COUNCIL ON STRATEGIC RISKS
THE NOLAN CENTER

BRIEFER

No. 30 | February 9, 2022

# Are U.S. Nuclear Sea-Launched Cruise Missiles Necessary? A Japanese Security Analysis

***By Dr. Michiru Nishida***
***Edited by Christine Parthemore and Francesco Femia***

## INTRODUCTION

In 2021 and the first months of 2022, the Biden administration has been in the process of conducting the fourth U.S. post-Cold War Nuclear Posture Review (NPR). One of the several focal points has been the treatment of nuclear-armed sea-launched cruise missiles (SLCMs) given that reviving these weapons was proposed by the Trump administration in its 2018 NPR.

The 2018 NPR proposed bringing back U.S. nuclear SLCMs in the context of "enhancing deterrence with non-strategic nuclear capabilities," and claimed that "expanding flexible U.S. nuclear options now, to include low-yield options, is important for the preservation of credible deterrence against regional aggression."[1] The 2018 NPR tied this to the nuclear umbrella conveyed to certain allies, and advocated that "in the near-term, the United States will modify a small number of existing SLBM [submarine-launched ballistic missile] warheads to provide a low-yield option, and in the longer term, pursue a modern nuclear-armed sea-launched cruise missile (SLCM)."[2]

In terms of the perceived merits of these changes, the 2018 NPR said that unlike dual capable aircraft (DCA), nuclear-armed SLCM, along with a low-yield SLBM warhead introduced via the same NPR, "will not require or rely on host nation support to provide deterrent effect. They will provide additional diversity in platforms, range, and survivability, and a valuable hedge against future nuclear 'break out' scenarios." It claimed that a nuclear SLCM would "provide a needed non-strategic regional presence, an

[1] U.S. Department of Defense, *Nuclear Posture Review 2018*, p.52-54.
[2] Ibid., p.54.

assured response capability" and that this step, along with a modified SLBM warhead, "are prudent options for enhancing the flexibility and diversity of U.S. nuclear capabilities to help address emerging deterrence requirements in the near term."[3]

In short, the nuclear-armed SLCM is proposed for regional deterrence, in particular for extended nuclear deterrence to allies. In 2018 the basic assumption was that the SLCM would be "an INF-Treaty compliant response to Russia's continuing Treaty violation." As stated in the 2018 NPR: "If Russia returns to compliance with its arms control obligations, reduces its non-strategic nuclear arsenal, and corrects its other destabilizing behaviors, the United States may reconsider the pursuit of a SLCM."[4] The nuclear SLCM is being developed in part vis-à-vis Russia and for assuring NATO allies.

However, though the 2018 NPR envisioned that the nuclear-armed SLCM would address Russia's so-called "escalate to de-escalate" doctrine,[5] it also envisioned a potential limited use of nuclear weapons by China in the Asia-Pacific region.[6] The recent U.S. Department of Defense Annual Report to Congress on China's Military and Security Developments also indicates that China may be seeking the introduction of new precise small-yield nuclear weapons for their controlled use.[7]

Therefore, although the nuclear-armed SLCM proposed in the 2018 NPR seemed primarily focused on Russia and the perspective of NATO allies, the SLCM is increasingly claimed to be relevant for China. Japan's perspective is therefore an important consideration. This paper discusses whether there is a need for nuclear-armed SLCMs from the perspective of Japan's national security, and concludes that they are not a necessary addition to the U.S. nuclear posture.

