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ISSUE BRIEF

Are Dual-Capable Weapon Systems Destabilizing?

Questioning Nuclear-Conventional Entanglement and Inadvertent Escalation

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JUNE 2021

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Executive Summary

Are dual-capable weapon systems (those relevant to both nuclear and conventional missions) destabilizing? According to a long-standing theory that is gaining increased recent attention, the entanglement of conventional and nuclear forces can result in inadvertent nuclear escalation. As a result, some analysts argue that the United States should limit the development or employment of its own dual-capable weapon systems, and avoid targeting enemy dual-capable systems, in order to preserve strategic stability.

This issue brief challenges the idea that nuclear entanglement poses a significant risk of inadvertent nuclear escalation. It argues that the hypothesized reasons for nuclear escalation in these scenarios are logically inconsistent, lack strategic empathy, and do not account for operational obstacles to nuclear preemption. In addition, there are countervailing reasons to believe that dual-use systems may, on balance, strengthen nuclear strategic stability. Brief analyses of the Cold War, the 1991 Gulf War, and the India-Pakistan rivalry demonstrate that nuclear-armed states have both employed and threatened dual-capable systems for decades, without prompting leaders to choose nuclear escalation.

This issue brief concludes, therefore, that scholars and strategists should reevaluate nuclear entanglement and inadvertent escalation as a plausible path to nuclear war. In the policy realm, the United States can continue to rely on dual-capable systems, and target those of its adversaries, without running an undue risk of nuclear escalation.

Introduction

Are dual-capable weapon systems destabilizing? According to a long-standing theory that is gaining increased recent attention, the entanglement of conventional and nuclear forces can result in inadvertent nuclear escalation.¹ The theory rests on the idea that dual-capable weapon systems (those relevant to both nuclear and conventional missions) are uniquely destabilizing for two reasons. First, if a state were to use conventional force against an enemy's dual-capable systems, then the enemy may fear that this strike is the prelude to a disarming nuclear attack and choose nuclear escalation.² Second, if a state employs (or prepares to employ) a dual-capable platform in a purely conventional role, then the enemy, which cannot be certain the dual-capable weapon is not nuclear-armed and intended to carry out a nuclear first strike, may choose nuclear escalation instead of absorbing an enemy nuclear attack.³

These theories are gaining increased attention due to a number of recent developments, including the return of great-power competition in international politics, the reliance of

some nuclear-armed states on a single command-and-control system for both nuclear and conventional operations, and acquisition plans from several nuclear powers to develop new dual-capable weapons systems.⁴ The United States, for example, has plans to develop a new B-21 stealth bomber to be used in both nuclear and conventional roles. Nuclear entanglement theory implies that, to minimize the risks of nuclear escalation, nuclear-armed states could eschew attacks against the dual-capable systems of adversaries and refrain from building or employing dual-capable systems of their own.

This issue brief challenges the idea that nuclear entanglement poses a significant risk of inadvertent nuclear escalation. Theories of nuclear entanglement rest heavily on the "use it or lose it" mechanism of nuclear escalation, which, as the analysis below will show, is logically inconsistent. In addition, these theories lack strategic empathy by failing to fully consider the payoff of deliberate nuclear use, compared to the alternative options facing leaders in hypothesized scenarios. Moreover, these theories do not adequately account for operational obstacles to nuclear preemption. In addition,

- 1 Among the most important contributions to the rich literature on nuclear entanglement are: Barry R. Posen, *Inadvertent Escalation: Conventional War and Nuclear Risks* (Ithaca, NY: Cornell University Press, 1991), <https://www.jstor.org/stable/10.7591/j.ctt1xx51d>; Caitlin Talmadge, "Would China Go Nuclear? Assessing the Risk of Chinese Nuclear Escalation in a Conventional War with the United States," *International Security* 41, 4, Spring 2017, 50–92, https://doi.org/10.1162/ISEC_a_00274; James M. Acton, "Escalation through Entanglement: How the Vulnerability of Command-and-Control Systems Raises the Risks of an Inadvertent Nuclear War," *International Security* 43, 1, Summer 2018, 56–99, doi:10.1162/ISEC_a_00320; Tong Zhao, "Going Too Fast: Time to Ban Hypersonic Missile Tests? A Chinese Response," *Bulletin of the Atomic Scientists* 71, 5, November 2015, 5–8, <https://doi.org/10.1177/0096340215599774>; Alexy Arbatov, Vladimir Dvorkin, and Petr Topychkanov, *Entanglement as a New Security Threat: A Russian Perspective*, Carnegie Moscow Center, November 8, 2017, <https://carnegie.ru/2017/11/08/entanglement-as-new-security-threat-russian-perspective-pub-73163>; Rebecca Hersman, "Wormhole Escalation in the New Nuclear Age," *Texas National Security Review*, Summer 2020, <http://dx.doi.org/10.26153/tsw/10220>; James Johnson, "'Catalytic Nuclear War' in the Age of Artificial Intelligence & Autonomy: Emerging Military Technology and Escalation Risk between Nuclear-Armed States," *Journal of Strategic Studies*, 2021, 1–41, <https://doi.org/10.1080/01402390.2020.1867541>; John Speed Meyers, "The Real Problem with Strikes on Mainland China," *War on the Rocks*, August 4, 2015, <https://warontherocks.com/2015/08/the-real-problem-with-strikes-on-mainland-china/>; Joshua Rovner, "Two Kinds of Catastrophe: Nuclear Escalation and Protracted War in Asia," *Journal of Strategic Studies* 40, 5, 2017, 696–730, <https://www.tandfonline.com/doi/abs/10.1080/01402390.2017.1293532?journalCode=fjss20>; Fiona S. Cunningham, "The Maritime Rung on the Escalation Ladder: Naval Blockades in a US-China Conflict," *Security Studies* 29, 4, 2020, 730–768, <https://www.tandfonline.com/doi/full/10.1080/09636412.2020.1811462>; James Acton, *Is it a Nuke? Pre-Launch Ambiguity and Inadvertent Escalation*, Carnegie Endowment for International Peace, April 9, 2020, <https://carnegieendowment.org/2020/04/09/why-warhead-ambiguity-could-lead-to-escalation-pub-81451>; Thomas G. Mahnken and Gillian Evans, "Ambiguity, Risk, and Great Power Conflict," *Strategic Studies Quarterly* 13, 4, Winter 2019, 57–77, https://www.airuniversity.af.edu/Portals/10/SSQ/documents/Volume-13_Issue-4/Mahnken.pdf; James M. Acton, "Technology, Doctrine, and the Risk of Nuclear War," 32–55 in *Meeting the Challenges of the New Nuclear Age: Emerging Risks and Declining Norms in the Age of Technological Innovation and Changing Nuclear Doctrines* (Cambridge, MA: American Academy of Arts and Sciences, 2018), https://www.amacad.org/sites/default/files/academy/multimedia/pdfs/publications/researchpapersmonographs/New-Nuclear-Age_Emerging-Risks/New-Nuclear-Age_Emerging-Risks.pdf#page=40; Vipin Narang, "Why Kim Jong Un Wouldn't Be Irrational to Use a Nuclear Bomb First," *Washington Post*, September 8, 2017, https://www.washingtonpost.com/outlook/why-kim-jong-un-wouldnt-be-irrational-to-use-a-nuclear-bomb-first/2017/09/08/a9d36ca4-934f-11e7-aace-04b862b2b3f3_story.html; Joshua Pollack, "Evaluating Conventional Prompt Global Strike," *Bulletin of the Atomic Scientists* 65, 1, January/February 2009, 13–20, <https://doi.org/10.2968/065001003>; Vipin Narang, "The Discrimination Problem: Why Putting Low-Yield Nuclear Weapons On Submarines Is So Dangerous," *War on the Rocks*, February 8, 2018, <https://warontherocks.com/2018/02/discrimination-problem-putting-low-yield-nuclear-weapons-submarines-dangerous/>. For an evaluation of the state of the field, see: Erik Gartzke and Matthew Kroenig, "Nukes with Numbers: Empirical Research on the Consequences of Nuclear Weapons for International Conflict," *Annual Review of Political Science*, 19, 2016, 397–412, DOI: 10.1146/annurev-polisci-110113-122130.
- 2 Posen, *Inadvertent Escalation*; Talmadge, "Would China Go Nuclear?" 52–53; Acton, "Escalation through Entanglement," 67; Rovner, "Two Kinds of Catastrophe," 702; Acton, *Is it a Nuke?* 43; Acton, "Technology, Doctrine, and the Risk of Nuclear War," 41.
- 3 Arbatov, et al., *Entanglement as a New Security Threat*; Hersman, "Wormhole Escalation in the New Nuclear Age," 102; Johnson, "'Catalytic Nuclear War' in the Age of Artificial Intelligence & Autonomy," 14; Acton, *Is it a Nuke?*; Mahnken and Evans, "Ambiguity, Risk, and Great Power Conflict," 68; Acton, "Technology, Doctrine, and the Risk of Nuclear War," 49; Pollack, "Evaluating Conventional Prompt Global Strike."
- 4 Matthew Kroenig, "How to Approach Nuclear Modernization? A US response," *Bulletin of the Atomic Scientists*, 71, 3, 2015, 16–18, DOI: 10.1177/0096340215581356.



