



THE STANDSTILL CONUNDRUM: THE ADVENT OF SECOND-STRIKE VULNERABILITY AND OPTIONS TO ADDRESS IT

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Emerging and disruptive technologies spell an uncertain future for second-strike retaliatory forces. New sensors and big data analysis may render mobile missiles and submarines vulnerable to detection. I call this development the "standstill conundrum": States will no longer be able to assure a nuclear response should they be hit by a nuclear first strike.

If the nuclear weapons states can manage this vulnerability, however, they might be able to escape its worst effects. "Managing" could mean shoring up nuclear deterrence; it could mean focusing more on defenses; or it could mean negotiating to ensure continued viability of second-strike deterrent forces.

Preface: The Nolan Legacy

In her seminal Century Foundation book *Tyranny of Consensus*, Janne Nolan wrote about how U.S. leaders tend to stay cemented together when confronted with significant policy problems:

The impulse to stay within the parameters and assumptions of an established strategy can become especially pronounced when the United States has important and long-standing interests There is tacit understanding among public servants of the boundaries of acceptable discourse about certain topics, and that stepping over those lines can raise doubts about one's personal loyalty and professionalism The awareness that there are inherent risks associated with speaking up can discourage public servants from daring to challenge conventional wisdom or to present new findings or information, if they believe it will cause controversy or meet with disapproval from higher-ranking officials.¹

Nolan put her finger on a persistent characteristic of U.S. foreign policy decision-making, analyzing regional case studies focused on Iran, Afghanistan, and East Africa. The "tyranny of consensus" is also a danger as we grapple with the uncertain futures that new technologies will bring about. Will the advent of technological breakthroughs be managed in a way that reinforces predictability

and stability? Or will it inevitably fuel instability?

Emerging technologies could have a profound impact on second-strike retaliatory forces, which nuclear weapons states have long taken for granted. As the vulnerability of such forces comes into view, the nuclear states will have to face the notion that they may be unable to respond in the dreadful event that a nuclear first strike on them occurs. This "standstill conundrum" will force the nuclear states to grapple with some tough choices. Military tools will be available to try to fix the problem, but the states also may be able to find mutual solutions at the negotiating table.

The assurance of a nuclear response to a nuclear attack has been at the heart of strategic stability for decades. It has allowed states to decide that they can make do with fewer nuclear weapons rather than striving for exact parity with the largest nuclear states. Thus, for example, the United Kingdom and France have long maintained the ability to retaliate should they be attacked first, but they have sized their forces to be able to penetrate Moscow's missile defenses, rather than building them up to the level of Russia's nuclear arsenal.

Secure retaliatory forces are becoming vulnerable, I argue, because ubiquitous sensing, paired with big data analysis, makes it possible for adversaries to reliably detect those forces. Even moving targets, such as mobile missiles and submarines, may become vulnerable to detection and targeting. Loss of secure second-strike retaliatory forces could lead to dangerous escalatory pressures and instability.

¹ Janne E. Nolan, *Tyranny of Consensus: Discourse and Dissent in American National Security Policy* (New York: The Century Foundation, 2013), 101–03.

This essay, written in homage to Janne Nolan, will look at ways to avoid the tyranny of consensus during this moment of change in the global nuclear weapons environment. It will explore several pathways, military and diplomatic, that countries may pursue to continue assuring their ability to respond in the case of a nuclear attack. All are worth considering. None should be prematurely discarded.

The Theory Behind It All

Up to this time, the concealment of strategic nuclear missile systems has guaranteed their survivability. The vulnerability issue, however, is longstanding. For decades, the U.S. Navy has worried that the Soviet Union or the Russian Federation would succeed in penetrating ocean waves and targeting the strategic-strike submarines that are at the heart of America's second-strike retaliatory capability.

The theory of nuclear retaliation goes as follows: The United States and Soviet Union, now Russia, maintain ground-launched intercontinental ballistic missiles (ICBMs) on high alert in a more or less equivalent way. These are the first-strike deterrent forces: Each side knows that the other does not have the capability to get away with a disarming first strike, because both countries maintain these missiles on such high alert that if one side should launch, the other side would launch too, as nuclear missiles began to detonate on that country's territory. The weapons would launch under attack. Both sides know it and thus remain deterred from trying to launch a first strike.

Second-strike retaliatory forces are a kind of insurance policy — the submarines that are concealed in the deep ocean would be available to retaliate no matter what happened. Even if Russia somehow brought off a first strike on the United States, its leaders know that they would face a devastating retaliatory nuclear blow — again, at least, that is, the theory. The bombers that each country maintains offer an additional retaliatory capability. They have the advantage of also being available for other missions, such as strategic signaling during crises, because they are recallable. Once launched, they can be recalled to base, but missiles cannot.

