamined, particularly in our analysis from phase 1?
- Are we potentially assuming that counter-escalation to a COA is inevitable when it may, in fact, not be inevitable?
- Given the potential risks and consequences explored in the previous phase, where do our stakes stand in relation to others?
- Is the selected COA coherent with US foreign policy?
- Are there fundamental points of departure, where either an ally or adversary's objectives become incompatible with keeping escalation manageable that will ultimately require a different approach?
- Should the US explore changes to its posture, capabilities, or plans to reduce escalation risks?
- Are there potential adversary or ally perceptions that the US needs to work on shaping prior to conflict (i.e., peacetime) to curb potential escalation risk?

PHASE 5 KEY QUESTIONS

- From the exercise/wargame's proceedings, what were the actual goals of the US adversary and US allies?
- What were the actual expectations of the trajectory of conflict for the US, the adversary, and relevant allies?
- If escalation did occur, how did it manifest?
- What were the expectations concerning the consequences of escalation?
- Should our objectives change or be modified?
- Based on the exercise/wargame's proceedings, do we need to make adjustments to the strategic profiles developed in phase 1?
- Are there potential adjustments for the COAs that will increase chances of future success?
- Is there new information or analysis available that helps us better understand adversary and ally decision points and thresholds?

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APPENDIX: ESCALATION VIGNETTE USED FOR STUDY WORKSHOP

Below we have included the vignette used in our SME workshop as an example for other scenario-led discussions that can use the proposed framework in this report.

US-RUSSIA ESCALATION VIGNETTE

OBJECTIVE: Deter Russian escalation while protecting the integrity of US strategic posture.

BACKGROUND AND KEY ASSUMPTIONS:

The year is 2021. New START has been extended for an additional five years with the condition that there will be follow-on negotiations for a new agreement, but thus far there have been no successful follow-on dialogues or meetings between the US and Russia on next steps for arms control.

Tensions remain high between the two states as disagreements have widened on issues affecting strategic stability. The coronavirus has largely subsided, with people mostly having returned to work, and economies having almost entirely re-opened, with new health and safety precautions in place.

Russian President Vladimir Putin remains in power. His current term is set to expire in 2024, but he is on the path to secure power beyond 2024 following the passage of a Duma law lifting presidential term limits and its ratification by popular vote.

Following a tumultuous 2020, including the US presidential election and growing popular sentiment of isolationism, the US political climate is averse to being drawn into armed conflict abroad. The current US presidential administration has decided not to make any major changes to the US nuclear posture until the completion of a nuclear posture review which is not expected to be finalized until 2022. This includes maintenance of the US declaratory policy that, “The United States would only consider the employment of nuclear weapons in extreme circumstances to defend the vital interests of the United States, its allies, and partners. Extreme circumstances could include significant non-nuclear strategic attacks. Significant non-nuclear strategic attacks include, but are not limited to, attacks on the US, allied, or partner civilian population or infrastructure, and attacks on US or allied nuclear forces, their command and control, or warning and attack assessment capabilities.” The US also maintains a triad of heavy bombers, intercontinental ballistic missiles, and submarine-launched ballistic missiles.

The US has remained part of the North Atlantic Treaty Organization (NATO) and continues to supply forward-deployed, dual-capable aircraft and gravity bombs as part of the alliance’s nuclear burden-sharing arrangement. However, there is growing concern that the nuclear infrastructure and modernization plan could run into financial difficulties because of unexpected costs. Experts are warning that it cannot afford to suffer from significant delays. The

ESCALATION VIGNETTE

planned new fleet of Columbia class ballistic missile submarines (SSBNs) is particularly vulnerable to this risk.

Russia continues to build its presence in the High North with scientific research and military assets. Russia also regularly conducts exercises and patrols with its naval forces, including SSBNs, which hold regular mock bastion defense exercises. Baltic states report dramatic increase in visiting Russian nationals of military age. Low oil prices have continued to be a drag on the Russian economy.

