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Would China Go Nuclear?

Caitlin Talmadge

Assessing the Risk of Chinese Nuclear Escalation in a Conventional War with the United States

Despite China's long-standing no-first-use pledge, both U.S. and Chinese experts have recently raised concerns about the possibility of Chinese nuclear escalation in the event of a conventional war with the United States—particularly if the United States employs concepts of operation that emphasize early attacks on Chinese command and control (C2) networks, ballistic missile submarines (SSBNs), mobile land-based missiles, missile bases, and air defense networks. These “escalation pessimists,” as I call them, stand in contrast to a group of “escalation optimists,” who are significantly less concerned about the potential nuclear pressures that a conventional war with the United States might place on China.

In general, a conventional war between the two countries is unlikely, much less Chinese nuclear escalation within that war. Certainly, Chinese nuclear escalation seems less likely than escalation by states such as Russia or Pakistan, which advertise a willingness to use nuclear weapons first. Nevertheless, the consequences of Chinese nuclear escalation would be so significant that the potential danger merits careful assessment. Unfortunately, the conflicting views of escalation optimists and pessimists remain a significant impediment to this assessment.

This impasse has two main sources. One is the lack of systematic, open-source military-technical analysis of the extent to which plausible U.S. conventional military operations are likely to threaten China's nuclear retaliatory capability. The other is a failure to incorporate perceptual variables that are likely to shape both how China will view threats to its nuclear arsenal after conventional deterrence fails and the purposes that China might believe nuclear escalation could serve under such conditions.

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This article examines both these military-technical and perceptual factors in order to assess the risk of Chinese nuclear escalation. It finds that the pressures emphasized by pessimists are plausible, though not inevitable. Notably, the danger stems less from the purely military-technical threat that a U.S. conventional campaign would pose to China's nuclear arsenal, which pessimists may at times overestimate, than from what China is likely to believe these military-technical developments signal about broader U.S. intentions once a conventional war is under way, which optimists too often overlook. Optimism is therefore unwarranted, but some of the strongest reasons for pessimism are not the ones identified in the current debate. These reasons also differ in important ways from concerns about possible Soviet nuclear escalation against NATO in the late Cold War, a scenario that has explicitly and implicitly shaped much recent analysis of China without rigorous attention to the possible limits of the analogy. This analysis thus clarifies and helps resolve key points of disagreement in the current debate over China while also highlighting the critical factors that have influenced or could influence nuclear escalation risk in other scenarios.

To preview the main claims, the article's military-technical analysis finds that, consistent with the worries of the escalation pessimists, plausible U.S. conventional military operations in the event of war with China almost certainly would erode significant components of China's nuclear or nuclear-relevant capabilities even if this were not the U.S. goal. Crucially, however, a U.S. conventional campaign would be extremely unlikely to inadvertently eliminate China's nuclear arsenal outright. The key question is how China would then assess the survivability of its degraded nuclear force.

China's assessment is likely to be much less confident amid the fog and suspicions of a major war than it would be in peacetime. Indeed, the generally relaxed beliefs about nuclear escalation currently espoused by China's strategic community seem unlikely to persist in a world where the outbreak of an intense conventional war would have recently proven many of this community's other working assumptions incorrect. Chinese leaders could reasonably come to believe that the United States was seeking to pursue conventional counterforce—that is, the erosion or destruction of China's nuclear arsenal without U.S. use of nuclear weapons—or even nuclear counterforce. Under such circumstances, Chinese leaders might see limited nuclear escalation as their least bad option, using nuclear weapons for purposes of military advantage or coercive leverage or both, for reasons I outline further in this article.

The article proceeds in four sections. The first section frames the debate between escalation optimists and pessimists. The second section draws on some of the suggestions in this debate as well as logical deduction, past scholarship, and historical evidence to produce a general framework for assessing the

threat that one country's conventional military operations might pose to an opponent's nuclear retaliatory capability and how the opponent might respond to this threat, based on both military-technical and perceptual variables. The third section uses this framework to evaluate the extent to which plausible U.S. conventional operations might erode China's nuclear retaliatory capability during a war and the extent to which such operations might in sum appear to China as the prelude to or an attempt at a counterforce campaign, possibly prompting Chinese nuclear escalation. The conclusion summarizes the findings and identifies areas for further research.

The Debate over Chinese Nuclear Escalation

In general, escalation from conventional to nuclear war could occur through a variety of pathways. These include preemption, as well as the dangers of unauthorized use, accidental launch based on faulty warning, and deliberate nuclear escalation to stalemate a conventional military attack.¹ With respect to China, the country's minimal nuclear posture, combined with its centralized control over nuclear weapons and long-standing no-first-use pledge, make these scenarios fairly implausible.² For example, a recent RAND analysis of U.S.-China conflict scenarios confidently excludes the problem of nuclear escalation all together. Capturing the general consensus, the report notes, "We assess the probability to be very low and so do not include the effects of nuclear warfare in our analysis of losses and costs. The general reason for this is that *mutual deterrence* prevails in the Sino-U.S. strategic-nuclear relationship."³

1. On preemption, see Marc Trachtenberg, *History and Strategy* (Princeton, N.J.: Princeton University Press, 1991), chap. 1; Charles L. Glaser, *Analyzing Strategic Nuclear Policy* (Princeton, N.J.: Princeton University Press, 1990); and Robert Jervis, *The Meaning of the Nuclear Revolution: Statecraft and the Prospect of Armageddon* (Ithaca, N.Y.: Cornell University Press, 1990), especially chap. 5. On unauthorized or accidental launch, see Bruce G. Blair, *Strategic Command and Control: Redefining the Nuclear Threat* (Washington, D.C.: Brookings Institution Press, 1989); Scott D. Sagan, *The Limits of Safety: Organizations, Accidents, and Nuclear Weapons* (Princeton, N.J.: Princeton University Press, 1995); and Peter D. Feaver, *Guarding the Guardians: Civilian Control of Nuclear Weapons in the United States* (Ithaca, N.Y.: Cornell University Press, 1992). On deliberate escalation, see Keir A. Lieber and Daryl G. Press, "Coercive Nuclear Campaigns in the 21st Century: Understanding Adversary Incentives and Options for Nuclear Escalation," PASC report number 2013-001 (Monterey, Calif.: Naval Postgraduate School, March 2013); Jasen Castillo, "Deliberate Escalation: Nuclear Strategies to Deter or Stop Conventional Attacks," Texas A&M University, October 2014, available from the author upon request; and Vipin Narang, *Nuclear Strategy in the Modern Era: Regional Powers and International Conflict* (Princeton, N.J.: Princeton University Press, 2014).

2. M. Taylor Fravel and Evan S. Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure," *International Security*, Vol. 35, No. 2 (Fall 2010), pp. 48-87; and Avery Goldstein, *Deterrence and Security in the 21st Century: China, Britain, France, and the Enduring Legacy of the Nuclear Revolution* (Stanford, Calif.: Stanford University Press, 2000), chaps. 3-4.

3. David C. Gompert, Astrid Stuth Cevallos, and Cristina L. Garafola, *War with China: Thinking*

Recently, however, intensified security competition between the United States and China has prompted the United States to adopt conventional concepts of operation that some argue raise a distinct set of so-called inadvertent nuclear risks: namely, that China might mistake U.S. conventional operations for an attempt at or prelude to counterforce, creating pressures on Chinese leaders to escalate to nuclear use. The United States maintains that its conventional force planning efforts are not aimed at any particular country. Nevertheless, the U.S. approach is explicitly designed to counter adversaries with antiaccess, area-denial capabilities of the type the United States commonly asserts China is developing.

In particular, the U.S. concept known as AirSea Battle, though vague and promulgated as much outside the Pentagon as within it, reportedly envisioned rapid, large-scale U.S. attacks on the Chinese mainland in the event of war. According to analysis from an influential think tank closely associated with the Pentagon, U.S. targets in an AirSea Battle-style campaign were to include Chinese command and control networks, missile sites, intelligence, surveillance, and reconnaissance (ISR) assets, air defense systems, and submarines, with the goal of “executing a blinding campaign against PLA [People’s Liberation Army] battle networks.”⁴ Although the Pentagon has since folded AirSea Battle into the broader U.S. Joint Operational Access Concept and renamed it the Joint Concept for Access and Maneuver in the Global Commons, the core ideas endure and reflect an expansive U.S. approach to conventional warfighting evident since at least 1991.⁵

ESCALATION PESSIMISTS

Escalation pessimists worry that the U.S. approach could lead inadvertently to Chinese nuclear use. Their arguments echo Barry Posen’s contention that NATO’s approach to conventional warfighting in the late Cold War could have generated pressures for Soviet nuclear use by unintentionally infringing upon vital components of the Soviet retaliatory capability, such as its SSBN force and ground-based early warning radars.⁶ For example, Thomas Christensen

through the Unthinkable (Santa Monica, Calif.: RAND Corporation, 2016), p. 29 (emphasis in the original).

4. Jan van Tol et al., “AirSea Battle,” Microsoft PowerPoint slides, May 18, 2010, p. xiii, available from the author upon request.

5. Sam LaGrone, “Pentagon Drops Air Sea Battle Name, Concept Lives On,” *U.S. Naval Institute News*, January 20, 2015, <http://news.usni.org/2015/01/20/pentagon-drops-air-sea-battle-name-concept-lives>; and Michael R. Gordon and Bernard E. Trainor, *The Generals’ War: The Inside Story of the Conflict in the Gulf* (New York: Little, Brown, 1995), pp. 137, 408, 414, 418, 423, 442.

6. Barry R. Posen, *Inadvertent Escalation: Conventional War and Nuclear Risks* (Ithaca, N.Y.: Cornell University Press, 1991).

writes that Posen's analysis "should apply even more clearly to attacks on the Chinese homeland in a future U.S.-China conflict."⁷ As Christensen explains, "China is simultaneously developing conventional and nuclear coercive capabilities that overlap significantly." He points in particular to the dual nuclear and conventional relevance of Chinese submarines, missiles, space assets, and command and control systems, emphasizing that "if strikes by the United States on China's conventional coercive capabilities or their critical command and control nodes and supporting infrastructure were to appear in Beijing as a conventional attack on its nuclear retaliatory capability or as a precursor to a nuclear first strike, even a China that generally adheres to a No-First-Use posture might escalate to the nuclear level."⁸

Avery Goldstein, too, argues that a U.S.-China conventional war could inadvertently escalate to the nuclear level. In his view, the use of conventional force is inherently unpredictable, and as two nuclear-armed states using force to bargain at the conventional level, the United States and China might miscalculate in ways that could eventually lead to "unanticipated nuclear catastrophe." A particular danger stems from the possibility that the United States might mistakenly sink a Chinese SSBN during the course of a conventional war, "inviting Chinese nuclear retaliation."⁹ Furthermore, Goldstein argues that both the United States and China are generally overconfident about their ability to control escalation, which exacerbates the risk.

Other experts also rate escalatory risks as high. For example, Joshua Rovner notes that there is a strong chance of inadvertent escalation given the targets that the United States likely would attack in a conventional first strike against China. "The targets . . . would include China's ballistic missiles and fixed and mobile launchers, as well as space- and ground-based facilities for targeting and guidance," he writes. "While U.S. planners might be confident that they can distinguish conventional from nuclear targets, Chinese officials might not be, especially because their ballistic missile stockpiles would be at the top of the target list."¹⁰

Similarly, Wu Riqiang writes that "because of the co-mingling of Chinese conventional and nuclear weapons and the difficulty of discriminating between them, the U.S. military might attack China's nuclear weapons inadver-

7. Thomas J. Christensen, "The Meaning of the Nuclear Evolution: China's Strategic Modernization and U.S.-China Security Relations," *Journal of Strategic Studies*, Vol. 35, No. 4 (August 2012), p. 470 fn. 54.

8. *Ibid.*, p. 453.

9. Avery Goldstein, "First Things First: The Pressing Danger of Crisis Instability in U.S.-China Relations," *International Security*, Vol. 37, No. 4 (Spring 2013), pp. 49-89, especially pp. 70-72, 88.

10. Joshua Rovner, "AirSea Battle and Escalation Risks," policy brief 12 (San Diego: University of California Institute on Global Conflict and Cooperation, January 2012), p. 4.

tently in a conventional war, which would drive China's confidence of retaliation lower. Therefore, Chinese leaders would face high use-it-or-lose-it pressure, and might lose confidence, leading to a decision to escalate." Wu identifies three types of intermingling as particularly worrisome. First, China mounts both nuclear and conventional warheads on its medium-range DF-21 missiles, which could lead to the United States unintentionally targeting China's nuclear arsenal in an attempt to suppress China's conventional missile threat. Second, Wu notes that the United States might have difficulty distinguishing between China's attack submarines and its SSBNs, resulting in the sinking of the latter, which could look to China like the prelude to counterforce. Third, Wu worries that U.S. efforts to degrade Chinese command and control over its conventional forces also could degrade China's ability to control or use its nuclear deterrent. In the larger context of what Wu sees as a vulnerable land-based Chinese intercontinental ballistic missile (ICBM) force, he worries that China might fear that it would soon lose its nuclear deterrent.¹¹

Other escalation pessimists express similar concerns. For example, Christopher Twomey notes that China's "conventional systems rely on command and control systems that also perform a role in nuclear operations. . . . Chinese long-range over-the-horizon radars used to find U.S. carriers for attack by conventional ballistic missiles might also provide early warning capabilities. China's Second Artillery Force is responsible for both conventional and nuclear-armed missiles. The separation of command and control links between the two sides of the force is unclear."¹² Likewise, a second recent RAND study that is less alarmist about nuclear risks overall than the one previously mentioned still frets about China's decision to mount both nuclear and conventional warheads on the DF-21. As Eric Heginbotham and his coauthors warn, "The hunt for conventionally armed missiles could result in the attrition of China's nuclear-capable missile force," which "could ultimately create a 'use-them-or-lose-them' dilemma. . . , particularly if other parts of China's strategic system (such as SSBNs) were under attack."¹³ Some pessimists are so concerned that they have proposed entirely different U.S. concepts of operation for war in the Western Pacific.¹⁴

11. Wu Riqiang, "Sino-U.S. Inadvertent Nuclear Escalation," Renmin University, 2016, pp. 6, 10, 13–17, 30, 33–35, available from the author upon request.