Russia and China have also sought second-strike retaliatory capabilities, partially by building submarines, but mostly by building mobile missiles that are difficult to target because they keep moving,

and because they deploy in areas — such as the heavily forested taiga of Russia — where they can be hidden. Both these countries are land powers and have invested less in the naval tradition than has the United States. Thus, their continued emphasis on ground-based systems for second-strike retaliation is natural — they look for concealment above ground, not below the ocean surface.

There are certain advantages to this approach. Communications with submerged submarines have always been difficult, and communications for something so important as nuclear launch orders are many times more so. The United States has worked hard to overcome these difficulties. But nevertheless, Moscow and Beijing can take advantage of the greater simplicity of communicating with above-ground nuclear units, despite the need to maintain operational security at a high level.

All of this is a vast simplification, of course: U.S. submarine-based missiles are highly accurate and could, in theory, be part of a first-strike targeting package. Likewise, for the Russian mobile ICBM force: It is highly accurate and could participate in a first strike. But no matter what, their concealment means that some portion of them, both U.S. submarine-based missiles and Russian ground-based missiles, would be reserved for assured retaliation — a second strike. The ability to successfully retaliate even after a devastating first nuclear strike has long been seen as that vital insurance policy and a cornerstone of strategic stability. Because of this, each side suspects the other of being on a long quest to undo the second-strike retaliatory capability of the other side. It would be one way to gain a decisive strategic advantage.

China is behind the United States and Russia in this regard, with strategic nuclear forces a fraction of the size of either the U.S. or Russian forces. Beijing has long insisted that it does not need to build up first-strike forces at all, but will depend on second-strike retaliation to keep its adversaries deterred. In more recent years, however, China has begun to build strategic missile submarines of its own, as well as highly accurate ICBMs, some of them mobile, some of them not. In 2021, it became clear that the country is digging a lot more holes for silo-based ICBMs.² This diversification of the Chinese nuclear arsenal has led many experts to wonder if they are thinking about trying to build up to the levels of the United States and Russia, to “sprint to parity” in order to deploy a first-strike

2 Joby Warrick, "China Is Building More than 100 New Missile Silos in Its Western Desert, Analysts Say," *Washington Post*, June 30, 2021, https://www.washingtonpost.com/national-security/china-nuclear-missile-silos/2021/06/30/0fa8debc-d9c2-11eb-bb9e-70fda8c37057_story.html.

deterrent force, particularly against Washington.³

Two more states are official nuclear weapons states under the Non-Proliferation Treaty, and they are the United Kingdom and France. Both of these countries decided long ago to maintain their relatively small strategic nuclear forces at sea, on ballistic missile submarines. They, too, are focused on second-strike retaliatory capability: If Russia were ever to attack them, these countries say that they would launch in retaliation to destroy Moscow.

While the discussion below is mostly about the United States, Russia, and China, it bears remembering that the United Kingdom and France are also concerned about sustaining a secure second-strike deterrent. Moreover, India and Pakistan, two states that possess nuclear weapons outside the Non-Proliferation Treaty, will have similar concerns. North Korea, as an emerging nuclear weapons state, is also in the mix. However, in this essay, I concentrate on the Non-Proliferation Treaty nuclear weapons states, with a focus on the near-peer competitors among them.

Emerging and Disruptive Technologies

Now let us turn to emerging and disruptive technologies, which are exciting but also have everyone tied in knots. These technologies include developments in autonomous systems fueled by AI and machine learning, developments in cyberspace fueled by the revolution in information technology, and developments in remote sensing fueled by ubiquity. “Ubiquitous sensors” are large numbers of sensors operating in multiple spectra, on satellites and other platforms that can be networked together to produce massive amounts of data. Analytic tools driven by AI are permitting this data — “big data” — to be tamed so that they become useful, in theory, to decision-makers.⁴

Many questions are swirling around these emerging and disruptive technologies, and they tend to have people worried. They worry the general pub-

lic, because they seem so whizz-bang and yet unpredictable. They worry scientists, because scientists, no matter how active their cooperation with other scientists around the world, do not want to see the leading edge of science and technology pass to other states. They worry governments, because governments are concerned about falling behind their peers and being confronted with unpredictable military threats.

It is the unpredictable military threats that seem best to capture the general anxiety. After all, every government has the responsibility of ensuring the national defense of its territory and citizens, so naturally the unpredictable threats just over the horizon grip the collective imagination. “Black swans,” people love to call them. A lot of attention is going into deciphering just what these over-the-horizon threats may be.