Despite economic downturn, Russia continues to make progress with the modernization of its nuclear deterrent and is proceeding with the development of new strategic delivery vehicles, including advanced hypersonic weaponry and a nuclear-armed underwater torpedo, with the goal of evading missile defense systems.

SCENARIO:

- NATO has recently completed another large-scale joint exercise centered on an Article 5 collective defense scenario and building on the lessons learned from Exercise Trident Juncture 2018.
- Following delays in the estimated deployment of the RS-28 Sarmat ICBM, US intelligence and Russia experts have been reporting that the Ministry of Defense has been under growing domestic political pressure to demonstrate technological progress.
- A month after the announcement of a successful major Russian bastion defense exercise in the North Atlantic, the US and its NATO allies Norway and Denmark hold a NATO Support of Nuclear Operations with Conventional Air Tactics (SNOWCAT) joint exercise, where Norwegian and Danish F-35s escort US B-52 bombers.
- During the exercise, the SNOWCAT group travels up the Norwegian coastline and accidentally flies farther than authorized and briefly crosses into Russian airspace over the Kola Peninsula, a key military site for the Russian Federation that hosts the Gadzhiyev submarine base and Okolnaya submarine support base, as well as an advanced weapons testing site and an air base.
- This action receives strong condemnation from Russia. The following day President Putin issues a statement that such encroachments into Russian airspace by NATO that threaten Russian nuclear assets “will not be tolerated with impunity. The US must remember the strength of Russia’s nuclear deterrent, any such future actions will be met with a reminder.”
- Following Putin’s statement, a Russian blog, associated with special-forces veterans and a strong nationalistic political following, talks about reprisal for the Kola overflight.

ESCALATION VIGNETTE

- The Ministry of Defense announces that it has successfully finished the conversion of additional MiG-31 interceptor jets to carry the hypersonic medium-range standoff strike capability (known as the *Kinzhal*), stating that this “greatly improves the Russian capability to counter US and NATO missile defense systems that are encroaching on Russian borders” and does not specify whether they are nuclear-armed, only that they are dual-capable.
- A few days later, the US receives unconfirmed reports of Russian naval forces sighted outside their usual patrol channels in the bastion areas in the High North and in the North Atlantic and Barents Sea.
- Another week passes before a known Russian military satellite that has been previously claimed to be an “inspector satellite” launches a sub-satellite into orbit.
- The sub-satellite is detected by US Air Force Space and Missile Systems Center (which is responsible for managing the Space Based Infrared System (SBIRS) program) and appears to be maneuvering slowly toward a US military satellite that is part of the US satellite communications that link US nuclear command, control, and communications (NC3).
- As the first satellite continues to maneuver, the USAF Space and Missile Systems Center later identifies two other satellites that have come in close proximity to two to three other US military satellites.
- After these Russian satellites position closer to the US-owned satellites, the US loses connection with two of its satellites, and its downlink communications to US warfighting system components (e.g., SSBNs) are impaired.
- The US is working quickly to get the satellites back online, but technicians report it will take at least 30 minutes to an hour to fully restore the satellite and its processors, adding that they have low confidence on whether their data storage will have been corrupted.

There is concern that this may be a prelude to further attack. Additionally, because such an attack on an NC3 asset could be read as a threat to a vital interest, decision-makers will be weighing the choice of whether to escalate, not respond at all, or identify other potential COAs as part of the workshop discussion.