12. Christopher P. Twomey, "Asia's Complex Strategic Environment: Nuclear Multipolarity and Other Dangers," *Asia Policy*, January 2011, p. 64.

13. Eric Heginbotham et al., *The U.S.-China Military Scorecard: Forces, Geography, and the Evolving Balance of Power, 1996–2017* (Arlington, Va.: RAND Corporation, 2015), p. 353.

14. T.X. Hammes, "Offshore Control: A Proposed Strategy for an Unlikely Conflict," Strategic Forum No. 278 (Washington, D.C.: Institute for National Strategic Studies, National Defense Univer-

ESCALATION OPTIMISTS

Escalation optimists rate the risk of Chinese nuclear escalation as substantially lower—certainly too low to provide a reason to abandon AirSea Battle or its progeny. For example, Elbridge Colby, a former Pentagon official, acknowledges that a U.S. conventional campaign would attack targets on the Chinese mainland, raising some inherent risks of nuclear escalation. Nevertheless, he contends that U.S. policymakers are sensitized to the dangers and can manage the problem through the careful design of military campaigns.¹⁵ Vincent Manzo, a Pentagon analyst, also soberly recognizes escalatory risk but argues that a U.S. campaign can be designed to limit the possibility that China would view it as threatening the country's nuclear deterrent. For example, the United States could geographically circumscribe the range of its operations on Chinese territory or conduct most of its attacks with stand-off weapons that would reduce the need to suppress Chinese air defenses.¹⁶ My own conversations and interviews with numerous other current and former U.S. government officials, both military and civilian, suggest that many share Colby's and Manzo's views.¹⁷ On occasion these views have surfaced publicly, as when former Director of National Intelligence and retired Commander of U.S. Pacific Command Adm. Dennis Blair recently described the possibility of nuclear escalation between the United States and China as "somewhere between zero and nil."¹⁸

Many Chinese analysts echo this relaxed view. As Fiona Cunningham and Taylor Fravel report, "China's strategic community does not share U.S. concerns about nuclear escalation from the implementation of the AirSea Battle Concept. Its members understand that the aim of the AirSea Battle Concept is to defeat Chinese 'antiaccess' capabilities and involves a blinding campaign. Nevertheless, most sources . . . did not believe that the AirSea Battle was relevant to Chinese nuclear weapons."¹⁹

sity, June 2012); and Jeffrey E. Kline and Wayne P. Hughes Jr., "Between Peace and the Air-Sea Battle: A War at Sea Strategy," *Naval War College Review*, Vol. 65, No. 4 (Autumn 2012), pp. 34–41.

15. Elbridge Colby, "Don't Sweat AirSea Battle," *National Interest*, July 31, 2013, <http://nationalinterest.org/commentary/dont-sweat-airsea-battle-8804>.

16. Vincent A. Manzo, "After the First Shots: Managing Escalation in Northeast Asia," *Joint Forces Quarterly*, 2nd Quarter 2015, especially pp. 96–97.

17. Discussions and interviews conducted with nearly three dozen current and former mid-level to senior civilians and military officers with experience serving in the Department of Defense (Office of the Secretary of Defense, Joint Staff, Service Staffs, Strategic Command, Pacific Command, and European Command), Department of State, and intelligence community, fall 2014–summer 2016. Participants requested anonymity.

18. Blair was responding to a question from William Norris during the Carnegie International Nuclear Policy Conference, Washington, D.C., March 23–24, 2015.

19. Fiona S. Cunningham and M. Taylor Fravel, "Assuring Assured Retaliation: China's Nuclear Posture and U.S.-China Strategic Stability," *International Security*, Vol. 40, No. 2 (Fall 2015), pp. 40–41.

Cunningham and Fravel do not accept these optimistic Chinese views uncritically, however. They note that Chinese confidence that an AirSea Battle-style campaign would not lead to nuclear escalation is in tension with stated Chinese concerns about how U.S. missile defenses and conventional prompt global strike might affect China's nuclear retaliatory capabilities.²⁰ Nevertheless, Cunningham and Fravel do question some of the pessimists' concerns. For example, Cunningham and Fravel show that "the majority of China's nuclear missiles are not colocated with conventional ones."²¹ Hence they argue that the chance that the United States might mistakenly target Chinese nuclear missiles in a campaign against the conventional ones is lower than often assumed. Cunningham and Fravel also echo Chinese doubts about whether U.S. attacks on China's conventional command and control would impinge on China's nuclear command and control; the two types of launch brigades use different command chains, and Chinese command and control systems exhibit significant redundancy.²²

Ultimately, both pessimists and optimists acknowledge some nontrivial potential for inadvertent nuclear escalation in the course of a conventional war. They disagree, however, on the seriousness of the risk. This disagreement stems largely from differing assumptions about which targets the United States would attack in a conventional military campaign against China, and whether China would view attacks on those targets as seriously eroding its nuclear retaliatory capabilities. The next section provides a general framework to help probe these two sets of assumptions systematically in the China case and beyond.

A Framework for Assessing Inadvertent Nuclear Escalation Risk

Two pathways could lead to inadvertent nuclear escalation.²³ First, a state could believe that its opponent was using conventional attack as a prelude to nuclear attack—that conventional operations were being used to "soften up" the target for a subsequent nuclear counterforce campaign, in a manner that would make that campaign more successful than if it occurred as a bolt from the blue. Or, even if such conventional operations did not objectively increase the likely effectiveness of a subsequent nuclear counterforce campaign, the target state might believe that operations of this sort strongly signaled that such a campaign was imminent, much more so than would have

20. *Ibid.*, pp. 17–19, 41.

21. *Ibid.*, p. 42.

22. *Ibid.*, p. 44.

23. I draw here on Posen, *Inadvertent Escalation*, especially chap. 1.

been credible in peacetime. Second, the target state might fear that the opponent was seeking to attrite the target's nuclear force through conventional counterforce—counterforce attacks below the nuclear threshold—and that it might soon be successful.²⁴

In both of these scenarios, the key question would not be whether the target state expected to suffer complete nuclear disarmament at the hands of a nuclear or conventional counterforce attack. Rather, the issue would be whether the target state feared the erosion of its nuclear capabilities past some threshold considered vital to its security. That threshold most obviously would encompass retention of the state's ability to inflict unacceptable damage in a retaliatory second strike, but it also could include the ability to perform other tasks, such as providing a nuclear umbrella for allies or deterring third parties.²⁵ Under such circumstances, the target state might decide that it was better off escalating to nuclear use before it suffered nuclear disarmament or degradation past that key threshold.

Two broad rationales could motivate such use. First, a state could escalate for purposes of military advantage. In the extreme, a state that felt certain its adversary was in the process of launching a nuclear first strike might launch its own first strike in an effort to limit damage. Although massive, such escalation could seem like the least bad option in a world where all-out nuclear war appeared inevitable.²⁶ Even in a world where such conflict did not appear inevitable, though, a state could seek military advantage by using nuclear weapons in more limited form to halt the components of the opposing conventional campaign that posed the greatest threat to the target's nuclear forces.²⁷ Nuclear weapons could achieve these effects more rapidly than conventional forces, and a state might believe that such use would not invite all-out retaliation.

Second, a state might engage in limited nuclear escalation to try to generate coercive leverage, signaling its resolve to make the opponent pay significant costs until the counterforce campaign was either suspended or completed. Nothing says "you've crossed my red line" quite like a mushroom cloud. This attempt at bargaining would hold more promise if the escalating state believed that the opponent had not yet fully committed itself to a counterforce campaign, or if the escalating state anticipated that the opponent's campaign would take considerable time to be successful, or both. Escalation in the form

24. *Ibid.*, p. 2.

25. *Ibid.*

26. For critical analysis of damage-limitation logics, see Glaser, *Analyzing Strategic Nuclear Policy*; and Jervis, *The Meaning of the Nuclear Revolution*.

27. See some of the examples in Posen, *Inadvertent Escalation*, pp. 143–146, 154.

of a demonstration strike or an attack on a purely military target might change the opponent's calculations during that window and lead it to back down.²⁸

Admittedly, these escalatory logics might seem counterintuitive to those who associate nuclear weapons with stability. Nuclear weapons are said to mitigate the security dilemma because they are not very useful for conquering others' territory, but they are very effective in deterring attacks on one's own, assuming a state has a secure second-strike capability. Hence the presence of nuclear weapons can induce a situation of defensive advantage that should be conducive to peace.²⁹ Precisely because of the importance that states attach to their nuclear arsenals, however, states are likely to treat threats to those arsenals with the highest possible concern. Put another way, although the threat of nuclear weapons may inhibit escalation from peace to war, threats to nuclear weapons may provide reasons for intra-war escalation.

Inadvertent escalatory pressures should not arise automatically in conventional wars between nuclear-armed states, however. The emergence and intensity of these pressures should vary depending on observable features of the opponent's military campaign, the degree of nuclear-conventional intermingling in the target state, the target state's nuclear force posture and doctrine, and the target state's information about the opponent's nuclear force posture and doctrine. Below I flesh out these military-technical factors before discussing two additional wartime perceptual dynamics that could lead the target state to view the military-technical balance especially pessimistically, heightening escalatory pressure.

MILITARY-TECHNICAL DRIVERS OF WARTIME ESCALATION RISK

Declaratory statements, known elements of force posture and campaign plans, past conventional military campaigns—all can offer clues as to whether and how one state might end up targeting the nuclear-relevant assets of another in a conventional war aimed at achieving only conventional objectives. Nuclear-relevant targets generally fall into four categories: (1) nuclear weapons or nuclear weapons components, such as mobile transporter erector launchers (TELEs) armed with nuclear missiles, nuclear silos, tactical nuclear weapons, or nuclear warhead storage facilities; (2) the platforms used to de-

28. On limited nuclear use for coercive purposes under conditions of mutual vulnerability, see Robert Powell, "Theoretical Foundations of Strategic Nuclear Deterrence," *Political Science Quarterly*, Vol. 100, No. 1 (Spring 1985), pp. 75–96; and Robert Jervis, "Why Nuclear Superiority Doesn't Matter," *Political Science Quarterly*, Vol. 94, No. 4 (Winter 1979/80), pp. 628–629.

29. Glaser, *Analyzing Strategic Nuclear Policy*; Jervis, *The Meaning of the Nuclear Revolution*; and Waltz's chapters in Scott D. Sagan and Kenneth N. Waltz, *The Spread of Nuclear Weapons: A Debate* (New York: W.W. Norton, 1997).

liver nuclear weapons, such as nuclear-capable aircraft or submarines armed with nuclear torpedoes or ballistic missiles; (3) the conventional forces used to protect or support nuclear forces, such as air defense systems that protect land-based missiles; attack submarines and land-based naval infrastructure that protect SSBNs; or infantry forces that guard the locations of nuclear weapons, warheads, or nuclear-relevant platforms; and (4) the command, control, communication, and computer (C4) networks and ISR assets relevant to detecting an incoming nuclear attack, as well as to targeting one's own nuclear weapons, such as early warning radars based in space, at sea, or on land; or fiber optic cables or radio transmitters.³⁰

Two characteristics of the target state's military are crucial in assessing the likelihood that these nuclear-relevant targets might come under attack in a conventional war. First, if the target state physically colocates its nuclear forces with conventional weapons, extensively employs dual-capable platforms, relies heavily on conventional forces to protect or support nuclear forces, or bases nuclear weapons or related infrastructure in areas physically proximate to conventional battlefields, the odds that a conventional attack could implicate the state's nuclear capabilities will be higher.³¹ Second, if the target state has tight, extensive interlinkages between the C4ISR used to issue orders and communicate with forces in the field responsible for both conventional and nuclear operations, it is more likely that conventional operations seeking to disrupt the target's conventional capabilities will also have nuclear ramifications.

Even in this scenario, however, the target state might not view conventional attacks as constituting a counterforce threat. Not all nuclear-relevant targets are equally essential to a target state's retaliatory capability, so losing them should not generate equally strong pressures to use what remains. A state that believes it has a wide margin of safety for the survivability of its secure second-strike forces can afford to take a slightly more relaxed view of conventional military operations that affect nuclear assets, at least as compared to a state that sees its nuclear arsenal as highly vulnerable to counterforce. For example, the significance of the destruction of a state's early warning radars during the course of a conventional war could vary dramatically depending on whether the state relies on those radars for a launch-on-warning posture. A state that expects to possess survivable second-strike forces even in the absence of warning of an incoming nuclear first strike is unlikely to view the conventional destruction of early warning radars with the same degree of alarm as

30. Posen provides a similar but more abbreviated list. See Posen, *Inadvertent Escalation*, p. 3.

31. *Ibid.*

a state whose nuclear forces are so vulnerable that they must be launched on warning if they are to be used at all.

Similarly, a state with mobile, hard-to-find ICBMs or submarine-launched ballistic missiles (SLBMs) that can survive the opponent's anti-submarine warfare (ASW) efforts has little reason to suddenly escalate if some of its tactical nuclear weapons are captured or destroyed in a conventional war, unless the state envisioned a vital mission that only tactical nuclear weapons could perform. The state's battlefield fortunes might not be as favorable at that point, but the state would still retain a nuclear retaliatory capability. By contrast, a target state reliant solely on tactical nuclear weapons for its nuclear deterrent (an unlikely case, but possible), or whose tactical nuclear weapons were backstopped only by highly vulnerable, silo-based ICBMs, or SLBMs not protected by a robust ASW capability, would have much more cause for concern in the event that a conventional war started to implicate those tactical nuclear weapons.