## CONSIDERATIONS FOR REGIONAL DETERRENCE

A useful way to address the nuclear SLCM issue is to draw from the thinking of Japanese security experts on the Tomahawk Land-Attack Missile-Nuclear (TLAM/N), the predecessor of the proposed nuclear-armed SLCM that was removed from U.S. Navy ships and put into storage at the initiative of President George W. Bush in 1991, and fully retired by President Barack Obama in 2011. For this purpose, statements and documents that reportedly were made by Japanese government officials for the 2008 U.S. Congressional Commission on U.S. Strategic Posture are relevant. One such report indicates that at a February 2009 meeting for the Commission, a senior Japanese government official presented a memo to the Commission, which stated several characteristics that Japan believes the U.S. nuclear deterrent should hold, which are that it remain "(a) flexible, (b) credible, (c) prompt, (d) discriminating and selective, (e) stealthy/ demonstratable, and (f) sufficient to dissuade others from expanding or modernizing their nuclear capabilities."[8] The memo also presented Japan's views on the advantageous characteristics of TLAM(N). The official reportedly expressed concern about the retirement of the TLAM/N.[9] As such, one

---

[3] Ibid., p.55.
[4] Ibid.
[5] Ibid., p.30.
[6] Ibid., p.32. "Our tailored strategy for China is designed to prevent Beijing from mistakenly concluding that it could secure an advantage through the limited use of its theater nuclear capabilities or any use of nuclear weapons."
[7] U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2021*, p.93.
[8] Masakatsu Ota, "Japan, U.S. Enhanced "Nuclear Bond" via Under-the-table Discussions," *Kyodo News* (March 30, 2018). As for the original memo presented to the Commission members by the senior Japanese government official as mentioned in the article, you can see at http://kakujoho.net/npt/npr2018.html#srcs.
[9] The 2008 Strategic Posture Report stated that "In our work as a Commission it has become clear to us that some U.S. allies in Asia would be very concerned by TLAM/N retirement". William J. Perry and James R. Schlesinger,

may think Japan would want the United States to keep developing the nuclear-armed SLCM. However, if we apply the thinking of Japanese government officials presented at the Commission's meeting to the nuclear-armed SLCM in today's context, under the assumption that the modernization of nuclear forces (other than nuclear SLCMs) advocated in the 2018 NPR will be implemented, the nuclear-armed SLCM is not necessarily essential from the perspective of Japan's security.[10]

As for TLAM(N), the memo presented to the Commission, while stating that Japan is "not in a position to know details of this weapon system [TLAM/N]," acknowledges that it provides flexibility in options, one of the six above-mentioned characteristics that Japan believes the U.S. nuclear deterrent should hold.[11] It cites four elements of flexibility (see below) and of these four elements, three, except for low yield, correspond to the characteristics that Japan seeks in the U.S. nuclear deterrent:

1. **Low yield**
2. **Stealthy (sea-based):** refers to "stealthy/demonstrable capabilities"
3. **Survivable (stand off):** refers to "credible capabilities"
4. **Ability to loiter:** likely part of "stealthy/demonstrate capabilities."

This briefer uses these same characteristics to evaluate a return of U.S. nuclear SLCMs against these same criteria but in the current context.

Firstly, regarding the *low yield* feature that Japan regarded as important for TLAM/N, in addition to the B61-12, the development of which is almost complete and whose yields are variable and include low yields, the low-yield SLBM warhead (W76-2) has already been deployed based on the 2018 NPR. Therefore, "low yield" is already a feature of the U.S. nuclear arsenal without adding the nuclear-armed SLCM. It could be argued that since the W76-2 is currently subject to the arms control treaty (New Strategic Arms Reduction Treaty, or New START) as a strategic nuclear weapon, and thus the number of deployments is constrained, there is an advantage in being able to fill out a more detailed escalation ladder if nuclear SLCMs are to be deployed. However, since a large number of B61-12s and long-range stand-off (LRSO) missiles are expected to be deployed, the numbers of low-yield nuclear weapons in the Asia Pacific region will be more than sufficient. In addition, if the W76-2 is not envisioned for use from the beginning of a conflict, but is envisioned to be used if a bomber is at risk of being detected by the enemy radar network and cannot conduct a deep strike mission, this meets varied escalation ladder steps if nations believe they are required. It may be possible to introduce nuclear SLCMs to further refine the escalation ladder, but this would be an excessive capability, not an indispensable one.