ENDNOTES

- 1 United States Department of Defense, *Summary of the National Defense Strategy*, Jan. 2018, 2.
- 2 United States Department of Defense, *Summary of the National Defense Strategy*, Jan. 2018, 2; and United States Department of Defense, Nuclear Posture Review, Feb. 2018, 6–8.
- 3 *Summary of the National Defense Strategy*, 2; *Nuclear Posture Review*, Feb. 2018, 11–13.
- 4 Despite sanctions having been in place since 2006, the DPRK has managed to make significant strides in developing a nuclear deterrent. By the end of 2019, the DPRK had conducted a series of 13 launches testing 25 missiles, including testing of both short-range and intercontinental range (in the form of submarine-launched) ballistic missiles. Colum Lynch, “North Korea Continues to Flout Trump, Advance Nuclear Ambitions,” *Foreign Policy*, Apr. 20, 2020. <https://foreignpolicy.com/2020/04/20/north-korea-trump-advance-nuclear-ambitions>.
- 5 Brad Roberts, *On Theories of Victory, Red and Blue*, Livermore Papers on Global Security, No. 7, Lawrence Livermore National Laboratory Center for Global Security Research, June 2020, 24.
- 6 Robert Peters, et al., “Deterrence in the 21st Century: Integrating Nuclear and Conventional Force,” *Strategic Studies Quarterly* (Winter 2018), 20.
- 7 Roberts, *On Theories of Victory, Red and Blue*, 23.
- 8 Michael Kofman and Anya Loukianova Fink, “Escalation Management and Nuclear Employment in Russian Military Strategy,” *War on the Rocks*, June 23, 2020, <https://warontherocks.com/2020/06/escalation-management-and-nuclear-employment-in-russian-military-strategy/>.
- 9 For clarification, this report acknowledges the literature has differing definitions for the terms *risk assessment* and *risk management*, with risk assessment being more narrowly scoped. This report adheres to the use of these terms with the following definitions. *Risk assessment* means: “the quantification or measurement of identified risk and probabilistic assessment that certain risks will manifest themselves” (refer to Yacov V. Haimes, “Risk Modeling, Assessment, and Management,” 2nd ed. (John Wiley & Sons, 2004) 57–58). *Risk management* incorporates risk assessment, but is best described for the intent in this report as the “continual process or cycle through which risks are identified, measured and evaluated; countermeasures are then designed, implemented and monitored to see how they perform, with a continual feedback loop for decision-maker input to improve countermeasures and consider tradeoffs between risk acceptance and risk avoidance.” Refer to Todd Masse, et al., “The Department of Homeland Security’s Risk Assessment Methodology: Evolution, Issues, and Options for Congress” *Congressional Research Service* (Washington, D.C., Feb. 2, 2007), 16.

ENDNOTES

- 10 Forrest Morgan, et al., *Dangerous Thresholds*, Arlington, Virginia: RAND Corporation, 2008, 8. Similar to this RAND study, this report acknowledges that escalation can occur across a variety of situations, from arms races to trade disputes, but for scoping this report is only considering escalation in confrontations that raise the risk of the use of military force, more specifically the use of nuclear weapons.
- 11 Morgan, et al., *Dangerous Thresholds*, 8.
- 12 Herman Kahn, *On Escalation: Metaphors and Scenarios*, 2nd ed., New Brunswick, New Jersey: Transaction Publishers, 2012.
- 13 Kahn, *On Escalation*, 52.
- 14 Thomas C. Schelling, *Arms and Influence*, Henry L. Stimson Lectures 2008 edition, New Haven, Connecticut: Yale University Press, 1966, 94.
- 15 Richard Smoke, *War: Controlling Escalation*, Cambridge, Massachusetts: Harvard University Press, 1977, 30–32.
- 16 Morgan et al., *Dangerous Thresholds*, xii. It is possible for escalation to also occur unilaterally (with specific goals held in mind by the escalating party) and not be met with a response, but in general a response is often expected by the party escalating. Refer to *Dangerous Thresholds*, 9.
- 17 Tami Davis Biddle, “Coercion Theory: A Basic Introduction for Practitioners,” *Texas National Security Review*, Vol. 3, No. 2, Spring 2020, <https://tnsr.org/2020/02/coercion-theory-a-basic-introduction-for-practitioners/>.
- 18 Schelling, *Arms and Influence*, 103.
- 19 The modes and forms of escalation and the proceeding definitions for them are derived from Morgan, et al., *Dangerous Thresholds*, 20–33 and Barry R. Posen, *Inadvertent Escalation: Conventional War and Nuclear Risks*, Ithaca, New York: Cornell University Press, 1991.
- 20 Morgan, et al., *Dangerous Thresholds*, 26–27.
- 21 Smoke, *War: Controlling Escalation*, 21–23. These different modes more precisely characterize both the “phenomenon” and “actor” images of escalation developed by Richard Smoke. The “actor” image aligns with deliberate escalation. This model of escalation depicts escalation as a conscious decision that is a unilateral act of people and institutions. The “phenomenon” image depicts escalation as an organic process that is a natural phenomenon of war, and this process is largely outside of the control of either participant. This more closely aligns with the pathways of inadvertent and accidental escalation as defined.
- 22 Morgan, et al., *Dangerous Thresholds*, 37, 60.
- 23 Morgan, et al., *Dangerous Thresholds*, 18–20.
- 24 In *War: Controlling Escalation*, Richard Smoke addresses why escalation commonly embodies this upward dynamic similar to what Kahn’s ladder depicts. He argues that the assumption that escalation is innately vertical can primarily be supported by sources inherent in the nature of warfare itself. These are: 1. the desire to attain the advantage; 2. the desire not to lose; 3. the desire to win naturally rising with the escalation of the stakes; 4. personal motives and psychology of high-level decision-makers; 5. the presence of tactical and military requirements that require the crossing of a “barrier” (or threshold, as we call it in our definition of escalation); 6. the “action-reaction” effect, or the reciprocal and/or cyclical sequence of escalatory acts between belligerents. See pages 23–26.