Likewise, a state possessing hardened, redundant, nuclear-dedicated C4ISR is less likely to feel pressure to escalate even in the event that a conventional war starts to infringe on some of the channels or methods it uses for commanding, controlling, and communicating with its nuclear forces. For example, a state could have multiple types of nuclear weapons and multiple ways of delivering launch orders to the operators of those different weapons. Even if some of these methods overlapped with those for conventional forces and were attacked as a way of neutralizing conventional forces in a conventional war, or did not overlap but were attacked by mistake in a conventional war, the state would still have a residual nuclear capacity. Although such a scenario would not be comforting, the target state's position would clearly be more secure than that of a state with fragile C4ISR shared between nuclear and conventional forces.

The target state's own estimates of the requirements of nuclear deterrence are critical as well. If the target state envisions a circumscribed role for nuclear weapons in its strategy, and in particular if the target state believes that the threshold for inflicting unacceptable retaliatory damage on an opponent is relatively low, then the state's ability to tolerate some conventional erosion of its nuclear capabilities will be higher. Put another way, a state that believes that the survival of only one or a handful of nuclear weapons is enough to induce nuclear restraint in its opponent can afford to be less worried about conventional counterforce. By contrast, if the target state believes that the threshold for inflicting unacceptable retaliatory damage on an opponent is relatively high, then the state has to be much more worried about the conventional erosion of its nuclear capabilities. Credibly threatening to destroy, say, 25 per-

cent of an opponent's industrial base and kill half its population usually requires much more than a stray surviving warhead, especially if the opponent is believed to have the ability to limit damage, for example through missile defenses.

The target state's information regarding the nuclear doctrine of its opponent is also important. If the opponent is known to have a counterforce doctrine and credible counterforce capabilities, this knowledge is likely to foment a more suspicious interpretation of the opponent's conventional military operations.³² By contrast, the conventional military operations of an opponent that has disavowed counterforce and that appears to lack counterforce capabilities will be less threatening even if this opponent attacks the same set of targets.

Ultimately, the upward curve of escalatory pressure is likely to look more exponential than linear as these various military-technical indicators of a possible counterforce campaign multiply. An isolated instance of conventional attack on a nuclear-relevant target can probably be distinguished from an attempt at or prelude to counterforce. If, however, a target state starts to experience multiple simultaneous or rapidly successive conventional attacks that seem to have nuclear implications, the interpretation may become more ominous. Even something as dramatic as the sinking of an SSBN could have vastly different meanings for the target state depending on the context of other events. Imagine, for example, a situation in which an SSBN had been sunk during the course of a conventional ASW campaign, but all of the target state's other nuclear weapons and nuclear-relevant C4 remained secure and physically distant from the site of conventional fighting. Such a scenario would look very different from a situation in which an SSBN had been sunk and these other nuclear-relevant targets were also under conventional attack. The target state could probably dismiss the potential counterforce implications of the sinking in the first scenario but might find it dramatically harder to do so in the second, where the sinking appeared to confirm a pattern.

ADDITIONAL PERCEPTUAL SOURCES OF WARTIME PESSIMISM

Two wartime perceptual dynamics could add further pessimism to a target state's assessment of the nuclear implications of a conventional war, tilting its reasoning toward worst-case assumptions. First, the fact that a conventional war has broken out at all means that deterrence has failed once already and that the target state has entered a realm of profound uncertainty. In peacetime, it might have been easy for the target state's leadership to reassure itself that the opponent would never pursue a counterforce campaign: the costs would

32. *Ibid.*, pp. 3, 9.

be too great, the chances of success too low, and so on. However, these are also arguably all reasons that an opponent should never have allowed a conventional war to happen either. If the target state's leadership now finds itself in a world where the conventional Rubicon has been crossed, a radical reassessment of the opponent's intentions and capabilities in the nuclear realm may follow. Is the opponent willing to take other actions that previously were considered unthinkable? If conventional deterrence failures are possible, why not nuclear ones? Is the opponent fighting a limited war, as perhaps assumed at the outset, or is the opponent bent on larger ambitions such as regime change, which could provide a motive for targeting the country's nuclear arsenal?

This reasoning alone is unlikely to generate nuclear escalatory pressure, but it may create a strong presumption of insecurity as the target state evaluates the military-technical variables that could generate such pressure. Indeed, dramatic wartime revision of peacetime assessments of adversary intentions is not unusual. Prior to the 1973 Arab-Israeli War, for example, Israel was supremely confident about its conventional superiority over its Arab neighbors. Within days of the war's outbreak, however, Israeli leaders came to fear that their country would be overrun. Although Arab ambitions were more limited—mainly to force Israel to negotiate the return of territory lost in 1967—Israeli leaders did not know this at the time and began making preparations for the use of their nuclear weapons as a means of ending the war. Fortunately, the war concluded for other reasons before this scenario came to pass, but the incident shows that the outbreak of an unexpectedly high-intensity conventional war can lead even previously secure states to rapidly infer that their adversaries' objectives are unlimited, resulting in preparations for nuclear use that would have seemed unthinkable only days earlier.³³

Second, the fog of war is likely to degrade the target state's ability to perform this military-technical evaluation accurately, and missing or ambiguous information may be interpreted as highly threatening.³⁴ Accurate information about which targets the adversary has attacked may be in short supply, and incorrect information about some attacks could dramatically change the context in which the state interprets correct information about other attacks. Does lack of contact with an SSBN mean that the SSBN has been sunk, or does it mean that communications systems are not working or that the submarine has gone quiet to evade ASW efforts? In a world where the target state has reliable infor-

33. Elbridge Colby et al., *The Israeli "Nuclear Alert" of 1973: Deterrence and Signaling in Crisis* (Washington, D.C.: Center for Naval Analyses, April 2013), pp. 13, 29–49; and Narang, *Nuclear Strategy in the Modern Era*, p. 289.

34. Posen, *Inadvertent Escalation*, pp. 19–23.

mation that its other nuclear weapons are secure, losing contact with an SSBN would not by itself be likely to induce panic. Ambiguous information about the status of an SSBN might look far more alarming, however, in a world where the state was also receiving mistaken reports that its nuclear-relevant C4 was under threat, in addition to confirmed reports that other nuclear-relevant assets had been attacked.

Ambiguous and inaccurate reports are endemic to war, as is pessimistic decisionmaking in response to limited information. This is why there are repeated instances of military forces engaged in hostilities mistakenly shooting down civilian airliners.³⁵ Errors are almost inevitable and will tend to exacerbate rather than inhibit escalatory pressures arising from the objective military-technical situation. Such tendencies do not make escalation automatic, but they are likely to create additional sources of target state insecurity even when a strict military-technical evaluation might imply a more relaxed assessment.

Chinese Nuclear Escalation with the United States

This section uses the framework just outlined to assess the risk of Chinese nuclear escalation in a conventional war with the United States. First, it defines the likely scope of a plausible U.S. conventional campaign against China. Second, it examines the threat that such a campaign might pose to China's nuclear arsenal. Third, it assesses the survivability of the residual nuclear forces that China likely would retain once such a campaign got under way. Fourth, it moves beyond military-technical analysis to a discussion of the perceptual variables that might influence how China would respond to its new circumstances.

LIKELY CONTOURS OF A U.S. CONVENTIONAL CAMPAIGN AGAINST CHINA

Despite the two countries' mutual interests in peace, several issues could plausibly embroil the United States and China in a major conventional war, notably Taiwan.³⁶ In the event of a Chinese effort to attack or coerce Taiwan, the United

35. Examples include the downing of a Malaysian Air jet over Ukraine in 2014, the U.S. downing of an Iran Air flight in 1988, and the Soviet intercept of a Korean Air flight in 1983.

36. Scott L. Kastner, "Is the Taiwan Strait Still a Flashpoint? Rethinking the Prospects for Armed Conflict between China and Taiwan," *International Security*, Vol. 40, No. 3 (Winter 2015/16), pp. 54–92; Samuel J. Locklear, prepared statement, Department of Defense Authorization of Appropriations for Fiscal Year 2014 and the Future Years Defense Program, U.S. Senate, Committee on Armed Services, April 9, 2013, p. 420, http://www.armed-services.senate.gov/imo/media/doc/pacom_fullcomm_hearing_040913.pdf; and Bernard D. Cole, *Asian Maritime Strategies: Navigating Troubled Waters* (Annapolis: Naval Institute Press, 2013), p. 99. Conflicts in the South or East China Seas or on the Korean Peninsula are also possible, though unlikely to be as intense.

States would face strong pressure to intervene, possibly resulting in direct conflict with China.³⁷ As such, I use a notional war over Taiwan as a baseline scenario to illustrate some of the key conventional Chinese military capabilities that a U.S. conventional campaign might seek to suppress or destroy. The goal of this approach is not to accurately predict how an actual war between the United States and China would break out, or what the combat outcomes of specific battles might be. Rather, the scenario is a heuristic, providing a means of estimating the upward bound of nuclear escalation risk in the event that Chinese and U.S. conventional capabilities interact in an intense conflict with high political stakes for China.

How might such a war unfold? Open-source assessments generally remain pessimistic about China's ability to launch an outright invasion of Taiwan.³⁸ War is more likely to begin with Chinese efforts to coerce Taiwan by imposing economic and military damage and civilian suffering, with the threat of more to follow. Such coercion would require China to be able to credibly threaten to deny the United States control of the air and waters surrounding Taiwan. In addition, it likely would involve some combination of actual or threatened Chinese air and missile attacks and cyberattacks, along with a naval blockade involving submarines, mines, surface ships, and anti-ship cruise missiles. The goal would be to pressure Taiwan into accepting reunification, in part by making commercial traffic to Taiwan prohibitively costly even if attacks on Taiwan itself were limited.

Several studies have concluded that Chinese efforts to blockade or bombard Taiwan in these ways could result in rapid Chinese victory, suggesting that U.S. intervention to halt such an outcome would have to be extensive and swift.³⁹ Although U.S. officials often refer to China's "counter-intervention" strategy, it is China that would be projecting power in a Taiwan scenario.⁴⁰

37. Charles L. Glaser, "A U.S.-China Grand Bargain? The Hard Choice between Military Competition and Accommodation," *International Security*, Vol. 39, No. 4 (Spring 2015), pp. 49–90.

38. James Steinberg and Michael E. O'Hanlon, *Strategic Reassurance and Resolve: U.S.-China Relations in the Twenty-first Century* (Princeton, N.J.: Princeton University Press, 2014), pp. 131–132; and Heginbotham et al., *The U.S.-China Military Scorecard*, chap. 8. On the likelihood of coercion, see Office of the Secretary of Defense, *Military and Security Developments Involving the People's Republic of China 2014*, annual report to Congress (Washington, D.C.: U.S. Department of Defense, 2014), http://archive.defense.gov/pubs/2014_DoD_China_Report.pdf; and Office of Naval Intelligence, *A Modern Navy with Chinese Characteristics* (Suitland, Md.: Office of Naval Intelligence, August 2009).

39. James Dobbins et al., *Conflict with China: Prospects, Consequences, and Strategies for Deterrence* (Washington, D.C.: RAND Corporation, 2011), pp. 3, 5; and Craig Murray, with Kyle Churchman, "Taiwan's Declining Defense Spending Could Jeopardize Military Preparedness" (Washington, D.C.: U.S.-China Economic and Security Review Commission, June 11, 2013), <http://www.uscc.gov/Research/taiwan%E2%80%99s-declining-defense-spending-could-jeopardize-military-preparedness>.

40. Roger Cliff, "Anti-Access Measures in Chinese Defense Strategy," testimony presented before the U.S.-China Economic and Security Review Commission (Santa Monica, Calif.: RAND Corpora-

The U.S. campaign therefore likely would seek to deny China this ability by (1) contesting China's efforts to control the air and waters surrounding Taiwan, as well as around U.S. military bases or forces in the region that were supporting the defense of Taiwan; (2) suppressing, attriting, or eliminating the weapons systems that China could use to strike Taiwan or U.S. military bases or forces in the region; and (3) paralyzing or destroying the Chinese C4ISR that would underlie China's campaign.

The potential target set for executing this type of campaign would be expansive. The United States likely would conduct both air-to-air and air-to-ground operations to prevent China's air force, the PLAAF, from being able to sortie over the strait, either to attack Taiwan directly (e.g., through operations to destroy Taiwan's air force, navy, and military infrastructure) or to enforce blockade efforts (e.g., through operations to attack ships seeking to bypass a blockade).⁴¹ In addition, the United States would have to neutralize PLAAF airborne command and control platforms.

The United States also would want to render inoperable the thirty-nine Chinese air bases within unrefueled combat range of Taiwan, striking those bases' runways, fuel storage, hangars, and command facilities (see map 1).⁴² To conduct such attacks, the United States probably would rely heavily on cruise missiles launched from the stand-off ranges provided by submarines, surface ships, regional bases, and aircraft.⁴³ This approach would be preferable to traditional direct aerial attacks because it would minimize the need to suppress or destroy Chinese ship- and land-based air defenses.

Nevertheless, the United States also might want to attack these bases with manned bombers, which would in turn necessitate varying levels of air defense suppression or destruction. This latter campaign could result in additional missile and aerial attacks on Chinese surface vessels and the mainland. For example, China has extensive ship-based air defenses, including eight modern destroyers with surface-to-air missiles (SAMs).⁴⁴ In addition, China possesses dozens of land-based, long-range air defense batteries capable of launching an estimated 1,000 SAMs.⁴⁵ At least some of these batteries are mo-

tion, January 27, 2011), p. 2; M. Taylor Fravel and Christopher P. Twomey, "Projecting Strategy: The Myth of Chinese Counter-intervention," *Washington Quarterly*, Vol. 37, No. 4 (Winter 2015), pp. 171-187; and Stephen Biddle and Ivan Oelrich, "Future Warfare in the Western Pacific: Chinese Antiaccess/Area Denial, U.S. AirSea Battle, and Command of the Commons in East Asia," *International Security*, Vol. 41, No. 1 (Summer 2016), pp. 7-48.