Artist rendering of a B-21 Raider concept in a hangar at Whiteman Air Force Base, Mo. Whiteman AFB is one of the bases expected to host the new airframe. Image courtesy Northrop Grumman and US Air Force. <https://www.af.mil/News/Photos/igphoto/2002241906/>.

there are countervailing reasons to believe that dual-use systems may, on balance, strengthen nuclear strategic stability. Finally, and most importantly, there is no evidence of dual-capable systems ever producing nuclear escalation in the empirical record. Brief case studies of the Cold War, the 1991 Gulf War, and the India-Pakistan rivalry show that nuclear powers have both employed and threatened to attack dual-capable systems for decades, without prompting leaders to fear disarming strikes or to choose nuclear escalation.

The results of this issue brief, therefore, have implications for scholars, strategists, and policymakers. This issue brief shows that the existing theory and evidence behind nuclear entanglement theory are weak. Scholars wishing to

salvage this theory must do much more to specify their theoretical logics and to muster empirical evidence to support their claims. In the policy realm, the report recommends that the United States continue to include adversary dual-use capabilities in its targeting lists and to modernize and employ its own dual-use capabilities.

The rest of the issue brief will continue in three major parts. First, it will present a criticism of the logic of nuclear entanglement theory. Second, several empirical case studies will reveal little support for the theory, even in “most likely” cases that fit the scope conditions of the theory. Third, and finally, it will offer a brief conclusion.

Questioning Theories of Nuclear Entanglement and Inadvertent Nuclear Escalation

This section reviews, and provides several novel critiques of, theories of nuclear entanglement and inadvertent escalation. Arguments about the entanglement of dual-use systems creating nuclear escalation risks seem plausible (and frightening) on their surface, but a deeper examination reveals that these arguments rest on weak logical foundations.

Vague Causal Mechanisms

Nuclear entanglement theorists are often vague about the precise mechanisms that lead from entanglement to nuclear escalation. Why, exactly, would the employment of dual-use systems encourage adversaries to choose nuclear escalation? Proponents of nuclear entanglement theory are often unclear on this matter and make vague claims about escalatory pressures and spirals.

Barry Posen writes that following “large-scale conventional attacks on nuclear forces,” target states could choose “dangerous...responses that actually employed nuclear weapons, ranging from limited demonstrative or tactical employment, through large-scale theater attacks, to full-scale counterforce exchanges.”⁵ James Acton maintains that threats to use nuclear weapons following an attack on dual-capable systems “could trigger an escalation cycle.”⁶ He also writes that “[t]hese steps could feed an escalation spiral or even precipitate nuclear use.” Thomas Christensen writes 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.”⁷ Thomas Mahnken and Gillian Evans write that “[w]hen countries complicate efforts to distinguish nuclear from conventional forces, they invite a higher risk of unintended vertical escalation and limited nuclear war.”⁸ Tong Zhao writes that, in these situations, leaders “will have to decide whether to launch preemptive strikes before fleeting windows of opportunity close. Risky decision making would be encouraged.”⁹ Rebecca Hersman worries about the “informational aspects of conventional-nuclear entanglement and the implications for unexpected escalatory effects.”¹⁰ Caitlin Talmadge argues that “threats to nuclear weapons may provide reasons for intra-war escalation.”¹¹ She elsewhere claims that, in situations of nuclear entanglement, “leaders might see limited nuclear escalation as their least bad option.”¹²

But, why? What is the logical reason why a leader or a commander would choose to deliberately launch a nuclear attack in the above situations? Why would intentionally launching a nuclear attack ever be the “least bad option,” as Talmadge maintains? Proponents do not take their audience into the mind of decision-makers and explain in concrete terms why this would be a reasonable choice.

Logical Inconsistencies of “Use It or Lose It”

Reading between the lines of most nuclear entanglement theory—and the direct arguments of others—it is clear that the theory rests almost entirely on the “use it or lose it” theory of nuclear escalation.¹³ “Use it or lose it” is the idea that, if a state fears that its nuclear arsenal might be wiped out, then the target state would prefer to use its nuclear weapons early in a crisis before it loses them. Attacks on a target’s nuclear forces or command and control creates pressures for the targeted state to use nuclear weapons

5 Posen, *Inadvertent Escalation*, 3–4.

6 Acton, “Escalation through Entanglement,” 73.

7 Thomas J. Christensen, “The Meaning of the Nuclear Evolution: China’s Strategic Modernization and U.S.-China Security Relations,” *Journal of Strategic Studies* 35, 4, August 2012, 470, fn. 54, cited in Talmadge, “Would China Go Nuclear?” 54.