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- 25 This is commonly embodied by the idea of an increase in geographical scope, such as expanding the locations for targets from military bases to populated rural areas.
- 26 In this cited article, this second lens illuminates that inter-domain relationships between air, land, and sea-based assets and their underpinning space and cyber assets create an asymmetric strategic vulnerability for the US. See Vincent Manzo, *Deterrence and Escalation in Cross-domain Operations: Where Do Space and Cyberspace Fit?* Strategic Forum, No. 272, Dec. 2011, 1–3.
- 27 This complexity is consequently making it increasingly harder to visualize escalation dynamics. There have been efforts at developing more nuanced models that are not as static as the vertical 44 rung ladder originally developed by Herman Kahn. These models vary from being an “escalation lattice” that seeks to integrate potential cross domain dynamics, to an “escalation vortex” that seeks to better account for temporal dynamics across the spectrum of conflict (e.g., pre-conflict actions up to high-level intra-war exchanges). See Jon R. Lindsay and Erik Gartzke, eds., *Cross-Domain Deterrence: Strategy in an Era of Complexity* (Oxford: Oxford University Press, 2019); and Ron Lehman, “Rethinking Nuclear Deterrence Again?,” presentation at the Belfer Center for Science and International Affairs Defense Intelligence Project, Cambridge, MA, Nov. 2017.
- 28 The term *entanglement* has several dimensions as coined by researcher James Acton. Entanglement can encompass the type of entanglement described above, as well as “dual-use delivery systems that can be armed with nuclear and non-nuclear warheads...and non-nuclear threats to nuclear weapons and their associated command, control, communication, and information (C3I) systems.” Refer to *Entanglement: Chinese and Russian Perspectives on Non-nuclear Weapons and Nuclear Risks*, edited by James M. Acton, Carnegie Endowment for International Peace, Nov. 8, 2017, 1; and James M. Acton, “Escalation through Entanglement: How the Vulnerability of Command-and-Control Systems Raises the Risks of an Inadvertent Nuclear War,” *International Security*, Vol. 43, No. 1 (Summer 2018), 56–99, doi:10.1162/ISEC_a_00320.
- 29 James N. Miller Jr. and Richard Fontaine, *A New Era in US-Russian Strategic Stability*, Center for New American Security and the Belfer Center for Science and International Affairs, Sept. 2017, 19.
- 30 This definition is adapted from Chairman of the Joint Chiefs of Staff Manual, “Joint Risk Analysis”, Oct. 14, 2016, Directive Current as of Sept. 5, 2019, C-4. This document defines *strategic risk* and *military risk* to be two separate considerations, with strategic risk being, “the potential impact upon the United States—including the US population, territory, civil society, critical infrastructure, and interests—of current and contingency events given their estimated consequences and probabilities” and military risk as “the estimated probability and consequence of the Joint Force’s projected inability to achieve current or future military objectives (risk-to-mission), while providing and sustaining sufficient military resources (risk-to-force),” refer to pages C-4 and C-8.
- 31 See Mihai Diaconeasa, et al., “A Quantitative Risk Assessment Study of the Initiation of Inadvertent Nuclear War,” *Quantifying Global Catastrophic Risks* Workshop Summary, The B. John Garrick Institute for the Risk Sciences, UCLA, Sept. 16, 2018; and Dr. Martin Hellman, “Risk Analysis of Nuclear Deterrence,” *The Bent of Tau Beta Pi*, Spring 2009, 14–22.