41. Heginbotham et al., *The U.S.-China Military Scorecard*, pp. 31, 75.

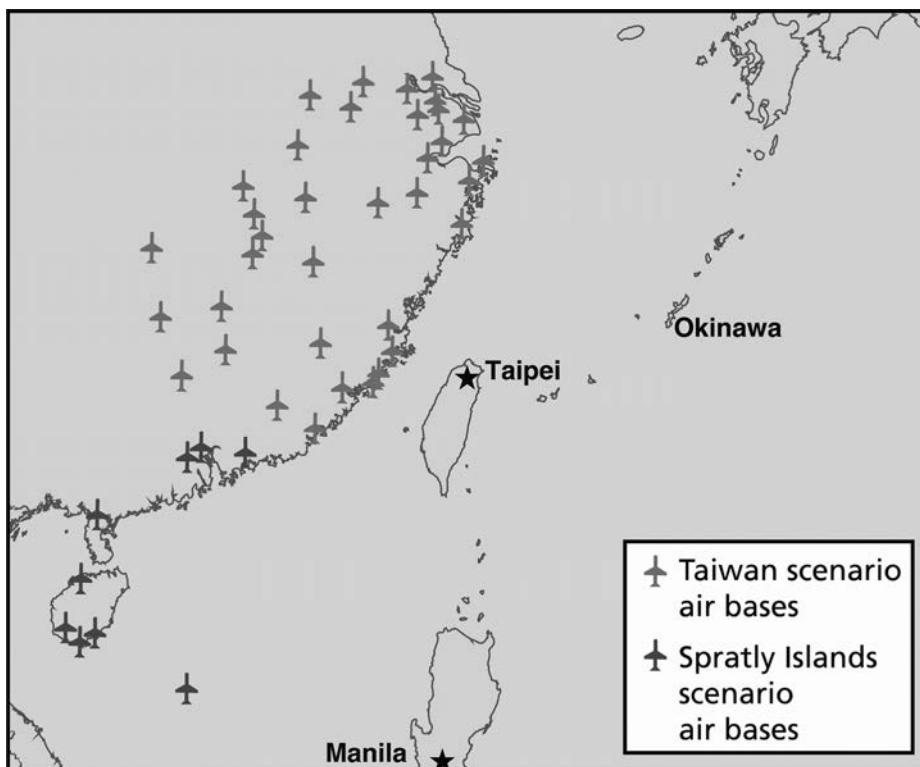
42. *Ibid.*, pp. xxv, 33, 139.

43. *Ibid.*, p. xxv.

44. *Ibid.*, p. 29.

45. *Ibid.*, p. 32.

Map 1. Chinese Air Bases Relevant to a Taiwan Conflict



SOURCE: Eric Heginbotham et al., *The U.S.-China Military Scorecard: Forces, Geography, and the Evolving Balance of Power, 1996-2017* (Arlington, Va.: RAND Corporation, 2015), p. 138.

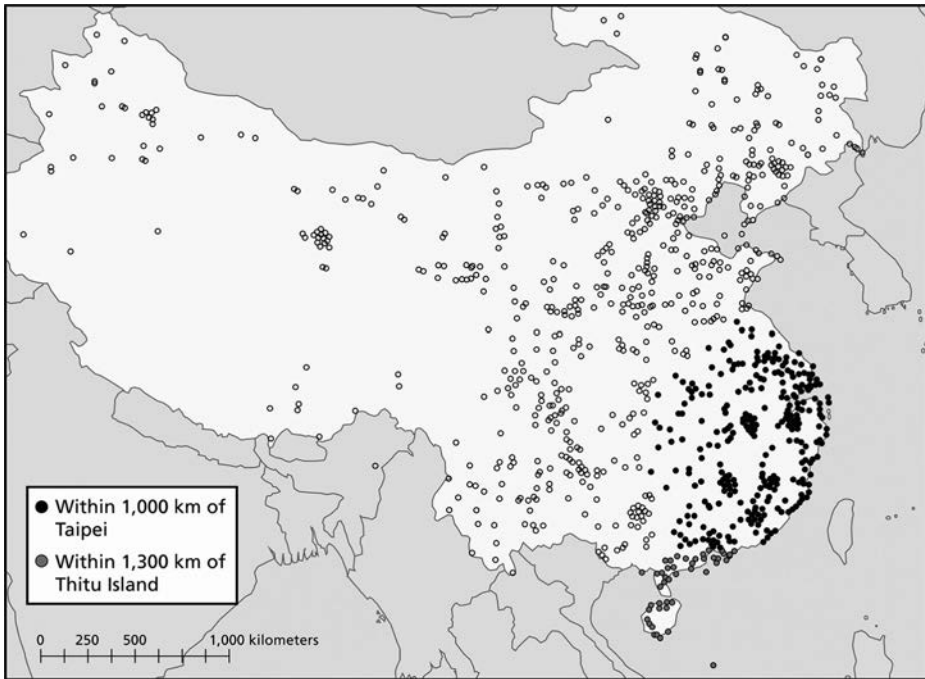
bile and designed to resist jamming.⁴⁶ A recent RAND study estimated that, in total, mainland China houses 823 air defense sites within 1,000 kilometers of Taiwan (see map 2).⁴⁷

Some U.S. aircraft, such as the F-22 and possibly the F-35, should be able to penetrate these defenses, but the United States would need to devote considerable effort to suppressing and destroying them given the limited inventory of fifth-generation platforms. The suppression campaign would consist largely of electronic warfare efforts to jam the communications and radar systems on which China's integrated air defenses rely. The U.S. Navy and Marine Corps'

46. Ibid., p. 99.

47. Ibid., pp. 109-111.

Map 2. Chinese Air Defenses, Highlighted in Black, Likely to Be Targeted in a U.S. Defense/Suppression Campaign in a War over Taiwan



SOURCE: Eric Heginbotham et al., *The U.S.-China Military Scorecard: Forces, Geography, and the Evolving Balance of Power, 1996–2017* (Arlington, Va.: RAND Corporation, 2015), p. 110.

EA-18G “Growler” aircraft is a modified Super Hornet dedicated expressly to this mission. The U.S. Air Force’s EC-130H “Compass Call” platform is similarly designed to disrupt communications. In addition, both services have aircraft that can carry missiles designed to find and physically destroy air defense radars.⁴⁸ The Air Force’s F-16CJ and the Navy and Marine Corps’ EA-18G both carry high-speed anti-radiation missiles (HARMs).⁴⁹ The F-22’s extremely powerful radar can assist in this process as well, by detecting radar

48. *Ibid.*, pp. 102–104.

49. The Growler, however, will eventually be replaced by the F-35, which, like other fifth-generation aircraft, is not large enough to carry the HARM internally while maintaining stealth. To attack enemy air defenses, fifth-generation aircraft will have to use subsonic glide weapons, which may not be as effective. See *ibid.*, p. 124.

emissions.⁵⁰ Nevertheless, the outcome would depend considerably on the skill and discipline of Chinese air defense crews.⁵¹

In addition to contesting Chinese control of the air, the United States likely would want to prevent the PLAN from operating freely within the first island chain.⁵² This effort would be a prerequisite to any attempt to restore the flow of trade to Taiwan or to engage in mine clearance operations in Taiwanese harbors. Beyond the aforementioned fleet air defense capabilities, all of China's major surface vessels can launch anti-ship cruise missiles that would pose a threat to potential U.S. operations in the strait. China also possesses approximately three dozen conventionally powered attack submarines (SS) capable of launching anti-ship cruise missiles, and it is in the process of acquiring a fleet of modern nuclear-attack submarines (SSN) and a guided-missile attack submarine that could potentially launch torpedoes, anti-ship cruise missiles, and land-attack munitions.⁵³ Notably, China's diesel attack submarines could be used not only to conduct attacks with torpedoes and mines but also as cueing platforms for other Chinese attacks.⁵⁴ The United States would want to prevent all of these vessels from escaping to the deeper waters outside the first island chain, where they could threaten U.S. carrier battle groups.⁵⁵ In addition, China has significant shore-based naval assets, including coastal defense anti-ship cruise missiles and the land-based, medium-range DF-21D anti-ship ballistic missile.⁵⁶

U.S. Aegis cruisers and destroyers do have robust organic defenses against such missiles, but saturated attacks could overwhelm them. As a result, the United States likely would seek to sink Chinese surface vessels and attack submarines. It also would want to eliminate shore-based naval infrastructure such as military ports, submarine pens, and ammunition depots, particularly for the East Sea Fleet based at Ningbo and South Sea Fleet based at Zhanjiang.⁵⁷

50. *Ibid.*, p. 103.

51. States have exhibited considerable variation in this regard. See Stephen Biddle and Robert Zirkle, "Technology, Civil-Military Relations, and Warfare in the Developing World," *Journal of Strategic Studies*, Vol. 19, No. 2 (June 1996), pp. 171–212; and Barry R. Posen, "The War for Kosovo: Serbia's Political-Military Strategy," *International Security*, Vol. 24, No. 4 (Spring 2000), pp. 39–84.

52. Heginbotham et al., *The U.S.-China Military Scorecard*, pp. 153–200.

53. *Ibid.*, p. 29; and Office of the Secretary of Defense, *Military and Security Developments Involving the People's Republic of China 2014*, p. 40.

54. Owen R. Coté Jr., "Assessing the Undersea Balance between the U.S. and China" (Cambridge, Mass.: Security Studies Program, Massachusetts Institute of Technology, February 2011), p. 2.

55. See Goldstein, "First Things First," pp. 69–73.

56. Heginbotham et al., *The U.S.-China Military Scorecard*, p. 30. For a discussion of the challenges that China may face in attempting to target this missile over the horizon, see *ibid.*, pp. 156–171; and Coté, "Assessing the Undersea Balance between the U.S. and China," pp. 16–17.

57. Office of Naval Intelligence, *The PLA Navy: New Capabilities and Missions for the 21st Century* (Suitland, Md.: Office of Naval Intelligence, April 2015), p. 14.

Again, the United States likely would try to use stand-off weapons where possible. U.S. attack submarines likely would launch torpedoes against Chinese surface vessels, as well as conduct ASW against Chinese attack submarines within the first island chain. The United States' maritime patrol aircraft and tactical auxiliary general ocean surveillance ships would join these efforts if China no longer controlled the air.

In addition, the United States almost certainly would target key components of the PLA Rocket Force (PLARF), formerly known as the Second Artillery.⁵⁸ Its arsenal of approximately 1,200 conventional short-range ballistic missiles (SRBMs) would be a major tool for coercing Taiwan, and China has stationed all such missiles within range of the island.⁵⁹ These short-range missiles also could pose a potential threat to U.S. surface or air forces operating in or near the strait, and likely to U.S. bases in South Korea and Japan. As such, the missiles' suppression or destruction would be a prerequisite to other operations, such as aerial ASW patrols or mine clearance.

Beyond its SRBMs, China's primary medium-range conventional ballistic missile (MRBM), the DF-21C, also could pose a substantial threat to U.S. bases in Japan and South Korea. China is believed to have thirty-six DF-21C launchers, with the number of missiles unknown. In addition, China has several hundred conventional ground-launched cruise missiles based in southwest and south-central China that could threaten Taiwan and U.S. forces.⁶⁰ Finding or disabling these short- and medium-range conventional missiles would be challenging, though not impossible. The base locations, as well as the general areas of operation for the individual missile brigades that fan out from the bases, are known with some confidence (see map 3).⁶¹

It is likely that in addition to targeting China's conventional missile brigades, especially the launch elements, the United States would seek to target the bases that provide staff support for these brigades, for three reasons. First, in contrast to the missiles themselves, the bases are fixed, readily identifiable

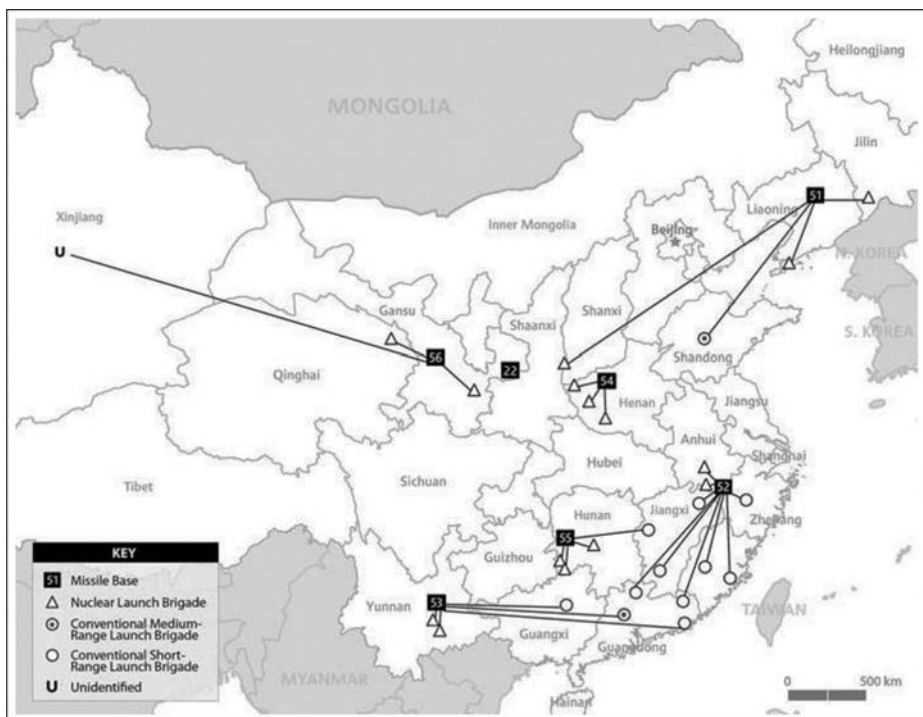
58. Kelsey Davenport, "China Elevates Nuclear Rocket Force," *Arms Control Today*, March 2016, https://www.armscontrol.org/ACT/2016_03/News/China-Elevates-Nuclear-Rocket-Force.

59. Heginbotham et al., *The U.S.-China Military Scorecard*, pp. 28, 47.

60. *Ibid.*, pp. 28, 50; Mark A. Stokes, prepared statement before the U.S.-China Economic and Security Review Commission, U.S. Senate, 114th Cong., 1st sess., April 1, 2015, pp. 6–17, http://origin.www.uscc.gov/sites/default/files/transcripts/April%2001,%202015_Hearing%20Transcript_0.pdf; and Mark A. Stokes and Ian Easton, "Evolving Aerospace Trends in the Asia-Pacific Region: Implications for Stability in the Taiwan Strait and Beyond" (Arlington, Va.: Project 2049 Institute, 2010), p. 12.