8 Mahnken and Evans, “Ambiguity, Risk, and Great Power Conflict,” 60.

9 Zhao, “Going Too Fast,” 5–8.

10 Hersman, “Wormhole Escalation in the New Nuclear Age,” 102.

11 Talmadge, “Would China Go Nuclear?” 59.

12 *Ibid.*, 51.

13 Francis J. Gavin, et al., “Policy Roundtable: The Trump Administration’s Nuclear Posture Review,” *Texas National Security Review*, February 13, 2018, <https://tnsr.org/roundtable/policy-roundtable-trump-administrations-nuclear-posture-review/>; George Perkovich, *Toward Accountable Nuclear Deterrents: How Much is Too Much?* Carnegie Endowment for International Peace, February 11, 2020, <https://carnegieendowment.org/2020/02/11/toward-accountable-nuclear-deterrents-how-much-is-too-much-pub-80987>. In the India-Pakistan context, see: Steven E. Miller, “A Nuclear World Transformed: The Rise of Multilateral Disorder,” *Dædalus*, 2020, 17–26, https://doi.org/10.1162/DAED_a_01787.



An unarmed AGM-86B Air-Launched Cruise Missile (ALCM) is released from a B-52H Stratofortress Sept. 22, 2014, over the Utah Test and Training Range during a Nuclear Weapons System Evaluation Program sortie. The Long-Range Standoff (LRSO) missile is slated to replace the ALCM. US Air Force photo/Staff Sgt. Roidan Carlson. <https://www.af.mil/News/Photos/igphoto/2000945832/>.

because the target fears that, if it does not use them, then its nuclear arsenal could be degraded or eliminated. The use of dual-capable offensive platforms could cause the target to choose nuclear escalation, because the target state might fear the dual-capable system is on the verge of conducting a nuclear attack, and the target state would prefer to employ its nuclear forces first before the attacking state can conduct a potentially disarming or decapitating nuclear attack.

Although often not stated clearly by proponents, this is the strongest underlying theoretical rationale for theories of nuclear entanglement and inadvertent escalation.

Talmadge, for example, worries that “the target state might fear that the opponent was seeking to attrite the target’s nuclear force through conventional counterforce.” She fears that “Chinese leaders could reasonably come to believe that the United States was seeking to pursue conventional counterforce...or even nuclear counterforce.”¹⁴

Sometimes, theorists enunciate this logic explicitly. Ankit Panda and James Acton argue that US attacks could “inadvertently degrade Chinese nuclear [command and control (C2)] and generate nuclear use-or-lose pressures.”¹⁵ Wu Riqiant writes that “Chinese leaders would face high use-it-or-lose-it pressure, and might lose confidence, leading to a

¹⁴ Talmadge, “Would China Go Nuclear?” 51.

¹⁵ Ankit Panda and James Acton, “Why the Pentagon Must Think Harder about Inadvertent Escalation,” *Defense News*, December 2, 2020, <https://www.defensenews.com/opinion/commentary/2020/12/02/why-the-pentagon-must-think-harder-about-inadvertent-escalation/>.

decision to escalate.”¹⁶ John Speed Meyers argues that US strikes on Chinese co-located missiles risk “putting Chinese leaders in a use-it-or-lose-it situation.”¹⁷ Joshua Rovner writes that “inadvertent escalation may occur when conventional attacks put the adversary’s nuclear force at risk...Fearing the destruction or incapacitation of its nuclear deterrent, the target state might face a ‘use it or lose it’ dilemma.”¹⁸

While superficially plausible, closer examination reveals that “use it or lose it” rests on a weak logical foundation and does not, in fact, provide rational incentives to use nuclear weapons for three reasons.¹⁹

First, “use it or lose it” is a false dilemma. A false dilemma is a common logical fallacy that occurs when one is presented with a choice between two unattractive options when, in fact, there are more than two options available. The false dilemma presented by “use it or lose it” is that leaders with vulnerable nuclear forces have a choice between either using their nuclear weapons or losing them. Rarely, if ever, however, in international politics, do leaders face a choice between suffering a disarming attack and launching an intentional nuclear attack of their own. They have many other options. They can surrender. They can conduct diplomacy. They can retaliate with conventional military force. They can launch a nonnuclear strategic attack, such as in space or cyberspace. They could take other steps to ensure the survivability of their forces, such as to flush submarines to sea, place nuclear-armed bombers on alert, or activate mobile missile forces. They can engage in nuclear brinkmanship, raising the risk of nuclear war through nuclear alerts or veiled nuclear threats in the hope that the other side will back down. Intentionally launching a nuclear first strike is not the only, or even the most obvious, response for a state that fears it might become the victim of a disarming attack.

Second, not only does “use it or lose it” present a false dilemma, but it also requires one to assume that vulnerable states, faced with a range of options, would intentionally select the riskiest and most costly option: deliberately initiating a nuclear attack. As Talmadge writes, leaders would have to view launching a deliberate nuclear attack as “the least bad option.”²⁰ But intentionally launching a nuclear

attack is almost always worse than the other available options detailed above. Because both states in entanglement scenarios possess nuclear weapons, a state that chooses a deliberate nuclear attack opens itself up to costly nuclear retaliation. The state would essentially risk inviting the major nuclear strike it was attempting to ward off.

To be sure, if leaders of the vulnerable state believed that their nuclear attack could completely disarm an opponent’s nuclear forces, then perhaps this course of action would make sense. But, if the potential aggressor possesses a retaliatory capability, then the vulnerable state would be choosing to launch a nuclear attack with full knowledge that the opponent could simply absorb the nuclear attack and retaliate with a devastating nuclear second strike of its own. This can hardly be seen as the least bad option.

Indeed, entanglement theorists often present the United States as the offensive state that is placing its adversaries in a use-it-or-lose-it situation, but Washington possesses a robust second-strike capability. Vulnerable adversaries would have little to gain—and much to lose—by deliberately launching a nuclear attack against the United States or its allies or forces, even if adversary states feared that their nuclear forces were potentially vulnerable. Again, Washington could simply absorb the attack and respond with a devastating nuclear counterattack. This logic is not unique to the United States. Most nuclear states could carry out nuclear retaliation so long as they possessed a secure second-strike capability.

Defenders of the theory might acknowledge that launching a full-scale nuclear war would be foolish but respond that a vulnerable state could launch a limited nuclear strike, with, say, one or two nuclear weapons, in the hope that Washington would back down. But, limited nuclear war has coercive power mostly because it carries the threat of broader nuclear escalation to follow.²¹ It is, therefore, inconsistent with the logic of “use it or lose it.” A state like Russia, with a survivable nuclear force, can make credible threats of limited nuclear war. Yet, a state with a vulnerable nuclear force would be unlikely to successfully leverage a limited nuclear strike for coercive purposes. Again, Washington

16 Wu Riqiang, “Sino-U.S. Inadvertent Nuclear Escalation,” Renmin University, 2016, 6, 10, 13–17, 30, 33–35, cited in Talmadge, “Would China Go Nuclear?” 55.