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- 32 Kevin Benson, “Tactical Risk in Multi-Domain Operations,” Apr. 25, 2019, Modern War Institute, <https://mwi.usma.edu/tactical-risk-multi-domain-operations/>.
- 33 Abigail Ruscetta, “Battle Tested,” *Risk Management* Vol. 56, No. 7: 26, Sept. 2009.
- 34 This conception of “negative risk” is illustrated by the US Department of the Navy Principles of Operational Risk Management. See, Department of the Navy, OPNAV Instruction 3500.93D “Operational Risk Management,” Mar. 29, 2018, 10.
- 35 CNA study team roundtable session with subject matter experts, July 9, 2020.
- 36 United States Department of Defense Joint Chiefs of Staff, *Deterrence Operations Joint Operating Concept*, (2006), 5, https://www.jcs.mil/Portals/36/Documents/Doctrine/concepts/joc_deterrence.pdf?ver=2017-12-28-162015-337.
- 37 Roberts, *On Theories of Victory, Red and Blue*, 64–65.
- 38 As emphasized in a previous footnote, *risk management* incorporates risk assessment, but also includes a continuous process in which after risks are identified, appropriate countermeasures are designed. They are then “implemented and monitored to see how they perform, with a continual feedback loop for decision-maker input to improve countermeasures and consider tradeoffs between risk acceptance and risk avoidance.” Todd Masse, et al., “The Department of Homeland Security’s Risk Assessment Methodology: Evolution, Issues, and Options for Congress,” 16.
- 39 These other spaces include the work already cited by the US Department of Homeland Security as well as research concerning adaptive regulation in technology policy issues such as Kenneth Oye, Lawrence McCray, and Arthur C. Petersen, “Planned Adaptation in Risk Regulation: An Initial Survey of United State Environmental, Health, and Safety Regulation,” *Technological Forecasting and Social Change*, Vol. 77, No. 6, 951–959.
- 40 CNA discussion with subject matter expert, June 3, 2020.
- 41 Andrew L. Ross, “The Origins of Limited Nuclear War Theory,” *On Limited Nuclear War in the 21st Century*, edited by Jeffrey A. Larsen and Kerry M. Kartchner, Stanford, California: Stanford University Press, 2014, 21–48.
- 42 John K. Warden, *Limited Nuclear War: The 21st Century Challenge for the United States*, Livermore Papers on Global Security, No. 4, Lawrence Livermore National Laboratory Center for Global Security Research, July 2018, 13–14.
- 43 Smoke, *War: Controlling Escalation*, 10.
- 44 CNA discussion with subject matter expert, June 1, 2020.
- 45 CNA discussion with subject matter expert, May 19, 2020.
- 46 This need to potentially engage in deliberate escalation in order to achieve tactical or operational objectives is acknowledged by Richard Smoke’s postulation regarding the upward tendency of escalation cycles. One of his conclusions is that this tendency occurs due to “the presence of tactical and military requirements that require the crossing of a ‘barrier.’” See Smoke, *War: Controlling Escalation*, 25.
- 47 Morgan, et al., *Dangerous Thresholds*, 36–38.

