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Anneke R. Taylor
University of Puget Sound, artaylor@pugetsound.edu

NUCLEAR DETERRENCE AND LOW-YIELD NUCLEAR WEAPONS IN RUSSIA AND THE UNITED STATES

ANNEKE TAYLOR

In early 2020, the Pentagon confirmed the deployment of a new low-yield nuclear weapon, the W76-2, to an unspecified number of Trident submarines in the US.[1] The military already owns air-dropped bombs of a similar size, but government officials argue that a submarine-launched weapon is strategically important and is a necessary addition.[2] This is a major change in direction for U.S. nuclear policy, as no significant new nuclear weapons have been added to the arsenal in decades.[3] These attempts to "modernize" the nuclear arsenal by producing new weapons in the midst of increasingly problematic relations with Russia have caused concern about a new arms race or even the possibility of war. While military officials such as John Rood, former Under Secretary of Defense for Policy, argue that the new low-yield weapon "strengthens deterrence and provides the United States with a prompt, more survivable low-yield strategic weapon," other military strategists, academics, and US representatives argue that low yield weapons increase the likelihood of war by lowering the threshold between conventional and nuclear warfare.[4] I argue that while low-yield weapons might, in certain circumstances, contribute to nuclear deterrence, they introduce far too many destabilizing factors for any additional level of deterrence to be worth the risk.

This article will explore the deterrence value of low-yield nuclear weapons (LYNWs) and their role in increasing the likelihood of a war that involves the use of both low-yield and standard yield nuclear weapons. The recent tensions between the US and Russia over the inclusion of LYNWs in Russian military strategy will serve as a case study. While it is uncertain whether or not the Russian military truly has an "escalate to de-escalate" war plan involving LYNWs, as intelligence and government reports are contradictory, the fact remains that US officials have based military actions

[1] Aaron Mehta, "Trump's New Nuclear Weapon Has Been Deployed," *Defense News* (February 6, 2020), https://www.defensenews.com/smr/nuclear-arsenal/2020/02/04/trumps-new-nuclear-weapon-has-been-deployed/.

[2] Fred Kaplan, "The Senseless Danger of the Military's New 'Low-Yield' Nuclear Warhead," *Slate Magazine* (Slate, February 18, 2020), https://slate.com/news-and-politics/2020/02/low-yield-warhead-nuclear-weapons-navy-trident-submarines.html.

[3] Kaplan

[4] Michael Krepon, "The Folly of Tactical Nuclear Weapons," *Defense One*, October 2, 2017, https://www.defenseone.com/technology/2017/10/folly-tactical-nuclear-weapons/141440/.

(John Rood served as US undersecretary of defense for policy from Jan 2018 to Feb 2020.)

and strategy on the existence of this plan and on the assumption that Russia has LYNWs in its nuclear arsenal. This is perhaps an indication that the new deployments are a result of an aggressive military culture rather than of strategic thinking. The deployment of LYNWs also carries several risks, which negate any deterrence value which comes from additional nuclear weapons. Firstly, the apparent smaller impact and more practical scale of LYNWs both lower the threshold between nuclear and conventional warfare. Secondly, there is a possibility that warring states might not know which type of weapon is being deployed, due to the frequent dual-use of launch systems for both high and low yield weapons. Thirdly, according to war game simulations, a real war involving the use of LYNWs, even if a yield limit was somehow maintained, would likely still cause huge civilian casualties and destruction on a massive scale. Lastly, it is possible that the use of the standard, non-nuclear deterrence is sufficient. In this case, the deployment of any new nuclear weapons would be a pointlessly risky move. All of these factors make extremely destructive nuclear war more, not less, likely when states add low-yield warheads to their arsenals.

The W76-2 warhead is estimated to have a yield of around six kilotons, about a third of the explosive power of the bomb dropped on Hiroshima.[5] Trident submarines are already equipped with similar warheads, the yields of which are between 90 and 450 kilotons.[6] While there is no official size threshold that defines a weapon as low-yield, they are generally considered to be weapons smaller than the nuclear bombs dropped in WWII.[7] However, a six-kiloton weapon is still five hundred times more powerful than the "most powerful conventional explosive in the US arsenal."[8] LYNWs are often referred to as "tactical" or "non-strategic" weapons, which are designed for use on the battlefield during a military conflict, but they could also be used strategically.[9] With recent developments in targeting technology, the line between strategic and tactical has become increasingly blurred.[10] Large nuclear weapons are usually considered to be strategic, as they can be used to bomb large civilian populations, however low-yield weapons could also be used on civilians as well. In general, the terms "tactical," "non-strategic," and "low-yield" are used interchangeably, meaning there is no longer any real distinction between them in terms of deterrence. All are assumed to have a yield lower than approximately 20 kilotons. For clarity, this article will use only the term "low-yield," but the sources cited may use either of the three terms.

Arguments for and against the deployment of LYNWs center around deterrence theory and mutually assured destruction. Deterrence, in its simplest form, is the attempt to add as many costs as possible to an enemy state's cost/benefit analysis of whether the monetary, structural, and human life costs of war are worth the gain in territory, resources, idealistic motives, or any other factor a nation might hold as beneficial. Nuclear deterrence rests on the concept of mutually assured destruction (MAD), which assumes that a war between any nuclear-armed states will result in a quick and devastating destruction of both countries (as well as their neighbors and allies), due to the massive impact of nuclear weapons (including radioactive fallout and other radiation effects) and the relative ease of using them.[11] Theoretically, nuclear-armed states are therefore faced with two possible outcomes: peace, if weapons are not used, or complete destruction of all parties involved if weapons are used. However, LYNWs complicate the special status of nuclear weapons as potentially extinction event-inducing devices and may undermine nuclear deterrence by appearing to reduce the threat of total mutual destruction.

