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In crises between nuclear powers, the nuclear shadow will loom large. The emerging situational awareness (SA) ecosystem can create new risks but can also ameliorate them depending on how these capabilities are used and communicated. Indeed, finding a balance between risk and benefit in such a complex security environment while also maximizing the value of information to terminate a crisis or conflict on favorable terms will not happen automatically. This environment will also require new perspectives on the value and risks associated with information dominance and its impact on nuclear crises. Information dominance has been essential to ensuring U.S. military effectiveness, but in a combined conventional/nuclear ecosystem involving conflict between nuclear-armed adversaries, the picture is far more complex.

In the emerging strategic SA ecosystem, new technologies are transforming the way information is collected, analyzed, and acted upon during competition between rival states. The growing reliance on technology across the spectrum of conflict means decisionmakers will have to grapple with enormous amounts of information from widely varying and potentially unfamiliar sources and on compressed timeframes. This increasingly combined strategic SA ecosystem, including a wide array of SA technologies, along with critical enablers, can create uncertainty in the conventional and nuclear space that could create escalatory risks under crisis scenarios. Advances in numerous technologies, however, have vastly increased the importance of SA for conventional conflict, including through remote sensing, global positioning system (GPS) navigation, internet communications, cyber capabilities, and remotely piloted unmanned vehicles, among others. Today these systems are substantially more capable, but the increased speed and precision is accompanied by a lack of firebreaks that could slow crises from escalating to nuclear conflict.

The transformational nature of the strategic SA landscape suggests a second look is necessary to consider the risks these emerging capabilities may introduce as well as and the challenges they may pose for policy professionals, especially when employed in a crisis or conflict between nuclear-armed states. To effectively manage crisis escalation, decisionmakers must understand how the strategic SA ecosystem has evolved, appreciate the dynamic relationship between improved strategic SA and crisis stability, and recognize the complex interplay between technology, escalation, and decisionmaking. This report has tried to take an initial step toward that reconsideration and examine the characteristics of this new environment and its implications.

Key Conclusions

The growing nuclear shadow requires new perspectives on the value and achievability of information dominance.

As the risk of crisis between nuclear-armed adversaries increases, assumptions about the value and achievability of information dominance may need to be reconsidered. Information dominance has been essential to ensuring U.S. military effectiveness, sustaining the credibility and assurance of military alliances, and stabilizing or reducing the risks of miscalculation or collateral damage, especially in post-Cold War conventional conflicts. In the combined conventional-nuclear strategic SA ecosystem, surveillance capabilities vital to U.S. conventional superiority may introduce underappreciated escalatory risks and anxieties. Careful re-examination is required.

The risk of inadvertent escalation will dominate how decisionmakers think about a crisis between nuclear-armed states. The presence of new technologies can enhance SA and influence risk perceptions, both positively and negatively. New technologies can provide more information more quickly and with greater precision than ever before, but decisionmakers must weigh the benefits of more rapid, decisive military victory afforded by information dominance against the high-stakes risks of possible nuclear escalation. Escalation anxiety may make decisionmakers assess the value of information and the means of its collection differently and with greater caution.

Critical decisions necessary to achieve and manage information dominance will occur early in a crisis as both sides seek to understand and resolve the crisis on the most favorable terms possible. Effective tools to evaluate risk, utility, and confidence associated with strategic SA capabilities are lacking, especially early in a crisis when the situation is most uncertain and information demands are high.

Despite the potential value of enhanced SA, decisionmakers may reject certain capabilities during a crisis if they perceive them as provocative or escalatory. Escalation aversion could result in information gaps during a crisis, contributing to strategic surprise, deterrence failure, or miscalculation. This could create new, unanticipated paths toward escalation or alternatively lead decisionmakers to “micromanage” their use. This could also exacerbate tensions between policymakers and operators, whose needs and perspectives on the value of supplemental information may differ.

The combined conventional/nuclear strategic SA ecosystem is here to stay.

Comingled platforms, mutual dependencies between conventional and non-conventional capabilities, and the need for strategic SA capabilities to address nuclear risks preclude relying on “disentanglement” as a primary means of risk reduction. Many technologies (e.g., AI, advanced sensors, autonomous unmanned platforms) will be comingled and integrated on single platforms, as well as interchangeable across platforms, requiring new frameworks and lexicons to understand the potential strategic risks and benefits of using them. Nuclear and conventional missions will be distinguished less by the capabilities used and more by the missions to which they are assigned.

The strategic SA ecosystem may be combined across the conventional and nuclear realms, but the communities responsible for planning, policy, and crisis management in these two operational areas are not. That needs to change. Communication and collaboration across both communities is essential to understand the trade-offs, risks, and benefits to conventional-nuclear integration in the strategic SA arena.