To their credit, some organizations and individuals are also trying to think positively about emerging and disruptive technologies. The NATO alliance has long taken the official position that emerging and disruptive technologies represent both challenges and opportunities, and that NATO should look at both sides of the ledger.⁵ Jessica Cox and Heather Williams wrote an article in the *Washington Quarterly*, in which they argue against taking a “defeatist view” that AI has only a destabilizing influence.⁶ AI technology, they stress, will inevitably be used in different sectors of society, including the military sphere. Therefore, according to Cox and Williams, we should make the best of it, for example, by improving early-warning and decision-making tools, and reducing bias in military planning and wargaming.

Across the board, it behooves us to remember that new technologies bring advances for humankind. The deployment of these new technologies is inevitable and is already proceeding apace in some arenas. In this environment, there are positive aspects to each new technology that we need to balance with its downsides.

There is no doubt that we are living in the Age of Anxiety with regard to emerging and disruptive

3 Hans M. Kristensen and Matt Korda, “China’s Nuclear Missile Silo Expansion: From Minimum Deterrence to Medium Deterrence,” *Bulletin of the Atomic Scientists*, Sept. 1, 2021, <https://thebulletin.org/2021/09/chinas-nuclear-missile-silo-expansion-from-minimum-deterrence-to-medium-deterrence/>. See also Patty-Jane Geller, “China Is Rapidly Expanding Its Nuclear Force: Should the U.S. Be Concerned?” The Heritage Foundation, Sept. 29, 2021, <https://www.heritage.org/asia/commentary/china-rapidly-expanding-its-nuclear-force-should-the-us-be-concerned>.

4 For more reading on these issues, see James Johnson, *Artificial Intelligence and the Future of Warfare: The USA, China and Strategic Stability* (Manchester, UK: Manchester University Press, 2021); and Josef Koller, “The Future of Ubiquitous, Realtime Intelligence: A GEOINT Singularity,” Center for Space Policy and Strategy, The Aerospace Corporation, August 2019, <https://aerospace.org/paper/future-ubiquitous-realtime-intelligence-geoint-singularity>.

5 Mircea Geoana, “An Abundance of Potential,” Remarks by NATO Deputy Secretary General Mircea Geoana at the AI and Cyber Conference, Sept. 27, 2021, https://www.nato.int/cps/en/natohq/opinions_186938.htm?selectedLocale=en.

6 Jessica Cox and Heather Williams, “The Unavoidable Technology: How Artificial Intelligence Can Strengthen Nuclear Stability,” *Washington Quarterly* no. 44, no. 1 (March 2021): 69–85, <https://doi.org/10.1080/0163660X.2021.1893019>.





technologies. To understand this point, I highly recommend the literature review that Brad Roberts and his team at Lawrence Livermore National Laboratory published in February 2021 on the potential impact of these technologies on strategic stability.⁷ Although it does not capture every excellent article in the English language on this topic, it does a good job of capturing a representative sample. As Roberts is quick to admit, he and his team have not yet taken on the job of tackling the Russian and Chinese literature that is available. I have urged them to do so and hope that we will see more from them soon.

for some experts, while reducing confidence in the success of preemption for other experts. Second, as far as crisis management is concerned, some experts in the review saw emerging and disruptive technologies as eroding crisis stability — by gaining the ability to act covertly and thus take escalation risks. Others saw them as improving crisis stability — by reinforcing mutual vulnerability.⁹

I am faulting no one in pointing out these disparate assessments. In some cases, it is simply too early to understand what the full effect of a given technology will be. In others, we are already seeing the steady application of a given technology, for example in the information warfare tools that Russia is using against NATO allies.¹⁰ However, we are still working to understand their full implications — these misinformation tools are changing and improving all the time, fueled by developments in search engine algorithms.

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What the Livermore review shows is that experts across the political spectrum do not yet know what to make of emerging and disruptive technologies in peacetime, crisis, and war. As Roberts puts it, “[E]very hypothesis about the disruptive effects of EDTs [emerging and disruptive technologies] and multi-domain complexity has generated a counter-hypothesis.”⁸ Will such technologies underpin more risk-taking or less? Will they help decision-makers to choose the right course of action with more precise and well-analyzed information? Or, by contrast, will they drown them with information overload? Will autonomous systems threaten the role of humans in managing and steering conflict? Worst of all, will these technologies somehow make nuclear use more possible, inspiring human decision-makers to take more risks with nuclear weapons than they might otherwise have been willing to take? In other words, will they spur more rapid nuclear escalation, or put a brake on it?