17 Meyers, “The Real Problem with Strikes on Mainland China.”

18 Rovner, “Two Kinds of Catastrophe,” 702.

19 For a recent, detailed criticism of the supposed use-it-or-lose it dilemma, see Matthew Kroenig, *The Logic of American Nuclear Strategy: Why Strategic Superiority Matters* (New York: Oxford University Press, 2018), Chapter 6.

20 Talmadge, “Would China Go Nuclear?” 58.

21 Robert Powell, “Nuclear Deterrence and the Strategy of Limited Retaliation,” *American Political Science Review* 83, 2, 1989, 503–519.



China's H-6 bombers are dual-capable. Some variants have nuclear missions, while others are used for conventional purposes. Courtesy Ministry of Defense of Japan, https://www.mod.go.jp/js/Press/press2015/press_pdf/p20151127_02.pdf.

could still absorb the attack and respond with a devastating nuclear counterattack. Moreover, since the attacking state's forces are vulnerable, Washington's counterattack might include a disarming counterforce strike. Once again, the attacking state would be more likely to invite a disarming attack than to stave it off.

Third, and related, "use it or lose it" is inconsistent with the most basic theories of nuclear deterrence, including mutually assured destruction (MAD).²² Nearly all nuclear strategists and deterrence theorists maintain that it would be illogical for a country to deliberately launch a nuclear attack against a country with a secure second-strike capability. Yet, "use it or lose it" maintains that a country might deliberately launch a nuclear attack, even when facing an opponent that possesses a secure second-strike capability—if it fears that it might otherwise lose its own nuclear weapons. So, do second-strike capabilities reliably deter nuclear attack, or not? The logic and empirical record for nuclear deterrence theory is quite strong, casting doubt on "use it or lose it" as a feasible path toward nuclear war.

A few entanglement theorists, such as Posen, have argued that entanglement might also increase the risk of a nuclear accident.²³ States looking to protect vulnerable nuclear forces might seek to take steps, such as placing forces on

alert or delegating launch authority, which could increase the risk of an accidental nuclear detonation. This is plausible and may deserve further study. But these theorists present a much narrower range of possible contingencies, and they are the exception to the main thrust of entanglement theory that rests—implicitly or explicitly—on logically inconsistent ideas about "use it or lose it."

Lacking in Strategic Empathy

Theories of inadvertent nuclear escalation also lack strategic empathy. They describe dangerous scenarios involving attacks with or against nuclear-capable systems and draw a link to nuclear weapons use. But, it is quite difficult to put oneself in the shoes of the leaders who would make the decision to launch a nuclear attack and to make a persuasive case about why nuclear use would be attractive to these leaders. The purpose of this section is to reexamine several of the hypothetical scenarios of inadvertent escalation described by previous theorists and to consider the countervailing risks that would make nuclear escalation extremely unattractive in these situations.

US-China Conflict. As stated above, nuclear entanglement theorists often maintain that US strikes against Chinese

²² Robert Jervis, *The Meaning of the Nuclear Revolution: Statecraft and the Prospect of Armageddon* (Ithaca, NY: Cornell University Press, 1990).

²³ Posen, *Inadvertent Escalation*.

co-located missiles could cause Beijing to choose nuclear escalation.²⁴ In these scenarios, China is engaged in a large-scale war in the Indo-Pacific against US and allied forces. Chinese nuclear warheads, nuclear-capable missiles, and nuclear command, control, and communications (NC3) are in the process of being degraded by conventional US strikes on the Chinese mainland. Nuclear entanglement theorists take it as self-evident that the Chinese leadership would feel pressure to use its nuclear weapons under these conditions.

But there are reasons to doubt that this is the case. Beijing maintains a nuclear “no first use” policy. While this declaratory policy might be window dressing and could be abandoned in a major war, China does not actively design a nuclear force for first use. People’s Liberation Army (PLA) operational units are not routinely assigned nuclear warheads and would receive warheads from the tight control of the Central Military Commission (CMC) only in a crisis.²⁵ Further, China does not have a robust early warning system to support timely decision-making under attack.²⁶ The US Defense Department reports that China might be moving toward a launch-on-warning posture, but the evidence it cites (an increase of Chinese missile silos) does not clearly support this conclusion. In sum, there is not much evidence that Beijing plans or builds forces for launching preemptive nuclear strikes.²⁷

Moreover, the risks to Beijing of taking this course of action would be immense. If China used nuclear weapons against the United States or its allies, then it is possible that the United States would respond with a nuclear attack of its own. Given the United States’ robust nuclear forces, a large-scale nuclear exchange between these powers would be extremely unattractive to China. Chinese leaders likely know that conducting a nuclear first strike with degraded forces against the United States and its allies in a major war could result in a devastating nuclear response. They would be more likely to seek to avoid this outcome than invite it.

Even if Beijing feared that its deterrent was being degraded, it would have other, more attractive options than launching a nuclear attack. It could continue the fight at the nonnuclear level. Meanwhile, it could flush submarines or move its mobile missiles into its extensive underground-tunnel network to enhance their survivability.²⁸ These options would be more attractive, as they could also prevent a possible US disarming strike without inviting devastating nuclear retaliation on China.

One might argue that, while irrational for Beijing, rogue PLA commanders in the field might be more likely to launch an unauthorized nuclear strike if their positions were coming under attack. But, Chinese nuclear command and control prioritizes negative control of nuclear weapons precisely because party leadership does not trust lower-level commanders to make decisions of this gravity.²⁹

In sum, on closer examination, it appears that US strikes on China’s nuclear-related forces would not make deliberate nuclear use an obvious or attractive choice for China’s leaders.

US-North Korea Conflict. Turning to another concrete example, proponents of nuclear entanglement have argued that US overflights of the Korean Peninsula with dual-capable bombers could give Kim Jong-Un an “itchy trigger finger” and the incentive to launch nuclear weapons first.³⁰ But, this would not be an attractive choice for the North Korean leadership.

The “use-it-or-lose-it” logic states that, if Kim does not act, he might become the victim of a decapitating or disarming first strike. That is a conceivable outcome and would certainly be highly undesirable for him. The probability that any US overflight would be the prelude to a decapitating or disarming strike, however, is very slim. If, on the other hand, during such an overflight, Kim intentionally launched a nuclear first strike against the United States or its allies, then the risk that the United States retaliates with a devastating nuclear response is much greater than before. Such

24 Talmadge, “Would China Go Nuclear?” 59.

25 Fiona Cunningham, “Nuclear Command, Control, and Communications Systems of the People’s Republic of China,” NAPSNet Special Reports, July 18, 2019, <https://nautilus.org/napsnet/napsnet-special-reports/nuclear-command-control-and-communications-systems-of-the-peoples-republic-of-china/>.

26 Ibid.

27 *Military and Security Developments Involving the People’s Republic of China 2020*, Office of the Secretary of Defense, August 2020, <https://media.defense.gov/2020/Sep/01/2002488689/-1/-1/2020-DOD-CHINA-MILITARY-POWER-REPORT-FINAL.PDF>, 90.