61. Cunningham and Fravel, "Assuring Assured Retaliation," p. 43; Mark A. Stokes, "China's Nuclear Warhead Storage and Handling System" (Arlington, Va.: Project 2049 Institute, March 12, 2010); and Mark A. Stokes, "Second Artillery Unit and Leadership Directory" (Arlington, Va.: Project 2049 Institute, January 2, 2014), available from the author upon request.

Map 3. Chinese Missile Bases and Launch Brigades



SOURCE: Fiona S. Cunningham and M. Taylor Fravel, “Assuring Assured Retaliation: China’s Nuclear Posture and U.S.-China Strategic Stability,” *International Security*, Vol. 40, No. 2 (Fall 2015), p. 43.

targets—the sort the United States has routinely attacked in comparable air operations in Vietnam, Iraq, and elsewhere.⁶² Second, the bases may house substantial stockpiles of additional missiles and spare parts, as well as repair, maintenance, and fuel facilities. Third, the bases may contain command and control facilities crucial to China’s direction of a missile campaign, although much of this command and control may also be dispersed at other sites.

Locating launchers out of garrison would depend significantly on the quality of U.S. prewar intelligence about patrol routes and prepared launch sites,

62. On Vietnam, see Marshall L. Michel III, *The Eleven Days of Christmas: America’s Last Vietnam Battle* (New York: Encounter Books, 2001); and Marshall L. Michel III, *Clashes: Air Combat over North Vietnam, 1965–1972* (Annapolis: Naval Institute Press, 2007). On Iraq, see Gordon and Trainor, *The Generals’ War*, especially p. 201; and Thomas A. Keaney and Eliot A. Cohen, *Gulf War Airpower Survey: Summary Report* (Washington, D.C.: Department of the Air Force, 1993), especially p. 32.

drawn mostly from satellite imagery and signals intelligence. The medium-range missiles are significantly larger than most other road traffic, cannot safely travel off road, require solid ground for launching to avoid debris kicked up by the rocket engine, and need significant numbers of personnel and vehicles to function properly—all of which would provide location clues.⁶³ In addition, U.S. satellites could detect infrared signatures from missile launches themselves as a means of narrowing search areas, and the United States might be able to detect additional communications between missile launch brigades and their headquarters.⁶⁴

Locating and destroying the launchers, however, would require the United States to control the airspace over significant areas of mainland China, or to accept sortie attrition rates not seen since the Christmas bombings in Vietnam or even the battles over Europe to defeat the German night fighter force in 1944.⁶⁵ Unmanned aerial vehicles (UAVs) with dual-mode radar are well equipped to provide detailed images of search areas that could be passed to tactical aircraft, and some armed UAVs could potentially target the missiles themselves, but these platforms are unlikely to be survivable in heavily defended airspace. Similarly, U.S. fourth- and fifth-generation combat aircraft cued by UAV or satellite imagery could plausibly find and destroy Chinese mobile missiles and have some ability to evade air defenses, but eastern and coastal China are heavily defended—much more so than other theaters where the United States has conducted recent operations, such as Iraq, Afghanistan, Libya, and Serbia. Furthermore, it is almost inconceivable that the United States would send large, scarce, visible, vulnerable platforms such as AWACS, JSTARS, the U-2, or Global Hawk into this sort of environment. However, these are the mobile airborne radar platforms that would most aid combat aircraft in narrowing their missile search areas, especially in combination with equally vulnerable airborne electronic intelligence platforms such as the RC-135 and EP-3.⁶⁶

63. Hans M. Kristensen, "DF-21C Missile Deploys to Central China" (Washington, D.C.: Federation of American Scientists, September 28, 2010), <https://fas.org/blogs/security/2010/09/df21c/>.

64. Caitlin Talmadge, "Closing Time: Assessing the Iranian Threat to the Strait of Hormuz," *International Security*, Vol. 33, No. 1 (Summer 2008), pp. 107–108, especially fn. 95; and Austin Long and Brendan Rittenhouse Green, "Stalking the Secure Second Strike: Intelligence, Counterforce, and Nuclear Strategy," *Journal of Strategic Studies*, Vol. 38, Nos. 1–2 (2015), pp. 15–16.

65. Michel, *The Eleven Days of Christmas*; William R. Emerson, "Operation POINTBLANK: A Tale of Bombers and Fighters," U.S. Air Force Academy Memorial Lecture No. 4 (Colorado Springs, Colo.: U.S. Air Force Academy, 1962), <http://www.usafa.edu/df/dfh/docs/Harmon04.pdf>; and Frank W. Heilenday, *Daylight Raids by the U.S. Eighth Air Force: Lessons Learned and Lingering Myths from World War II* (Santa Monica, Calif.: RAND Corporation, 1995), pp. 3–4.

66. Talmadge, "Closing Time," pp. 107–108; and Coté, "Assessing the Undersea Balance between the U.S. and China," p. 21.

Lastly, the United States likely would seek to interfere with Chinese C4ISR. It would want to deny China the ability to direct and communicate with its forces and to maintain awareness of U.S. operations. The United States probably would use both kinetic and non-kinetic means to target China's known air and naval operations command facilities; its command and control platforms in the air and at sea; and the computer, fiber-optic, and radio networks that connect these commanders to their various forces. China's coastal radio transmitters and over-the-horizon radar system, known as Skywave, would be particularly vulnerable, because they are large, fixed, emitting targets essential to cueing Chinese submarines and longer-range missiles.⁶⁷ In addition, the U.S. air defense suppression campaign would seek to neutralize Chinese radars used to detect and target incoming aircraft.⁶⁸ It is possible that the United States could seek to target Chinese satellites as well, or to jam Chinese space-based communication systems, although China would be less dependent on these in a Taiwan campaign because most of its land-based systems would be within theater range.⁶⁹

THE U.S. CONVENTIONAL THREAT TO NUCLEAR-RELEVANT TARGETS

The earlier framework identified four categories of nuclear-relevant targets that could come under threat during a conventional war. Analysis of China's force structure and the contours of a likely U.S. campaign to defend Taiwan suggests that Chinese assets in all four categories could come under U.S. attack. Here I review them in turn, grouping the first two because they are tightly linked in this case.

NUCLEAR WEAPONS, COMPONENTS, AND DELIVERY PLATFORMS. A U.S. campaign to find, suppress, and destroy China's short- and medium-range conventional missiles would almost certainly take place in areas where China also has stationed some of its medium-range and intercontinental nuclear-tipped ballistic missiles. Of China's six operational missile bases, Bases 52, 53, and 55 are all located in southeast China relatively close to Taiwan. All oversee both nuclear and conventional missile brigades, although it is important to remember that these brigades and many of their supporting elements are dispersed from the bases themselves, which function essentially as staff offices.

According to open sources, Base 52 mostly oversees brigades of short-range conventional missiles such as the DF-11 but also has responsibility for at least

67. Heginbotham et al., *The U.S.-China Military Scorecard*, p. xxv; and Coté, "Assessing the Undersea Balance between the U.S. and China," pp. 16–17.

68. Heginbotham et al., *The U.S.-China Military Scorecard*, p. 98.

69. *Ibid.*, chap. 9, especially pp. 238, 240–241.

one medium-range nuclear missile brigade of the DF-21A and one medium-range ballistic missile brigade of the conventional DF-21C. It also has substantial nuclear warhead storage and handling responsibilities. Similarly, Base 53 appears to oversee both conventional and nuclear missile brigades (probably one nuclear DF-21A brigade, one conventional DF-21D brigade, and one DF-21C or DF-31 nuclear brigade), as well as a conventional cruise missile brigade of DH-10s and a short-range conventional ballistic missile brigade of DF-11s. Likewise, Base 55 probably oversees two silo-based nuclear ICBM D-5A brigades but also a mobile, nuclear DF-31A brigade and a conventional cruise missile brigade of DH-10s.⁷⁰

In addition, Base 51, located in northeastern China, appears to oversee a mix of both conventional and nuclear DF-21 brigades.⁷¹ Although these brigades are located at substantial distances from Taiwan, their assets are ideally positioned to thwart U.S. forces in South Korea or Japan that might help defend Taiwan. As such, U.S. military operations in the vicinity of the nuclear DF-21 brigades are not unthinkable, depending on how China chooses to employ the conventional DF-21 brigades.

The nuclear and conventional missiles supported by these bases do not appear to be intermingled at the launch-brigade level, so in theory the United States could take care to attack only conventional launch brigades and their associated headquarters.⁷² Threading this needle may prove difficult in the case of the DF-21, though. As mentioned, the DF-21 can carry either a nuclear or conventional warhead. China has at least four or five brigades that carry some form of the DF-21,⁷³ and distinguishing from the air or at significant distances which DF-21s are conventional versus nuclear may not be possible. Prepared launch sites, surely a U.S. target, would look identical. As one authority notes, "The distinction between ballistic missiles equipped with nuclear and conventional payloads is becoming increasingly blurred."⁷⁴

In addition, the wartime patrol routes of the nuclear and conventional brigades could overlap, especially given that a typical brigade comprises six

70. Jeffrey Lewis, *Paper Tigers: China's Nuclear Posture*, Adelphi Paper No. 446 (London: International Institute for Strategic Studies, 2014), p. 116; and Stokes, "Second Artillery Unit and Leadership Directory," pp. 10, 11, 20, 26.

71. Lewis, *Paper Tigers*, p. 116.

72. Cunningham and Fravel, "Assuring Assured Retaliation," pp. 42–45; and Ron Christman, "China's Second Artillery Force: Capabilities and Missions for the Near Seas," in Peter Dutton, Andrew S. Erickson, and Ryan Martinson, eds., *China's Near Seas Combat Capabilities* (Newport, R.I.: Naval War College, 2014), p. 35.

73. Stokes, prepared statement before the U.S.–China Economic and Security Review Commission, p. 9; and Lewis, *Paper Tigers*, p. 116.

74. Stokes, "China's Nuclear Warhead Storage and Handling System," p. 3.

battalions with two companies each.⁷⁵ These are unlikely to remain in a tightly confined area given that the point of such a structure is to enable mobility and dispersal. Multiple support elements are attached to each launch brigade, sometimes spread out within a radius of as much as 200 kilometers.⁷⁶ Furthermore, there is substantial open-source uncertainty about which missile brigades operate where and little detailed information at the battalion level or lower. Analysts who follow these matters also report regular and frequent changes in China's missile deployment patterns, which could increase the challenge of distinguishing nuclear from conventional targets.⁷⁷

Moreover, if the areas of operation overlap, nuclear and conventional missile brigades might rely on the same transportation networks to reach launch sites or receive support. The PLARF relies heavily on surreptitious circulation of nuclear warheads along road and especially rail networks to improve survivability in a crisis or war, but this approach raises the risk that U.S. efforts to stymie movements of the conventional missile brigades could have a similar effect on the nuclear brigades.⁷⁸ At the very least, as Cunningham and Fravel note, "a conventional attack on a Chinese conventional missile brigade would send a very strong signal to China of an adversary's ability to threaten China's nuclear forces."⁷⁹

As escalation pessimists have noted, an ASW campaign is the other pathway by which the United States might directly target Chinese nuclear weapons in the course of a conventional campaign. It is plausible that the United States could sink an SSBN in the process of hunting Chinese attack submarines. Historically, the correct classification of undersea targets has been one of the most challenging aspects of ASW, which is why the most robust approaches have relied on integrating multiple sources of information from passive sonar and signals intelligence. During the Cold War, for example, the United States relied on passive sonar in tactical engagements to help identify particular types of Soviet submarines based on the distinctive sounds (known as tonals) created by propellers and internal machinery rotating at particular frequencies. This method worked, however, only because the United

75. Stokes, prepared statement before the U.S.-China Economic and Security Review Commission, pp. 4, 9.

76. Stokes, "Second Artillery Unit and Leadership Directory," p. 10.

77. See, for example, Stokes and Easton, "Evolving Aerospace Trends in the Asia-Pacific Region," pp. 8, 13; and Christman, "China's Second Artillery Force," p. 39.

78. Stokes, "China's Nuclear Warhead Storage and Handling System," p. 8.

79. Cunningham and Fravel, "Assuring Assured Retaliation," p. 45.

States maintained highly accurate libraries identifying the signatures of every Soviet submarine.⁸⁰

Advances in computing have since greatly improved U.S. target classification abilities, but the process can still prove difficult. A particular challenge is likely to arise from the fact that China will probably send its SSBNs to sea only if they are accompanied by an SSN or SS for protection. Chinese SLBMs lack the range to hit the continental United States from close to China's coasts, so defending SSBNs on the journey through U.S. acoustic barriers around the edges of the first island chain to the open ocean (most likely via the Philippine Sea) would be essential.⁸¹ Furthermore, even if China were not trying to get its SSBNs to the open ocean, it might send them to sea within the first island chain so that they would not be destroyed in port. Hence protecting the SSBNs would be a key task for China's attack submarines, much as it was for Soviet attack submarines in the Barents Sea during the Cold War.⁸²

Close Chinese SSN escorts of SSBNs are likely to complicate target differentiation for the United States, because U.S. attack submarines approaching Chinese submarines within attack or trail range in shallow water likely would lose the ability to keep the two targets distinct acoustically. To be clear, the United States is likely to be able to initially find China's SSBNs because they are distinctively noisy.⁸³ But even if a U.S. attack submarine ascertained that China had both an SSBN and SSN close by (say, 5 miles ahead), maintaining clarity regarding which target track was associated with which enemy signature could be hard as the U.S. vessel closed in. The relevant waters in this scenario are also likely to be crowded and noisy, further complicating target classification, and in the most critical early stages of the campaign, the United States is unlikely to control the air such that it might be able to bring other ASW assets to assist.⁸⁴

As a result, the United States might face a difficult choice: attacking both targets, knowing one might be an SSBN, or letting both the SSBN and attack submarine continue to roam. Sinking an SSBN in this scenario would not be truly

80. Owen R. Coté Jr., *The Third Battle: Innovation in the U.S. Navy's Silent Cold War Struggle with Soviet Submarines* (Newport, R.I.: Naval War College, 2003), especially pp. 25–26.