As for the next two features, *stealthy* and *survivable*, it is hard to argue against the strategic nuclear submarine (SSBN) being more than capable of playing this role. If the survivability of SSBNs is threatened in the future, then the survivability of submarine-based nuclear SLCMs will also be threatened, not to mention the vulnerability of nuclear SLCMs on a surface ship, in particular in the environment of China's increasing anti-access and anti-denial (A2/AD) capabilities.

---

America's Strategic Posture: The Final Report of the Congressional Commission on the Strategic Posture of the United States (2009), p.26.

[10] Regarding the nuclear SLCM, although it is not yet decided whether the platform will be a submarine or a surface ship, it is generally assumed to be a submarine. It is thus plausible to base our thinking on Japan's view on TLAM(N) at the time.

[11] Masakatsu Ota, "Japan, U.S. Enhanced 'Nuclear Bond' via Under-the-table Discussions," *Kyodo News* (March 30, 2018). As for the original memo presented to the Commission members by the senior Japanese government official as mentioned in this article, it can be found at: http://kakujoho.net/npt/npr2018.html#srcs.

Regarding the final feature, the *ability to loiter*, the aim is likely the ability to demonstrate regional nuclear presence and thus regional deterrence by loitering in regional waters. However, in the case of a nuclear-armed SLCM using a submarine as a platform, even if it can loiter in the region, it cannot demonstrate visibility because it is hidden under the sea, except when it surfaces or during a port call. In fact, in terms of demonstrating presence, demonstrations by bombers have a higher signaling effect. On the other hand, in the case of surface ships, regional loitering capability will be severely limited in light of China's increasing A2/AD capability.

It is true that submarines can loiter over an area for a longer period of time (albeit in hiding) than bombers, and have greater survivability than airborne or ground-based systems. If a bomber is stationed at a forward-deployed base such as Guam, and is in danger of being destroyed in a first strike, it may harm crisis stability depending on the situation—for example if it takes off in a premature manner to avoid a first strike.[12] Even after they take off, China's improved A2/AD capability could threaten their airborne survivability. Therefore, the ability to loiter for a long time in a survivable form is the only comparative advantage that a nuclear SLCM (with a submarine as a platform) has over other nuclear systems.

However, it is questionable how seriously such risks should be taken in practice. Some may argue that the risk of bombers impairing crisis stability is a concern that arises because of the signaling effect, and that the nuclear SLCM (on a submarine platform) that could replace it may not pose such a risk because it is submerged. But the signaling effect expected from bombers cannot be expected from nuclear SLCMs if they are used on submarine platforms. If bombers with signaling effects can be problematic in terms of crisis stability, then the prescription is not nuclear SLCMs on submarine platforms, which has little signaling effect, but rather careful operation of the bombers. For the argument that nuclear SLCMs are essential, it would be necessary to show the missions that can only be accomplished with nuclear SLCMs, which is not the case.

A detailed technical evaluation would be needed to determine the extent to which the issue of the survivability of airborne systems in a severe A2/AD environment should actually be a concern to the combination of stealthy bombers and standoff-capable LRSOs. However, since the potential range of China's A2/AD capability is not expected to go beyond the range of those combined in the foreseeable future, it should not be a problem as long as a bomber is outside China’s A2/AD boundary. As long as the target is within the range of the bomber plus LRSO, there is no need to dare to fly into the A2/AD area. For the expected signaling effect of the bombers, it does not matter how close they are to the target, but the fact that they are flying and showing their presence is important. While sufficiently survivable bombers have signaling effects, the ability of a submarine-based nuclear SLCM to loiter would also be a “might-be-better-to-have” capability and not necessarily an essential one. Additionally, beyond signaling, the envisioned role of the LRSO in this scenario can be performed by submarine-based ballistic missiles that would also add the benefit of lacking visibility.