28 Tong Zhao, “Conventional Counterforce Strike: An Option for Damage Limitation in Conflicts with Nuclear-Armed Adversaries?” *Science & Global Security* 19, 3, 2011, 195–222, DOI: 10.1080/08929882.2011.616146.

29 Cunningham, “Nuclear Command, Control, and Communications Systems of the People’s Republic of China.”

30 Narang, “Why Kim Jong Un Wouldn’t Be Irrational to Use a Nuclear Bomb First.”



Russia's Kh-47M2 Kinzhal is a dual-capable hypersonic weapon shown here on a MiG-31 interceptor. It is featured here in the 2018 Moscow Victory Day Parade. Image courtesy Russian Presidential Press and Information Office. <http://www.kremlin.ru/events/president/news/57436>.

an attack might even result in the end of the Kim regime. By going down this path, Kim would essentially be choosing the worst possible outcome, inviting the decapitating nuclear attack he was attempting to ward off.

To be sure, if the United States or South Korea were conducting a full-scale invasion of North Korea and Kim felt that he had nothing left to lose, then it might make sense for him to threaten the use of nuclear weapons, or even use them, in the hope of forcing the conflict to a close on acceptable terms.³¹ But this is an entirely different theoretical logic from “use it or lose it” and inadvertent escalation, as explained above.

Some may counter that Kim—or other US adversaries—may be reckless or irrational. Or perhaps they may act suboptimally due to extreme preferences, psychological biases, or organizational pathologies.³² If a leader makes irrational or suboptimal decisions, however, then they might also launch a nuclear attack for a wide range of other reasons, including because it is Tuesday. Proponents of nuclear entangle-

ment theory do not base their arguments on irrationality. Rather, they present their case as if nuclear entanglement provides rational incentives for vulnerable nuclear states to choose escalation.

As this section shows, however, North Korean leadership would be extremely reluctant to deliberately launch a nuclear attack on the United States, even if it feared that overflights from US dual-capable bombers might be used for a decapitating nuclear first strikes.

A Vulnerable United States. Much of the nuclear entanglement literature is one sided. Many analysts cast the United States' dual-capable systems as presenting an ambiguity problem to US adversaries. But the United States is not alone in pursuing ambiguous, dual-capable systems. Indeed, China and Russia are much more reliant on dual-capable platforms than the United States and its allies. China possesses hundreds of ground-launched, short-, medium-, and intermediate-range surface-to-surface missiles that can be equipped with either conventional or nuclear warheads.³³

31 Vipin Narang, *Nuclear Strategy in the Modern Era: Regional Powers and International Conflict* (Princeton, NJ: Princeton University Press, 2014); Keir A. Lieber and Daryl G. Press, “The Next Korean War,” *Foreign Affairs*, April 1, 2013, <https://www.foreignaffairs.com/articles/north-korea/2013-04-01/next-korean-war>.

32 Graham Allison and Philip Zelikow, *Essence of Decision* 2nd ed. (New York: Longman, 1999); Jack S. Levy, “Prospect Theory and International Relations: Theoretical Applications and Analytical Problems,” *Political Psychology* 13, 2, June 1992, 283–310, <https://doi.org/10.2307/3791682>.

33 Talmadge, “Would China Go Nuclear?” 55.

Russia possesses an even wider range of dual-capable platforms, including: short-range and intermediate-range ground-launched cruise and ballistic missiles, anti-aircraft missiles, air-launched cruise missiles, sea-launched cruise missiles, fighter aircraft, intercontinental-range hypersonic missiles, strategic bombers, fighter aircraft, torpedoes, sea and land mines, and depth charges.³⁴ Moreover, these countries regularly use these systems in ways that could be destabilizing, according to the logic of entanglement theory.

Russia, for example, routinely conducts patrols with nuclear-capable bombers in international airspace near the borders of the United States and NATO allies.³⁵ Would it be reasonable for Washington or Brussels to assume that these flights are the prelude to a disarming nuclear attack and respond with a preemptive nuclear strike of their own? Would proponents of inadvertent escalation theory advocate that a US president respond to Russian nuclear posturing with a deliberate nuclear strike?

China possesses dual-capable intermediate-range missiles. If China were to employ these missiles in the event of a major conflict in the Indo-Pacific, would US officials fear that the Chinese missiles may be armed with nuclear weapons and decide to use US nuclear weapons preemptively? Would entanglement theorists recommend this course of action?

This would seem to be a rash and unreasonable response, and it would be difficult to find a serious Western analyst who would advocate that Washington conduct preemptive nuclear strikes in these circumstances. Yet this is precisely the type of decision one must expect rival leaders to make in order to believe that nuclear entanglement can generate nuclear escalation. It is hard to imagine a responsible leader (whether in Washington, Moscow, or Beijing) taking such a decision, casting further doubt on entanglement theory.

Operational Obstacles to Inadvertent Escalation

Operational details cast further doubt on nuclear entanglement theory. The fear of inadvertent escalation from dual-use capabilities stems from the possibility that a country might mistake the operation of a dual-capable platform

armed with conventional warheads for an incoming nuclear attack and choose nuclear escalation. This argument therefore assumes that the target state can detect an incoming enemy platform, determine whether the aggressing platform is dual capable, and then conduct a nuclear attack before the platform can deliver its munitions. In other words, since the logic of the argument is that a country might want to use its nuclear weapons before it loses them, then the country must *actually* be capable of using them before it loses them. This is often an unrealistic assumption.

Most US dual-capable platforms (such as the B-2, F-35, planned B-21, and cruise missiles) are stealthy and, depending on the scenario, it would be difficult for any US adversary to detect, track, and identify them before they deliver their munitions. Furthermore, even if the adversary can detect the incoming platform, most early-warning systems could not distinguish whether the signal was produced by a conventional-only or a dual-capable platform. Nor is it necessarily straightforward for an adversary to identify the target of a stealthy attacker. Unless such discrimination is possible, then nuclear entanglement theory, to be true, must be taken to an absurd extreme—that every detected enemy platform might be nuclear capable and would therefore warrant an immediate nuclear response.

Finally, even if the enemy can identify a dual-capable platform, it is unlikely that the enemy could launch a nuclear strike before the platform could deliver its munitions. Consider a bomber with a notional airspeed of 1,000 kilometers per hour (km/h).³⁶ If it was detected 100 kilometers away, the targeted state would have roughly six minutes to react. It seems unlikely that, in those six minutes, the state could: verify the incoming platform, communicate the threat to national leadership, decide to launch a nuclear attack, transmit attack orders to nuclear forces, and finally carry out a nuclear strike. After six minutes passed and it was revealed that the incoming dual-capable platform did not attack (or attacked with conventional munitions) then any planned nuclear retaliation could be called off. In theory, automated response to warning and the pre-delegation of launch authority could make a nuclear launch physically possible in this timeframe, but no nuclear-armed states currently have such a plan for managing nuclear operations,

34 Acton, *Is It a Nuke?* 17–25.

35 Stephen Losey, “NORAD F-22s Intercept Russian Fighters, Bombers Near Alaska,” *Air Force Times*, October 20, 2020, <https://www.airforcetimes.com/news/your-air-force/2020/10/20/norad-f-22s-intercept-russian-fighters-bombers-near-alaska/>.