81. Wu Riqiang, "Survivability of China's Sea-Based Nuclear Forces," *Science and Global Security*, Vol. 19, No. 2 (2011), pp. 91–120; and Coté, "Assessing the Undersea Balance between the U.S. and China," especially pp. 12–14.

82. Coté, *The Third Battle*, p. 75.

83. Office of Naval Intelligence, *A Modern Navy with Chinese Characteristics*, p. 22. On likely Chinese efforts to pursue quieting, see Steven Mufson, "Obama's Quiet Nuclear Deal with China Raises Proliferation Concerns," *Washington Post*, May 10, 2015.

84. Wu, "Survivability of China's Sea-Based Nuclear Forces," p. 98. For background, see Scott R. Thompson, "Sound Propagation Considerations for a Deep-Ocean Acoustic Network," master's thesis, Naval Postgraduate School, 2009.

inadvertent in the sense of mistaking an enemy SSBN for an attack submarine; it would be a known risk. But the scenario nevertheless points to the nuclear dangers that could arise from the standard course of conventional operations, even if the United States did not set out to aggressively sink Chinese SSBNs.⁸⁵ Beyond any dangers arising from the likely attacks on China's MRBMs as described above, the U.S. ASW campaign clearly would pose a direct threat to some of China's nuclear weapons, nuclear weapons components, and delivery platforms, much as the pessimists fear.

CONVENTIONAL FORCES USED TO PROTECT OR SUPPORT NUCLEAR FORCES. A U.S. conventional campaign on the scale described above also would involve attacks on Chinese conventional targets relevant to the protection or support of at least some nuclear forces. Three factors make it likely that such attacks would render those forces highly vulnerable or nonfunctional even if they remained physically intact.

First, the U.S. air defense suppression/destruction campaign would take place over largely the same territory that houses the missile bases and elements that oversee and support both nuclear and conventional launch brigades—especially Bases 55 and 52, which are closest to Taiwan and whose brigades operate under a heavy concentration of Chinese air defense assets (see map 2). By definition, if the United States seeks to degrade the air defenses that protect conventional missile launch brigades, and nuclear missile launch brigades patrol and operate in the same or nearby locations, both conventional and nuclear missile launch brigades will lose some protection from aerial attack.⁸⁶

This outcome is especially likely given that sophisticated air defense systems such as China's operate as an integrated network of radars and shooters rather than simply a point defense.⁸⁷ For example, U.S. attacks on detection and tracking radars along the coast would start to reduce warning for the SAM batteries that protect Chinese mobile SRBMs and MRBMs farther inland, potentially including nuclear MRBMs, even if the objective was to denude only the conventional missiles of protection. Similarly, U.S. attacks on Chinese air bases as part of the conventional fight would reduce China's ability to sortie aircraft that might otherwise protect airspace surrounding nuclear missile

85. This problem is not new. See John J. Mearsheimer, "A Strategic Misstep: The Maritime Strategy and Deterrence in Europe," *International Security*, Vol. 11, No. 2 (Fall 1986), pp. 12, 40–41.

86. China is clearly aware of this threat and has added electronic countermeasure battalions to its missile brigades in response. See Stokes, "Second Artillery Unit and Leadership Directory," p. 9.

87. Office of the Secretary of Defense, *Military and Security Developments Involving the People's Republic of China 2014*, pp. 10, 33, 69.

launch brigades just as much as the areas surrounding conventional missile launch brigades.

Second, as mentioned, in combating China's SRBMs and MRBMs, the United States would face strong incentives to attack Chinese missile bases and base elements directly—at least for Bases 55 and 52, and possibly Bases 53 and 51, though they are farther from Taiwan. All of these bases support conventional missile launch brigades that would be relevant in a Taiwan contingency. However, these same bases also support nuclear missile brigades by overseeing regiments dedicated to “transportation, warhead storage and inspection, repair and maintenance, and communications.”⁸⁸ Under these circumstances, it is unlikely that the United States would attack these bases and nearby elements in a manner that would disrupt activities relevant to conventional missile operations only.

Third, even if the United States avoided sinking Chinese SSBNs, U.S. efforts to sink or constrain Chinese attack submarines—a virtual certainty given these vessels' offensive conventional capabilities—would render Chinese SSBNs significantly more vulnerable. Given the vulnerability of China's SSBNs, China would have to know that the loss of its attack submarines would enable the United States to destroy China's SLBM force virtually at will.⁸⁹ In addition, likely U.S. attacks on Chinese shore-based naval infrastructure and ports, discussed above, could dramatically undermine the functioning and survival of China's SSBNs even if they were not attacked directly. The East Sea Fleet oversees eighteen of China's diesel attack submarines, while the South Sea Fleet contains sixteen additional diesel attack submarines, two nuclear attack submarines, and all four (likely soon to be five) of China's Jin-class submarines that carry the JL-2 SLBM.⁹⁰ One can imagine a scenario in which the United States had not actually attacked any Chinese SSBNs but had set them adrift with no protection, no ports, and, as I discuss below, no ability to send or receive communications.

C4ISR RELEVANT TO NUCLEAR WARNING OR OPERATIONS. U.S. attacks on China's conventionally relevant C4ISR networks could also impede China's nuclear-relevant C4ISR. One problem is that the degree of Chinese comingling between nuclear and conventional missile command and control systems is not well understood, at least in the open-source literature. As noted above, many Western experts believe that systems for the two types of missiles are

88. Stokes, “China's Nuclear Warhead Storage and Handling System,” p. 3.

89. Heginbotham et al., *The U.S.-China Military Scorecard*, pp. 315–316; and Wu, “Survivability of China's Sea-Based Nuclear Forces.”

90. Office of Naval Intelligence, *The PLA Navy*, pp. 14–15; and Hans M. Kristensen and Robert S. Norris, “Chinese Nuclear Forces, 2015,” *Bulletin of the Atomic Scientists*, Vol. 71, No. 4 (2015), p. 81.

interlinked, whereas many Chinese experts insist that the two are separate.⁹¹ If the Western experts are right, then there may be no way to degrade China's conventional C4ISR without nuclear implications. Even if the Chinese experts are right, however, the United States would need excellent intelligence about which C4ISR components are designated for conventional or nuclear activities to avoid the latter while targeting the former. Without this level of knowledge about China's command arrangements, the United States could destroy nuclear-relevant C4 during a conventional campaign even absent comingling.

C4ISR comingling could be a problem in the naval realm as well. China uses the same very low frequency transmitters to communicate with both its SSNs and SSBNs. The United States is likely to target these transmitters because of their vulnerability and their importance for conventional naval warfare.⁹² In so doing, however, the United States would substantially degrade, if not eliminate, China's ability to communicate with its SSBNs at sea.

THE SURVIVABILITY OF CHINA'S RESIDUAL NUCLEAR FORCES

Despite the scope of the U.S. campaign just described, it is not obvious that China would immediately come to fear the impending destruction of its nuclear arsenal. For one thing, the conventional war would not afford the United States significant counterforce advantages over China beyond what the United States already enjoys in peacetime. U.S. satellites and nuclear weapons would do the bulk of the heavy lifting in a true counterforce scenario and would not suddenly become more effective because of a conventional war against China.⁹³ If anything, a first strike against China would probably be easier for the United States in peacetime, when China had not dispersed its TELs as it would during a crisis or war.

This situation notably differs from that of the late Cold War. In that era, the Soviets had real reason to fear that a conventional war could have served as the cloak behind which the United States would gain military advantages in executing a nuclear counterforce strike.⁹⁴ For example, NATO's offensive efforts to gain sea control in a conventional war also would have given NATO a leg up in destroying the Soviet SSBN force before it could reach the locations where it would most threaten the United States. Similarly, NATO conventional

91. Cunningham and Fravel, "Assuring Assured Retaliation," p. 42. Some Western analysts, such as Stokes, do believe that the systems are separate. See Stokes, prepared statement before the U.S.-China Economic and Security Review Commission, p. 11.

92. Wu, "Sino-U.S. Inadvertent Escalation," pp. 33-35.

93. Keir A. Lieber and Daryl G. Press, "The New Era of Counterforce: Technological Change and the Future of Deterrence," *International Security*, Vol. 41, No. 4 (Spring 2017), pp. 9-49.

94. Posen, *Inadvertent Escalation*, pp. 13-15, and chap. 2.

air operations would have involved electronic and kinetic attacks on Soviet ground-based early warning radars, which were critical to the Soviet ability to detect the initial stages of a nuclear attack, especially if that attack began with low-flying bombers or cruise missiles launched from the Soviet periphery. Such degradation would have nullified any Soviet hope of launching on warning, rendering the country's silo-based nuclear forces highly vulnerable. It also could have hampered Soviet nuclear command and control more generally.

As a result, the Soviets might have escalated out of a fear that the conventional war was delivering distinct and irreversible counterforce advantages to the United States, and in the belief that going first could limit damage or rapidly halt the components of the conventional campaign that posed the greatest nuclear threats, or both.⁹⁵ Yet militating against this escalatory danger was the very high baseline survivability of the Soviet nuclear arsenal, which through its sheer size might have provided some insurance against escalatory pressures on Soviet leaders.

Today's situation with respect to China is distinct. China does not appear to rely on its SSBN force or on early warning in the same ways the Soviets did, so the implications of conventional attacks that might impinge on those assets may be more benign. China also has virtually no ability to limit damage by going first. Furthermore, China's arsenal is smaller and inherently more vulnerable to counterforce even in peacetime, especially given improved U.S. capabilities since the Cold War. As a result, a conventional war with the United States would not alter the nuclear balance to nearly the degree that was possible in the Cold War case.

Indeed, many analysts note that China already recognizes the vulnerability of its sea-based deterrent forces.⁹⁶ Some go so far as to describe China's Jin-class program as "puzzling" given the platforms' lack of survivability, and note that China seems much more focused on "modernizing and hiding its land-based missiles" as the main bulwark against nuclear attack.⁹⁷ It is possible, for example, that China's efforts to develop SSBNs are rooted in bureaucratic or domestic political motives rather than in a belief that these platforms

95. *Ibid.*, pp. 2, 15, 28–29, and chap. 4, especially pp. 129–132; Benjamin B. Fischer, "The Soviet-American War Scare of the 1980s," *International Journal of Intelligence and Counterintelligence*, Vol. 19, No. 3 (2006), pp. 499–501, 504; Pavel Podvig, "History and the Current Status of the Russian Early-Warning System," *Science and Global Security*, Vol. 10 (2002), pp. 21–60; and interviews with A.S. Kalashnikov and Andrian Danilevich in John G. Hines, Ellis M. Mishulovich, and John F. Shull, *Soviet Intentions, 1965–1985*, Vol. 2: *Soviet Post-Cold War Testimonial Evidence* (McLean, Va.: BDM, 1995), pp. 31, 33–35, 41, 46, 57, 64, 88–90.

96. China likely is already planning to develop a next-generation SSBN and SLBM. See Michael S. Chase and Arthur Chan, "China's Evolving Strategic Deterrence Concepts and Capabilities," *Washington Quarterly*, Vol. 39, No. 1 (Spring 2016), p. 125.

97. Kristensen and Norris, "Chinese Nuclear Forces, 2015," p. 82.

functionally enhance China's nuclear deterrent. If that is true, then China's loss of its SSBNs might not be as threatening, because Chinese leaders may have already calculated their requirements for deterrence on the assumption that they will not be able to rely on SLBMs.

If this logic is correct, then the real question is how secure China's leaders assess their land-based nuclear forces to be (see map 3). Here, too, China might remain relatively insulated from nuclear escalatory pressures. For example, even if the United States destroyed all of China's DF-21 missiles, both nuclear and conventional, within range of Taiwan, China would retain other land-based nuclear missiles. These would include other DF-21 launch brigades hundreds of miles farther inland, attached to Base 56 deep in China's interior.⁹⁸ Although currently positioned to deter India and Russia, these mobile missiles could relocate to areas from which they could threaten U.S. bases or forces in Asia.

Under the Taiwan scenario, China also would retain its approximately twenty silo-based, liquid-fueled DF-5A or DF-5B ICBMs, the latter of which the Pentagon now reports as carrying multiple independently targeted reentry vehicles.⁹⁹ Although vulnerable to counterforce attacks given their immobility and the need for fueling prior to launch, the DF-5A certainly would not be mistaken for a DF-21. Furthermore, the DF-5As have known, fixed locations that the United States could avoid (even though some of these may be decoy silos). As mentioned, China does station two brigades of DF-5A missiles near Base 55, which likely would be involved in a Taiwan campaign. The other DF-5As are attached to Base 54, however, which is farther from Taiwan and also appears to support exclusively nuclear brigades.¹⁰⁰ As a result, the United States and China likely could keep this latter base and its related elements fairly clear of the conventional fight. China also likely would retain its single brigade of the older, road-mobile, liquid-fueled DF-4 ICBMs, comprising about ten warheads and believed to be based in caves.¹⁰¹

Most importantly, China's DF-31 and DF-31A missiles—the road-mobile, intercontinental backbone of the country's nuclear deterrent—appear to be spread across a variety of locations, only some of which might be physically touched by the conventional fight. Open sources suggest that China proba-

98. Lewis, *Paper Tigers*, p. 116.

99. Office of the Secretary of Defense, *Military and Security Developments Involving the People's Republic of China 2015*, annual report to Congress (Washington, D.C.: U.S. Department of Defense, 2015), p. 8; and Kristensen and Norris, "Chinese Nuclear Forces, 2015," pp. 78–79. I exclude the DF-3 because China is likely phasing it out. See *ibid.*; and Lewis, *Paper Tigers*, p. 116.