In this environment, we must remain alert to the dangers of inadvertent escalation as the uncertainties continue to plague us. Rebecca Hersman wrote a seminal piece that captures the current environment.¹¹ She underscores that the simple, old escalation ladder, moving in a linear way from low-level crisis to full-blown nuclear conflict, no longer applies. Instead, “gray-zone” attacks and the erosion of firebreaks between conventional and nuclear systems mean that local flashpoints could move quickly to nuclear escalation.

Her arguments bear paying close attention to as we grapple with the significance of new technologies — we should definitely keep such dangers in mind. But, we should also remember that, so far, no one can grasp just how destabilizing these new and emerging technologies will be or, quite the opposite, whether they will come to contribute to a new stability. Perhaps it will be of a sort that we never confronted before, but stability it will be.

The Livermore review illustrates these contradictions. First, as far as the impact of these technologies on warfare is concerned, these technologies increase the perceived value of preemption

7 Brad Roberts, *Emerging and Disruptive Technologies, Multi-Domain Complexity, and Strategic Stability: A Review and Assessment of the Literature*, Center for Global Security Research, Lawrence Livermore National Laboratory, February 2021, https://cgsr.llnl.gov/content/assets/docs/EDT_ST2_BHR_2021.3.16.pdf.

8 Roberts, *Emerging and Disruptive Technologies*, 19.

9 Roberts, *Emerging and Disruptive Technologies*, 17–18.

10 Janne Hakala and Jazlyn Melnychuk, “Russia’s Strategy in Cyberspace,” NATO Strategic Communications Center of Excellence, June 11, 2021, <https://stratcomcoe.org/publications/russias-strategy-in-cyberspace/210>.

11 Rebecca Hersman, “Wormhole Escalation in the Nuclear Age,” *Texas National Security Review* 3, no. 3 (Summer 2020), <http://dx.doi.org/10.26153/tsw/10220>.

The Standstill Conundrum

That brings us back to the “standstill conundrum,” the idea that nuclear weapons states will have to face up to the notion of being unable to respond in the dreadful event that a nuclear first strike on them occurs. In other words, the survivability associated with secure second-strike retaliatory forces will become uncertain because their concealment will be impossible.

I am not the first to argue that the concealment that enables a secure second strike is disappearing; James Miller, Richard Fontaine, Keir Lieber, and Daryl Press made these arguments five years ago.¹² I believe I am the first, however, to argue that the disappearance of the secure second strike could occur within a similar period for the United States, Russia, and China — and indeed, for the United Kingdom and France.

Why do I think that a similar timeframe for all these countries is plausible? The nuclear weapons states, all of which are battling to stay on the leading edge of new and emergent technologies, will endeavor and succeed in competing for technologies that provide for powerful, ubiquitous sensing capability bolstered by AI tools and big data analysis. By staying together in the race, they will lose the survivability of their second-strike retaliatory forces at approximately the same time — 20 or 25 years hence.

Of course, uncertainty will reign in the transition, with different states trading technological advantage. We can already see this effect in the fact that the United States currently dominates earth sensing from space with large constellations of commercial imaging satellites in multiple spectra.¹³

The emergence of more ubiquitous earth imaging and sensing is already beginning to erode the concealment of Russian and Chinese mobile missiles. The vast networks of imaging satellites being put into low Earth orbit by commercial companies have the ability to visit and revisit the same spot on the surface of the earth several times a day and detect changes in what is happening on the ground. The networks are capable of imaging the entire surface of the earth on a 24/7 basis with infrared and other imaging technologies that allow penetration of darkness and cloud cover.

The vast number of images collected can be analyzed using AI tools and big data analysis, allowing information to be available to decision-makers quickly — including information about the locations of Russian and Chinese mobile missiles. Such “real time” information will not be achieved immediately. Nevertheless, the necessary imaging technologies are already available, as are the analytic tools needed to make sense of images for targeting purposes. Thus, although Russia and China will not lose the concealment advantage of their mobile missiles today or tomorrow, they will in the foreseeable future.

The United States may dominate this technological space now, but its advantage is likely to be ephemeral. China is hard on its heels and Russia certainly has the technical know-how to compete in this area.

What about the submarines? The United States has long feared that Soviet and Russian science would render the seas transparent, making even the most silent of U.S. submarines subject to targeting and destruction. The concealment of U.S. strategic-strike submarines has long been a predominant goal of U.S. defense policy, in order to sustain America’s second-strike retaliatory capability.