36 “B-2 Spirit,” Air Force Global Strike Command Public Affairs Office, December 16, 2015, <https://www.af.mil/About-Us/Fact-Sheets/Display/Article/104482/b-2-spirit/>.

and there are good reasons why they would be reluctant to put such plans in place.

In sum, nuclear entanglement theory runs aground on operational realities. In many cases, a state targeted by dual-use capabilities, especially the stealthy ones fielded by the United States, would either receive no warning of the attack, be unable to discriminate dual-use platforms from other platforms, or receive insufficient warning to order a nuclear counterattack. A country will not be tempted to use its nuclear weapons before it loses them if it knows this is unlikely to be a viable option.

Nuclear Entanglement Can Be Stabilizing

Nuclear entanglement theory suggests that entanglement is inherently destabilizing. If one takes the logic of nuclear entanglement seriously, however, then there are reasons to believe that dual-use capabilities might actually strengthen strategic stability.

First, the presence of dual-use capabilities reduces first-strike incentives. If a nuclear-armed state believed with high confidence that it could eliminate its opponent's nuclear arsenal, then it might be tempted to do so. Dual-use capabilities increase the number of nuclear-related targets, making it more difficult to conduct a successful disarming strike. China's large numbers of dual-capable DF-26 intermediate-range ballistic missiles (IRBMs) and DF-21 medium-range ballistic missiles (MRBMs) present an adversary with a challenging target set.³⁷ Without these dual-use systems, China's adversaries might be able to target a smaller number of nuclear-capable systems with a higher level of confidence that they could eliminate all of them.

Second, entanglement might stabilize international politics by causing countries in an inferior position to choose capitulation, rather than escalation. Basic international relations theories maintain that the balance of power shapes

coercive bargaining and that weaker countries are more likely to choose submission.³⁸ States that are facing a weak and eroding military position due to adversary strikes that are degrading their nuclear-related forces and NC3 might, therefore, be more likely to deescalate the crisis or sue for peace than to choose deliberate, and potentially devastating, nuclear escalation.

Third, countries may intentionally pursue deterrence through entanglement. Ironically, theories of entanglement and inadvertent escalation, if correct, could actually suggest a reason why dual-use capabilities might render nuclear escalation less likely. Leaders might conclude that attacking dual-use capabilities is too risky. They might voluntarily refrain from attacking certain targets in order to avoid the escalatory risks. Indeed, states with vulnerable dual-use systems are already attempting to exploit this possibility to their advantage. China may purposely co-locate its nuclear and conventional missiles in order to achieve this deterrent effect.³⁹ The United States, in the 2018 Nuclear Posture Review (NPR), implied that any attack (even a cyberattack) on its NC3 systems might conceivably result in US nuclear retaliation.⁴⁰ Many criticized this US threat for not being credible.⁴¹ But, to the degree that leaders believe entanglement theory, countries should have incentives to deter through entanglement, and their adversaries could become more cautious around dual-use systems in crises in a way that contributes to stability.⁴²

The Empirical Record of Nuclear Entanglement and Inadvertent Escalation

This section will examine the empirical evidence of nuclear entanglement and inadvertent escalation. Nuclear entanglement is not entirely new. After all, the *Enola Gay* was a dual-capable platform. Nuclear weapons and dual-use weapons systems have existed for three quarters of a century and, over that time, there have been many conflicts and

37 *The Military Balance 2020*, International Institute of Strategic Studies, 2020, 259.

38 James D. Fearon, "Bargaining, Enforcement, and International Cooperation," *International Organization* 52, 2, 1998, 269–305; Geoffrey Blainey, *The Causes of War* 3rd ed., (New York: Free Press, 1988).

39 Ankit Panda, "China's Dual-Capable Missiles: A Dangerous Feature, Not a Bug," *Diplomat*, May 13, 2020, <https://thediplomat.com/2020/05/chinas-dual-capable-missiles-a-dangerous-feature-not-a-bug/>.

40 *2018 Nuclear Posture Review*.

41 Michael T. Klare, "Cyber Battles, Nuclear Outcomes? Dangerous New Pathways to Escalation," *Arms Control Today*, November 2019, <https://www.armscontrol.org/act/2019-11/features/cyber-battles-nuclear-outcomes-dangerous-new-pathways-escalation>.

42 There are, however, reasons to be pessimistic that the proliferation of nuclear capabilities, such as dual-capable weapons, can stabilize international politics, including because "stability" may not advance US national interests. See: Matthew Kroenig, "The History of Proliferation Optimism: Does It Have a Future?," *Journal of Strategic Studies*, 38, 1-2, 2015, 98-125, DOI: 10.1080/01402390.2014.893508.



The Advanced Extremely High Frequency (AEHF) satellite supports US nuclear and conventional missions communications. Image courtesy US Air Force Space Command. <https://www.afspc.af.mil/About-Us/Fact-Sheets/Display/Article/249024/advanced-extremely-high-frequency-system/>.

crises involving nuclear-armed states. In that time period, however, leaders have not decided to use nuclear weapons due to use-it-or-lose-it fears or other supposed escalatory pressures arising from the employment of dual-use capabilities. This section will briefly explore the empirical record of nuclear entanglement in the Cold War, the Gulf War, and the India-Pakistan rivalry.

Dual-Use Capabilities in the Cold War

Dual-use systems were frequently employed during the Cold War—including in combat—without instigating nuclear

escalation. The very first nuclear weapon was carried by the B-29, a strategic bomber also used to carry conventional munitions. Variants of the US B-36, B-46, and B-50 strategic bombers, mainstays of the Strategic Air Command in the 1950s, were used for photoreconnaissance. These camera-equipped bombers routinely penetrated Soviet airspace, overflow sensitive sites, and were sometimes shot down by Soviet interceptors.⁴³ During the Korean War, covert Soviet fighters duelled with US nuclear-capable B-29 and B-45 bombers, which were engaged in conventional bombing raids on the Korean Peninsula at a time when US leaders were making verbal nuclear threats.⁴⁴ These dual-capable bombers were also used during the war to

43 Sebastien Roblin, "Why America's B-50 Bomber Was Much More Than An Evolved B-29 Superfortress," *National Interest*, December 18, 2019, <https://nationalinterest.org/blog/buzz/why-americas-b-50-bomber-was-much-more-evolved-b-29-superfortress-105876>; Daniel Ford, "B-36: Bomber at the Crossroads," *Air & Space Magazine*, April 1996, <https://www.airspacemag.com/history-of-flight/b-36-bomber-at-the-crossroads-134062323/>; "RB-47H Shot Down," National Museum of the United States Air Force, June 2, 2015, <https://www.nationalmuseum.af.mil/Visit/Museum-Exhibits/Fact-Sheets/Display/Article/197621/rb-47h-shot-down/>.