100. Stokes, "Second Artillery Unit and Leadership Directory," p. 24.

101. Kristensen and Norris, "Chinese Nuclear Forces, 2015," p. 79. Kristensen and Norris note that this missile is in the process of being replaced by the DF-31.

bly has about eight DF-31 TELs and about the same number of warheads, with a range of about 7,000 kilometers. Estimates of the DF-31A suggest about twenty-five TELs and the same number of warheads, with a range of about 11,000 kilometers.¹⁰² The two DF-31 missile brigades appear to be attached to Base 54 and possibly Base 53, while the three DF-31A brigades are likely attached to Bases 51, 55, and 56.¹⁰³

Two features of this deployment pattern stand out. First, none of these ICBM brigades are attached to Base 52, which is the base with the greatest conventional missile capability and closest proximity to Taiwan. This suggests that the most intense and aggressive U.S. conventional operations are unlikely to pose a direct physical threat to China's core ICBM force.

Second, the mobile ICBM brigades are distributed across China's other operational missile bases in a notable effort at dispersion that should afford varying degrees of insulation from conventional warfare.¹⁰⁴ This use of strategic depth to improve survivability is a long-standing theme in China's nuclear strategy.¹⁰⁵ Some of these bases and associated brigades, such as the DF-31A brigade attached to Base 55, could still be affected by the conventional fight because of the bases' conventional missiles (whose areas of operation might overlap with those of the nuclear brigades) and the bases' and base elements' general proximity to Taiwan. This is also true to a lesser degree of the DF-31 brigade possibly attached to Base 53 in southern China. These bases are farther from Taiwan but also oversee conventional capabilities that could become relevant in a conventional conflict.

Even under those circumstances, however, China would still retain another DF-31 brigade attached to Base 54, which is located well inland and whose capabilities appear to be entirely nuclear and are therefore unlikely to be involved in a Taiwan scenario. In addition, China still would have a final DF-31A brigade attached to Base 56, located hundreds of miles away in western China. This brigade could be especially reassuring given that the longer range of the DF-31A as compared to the DF-31 would enable the brigade to hold more U.S. targets at risk. In general, these deployment patterns suggest that China should have reasonable confidence in the survivability of at least some of its mobile nuclear ICBM brigades even in the event of a conventional war over Taiwan.

102. *Ibid.*, p. 78–80. For background, see Heginbotham et al., *The U.S.-China Military Scorecard*, p. 28.

103. Lewis, *Paper Tigers*, p. 116.

104. Stokes, "Second Artillery Unit and Leadership Directory," pp. 12, 26; and Lewis, *Paper Tigers*, p. 116.

105. M. Taylor Fravel, "China's Nuclear Strategy," Massachusetts Institute of Technology, 2016, chap. 6.

In addition to the physical separation of some of these bases and nuclear launch brigades from the likely locus of conventional conflict, the PLARF's central warhead storage base is located deep inside China in the Qinling mountain range.¹⁰⁶ It is virtually inconceivable that the United States could somehow inadvertently threaten or destroy Base 22 while conducting the conventional campaign described earlier; it would be challenging even to do so deliberately. Although it is at least plausible that in the course of a war over Taiwan the United States might attack conventional targets well inside eastern China, such as elements attached to Bases 52 or 55, U.S. forces would have to travel hundreds of miles still farther into the Chinese interior before reaching Base 22.

The physical separation of many of China's nuclear launch brigades from areas likely to see conventional conflict with Taiwan also reduces the possibility that U.S. attacks on Chinese conventional C4ISR would eliminate China's nuclear retaliatory capacity. For example, even if the United States attacked bases or base elements closer to Taiwan, possibly destroying some nuclear-relevant C4ISR in the process, it is highly unlikely that these attacks would prevent China from launching nuclear weapons from brigades attached to bases located elsewhere. Furthermore, China likely has built significant redundancies into its command and control arrangements for nuclear weapons, including by building back-up command and control capability into the extensive, virtually impenetrable complex at Base 22.¹⁰⁷ This development is far more important for nuclear stability than whether nuclear and conventional systems are interlinked. Even if interlinkages exist, redundancies could mean that conventional fighting would not necessarily create sudden, catastrophic escalatory nuclear pressures.

This is not to say that Chinese nuclear command and control is invulnerable. Command and control posed significant challenges for the United States and the Soviet Union throughout the Cold War, and China appears to recognize it as a serious concern today.¹⁰⁸ For example, Charles Glaser and Steve Fetter conclude that although developing truly survivable nuclear C2 is probably within China's reach, China has not yet achieved it.¹⁰⁹ Crucially, however, their analysis assesses the survivability of China's nuclear C2 in a nuclear war, not a

106. Stokes, "China's Nuclear Warhead Storage and Handling System," p. 4.

107. Stokes, "Second Artillery Unit and Leadership Directory," p. 3; and Stokes, "China's Nuclear Warhead Storage and Handling System," p. 6.

108. Ashton B. Carter, John D. Steinbruner, and Charles A. Zraket, eds., *Managing Nuclear Operations* (Washington, D.C.: Brookings Institution Press, 1987); Blair, *Strategic Command and Control*; and Gregory Kulacki, "The Chinese Military Updates China's Nuclear Strategy" (Cambridge, Mass.: Union of Concerned Scientists, March 2015), <http://www.ucsusa.org/sites/default/files/attach/2015/03/chinese-nuclear-strategy-full-report.pdf>.

109. Charles L. Glaser and Steve Fetter, "Should the United States Reject MAD? Damage Limita-

conventional war. The question motivating their analysis is whether the United States can achieve or should pursue a damage-limitation capability against China—that is, the ability to preemptively destroy as much of China’s nuclear arsenal as possible in a scenario where the United States anticipates a looming Chinese nuclear first strike. Such a scenario presupposes a dedicated effort to systematically destroy China’s nuclear-relevant C2, including through the use of U.S. nuclear weapons. Glaser and Fetter are optimistic that China will eventually obtain survivable C2 even though the bar for survivability under the conditions they examine is dramatically higher than it would be in a conventional war of the type analyzed here.

In sum, the optimists have military-technical grounds for believing that a U.S. conventional campaign would not eliminate China’s nuclear retaliatory capability, though significant erosion along the lines the pessimists fear does seem likely. The key question is how China interprets this erosion.

CHINA’S LIKELY VIEWS OF THE SURVIVABILITY OF ITS NUCLEAR FORCES

China’s long-standing belief in the minimal requirements of nuclear deterrence is reassuring.¹¹⁰ Even with only a small number of remaining weapons, China might still believe that it had some insurance against a first strike. That said, if China believed that the U.S. conventional campaign was evolving into an attempt at conventional counterforce, or signaled that the United States would soon launch a nuclear counterforce attack, escalatory pressures could still arise. Chinese writings and statements remain deliberately ambiguous about whether China’s no-first-use pledge would hold in the event that conventional attacks started to degrade China’s nuclear retaliatory capabilities and about what sorts of conventional attacks China believes would cross this threshold.¹¹¹

Furthermore, if China believes that the United States possesses a damage-limitation capability (or if China believes that the United States believes that it possesses a damage-limitation capability, whether the United States actually does or not), then the threshold above which China will believe it has enough survivable nuclear forces to deter a U.S. first strike is likely to rise.¹¹² China’s

tion and U.S. Nuclear Strategy toward China,” *International Security*, Vol. 41, No. 1 (Summer 2016), pp. 72–74.

110. Fravel and Medeiros, “China’s Search for Assured Retaliation”; and Fravel, “China’s Nuclear Strategy.”

111. Fravel and Medeiros, “China’s Search for Assured Retaliation,” p. 80; and Christensen, “The Meaning of the Nuclear Evolution,” pp. 454, 475–477. This ambiguity is a long-standing theme in Chinese nuclear strategy. See Goldstein, *Deterrence and Security in the 21st Century*, pp. 129–136.

112. Glaser and Fetter, “Should the United States Reject MAD?”; and Chase and Chan, “China’s Evolving Strategic Deterrence Concepts and Capabilities,” p. 130.

persistent concern about U.S. missile defenses and conventional prompt global strike implies that China is indeed worried about whether it would have an adequate survivable nuclear force to impose unacceptable damage after a U.S. first strike.¹¹³ In fact, China's pursuit of SLBMs may stem in part from the desire to thwart these U.S. efforts, because these missiles could be more difficult for U.S. defenses to intercept.¹¹⁴

After all, China could reasonably expect failures in some proportion of its surviving nuclear missiles, no matter their type. For example, during the Cold War the United States routinely made conservative estimates of only 0.8 reliability for its missiles (that is, that out of every ten missiles it tried to launch, two would experience some sort of technical failure), even though actual reliability was probably at least 0.9.¹¹⁵ China seems likely to make estimates that are at least as conservative given the relative immaturity of its nuclear forces. As such, it might view the destruction of its nuclear forces during the course of a conventional war as more threatening than peacetime statements about the minimal requirements of deterrence would imply, because China cannot assume that all of its surviving missiles will function properly.

Regardless, China continues to express general concerns about the survivability of its nuclear forces in the face of U.S. technological advancements, and the country's leaders are likely aware of considerable open-source evidence regarding U.S. counterforce capabilities.¹¹⁶ Whether the United States could succeed in disarming China in a first strike remains the subject of considerable disagreement, of course. This is primarily a question of whether the United States would be able to find China's mobile land-based nuclear missiles. Li Bin, a physicist and expert on China's nuclear forces, has offered one of the most detailed analyses of the problem, arguing that the United States likely cannot develop the capability to find all of China's mobile missiles, as long as China undertakes some basic efforts at deception and dispersal.¹¹⁷ Glaser and

113. Cunningham and Fravel, "Assuring Assured Retaliation," pp. 15, 19–20; Heginbotham et al., *The U.S.-China Military Scorecard*, p. 315; and Theodore Postol, "Is a U.S. Missile Defense Aimed at China?" presentation at the Carnegie Endowment for International Peace, Washington, D.C., October 15, 2015, <http://carnegieendowment.org/2015/10/15/is-u.s.-missile-defense-aimed-at-china-event-5026>.

114. Andrew S. Erickson and Lyle J. Goldstein, "China's Future Nuclear Submarine Force: Insights from Chinese Writings," *Naval War College Review*, Vol. 60, No. 1 (Winter 2007), pp. 65–66.

115. Joshua M. Epstein, *The 1988 Defense Budget* (Washington, D.C.: Brookings Institution Press, 1987), p. 22; and Theodore Postol "The Trident and Strategic Stability," *Oceanus*, Vol. 28, No. 3 (Summer 1985), p. 51.

116. Keir A. Lieber and Daryl G. Press, "The End of MAD? The Nuclear Dimension of U.S. Primacy," *International Security*, Vol. 30, No. 4 (Spring 2006), pp. 7–44.

117. Li Bin, "Tracking Chinese Strategic Mobile Missiles," *Science and Global Security*, Vol. 15 (2007), pp. 1–30.

Fetter similarly conclude that “China’s mobile missiles are likely highly survivable if deployed in the field with nuclear weapons relatively early in a crisis. . . ; if China could launch its mobile missiles from unprepared or unidentified sites; and if Chinese missile forces adopt best practices to avoid detection while in the field.”¹¹⁸ These arguments are consistent with a more generally skeptical view of the U.S. ability to locate mobile targets, drawn in part from the failed Scud missile hunt in the 1991 Gulf War.¹¹⁹

Other scholars have presented a more confident assessment of U.S. counterforce capabilities, however. Keir Lieber and Daryl Press argue that long-gestating technological trends rooted in the computer revolution have produced dramatic improvements in the accuracy and remote sensing required to conduct counterforce strikes, undermining the value of the hardening, concealment, and redundancy that states have typically pursued to ensure the survivability of their nuclear weapons. In particular, Lieber and Press posit that U.S. satellites can now use synthetic aperture radar to hunt mobile missiles much more effectively than in the past, which could have significant implications for the survivability of China’s arsenal.¹²⁰

Austin Long and Brendan Green come to a similar conclusion through retrospective analysis, showing that even in the Cold War U.S. intelligence capabilities relevant to potential counterforce operations were much better than commonly understood and are probably quite a bit better today given continuing investments.¹²¹ Although Long and Green do not focus specifically on China, their analysis implies that the United States probably could use a combination of signals intelligence detected by satellites plus imagery intelligence provided by stealthy, high-altitude UAVs to locate Chinese mobile ICBMs, especially given that these missiles are substantially slower, larger, and more constrained in their movements and launch locations than Scud missiles were. They also are fewer in number and likely would have been monitored much more closely in peacetime.¹²² Long and Green note, for example, that “mobile ICBMs are not typically operated as single transporter erector launchers (TELs). There is a mobile command center, a support vehicle carrying supplies and a field kitchen for the crew, a massive fuel tanker, and at least one security vehicle. Communications between these vehicles can . . . potentially be intercepted and used to locate the vehicles.”¹²³

118. Glaser and Fetter, “Should the United States Reject MAD?” p. 70.

119. See, for example, David Ochmanek and Lowell H. Schwartz, *The Challenge of Nuclear-Armed Regional Adversaries* (Santa Monica, Calif.: RAND Corporation, 2008).

120. Lieber and Press, “The New Era of Counterforce.”

121. Long and Green, “Stalking the Secure Second Strike,” especially pp. 5–9.

122. *Ibid.*, pp. 21–23.

123. *Ibid.*, pp. 14–18.

Furthermore, in an all-out counterforce scenario the United States likely would be targeting these ICBMs with its own ICBMs, which move much faster to a target and have much lower accuracy requirements than the conventional munitions delivered by fighter-bombers in the Scud hunt.¹²⁴ The United States also is continuing to develop and refine a variety of techniques that could enable it to pursue even more sophisticated approaches to hunting Chinese mobile missiles in the future. These include covertly attaching tagging, tracking, and location devices to TELs or related vehicles, and emplacing on likely transportation routes unattended ground sensors that could detect passing TELs and communicate the information to U.S. satellites using burst transmissions that would be hard to intercept.¹²⁵ The implication is that hunting China's mobile ICBMs would not be impossible and that this is a contingency for which the United States has prepared for several decades.