Nuclear and conventional communities—military and civilian—bring different perspectives, familiarity, and comfort with different technical capabilities and in turn will raise different questions and maintain different assumptions about the risks and benefits of their use. Managing conventional crisis under a nuclear shadow will require an appreciation for these differences and a combined approach.

The combined nuclear/conventional strategic SA ecosystem will shape, not just inform, crises with nuclear-armed states.

Strategic SA capabilities, especially when used overtly, can signal U.S. intent to an adversary, predict adversary action, manage allies and partners, and shape the international environment more broadly. On the other hand, tactical or operational collection decisions—such as where unmanned aircraft can fly or which cyber systems will be penetrated—will be infused with strategic meaning and consequences.

The United States will need to weigh when, whether, and how to share information regarding the use of new strategic SA technologies with allies and partners in a crisis. This will include questions regarding the disclosure of covert or clandestine capabilities, operational coordination, and “rules of the road” in terms of friend-on-friend surveillance.

To improve their utility in a crisis, autonomous collection platforms (e.g., unmanned, cyber, and space-based systems) must be able to adapt to various policy-imposed limits. Intrusive or clandestine capabilities are most likely to be subject to policy constraints or “guardrails” to limit where, when, or how such capabilities can be used or to establish specific high-level approval processes. At a minimum, collectors and operators must be prepared for additional transparency and disclosure requirements, and policymakers need a clear understanding of the costs, as well as benefits, associated with such constraints.

High stakes and unfamiliar technologies may increase the risk of biased decisionmaking.

Cognitive bias—a looming challenge for all decisionmakers—may be exacerbated in the emerging strategic SA ecosystem, with unfamiliar technology and high-stakes, high-stress circumstances. Training and preparation can reduce the influence of cognitive biases and improve the decision process regarding the use of information collection capabilities in a crisis, but only if done in advance.

Decisionmakers have few tools to understand how nuclear-armed adversaries perceive the new strategic SA environment, technologies, and their linkages with escalation and risk. As a result, decisionmakers are forced to make assumptions—assumptions an adversary might not share. In the absence of data, decisionmakers look for definable boundaries (e.g., international borders) that may reflect Western values and biases. Filling these gaps should be a priority for future research and a topic for dialogue with both allies and potential adversaries.

The vulnerabilities of some technical capabilities to interference, manipulation, disinformation, spoofing, or even cooptation by an adversary are not well understood, especially in the areas of cyber, space, and AI. Under such high-stakes scenarios, decisionmakers will demand high confidence in informational provenance and chain of custody.

How emerging strategic SA technologies are used in peacetime, or in early crises, will have significant bearing on decisionmakers’ perspectives and familiarity regarding their acceptable use in crisis and war. Introducing new or unfamiliar capabilities in crisis will prompt additional scrutiny for utility and escalatory risk. Finding ways to utilize these capabilities to enhance strategic SA before a crisis will improve familiarity and may reduce perceived escalatory risks.

Recommendations

Close the divide between technology and policy regarding the benefits, risks, and requirements for strategic SA capabilities. Information complexity and a lack of familiarity with strategic SA capabilities introduces underappreciated risks, especially in high-stakes, high-stress scenarios under a nuclear shadow. Technical, operational, and policy communities lack common views on the utility of some capabilities, the risks of disclosure, and the provocation involved in their use, as well as their vulnerability to tampering or manipulation. Socializing technical capabilities and operational requirements now—through training, exercises, and simulations as well as day-to-day use for strategic SA—is essential to reducing information risks, minimizing cognitive biases, and improving crisis management.

Integrate strategy, planning, and operations between the conventional and nuclear communities to better prepare for conventional crises under a nuclear shadow. These integrated approaches must incorporate early-crisis scenarios and recognize the combined strategic SA ecosystem that supports both nuclear and conventional missions. Differing perspectives on information dominance, escalation anxiety, and transparency need to be appreciated and adjudicated in advance.

Engage with allies and potential adversaries on issues of technology, information, and warning to better understand thresholds, risks, and perceptions in early crisis. The “information space” is underappreciated and critical for understanding and managing crises, not only in terms of internal decisionmaking but also externally with partners and potential adversaries. Multilateral planning and exercises with allies and partners should incorporate informational aspects of early crisis management. Similarly, issues of escalatory risks associated with warning, surveillance, and information should be addressed through security and stability dialogues with potential adversaries.

Seek ways to make strategic SA capabilities and the information they provide more adaptable and flexible to potential requirements for enhanced transparency, signaling, self-attribution, information sharing, and public disclosures. This may include the development of mechanisms, protocols, and options needed to manage collection assets beyond traditional covert, clandestine, or intelligence-oriented concepts of operation when needed for signaling and crisis management purposes in a crisis with a nuclear-armed adversary.