44 Daniel Calingaert, "Nuclear Weapons and the Korean War," *Journal of Strategic Studies* 11, 2, January 24, 2008, 177–202, <https://doi.org/10.1080/01402398808437337>; Mark O'Neill, "Soviet Involvement in the Korean War: A New View from the Soviet-Era Archives," *OAH Magazine of History* 14, 3, Spring 2000, 20–24.



GWALIOR AIR FORCE STATION, India – An Indian air force M-2000 Mirage taxis into position. India's Mirage aircraft are nuclear-capable. US Air Force photo by Tech Sgt. Keith Brown. <https://media.defense.gov/2004/Feb/24/2000594355/-1/-1/0/040224-F-0000S-008.JPG>

conduct reconnaissance missions over Soviet territory and were also sometimes shot down.⁴⁵ Moscow could not have known whether these planes carried nuclear weapons, yet Soviet leadership did not preemptively respond with nuclear escalation. In none of these instances did the employment of dual-use bombers in dangerous international situations prompt enemy nuclear escalation.

Dual-Use Capabilities in the 1991 Gulf War

The 1991 Gulf War casts further doubt on nuclear entanglement theory. Iraq was not a nuclear-armed power, but it did possess chemical weapons in 1991 and it threatened to use them against Israel, the United States, and coalition forces.⁴⁶ The United States, Israel, and the United Kingdom were nuclear powers involved in the conflict and they held out the threat of nuclear retaliation as a deterrent against Saddam Hussein's chemical weapons.⁴⁷ The key logic of nuclear entanglement—that a country might choose escalation because it incorrectly fears that a strategic attack is

45 Robert Burns, "Mystery of Korean War's Secret Air Force Mission Is Unraveled," *Los Angeles Times*, December 18, 1994, <https://www.latimes.com/archives/la-xpm-1994-12-18-mn-10191-story.html>.

46 W. Andrew Terrill, "Chemical Warfare and 'Desert Storm' the Disaster that Never Came," *Small Wars & Insurgencies* 4, 2, November 26, 2007, 263–279, <https://doi.org/10.1080/09592319308423050>.

47 John Pike, "Nuclear Threats During the Gulf War," Federation of American Scientists, February 19, 1998, <https://fas.org/irp/eprint/ds-threats.htm>.

already under way—might conceivably be expected to apply here.

During the war, the United States employed several dual-use capabilities against Iraqi forces, including B-52 bombers and Tomahawk cruise missiles, but Hussein did not assess these as incoming nuclear attacks or escalate to using chemical weapons.⁴⁸ Similarly, the Iraqi use of dual-capable Scud missiles (capable of carrying conventional or chemical warheads) against Israeli civilian targets and US military targets did not result in either of these two nuclear-armed states misattributing the attacks as weapons of mass destruction (WMD) or engaging in inadvertent nuclear escalation.⁴⁹ Although an imperfect analogue, the 1991 Gulf War provides some evidence that states coming under attack from dual-capable platforms do not incorrectly assume an impending strategic attack and drastically escalate the conflict in response.

Additionally, the Gulf War calls into question the first mechanism of nuclear entanglement—that of dealing with attacks on dual-use command and control. The opening phase of the Gulf War involved perhaps the most complete destruction of a nation's command and control in modern warfare.⁵⁰ Nuclear entanglement theory suggests that Iraqi leadership, fearing that it would soon lose its strategic weapons and be unable to leverage their deterrent value, might be tempted to order the massive use of chemical weapons. Instead, Hussein did not use WMD, even as conventional bombs struck command posts in Baghdad. While there is no comparable case study of blinding attacks on the command and control of a nuclear-armed state, this at-

tack suggests that the destruction of command and control does not lead a state to escalate preemptively to the highest possible level.

Dual-Use Capabilities in the India-Pakistan Rivalry

Conventional conflict between Pakistan and India has carried the risk of nuclear escalation since these countries joined the nuclear club in the late twentieth century. Despite the use of dual-capable systems in several high-stakes crises since 1998, however, none of these crises have resulted in inadvertent escalation.

The 1999 Kargil Crisis began with Pakistani forces infiltrating Indian positions on the Indian side of the Line of Control (LOC). The conflict escalated to include Indian aerial bombardment of the Pakistani forces. To carry out these attacks, India employed the Mirage 2000.⁵¹ The Mirage is a dual-capable platform and the mainstay of the air leg of India's nuclear forces.⁵² According to nuclear entanglement theory, the use of these nuclear-capable fighters could have proved highly escalatory. Instead, the conflict remained conventional and limited in scope.⁵³

In subsequent clashes between Pakistan and India, including Indian bombings in 2002 and 2019, the Indian Air Force again employed the dual-capable Mirage.⁵⁴ Similarly, Indian sources claim that Pakistan used its own dual-capable Mirage-III and F-16 aircraft in airstrikes conducted in a 2019 cross-border crisis.⁵⁵ Even as India and Pakistan engaged

48 Yancy Mailles, "Operation Desert Storm B-52 Specific," United States Air Force, January 5, 2016, https://www.af.mil/Portals/1/documents/Operation%20Desert%20Storm%2025th%20Anniversary/IQ_Builder_Operation_Desert_Storm_B-52_Specific.pdf; "Where are the Shooters? A History Of The Tomahawk In Combat," *Surface Warfare Magazine* 55, Summer 2017, <https://www.public.navy.mil/surfor/swmag/Pages/Where-are-the-Shooters.aspx>.

49 Rick Atkinson and Dan Balz, "Scud Hits Tel Aviv, Leaving 3 Dead, 96 Hurt," *Washington Post*, January 23, 1991, <https://www.washingtonpost.com/wp-srv/inatl/longterm/fogofwar/archive/post012291.htm>.

50 Carl H. Builder, Steven C. Bankes, Richard Nordin, *Command Concepts: A Theory Derived from the Practice of Command and Control*, RAND, 1999, https://www.rand.org/pubs/monograph_reports/MR775.html, Chapter 5.

51 Benjamin S. Lambeth, *Airpower at 18,000': The Indian Air Force in the Kargil War*, Carnegie Endowment for International Peace, 2012, <https://carnegieendowment.org/files/kargil.pdf>.

52 Sushant Singh, "20 Years after Kargil War: How India Readied Nuclear Weapons in IAF's Mirage," *Indian Express*, July 21, 2019, <https://indianexpress.com/article/india/india-pakistan-kargil-war-air-force-mirage-fighter-jets-5839794/>; Hans M. Kristensen and Matt Korda, "Indian Nuclear Forces," *Bulletin of the Atomic Scientists* 76, 4, 2020, 217–225, 10.1080/00963402.2020.1778378.

53 Mark S. Bell and Julia Macdonald, "How Dangerous Was Kargil? Nuclear Crises in Comparative Perspective," *Washington Quarterly* 42, 2, April 3, 2019, 135–148.

54 "Blow-by-Blow Account: How Mirage 2000 Jets Destroyed Targets Inside Pakistan," ANI, February 26, 2019, <https://www.wionews.com/india-news/blow-by-blow-account-how-mirage-2000-jets-destroyed-targets-inside-pakistan-199915>.