I have tended to be skeptical that U.S. competitors can achieve the goal of undoing that concealment, rendering the seas transparent so that America’s submarines become targetable. Lately, however, the advent of quantum sensing has led me to wonder: Is the goal achievable in the next 20 or 25 years? Quantum sensing already seems on the cusp of moving from the laboratory to the field as it is used to improve the sensitivity of existing sensors and enable new sensor types. U.S. submarines may be a near-term target.¹⁴

The United States, however, is unlikely to allow such an achievement to take hold without challenging it. Moreover, the United Kingdom and France, wholly dependent on at-sea retaliatory forces, may be glad to cooperate with America to achieve the sensing breakthroughs necessary to achieve the same objective. Although the Russian Federation and China place less emphasis on at-sea retaliatory forces, their submarine forces are nevertheless an important supplement to their mobile missiles.

Thus, although risky asymmetries may emerge

12 James N. Miller Jr. and Richard Fontaine, “A New Era in U.S.-Russian Strategic Stability: How Changing Geopolitics and Emerging Technologies Are Reshaping Pathways to Crisis and Conflict,” Center for New American Security, September 2017, <https://www.cnas.org/publications/reports/a-new-era-in-u-s-russian-strategic-stability>; and Keir Lieber and Daryl Press, “The New Era of Counterforce: Technological Change and the Future of Nuclear Deterrence,” *International Security* 41, no. 4 (Spring 2017): 9–49, https://doi.org/10.1162/ISEC_a_00273.

13 “North America Small Satellite Market - Growth, Trends, COVID-19 Impact, and Forecasts (2021 - 2026),” Mordor Intelligence, accessed Oct. 12, 2021, <https://www.mordorintelligence.com/industry-reports/north-america-small-satellite-market>.

14 Among other experts, Katarzyna Kubiak shone a spotlight on the issue in her December 2020 piece for the European Leadership Network, “Quantum Technology and Submarine Near-Invulnerability,” <https://www.europeanleadershipnetwork.org/wp-content/uploads/2020/12/Quantum-report.pdf>.





during the transition period, while countries are acquiring these new capabilities, in the end, the states will arrive at a point of “transparency parity.” They will all be equally vulnerable to attack on their second-strike retaliatory forces.

Under the standstill conundrum, concealment of nuclear weapon systems could no longer be assumed. Each additional nuclear missile deployed would, potentially, immediately be vulnerable. In effect, the second-strike retaliatory forces would be subject to the same use-or-lose dynamic that drives launch-under-attack strategies for the first-strike deterrent forces. All would be vulnerable. All would be subject to targeting. All would have to stand on high alert against a devastating strike.

What will this mean for stability? How will the nuclear weapons states try to respond? The standstill conundrum will force the nuclear states to grapple with some tough choices. If all states are equally vulnerable — which speaks to the necessity of staying in the technological race and not letting any other country pull ahead — then one might argue that that mutual vulnerability could be stabilizing. One country may build and deploy more weapons, but these weapons would immediately be vulnerable to targeting. Other military tools will be available to try to fix the problem, but the nuclear states also may be able to find mutual solutions at the negotiating table.

I am not presuming that nuclear weapons would go away under this conundrum. As always, as long as nuclear weapons exist, they must remain safe, secure, and effective. Even if they are all equally vulnerable to targeting, we need to ensure that they are well maintained and ready for launch, if the terrible day ever arrives when they would be called on to do so. Deterrence depends on adversaries believing in such readiness.

Military Response Options

In considering what options are available to respond to the standstill conundrum, I proceed under the assumption that nuclear weapons will continue to occupy a unique and limited place in U.S. military doctrine, with the chances of their use remaining “extremely remote.”¹⁵ Whether or not the Biden administration proceeds with

a declaration that the sole purpose of nuclear weapons is to deter other nuclear weapons, they will not be a preferred weapon of war.¹⁶ Their primary purpose will be to deter others from using nuclear weapons.

I also assume that the U.S. military will continue to support investing in nuclear force modernization as long as nuclear weapons continue to occupy this unique and limited place. If investments in nuclear weapons begin to draw resources away from investing in conventional forces and their supporting systems — command and control, intelligence and surveillance, etc. — then U.S. military leaders will see them as competing with vital warfighting capabilities. Their preference will be to emphasize conventional systems that are useful in warfighting over nuclear systems, which are not.

Moreover, U.S. defense budget resources will remain finite, forcing choices on U.S. civilian and military policymakers alike. Weapon systems incorporating new technologies are becoming steadily more expensive. Acquisition costs are rising, and will continue to do so. Policymakers will face tough choices about what mix of weapon systems, nuclear or conventional, they can afford to purchase.