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- 48 This is one way that what Herman Kahn referred to as “an agreed battle” can become established, whereby an implicit agreement to avoid further escalation comes to fruition because each side has an incentive to not escalate further. Herman Kahn as cited by James N. Miller and Neal A. Pollard, “Persistent Engagement, Agreed Competition and Deterrence in Cyberspace,” *Lawfare*, Apr. 30, 2019, <https://www.lawfareblog.com/persistent-engagement-agreed-competition-and-deterrence-cyberspace>.
- 49 This objective would continue to be in place even following the failure of strategic deterrence and nuclear use against a US ally with the interest of restoring US credibility as a security guarantor. Vince A. Manzo and John K. Warden, “After Nuclear First Use, What?,” *Survival*, 60:3, 133-160, DOI: 10.1080/00396338.2018.1470770.
- 50 Morgan, et al., *Dangerous Thresholds*, 31–33.
- 51 Paul Bracken, “War Termination,” *Managing Nuclear Operations*, edited by Ashton B. Carter, John D. Steinbruner, and Charles A. Zraket, Brookings Institution Press, 1987, 208.
- 52 CNA discussion with subject matter expert, June 1, 2020.
- 53 For clarity, this study believes *deterrence* is best defined as, “the practice of discouraging or restraining someone...from taking unwanted actions” through “the existence of a credible threat of unacceptable counteraction and/or belief that the cost of action outweighs the perceived benefits.” Michael J. Mazarr, *Understanding Deterrence*, Santa Monica, California: RAND Corporation, PE-295-RC, 2018, 2 and Office of the Chairman of the Joint Chiefs of Staff, *DOD Dictionary of Military and Associated Terms*, (Washington, DC: The Joint Staff, Jan. 2020), 64.
- 54 Schelling, *Arms and Influence*, 102–103, 109.
- 55 Morgan, et al., *Dangerous Thresholds*, 30–31.
- 56 Schelling, *Arms and Influence*, 121.
- 57 Bracken, “War Termination,” 208.
- 58 Gerald C. Brown, “Deterrence Norms and the Uncomfortable Realities of a New Nuclear Age,” *War on the Rocks*, Apr. 20, 2020, <https://warontherocks.com/2020/04/deterrence-norms-and-the-uncomfortable-realities-of-a-new-nuclear-age/>.
- 59 This was noted as a challenge when considering how to prevent further escalation during one of the semi-structured discussions conducted for this study. CNA discussion with subject matter expert, Apr. 3, 2020.
- 60 Morgan, et al., *Dangerous Thresholds*, 45.
- 61 Schelling, *Arms and Influence*, 3–4.
- 62 CNA discussion with subject matter expert, June 1, 2020.
- 63 Bracken, “War Termination,” 200.
- 64 Forrest Morgan, *Dancing with the Bear: Managing Escalation in a Conflict with Russia*, Ifri Security Studies Center, Proliferation Papers: Winter 2012, 40. Digging into the historical relationships can also be a useful means of uncovering past factors that influenced dynamics between these parties in previous scenarios that carried escalatory risk.
- 65 Forrest Morgan, et al., *Confronting Emergent Nuclear-Armed Regional Adversaries: Prospects for Neutralization, Strategies for Escalation Management*, Santa Monica, California: RAND Corporation, 2015, 35–36.