55 Hans M. Kristensen, Robert S. Norris, and Julia Diamond, "Pakistani Nuclear Forces," *Bulletin of the Atomic Scientists* 74, 5, 2018, 348–358, 10.1080/00963402.2018.1507796; Sameer Lalwani and Emily Tallo, "Did India Shoot Down a Pakistani F-16 in February? This Just Became a Big Deal," *Washington Post*, April 17, 2019, <https://www.washingtonpost.com/politics/2019/04/17/did-india-shoot-down-pakistani-f-back-february-this-just-became-big-deal/>; Aniruddha Dhar, "IAF, Army to Destroy 3–4 Unexploded Bombs Fired by Pakistan's Mirage-III Jets in Mendhar Area along LoC," *News Nation*, April 3, 2019, <https://english.newsnationtv.com/india/news/breaking-iaf-indian-army-destroy-3-4-unexploded-bombs-fired-by-pakistan-mirage-iii-jets-planes-mendhar-loc-jammu-and-kashmir-219225.html>.



A Pakistan air force F-16C Fighting Falcon assigned to the No.5 Squadron, Rafiqui Air Force Base prepares for take-off at Nellis Air Force Base, Nev., Aug. 17, 2016. Pakistan's F-16s are nuclear capable. US Air Force photo by Tech Sgt. Frank Miller/Released. <https://www.nellis.af.mil/News/Article-Display/Article/929680/f-16s-help-strengthen-bond-between-us-pakistan-air-forces/>.

in direct military conflict with nuclear-capable aircraft, neither party suspected that the use of these warplanes signaled an impending nuclear attack or decided to choose nuclear escalation.

Thankfully, there have been zero large-scale wars between nuclear powers against which to test nuclear entanglement theory. There have also been zero cases in which dual-use platforms were plausibly in a position to conduct a disarming strike on an adversary's nuclear forces. Still, the above examples of smaller-scale conflicts lead to two conclusions. First, dual-capable platforms are not new and have been employed in wars between nuclear-armed states in the past. Second, the escalatory pressures from dual-use systems theorized by scholars have not materialized in history's closest analogues to the scenarios postulated by nuclear entanglement theory.

Conclusion

This issue brief examined the idea that the entanglement of conventional and nuclear forces can lead to inadvertent nuclear escalation. It found that the recent scholarly attention focused on this potential problem may be misplaced. The issue brief began with a theoretical investigation that showed that there are several logical reasons to be skeptical of entanglement theory. It explained that proponents are not clear about exactly why dual-capable platforms would create escalatory pressures. It also explained why fears of having its nuclear weapons degraded or eliminated is generally not a logical reason for a vulnerable state to launch an intentional nuclear attack. The report explained that arguments about inadvertent escalation often fail to consider the situation from the vantage point of the decision-makers in the vulnerable nuclear state, for whom nuclear escalation would be an extremely risky, and potentially costly, decision. Operational realities mean that the pathways to nuclear war envisioned by entanglement theorists are unlikely to be possible in practice. Finally, the

entanglement of nuclear and conventional forces might, on balance, strengthen, not undermine, nuclear strategic stability. The article continued with a series of short treatments of the Cold War, the 1991 Gulf War, and the India-Pakistan nuclear rivalry. The empirical evidence revealed that the use of dual-capable platforms, including in war, did not result in the escalatory pressures predicted by entanglement theorists.

These findings have important implications for scholars and policymakers. For scholars, this article contributes to nuclear deterrence theory by casting doubt on theories of nuclear entanglement and inadvertent escalation. There are few subjects more important than nuclear war, and the empirical evidence in this area remains fragmentary. This debate should, and likely will, continue. Nevertheless, this issue brief provides reason to be skeptical that nuclear entanglement poses a significant risk of inadvertent nuclear escalation. The burden of proof now shifts to proponents of entanglement theory. If they wish to salvage the theory, they must marshal additional logical justification and empirical evidence to make a more persuasive case.

The policy implications of this debate are quite substantial. If dual-capable systems carry an unacceptable risk of nuclear war, then nuclear-armed states could consider taking several monumental steps. First, nuclear-armed states could consider refraining from building and deploying dual-capable systems. For the United States, this would mean eliminating, reconfiguring, or withholding from combat most of its strategic bombers, fighters, and cruise missiles. Second, nuclear-armed states could consider giving sanctuary to adversaries' dual-use systems, including NC3. For the United States, this would mean refraining from targeting a large portion of enemy capabilities, as Russia and China rely heavily on dual-use offensive systems and NC3. Finally, nuclear powers could consider separating conventional systems, nuclear weapons, and NC3 systems. These steps might be justified to reduce the risk of nuclear war, but would come with significant costs, including the financial cost of separating or reconfiguring systems and the cost of reduced lethality as countries hold back combat power and refrain from targeting enemy capabilities.

This article suggests that it would be unwise to take such drastic steps. States can continue to build and employ dual-capable systems, and it is unlikely that these weapons will produce inadvertent nuclear escalation. US dual-capable systems, such as the B-2 and planned B-21 stealth

bombers, B-52 bomber, multiple fighter aircraft, and cruise missiles, have advanced US national security interests in the past and have contributed to the deterrence of adversaries and the assurance of allies in the past. These concrete advantages outweigh the supposed risks postulated by unpersuasive theories of nuclear-conventional entanglement and inadvertent nuclear escalation.

States can also continue to target adversary dual-use systems with little fear of inadvertent nuclear escalation. To reduce the danger even further, Washington can explain that adversaries should expect dual-capable weapons systems and NC3 to come under attack in major conventional wars. If US adversaries fear that their co-location of nuclear and conventional missiles, or their reliance on a single command-and-control system for nuclear and conventional operations, render their nuclear second-strike capabilities vulnerable, then these states retain the option of separating their nuclear and conventional systems.

This analysis also suggests that states are likely to face serious credibility problems if they attempt to base their deterrence strategies on fears of nuclear entanglement. The United States, for example, should recalibrate its policy of attempting to deter attacks on its space-based assets and NC3 with threats of nuclear retaliation. If it is not credible that US adversaries would choose nuclear escalation in response to attacks on dual-capable systems, then it may not be credible for Washington to threaten to do so either. The United States could, of course, leave the possibility of a nuclear response on the table. It gains little by assuring adversaries that they can attack strategic targets without serious consequence. It is only that this is unlikely to be a reliable deterrent on its own. Instead, Washington should seek to deter by denial by strengthening the resilience of these systems, through, for example, greater redundancy, security, and defensive countermeasures.

Finally, Washington should continue to prioritize conventional-nuclear integration in its defense strategy. The 2018 National Defense Strategy announced conventional-nuclear integration as a priority. While inadvertent escalation from dual-capable systems may be an exaggerated problem, US adversaries, such as Russia, are still planning to incorporate nuclear weapons into their conventional war plans as a deliberate tool of statecraft. Washington should continue to consider how it can better integrate conventional and nuclear operations to deter—and, if necessary, defend against—attacks from nuclear-armed adversaries.



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