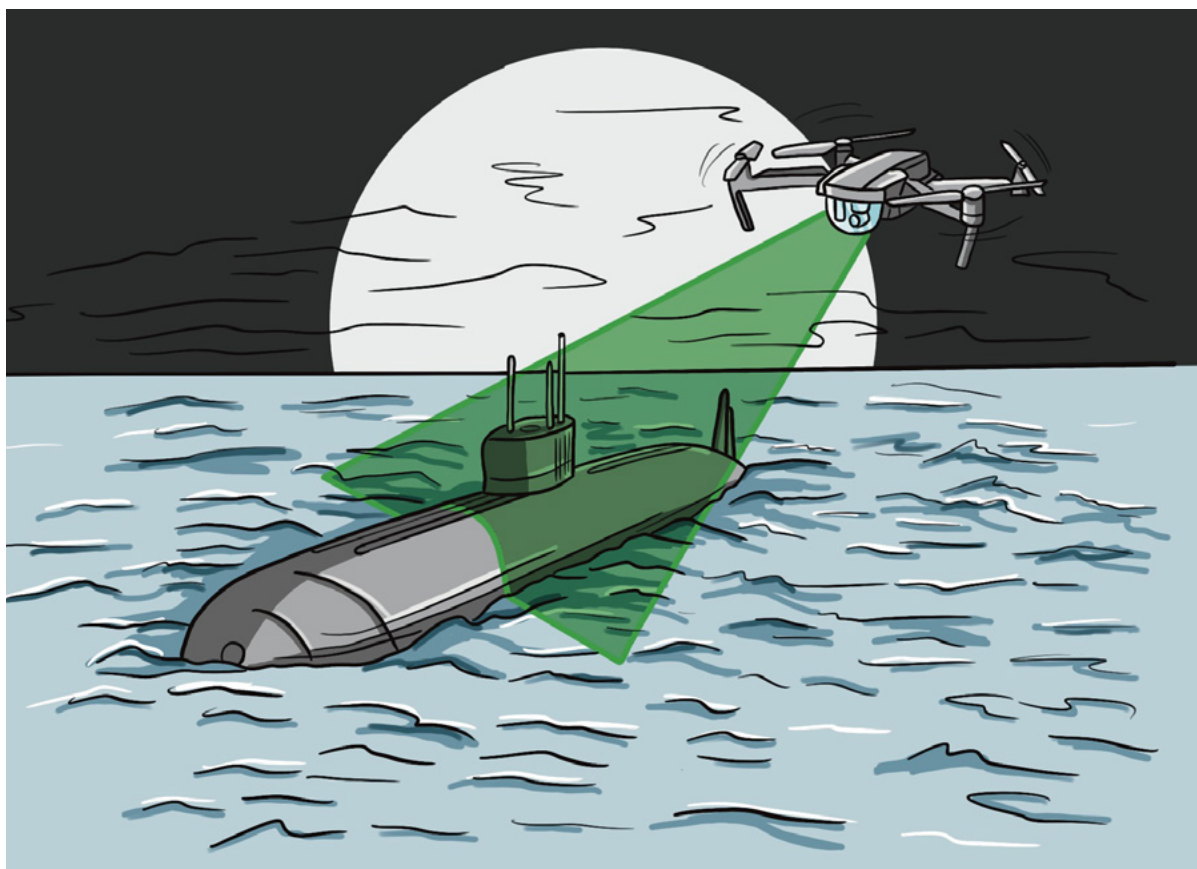
In the context of these assumptions, the United States will no doubt look for military options in order to respond to second-strike vulnerability. They will do everything that they can to ensure that it remains viable, to ensure that U.S. nuclear retaliatory forces will survive an attempt to target and attack them with a disarming strike.

Indeed, a reality that has been with us since nuclear deterrence doctrine was born is the difficulty of pulling off a disarming first strike. Although new sensing technologies might give the nuclear powers an enormous capability to detect nuclear missiles, even on the move, targeting a large mobile force in real time would be extraordinarily difficult, some would say impossible.

To compound such difficulties for the attacker, countermeasures employing cyber and quantum technologies could be used to supercharge concealment and decoy tactics, further complicating planning and preparing for an attack. In addition, getting dispersed attack platforms to fire all at once in an exquisitely timed disarming strike is far-fetched, considering that new technologies will be used — as they already are being used — to com-

15 “Post-Warsaw Analysis: What NATO Said (or Didn’t Say) About Nuclear Weapons,” Nuclear Threat Initiative, July 19, 2016, <https://www.nti.org/analysis/articles/post-warsaw-analysis-what-nato-said-or-didnt-say-about-nuclear-weapons/>.