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- 66 Smoke, *War: Controlling Escalation*, 39.
- 67 Smoke, *War: Controlling Escalation*, 311; and CNA discussion with subject matter expert, June 1, 2020.
- 68 Smoke, *War: Controlling Escalation*, 38.
- 69 Smoke, *War: Controlling Escalation*, 315.
- 70 CNA discussion with subject matter expert, Apr. 30, 2020.
- 71 There are other emerging capabilities that can have an impact on escalation, and those listed here are intended to serve as an example. For a comprehensive review of the various technologies that may raise nuclear risk, see John Borrie, “Nuclear Risk and the Technological Domain: A Three-Step Approach,” *Nuclear Risk Reduction: Closing Pathways to Use*, edited by Wilfred Wan, 70–91, United Nations Institute for Disarmament Research, Apr. 2020.
- 72 Caitlin Talmadge, “Emerging Technology and Intra-war Escalation Risks: Evidence from the Cold War, Implications for Today,” *Journal of Strategic Studies*, 42:6, 869 and 879–880, DOI: 10.1080/01402390.2019.1631811.
- 73 The United States’ competitors have been exploiting strategic ambiguity in an effort to bolster deterrence against the US and its allies that may also bring unintended escalation. This includes the deliberate creation of ambiguity around the size, scope, and scale of nuclear arsenals; ambiguity around force composition; and ambiguity around the strategic conditions and national interests that may drive the decision to use nuclear weapons in crisis or conflict. See Thomas G. Mahnken and Gillian Evans, “Ambiguity, Risk, and Limited Great Power Conflict,” *Strategic Studies Quarterly*, Vol. 13, No. 4 (Winter 2019), 59–60, <https://www.jstor.org/stable/10.2307/26815046>.
- 74 CNA discussion with subject matter expert, Apr. 30, 2020.
- 75 Suggestion from study team roundtable session with subject matter experts, July 9, 2020.
- 76 CNA discussion with subject matter expert, June 1, 2020.
- 77 By asking for a range of available COAs rather than the most likely COA, one can then consider a range of plausible responses to these COAs in order to identify as many plausible escalation paths as possible. The choice to ask for a range of plausible COAs rather than the most likely COA leverages a technique called the Delphi method, a forecasting technique developed by the RAND Corporation. Refer to Morgan, et al., *Dangerous Thresholds*, 221–224.
- 78 This question is a paraphrase of a point made by one researcher on the importance of the US being prepared to influence the formulae of any war (in this cited writing, with Russia and China) that it may become engaged in, stating “...the United States should have a clear idea of what it wants the boundaries of constraint to look like in potential conflicts with Russia or China, and a plan for how it would advance its arguments for those boundaries. It must also have a realistic assessment as to what the limits would actually end up looking like. That is, the United States should be prepared to operate well not only under its preferred but also under the most likely parameters of a limited war.” See Elbridge Colby, “Prevailing in Limited War,” *Managing Escalation and Limiting War to Achieve National Objectives in a Conflict in the Western Pacific*, Washington, DC: Center for New American Security, Aug. 2016, 17.

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- 79 Smoke, *War: Controlling Escalation*, 305–306.
- 80 Smoke, *War: Controlling Escalation*, 311.
- 81 This question is important when considering the vulnerability of military assets in the space and cyberspace domains. US dependence on these domains to operate each leg of the triad and other conventional assets could encourage potential adversaries to exploit these vulnerabilities for operational impact. See Manzo, *Deterrence and Escalation in Cross-domain Operations*, 2–3.
- 82 Smoke, *War: Controlling Escalation*, 313.
- 83 Smoke, *War: Controlling Escalation*, 313.
- 84 Morgan, *Dancing with the Bear*, 41.
- 85 CNA discussions with subject matter expert, Apr. 30, 2020, and June 1, 2020.
- 86 CNA discussion with subject matter expert, June 12, 2020.
- 87 Smoke, *War: Controlling Escalation*, 314.
- 88 Smoke, *War: Controlling Escalation*, 314.
- 89 CNA discussion with subject matter expert, Mar. 31, 2020.
- 90 CNA discussion with subject matter expert, Mar. 31, 2020.
- 91 Smoke, *War: Controlling Escalation*, 306, 307.
- 92 Smoke, *War: Controlling Escalation*, 307.
- 93 Masse, et al., “The Department of Homeland Security’s Risk Assessment Methodology: Evolution, Issues, and Options for Congress,” 16.
- 94 Smoke, *War: Controlling Escalation*, 39.
- 95 Smoke, *War: Controlling Escalation*, 39.
- 96 There has been research regarding the challenges and opportunities provided by advanced strategic situational awareness and information technologies platforms in managing escalation and their impact on decision-maker bias and cognitive processing. For more on this topic see Rebecca Hersman, et al., *Under the Nuclear Shadow: Situational Awareness Technology and Crisis Decisionmaking*, Washington, DC: Center for Strategic and International Studies, Mar. 2020, 39 and 43.
- 97 Masse, et al., “The Department of Homeland Security’s Risk Assessment Methodology: Evolution, Issues, and Options for Congress,” 22.

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