## ENSURING DESIRED DETERRENCE CAPABILITIES

When the TLAM/N was going to be scrapped, according to the aforementioned memo presented to the Congressional Strategic Posture Commission, Japan asked for a “consult[ation] well in advance on how the loss of this capability will be offset.”[13] The alternative was said to be the LRSO. Today, the

[12] Masashi Murano, “Trump Seiken no Aratana Kakusenryaku to Nihon eno Eikyo (Kohen)” [Trump Administration’s New Nuclear Strategy and Its Implications to Japan (the second part)], *Wedge Infinity* (March 2, 2018).

[13] On the other hand, the then Japanese Foreign Minister Okada in his letter addressed to U.S. Secretary of State Clinton denied reports that the Japanese government opposed the retirement of TLAM/N had concerns, saying that if

development of the LRSO is well under way, and a major difference from that time is the deployment of the W76-2, a low-yield nuclear weapon with the capability of prompt delivery. As noted in the memo, at the time Japan was concerned that if the U.S. nuclear arsenal was full of high-yield warheads that would always cause massive civilian casualties, the credibility of U.S. nuclear deterrence in the eyes of potential adversaries may be reduced. In other words, it was argued that since high-yield nuclear weapons, especially in the case of a surface explosion, would cause fallout damage in which a large amount of soil and dust containing radioactive materials would be scattered, an adversary may think that the United States would hesitate to retaliate with such high-yield nuclear weapons. In this context, the adversary may not be deterred from using low-yield nuclear weapons in a way in which collateral damage is as low as possible. However, this point has already been addressed with the deployment of the W76-2, which has enabled the escalation ladder to be finely tuned.

In addition, the W76-2 offers the advantage of promptness and immediacy, as well as the ability to destroy hardened targets. For example, if North Korea contemplates a nuclear first strike for whatever reasons (whether miscalculation or misperception) and is detected to begin dispersing mobile nuclear missiles, and if the U.S. military determines and advises the U.S. President that only nuclear weapons can prevent North Korea from launching a preemptive nuclear attack, the W76-2 could provide a concrete option to accomplish such a mission that requires promptness and immediacy with the capability to strike time-sensitive targets such as mobile missiles in near real-time with potentially lower collateral damage than other nuclear weapon options. To highlight the speed of such a scenario, if Trident were to be launched from the waters around Guam, one source suggests that it could strike a North Korean missile base in less than 18 minutes.[14]

Furthermore, if an enemy launch of a nuclear missile hidden in a reinforced underground bunker is detected, the W76-2 on a ballistic missile, which has tremendous speed as a traditional hypersonic weapon, may be able to destroy deep and hardened targets quickly, unlike the nuclear SLCM, which has lower speed and lower payload. This provides the capability of striking deep and hardened underground facilities, a specific example of the "flexibility" that the Japanese official cited in the above-mentioned memo. This argument is not intended to justify the use of a first, disarming nuclear strike, but even if one applies the logic of Japan's security, the W76-2 theoretically enables performing the missions expected of a nuclear SLCM and beyond.

## CONCLUSION

Even if the logic of Japan's own security is applied, the nuclear-armed SLCM is likely a duplicative capability in most situations. Since it can be substituted by other capabilities (assuming that modernization other than the nuclear SLCM is implemented), it is not an essential capability. As to the only condition under which a nuclear SLCM on a submarine platform can be claimed to have a comparative advantage, such a claim itself is not necessarily solid, and even if it were plausible, it would be an advantage with low marginal benefit. Finally, these considerations should be reflected alongside Japan's longstanding, strong support for nuclear arms control and progress toward disarmament.

*Dr. Michiru Nishida is a Professor at Nagasaki University, and was previously Special Advisor for Arms Control, Disarmament and Non-Proliferation Issues of the Ministry of Foreign Affairs of Japan.*

---

any opposition was expressed, it would clearly differ from his view. Hans Kristensen, "The Japanese Government Rejects TLAM/N Claim," *Strategic Security Blog* (January 24, 2010). The letter can be viewed here: http://kakujoho.net/npt/okd_ltr.html.

[14] Masashi Murano, "What the New US Nuclear Posture Means for Northeast Asia," *The Diplomat*, August 29, 2018.