16 For more on Biden’s consideration of “sole purpose,” see Adam Mount, “Biden Must Be Clear About What Nuclear Weapons Are For,” *Foreign Policy*, May 12, 2021, <https://foreignpolicy.com/2021/05/12/biden-nuclear-weapons-review-sole-purpose/>.



plicate command, control, and communications.¹⁷ These arguments highlight that new technologies will be as useful to the defender as to the attacker by allowing the defender to prevent such targeting of mobile nuclear forces.

Nevertheless, the difficulty of pulling off a disarming first strike against high-readiness nuclear forces has not prevented policymakers from grappling with the threat, nor military leaders from planning against it. In short, America has not been able to know how “real” the vulnerability is, but we have been preparing for it for almost 70 years. This uncertainty will also affect second-strike retaliation, forcing the military to plan against it.

Another military option in response to the standstill conundrum is defensive in nature. New technologies may permit the development of truly effective means and methods to defend nuclear deterrent forces. These might include active defenses, sophisticated concealment and decoy tactics (as noted above), electronic countermeasures, and perhaps countermeasures in other realms, such as interfering directly in the adversary’s com-

mand-and-control systems. New technologies will also, no doubt, contribute to the resilience of the weapon systems themselves, making them better able to cope with damage that may come their way from any source — kinetic, electronic, electromagnetic, or otherwise.

The challenge for this option is that defenses are hard to make impermeable. This is the same argument that undid Ronald Reagan’s Star Wars program in the 1980s. At best, new defensive technologies might reinstate some of the insurance policy aspect of second-strike deterrent forces. If enough defenses are in place to support them, then some will likely survive to retaliate. Maybe.

Despite the problems with these military options, they need to be considered in light of the attitudes of America’s likely peer adversaries, Russia and China. Both countries are diversifying their nuclear forces as they modernize, and China is evidently building up its forces. Experts challenge the assumption that, as new technology spurs military developments, countries will continue to treat nuclear weapons as having a unique place on the

17 Page Stoutland, “The Big Hack’s Nuclear Implications: No Confidence in Essential Systems,” *Atomic Pulse*, The Nuclear Threat Initiative, Oct. 15, 2018, <https://www.nti.org/analysis/atomic-pulse/big-hacks-nuclear-implications-no-confidence-essential-systems/>.



deterrence spectrum: one that is not useful for warfighting but is needed for deterrence.¹⁸ These experts see continuing trends toward integration of nuclear weapons into conventional force structures, particularly highly accurate missiles that are deployed in both nuclear and conventional variants. In effect, nuclear weapons will begin to leak back into the realm of warfighting instruments.

Debates about whether Russia, for example, is on track to practice early nuclear use in order to “shock and awe” its opponents will not go away any time soon. China’s nuclear doctrine and policy toward nuclear use are much less well known than Russia’s. What seems clear is that Chinese nuclear forces are moving away from the second-strike retaliatory posture that has been at the heart of China’s approach for decades.

Bolstering Stability at the Negotiating Table

With regard to both Russia and China, America ought to use every tool at its disposal to find out what is going on with each country’s nuclear deterrent forces. These tools include good old-fashioned analysis of Russian and Chinese exercises and training, deep reading of doctrinal literature (in the original languages, as well as in translation), and requests for confidence and predictability activities (such as observing exercises). It also includes talking to them at all levels, from top decision-makers to military leaders and diplomats.

If Moscow and Beijing will not engage in formal talks, which seems now to be the Chinese position, then the United States should seek other opportunities to talk to them. These include high-level engagement of leaders in settings such as the G-20 or U.N. General Assembly; military-to-military staff talks; P-5 engagement among the United States, United Kingdom, France, Russia, and China; and Track 1.5 and 2 discussions. America should be pursuing every opportunity to engage, if only to signal that it is ready to build confidence from its side and to urge Russia and China also to be willing to do so.

If neither Russia nor China is willing to talk about destabilizing developments, then that will indicate that they are no longer interested in working through problems at the diplomatic table. America

should not, however, insist that early nuclear escalation is their preference and that they no longer believe in limiting nuclear forces and minimizing their importance, except as the ultimate deterrent.

A frank discussion with Russian and Chinese leaders about emerging second-strike vulnerability could be the best option to head off future instability. Ideally, steady engagement now would lead, at a future date, to deep discussion of this highly sensitive issue and a mutual resolution of it. Shared vulnerability of second-strike retaliatory forces may turn into an opportunity to find common interest with the other nuclear weapons states, all of which will be striving to ensure, into the future, that they remain able to respond if a surprise nuclear attack on them occurs.