Less important than whether this analysis is objectively correct is whether Chinese leaders might believe that it could be correct, regarding both the assessment of raw U.S. technological capabilities and what the pursuit of these capabilities signals about U.S. intentions. In other words, even if the capabilities and trajectory that these scholars identify do not prove definitively that the United States could find and destroy all Chinese mobile missiles, or that the United States would try to do so, the posited developments would make it significantly harder for a Chinese leader to confidently dismiss such possibilities during a war. The contest will come down to whether China believes it can hide a couple of dozen mobile missiles from the United States—or, more precisely, whether China believes that the United States believes that China can hide these missiles.

That story may become progressively harder for Chinese leaders to tell themselves as more and more of their conventional and nuclear or nuclear-relevant assets come under threat during a conventional war. If China interprets those developments as signs that the United States either is attempting conventional counterforce or is more willing to engage in nuclear counterforce than previously understood, China could come to see first use of nuclear weapons as a means of halting the most threatening components of the conventional campaign, or signaling resolve and forcing the United States to reconsider, or both. For example, if China's conventional military capabilities had been significantly degraded, China might see the limited use of nuclear weapons against a U.S. carrier strike group launching attacks on Chinese missile forces or supporting attacks on China's submarine force as the most expeditious means of stopping those potential threats to its nuclear arsenal. Even

124. *Ibid.*, pp. 21–23.

125. *Ibid.*, pp. 26–27.

absent this sort of military utility, however, if China simply believed that the United States was in the process of probing for Chinese resistance, without having fully committed to counterforce yet, and that a counterforce campaign would take some time to be successful, China might see a window in which nuclear use—perhaps beginning with a demonstration strike—could impose enough costs on the United States to cause it to back down. Either or both of these types of motives could lead to use.

Wartime perceptual dynamics are likely to exacerbate fearful Chinese assessments of the security of their nuclear arsenal under these circumstances as well. It is one thing to be confident about the deterrence provided by even small numbers of nuclear weapons in a world where conventional deterrence is also holding steady and the prospect of an adversary attempt at damage limitation is remote. It is more difficult to be confident in a world where those nuclear weapons already have failed to deter the onset and escalation of a massive conventional war on one's home territory, and many of the state's nuclear weapons have been disabled or destroyed.

The mere fact that such a war is occurring could cause significant Chinese reassessment of U.S. intentions. Indeed, circumstantial military-technical evidence of possible U.S. preparation for nuclear counterforce strikes or of U.S. efforts at conventional counterforce may appear cumulatively more ominous during the course of a hot war than they would as a series of isolated hypotheticals in peacetime. In addition, China's ability to assess the scope and implications of U.S. conventional military operations in real time is likely to be limited, in part because U.S. military operations will deliberately seek to circumscribe China's situational awareness. Both of these factors could lead Chinese leaders to fear the worst in the face of an ambiguous military-technical assessment, even if the war had not produced real changes in the U.S. ability to destroy China's arsenal.

China's only past nuclear crisis during a conventional war lends some credence to this possibility. The 1969 border war with the Soviet Union began when Chinese troops ambushed Soviet border guards in a disputed area in an attempt to deter further Soviet incursions in the area as well as any broader Soviet intervention into Chinese politics.¹²⁶ The conflict quickly escalated beyond what Chinese leaders had expected and resulted in Moscow brandishing the threat of invasion as well as nuclear attack on China's nascent nuclear

126. M. Taylor Fravel, *Strong Borders, Secure Nation: Cooperation and Conflict in China's Territorial Disputes* (Princeton, N.J.: Princeton University Press, 2008), pp. 211–217; and Lorenz M. Lüthi, "Restoring Chaos to History: Sino-Soviet-American Relations, 1969," *China Quarterly*, June 2012, pp. 378–397.

program.¹²⁷ Although China initially dismissed the nuclear threats, once Chinese leaders learned that the Soviets had been discussing such plans with other countries, the Chinese radically upgraded their assessment of the threats' credibility.¹²⁸

According to a recent study, Chinese leaders suddenly "began to worry, albeit based on little reliable evidence, that Moscow would use the border negotiations as a 'smokescreen' for a nuclear 'sneak attack'." Three separate times during the fall of 1969, Chinese leaders were sure that a Soviet nuclear attack was imminent, to the point that they believed that aircraft transporting Soviet representatives to Beijing for talks on settling the war might actually be armed with nuclear weapons or part of a ruse to insert special operations forces.¹²⁹ Chinese leaders left Beijing and ordered preparations for the large-scale evacuation of Chinese civilians, as well as the dispersal of industrial facilities, digging of air-raid shelters, and stockpiling of key supplies.¹³⁰ Most importantly, Chinese leaders test-fired a thermonuclear weapon at Lop Nor and placed the country's nuclear forces on a months-long alert for the first and only time in China's history—a risky move given the reliance on liquid-fueled missiles and relatively untested command and control procedures at the time.¹³¹ After numerous preparations for nuclear attacks that never came, China finally agreed to negotiations.

China is a different country today than it was in the time of Mao Zedong, and its arsenal is now better developed, which should induce caution in efforts to discern lessons from the earlier era. Nevertheless, this episode highlights several points with enduring relevance regarding the nuclear implications of conventional wars. China initiated a war in which it believed nuclear weapons would be irrelevant, despite the vast nuclear asymmetry between itself and its opponent. China then radically updated its assessment of the possibility of nu-

127. Fravel, *Strong Borders, Secure Nation*, p. 213; Michael Gerson et al., *The Sino-Soviet Border Conflict: Deterrence, Escalation, and the Threat of Nuclear War in 1969* (Washington, D.C.: Center for Naval Analyses, November 2010), p. 27; Lüthi, "Restoring Chaos to History," p. 383; John Wilson Lewis and Litai Xue, *Imagined Enemies: China Prepares for Uncertain War* (Stanford, Calif.: Stanford University Press, 2006), p. 52; and Lyle J. Goldstein, *Preventive Attack and Weapons of Mass Destruction: A Comparative Historical Analysis* (Stanford, Calif.: Stanford University Press, 2006), pp. 78–83.

128. Lüthi, "Restoring Chaos to History," pp. 390–391; Gerson et al., *The Sino-Soviet Border Conflict*, pp. 28–40; and Lewis and Xue, *Imagined Enemies*, p. 56.

129. Gerson et al., *The Sino-Soviet Border Conflict*, pp. 46, 50. See also Lewis and Xue, *Imagined Enemies*, pp. 58–64.

130. Lüthi, "Restoring Chaos to History," pp. 391–394; Gerson et al., *The Sino-Soviet Border Conflict*, pp. 40–41; and Lewis and Xue, *Imagined Enemies*, pp. 54, 57.

131. In fact, there is evidence that senior Chinese leaders did not fully understand the primitive state of some of the missiles ordered to alert status. See Gerson et al., *The Sino-Soviet Border Conflict*, p. 4; Fravel, *Strong Borders, Secure Nation*, p. 215; and Lewis and Xue, *Imagined Enemies*, pp. 45, 59–72.

clear attack to a degree bordering on paranoia once the conventional war did not go as expected. Everything the Soviets did—even sending representatives to negotiate, or not launching a nuclear strike on a day that the Chinese expected it—only fed the narrative among Chinese leaders that a nuclear attack was imminent, even though archival evidence now suggests that the Soviets never intended to follow through on their threat.¹³² Most worryingly, China prepared to use its nuclear weapons, even though it had to expect devastating retaliation and that merely the preparations to launch raised serious risks of accidental or unauthorized use. Fortunately, China's fears in this case eventually led it to de-escalate the crisis. It is an open question whether a similarly uneventful denouement would occur today in the event of a much larger-scale conventional war involving actual destruction of components of the country's nuclear arsenal and stakes radically more significant than uninhabited islands in the Ussuri River.

Conclusion

Chinese nuclear escalation in the event of a conventional war with the United States is a significant risk, although for reasons not fully surfaced in the existing debate. A U.S. conventional campaign would indeed pose a large, though not total, threat to China's nuclear arsenal. More important than the purely military-technical implications of the U.S. campaign, however, is what China is likely to believe the campaign signals about U.S. intentions in a world where conventional deterrence has just failed. Reasonable Chinese fears that the United States might be attempting conventional counterforce, or considering or preparing for nuclear counterforce, could lead China to engage in limited nuclear escalation to gain military advantage or coercive leverage—despite China's no-first-use policy.

This conclusion, derived from the article's general framework, raises a host of questions for further research. One of the most important is whether China's efforts to alert its nuclear forces during a crisis in order to improve survivability could look to the United States like preparation for escalation, leading the United States to launch what it saw as a damage-limitation strike even if it had originally not intended to engage in counterforce at all.¹³³ This possibility points to additional escalatory dynamics that might emerge in a future U.S.-China conflict, arising from U.S. interpretations of Chinese actions, especially as Chinese nuclear capabilities expand. Some expansion could be stabilizing, however. If China eventually develops a larger and more survivable

132. Gerson et al., *The Sino-Soviet Border Conflict*, pp. 46–52.

133. I owe my understanding of this point to Charles Glaser and Avery Goldstein.

nuclear arsenal, the threshold at which U.S. conventional operations could start to seriously erode that arsenal would increase, reassuring Chinese leaders in wartime. Whether such a development would be a net positive for the United States would depend among other things on how China's nuclear expansion affected other aspects of China's behavior, but on the escalation question, it could be beneficial.

More broadly, analysis of the China case raises the question of why the United States might adopt conventional military strategies that could increase risks of opponent nuclear escalation in the first place. Optimists often simply do not address the underlying drivers of such policies, whereas pessimists tend to characterize them as the inadvertent product of U.S. military planning run amok of civilian guidance.¹³⁴ It seems more likely that such policies are not inadvertent, at least not in the sense that senior civilian policymakers are blindly unaware of the escalatory risks these policies entail. Rather, my interviews and conversations with senior policymakers, both military and civilian, suggest that they have long been generally cognizant of the fact that U.S. conventional military operations have the potential to create nuclear pressures on opponents.¹³⁵

Some U.S. policymakers view these pressures as regrettable but unavoidable, a necessary evil that should be minimized where possible. Others view these escalatory pressures as affirmatively useful—a means of improving general deterrence and making both conventional and nuclear war less likely. This divide mirrors an old debate.¹³⁶ In the Cold War, for example, RAND analysts noted that “those who would emphasize reducing the risk that a deep crisis might lead to nuclear war would give priority to enhancing first-strike stability,” that is, to improving the chances that neither side will have an incentive to launch nuclear weapons first in a crisis. But “conversely,” these analysts noted, “those who would stress the goal of deterring the Soviets, through the presence of strategic nuclear forces, from provoking a deep crisis in the first place would give priority to strengthening extended deterrence,” including by developing policies that would deliberately undermine first-strike stability and threaten nuclear escalation if a crisis did break out.¹³⁷ “Obviously,” they wrote, “the objective of extended deterrence contradicts that of first-strike stability.”¹³⁸

134. See, for example, Christensen, “The Meaning of the Nuclear Evolution,” p. 482; and Posen, *Inadvertent Escalation*, especially chap. 6.

135. See footnote 17.

136. Mearsheimer, “A Strategic Misstep,” especially pp. 7–8, 46–54.

137. Glenn A. Kent and David E. Thaler, *First-Strike Stability: A Methodology for Evaluating Strategic Forces* (Santa Monica, Calif.: RAND Corporation, 1989), p. 5.

138. *Ibid.*, pp. 45–46.

Today, most escalation pessimists would err on the side of strengthening what those analysts called first-strike stability, while escalation optimists tend to think first-strike instability will not be a problem or even to see it as beneficial. Aaron Friedberg has articulated this latter view most clearly with respect to China: "If PLA planners believe that the US would respond to a [conventional] first strike with a blinding campaign, and if they recognize that this could force them to contemplate using or losing their own nuclear weapons, their desire to avoid being put in such a situation might cause them to refrain from launching an [antiaccess/area-denial] campaign in the first place. In short, those who warn of ASB's escalatory potential may be right; but this very fact could actually enhance its deterrent utility."¹³⁹ Indeed, the fact that members of China's strategic community insist that they do not see a path from conventional to nuclear war could be read as an effort to deny the United States this "deterrent utility"—to convince the United States that adopting escalatory conventional strategies will not improve general deterrence, because China does not appreciate the nuclear risks that would inhere in a conventional war.¹⁴⁰

The ultimate question is which of these views is correct. Should the United States do everything in its power to tamp down nuclear escalatory risks that might arise amid conventional war, even if this means sacrificing some conventional military advantages? Or should the United States leverage or even heighten these risks as a means of reducing the likelihood that war ever breaks out? Could there be a middle ground, some set of policies that would achieve what RAND analysts once called "an optimal amount of instability"—"enough to deter the [adversary] from precipitating a crisis, but not enough to cause a crisis to spiral out of control should it occur"?¹⁴¹

This article does not answer those enduring questions, but it does provide a foundation that could be used to perform the necessary analysis, both in the U.S.-China context and beyond. These trade-offs will remain challenging as the United States shapes its conventional military strategies toward other potential adversaries that have tight interlinkages between nuclear and conventional forces, such as Russia and North Korea. Future research should examine the extent to which such interlinkages may themselves be the product of deliberate strategic choices on the part of opponents.¹⁴²

139. Aaron Friedberg, *Beyond Air-Sea Battle: The Debate over U.S. Military Strategy in Asia*, Adelphi Paper No. 444 (London: International Institute of Strategic Studies, April 2014), pp. 89–90.

140. I owe my understanding of this point to George Quester.

141. Kent and Thaler, *First-Strike Stability*, p. 46.

142. Opponents may adopt such strategies in an effort to wield "the threat that leaves something to chance." Thomas C. Schelling, *The Strategy of Conflict* (Cambridge, Mass.: Harvard University Press, 1960), chap. 8. See also Robert Powell, "Nuclear Brinkmanship, Limited War, and Military Power," *International Organization*, Vol. 69, No. 3 (Summer 2015), especially pp. 593–597.