All nuclear weapons states will be looking for ways to strengthen their second-strike retaliatory capability as it becomes vulnerable to detection. They may be willing to agree to certain measures of negotiated restraint, in order to sustain mutual vulnerability and mutual stability. Such negotiations could explore a number of pathways for doing so.

The first pathway would be to seek an agreement to maintain sanctuary for second-strike retaliatory forces. In this scenario, nuclear states would agree that such forces are not to be targeted. This declaratory policy would provide a normative underpinning for other agreed-upon measures of restraint.

The second pathway would be for the nuclear states to take measures to enhance mutual predictability regarding second-strike retaliatory forces. Predictability measures regarding these forces may range from simple information exchanges to frank discussions about measures to enhance their survivability. They could also include enhanced means of real-time secure communication among the leaders of nuclear weapons states. To strengthen mutual transparency, the states may adapt traditional concepts such as non-interference with national technical means to include ubiquitous sensors. Finally, the states may agree to measures that would bolster the direct defense of second-strike retaliatory forces.

The third pathway would be to put limits or controls on technologies and weapons. Although the history of technology control is not encouraging, its potential should nevertheless be re-examined in light of the challenge to second-strike retaliation.¹⁹

18 Mark Episkopos, “Russia’s Crazy Nuclear War Strategy: Escalation...to Deescalate?” *National Interest*, March 19, 2021, <https://nationalinterest.org/blog/buzz/russia%E2%80%99s-crazy-nuclear-war-strategy-escalation-to-de-escalate-180680>. For a particular focus on the link between new weapon technologies and Russian doctrine, see Mark Schneider, “Escalate to Deescalate,” *U.S. Naval Institute Proceedings*, February 2017, <https://www.usni.org/magazines/proceedings/2017/february/escalate-de-escalate>.

19 For a thoughtful review of the difficulty of controlling strategic weapons technology, see Michael Krepon, Travis Wheeler, and Shane Mason, eds., *The Lure and Pitfalls of MIRVs: From the First to the Second Nuclear Age*, Stimson Center, May 2016, https://www.stimson.org/wp-content/files/file-attachments/Lure_and_Pitfalls_of_MIRVs.pdf.

Some verifiable limits or controls could be explored, for example, to bolster confidence in the sanctuary declaration. Limits and controls on nuclear offensive forces should also be sustained, to provide mutual assurance against nuclear breakout.

There is time to consider these different options and to shape them. What America can achieve at the negotiating table is likely to be different from what it was able to do in the past, because the simple hardware constraints of traditional strategic arms reduction treaties will not be enough to address the dominance of software in new technologies. However, the same technologies that are driving second-strike vulnerability — ubiquitous sensing and big data analysis — are also available to those seeking negotiated restraint. In other words, monitoring and verification capabilities, like military detection, are on the cusp of broad improvement.

Conclusion

Janne Nolan argued for an array of options in America's national discourse about security policy. She insisted that different viewpoints be brought to bear, challenging conventional wisdom and the herd instinct in Washington. She was right. At this crucial moment in U.S. history, when new technologies are leading the country into the dark unknown, her advice is prescient. America cannot afford to be left behind in the race for new technology. It cannot afford to ignore any option, but neither can it afford to stop talking to its adversaries.

The tyranny of consensus, however, seems to be gaining strength in this space. U.S. experts in and out of government argue that negotiated solutions will be inadequate or simply ineffective to address the stability circumstances in which America will find itself.²⁰ They press for more nuclear weapons and military systems, more defenses, more resilience. These options should be examined, but not to the exclusion of diplomacy.

Moreover, we Americans need to take care that our military response options remain viable. The United States should not allow itself to be outpaced in the acquisition of advanced technologies.²¹ If we do, then we will find ourselves in a destabilized situation, in which our force structure — nuclear *and* conventional — is vulnerable while others' are not. If America fails to keep abreast of technological developments, we will not sustain our ability to

defend ourselves, which will be an immense strategic failure and a disaster for the country. Nuclear weapons, in this case, will not save us. 🇺🇸

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20 Matthew Kroenig, "China's Nuclear Silos and the Arms-Control Fantasy," *Wall Street Journal*, July 7, 2021, <https://www.wsj.com/articles/chinas-nuclear-silos-and-the-arms-control-fantasy-11625696243>.

21 A strong proponent of this view is Nicolas Chaillan, who left his Defense Department position to protest the slow pace of U.S. technology acquisition. See Katrina Manson, "Pentagon's Ex-Software Chief Believes China's AI Supremacy Is a 'Done Deal,'" *Financial Times*, Oct. 11, 2021.