Government proponents of adding LYNWs to the U.S. nuclear arsenal argue that the weapons fill an essential gap in an attempt to match that of Russia's and without them the US remains vulnerable.[12] This argument is based on Russia's reported but not confirmed "escalate to de-escalate" plan, which holds that, should a European war erupt and endanger Russian territory, Russia would launch low-yield weapons at tactical targets in Europe, forcing their opponents to surrender.[13] The alternative to European surrender to Russian forces is theorized to be a counter deployment and detonation of a U.S. low-yield weapon.[14] Low-yield weapon advocates argue that having this option available would extend deterrence from large scale conflict to smaller scale conflict, as well as preclude Russia from attempting this "escalate to de-escalate" tactic.[15] Some defense experts, like Elbridge Colby, argue that a smaller scale nuclear war would be preferable to a large scale war, and that we should pursue proliferation to increase deterrence.[16] These arguments downplay the importance of two key dangers: the potential escalation from small-scale, low-yield nuclear warfare to larger-scale, standard or high-yield

5 Robert Burns, "US Adds 'Low Yield' Nuclear Weapon to Its Submarine Arsenal at Bangor," *KOMO* (KOMO, February 4, 2020), https://komonews.com/news/local/us-adds-low-yield-nuclear-weapon-to-its-submarine-arsenal-at-bangor.

6 Kaplan

7 Hans M. Kristensen and Matt Korda, "Tactical Nuclear Weapons, 2019," *Bulletin of the Atomic Scientists* 75 (Routledge, 2019): 254.

8 Andrew Facini, "The Low-Yield Nuclear Warhead: A Dangerous Weapon Based on Bad Strategic Thinking," *Bulletin of the Atomic Scientists*, January 27, 2020, https://thebulletin.org/2020/01/the-low-yield-nuclear-warhead-a-dangerous-weapon-based-on-bad-strategic-thinking/.

9 Kristensen and Korda, 254.

10 Ibid, 255, and Brendan Thomas-Noone, *Tactical Nuclear Weapons in the Modern Nuclear Era.* (Lowy Institute for International Policy, 2016): 2.

11 Alexey Arbatov, "Nuclear Deterrence: A Guarantee or Threat to Strategic Stability?" Carnegie Moscow Center, accessed May 10, 2020.

12 Burns

13 Brendan Thomas-Noone, *Tactical Nuclear Weapons in the Modern Nuclear Era* (Lowy Institute for International Policy, 2016): 8.

14 Thomas-Noone, 9.

15 Elbridge Colby, "If You Want Peace, Prepare for Nuclear War." *Foreign Affairs*, Nov, 2018, 5.

16 Colby, 5

nuclear warfare and the enormous death toll that would likely result from even a limited nuclear warfare.

Key arguments against the deployment of LYNWs focus on the possibility of escalation to the use of high-yield nuclear weapons once the nuclear threshold has been lowered. Many argue that having a less destructive nuclear option makes the choice to shift to nuclear weapons easier, because the low-yield weapons can be used tactically or in smaller strategic areas. Additionally, LYNWs may not appear as likely to lead to an outcome of mutual destruction. These weapons are more "survivable," meaning that the effects and externalities of LYNW deployment and detonation are perceived to be less severe than those assumed of a traditional, twenty kiloton to megaton size, nuclear bomb.[17] The use of LYNWs could potentially lead to higher-yield nuclear war, as the nuclear threshold would have already been lowered with the use of lower-yield weapons.

General Andre Beaufre, a "renowned military thinker and strategist," writes that when low-yield weapons are introduced and the nuclear threshold is lowered, "the risk of an accidental or inadvertent nuclear war increases."[18] Although Beaufre argues for the deterrence value of LYNWs, Beaufre still acknowledges the danger of LYNW use potentially lowering the nuclear threshold. Once a nation detects that a nuclear weapon has been launched at them, they probably do not have time to assess the yield of the weapon and resulting damage, and as a result, will retaliate using whatever nuclear weapons they have in their arsenal. This makes communication between warring states impossible in the short run because the country being attacked does not know what is happening. If a submarine were to launch a warhead, the enemy would be unable to differentiate between a small weapon, supposedly meant to prevent escalation, and a large weapon. The enemy would then be forced to choose between retaliating at full strength or possibly under-reacting to a serious threat, giving up their crucial window for a second strike.[19] This has been an issue with other low-yield nuclear weapons, including Pakistan's launching systems that work for both conventional and nuclear weapons, and the existing US warheads with adjustable yields.[20] This difficulty of differentiation is a significant issue when considering the deterrent effects of low-yield weapons, as, in certain cases, it negates any additional deterrence a low-yield weapon would produce since there is no way to tell which weapon is being used. This potential for escalation from a relatively contained nuclear conflict to a full nuclear war makes low-yield weapons, at least as they are currently deployed, dangerously unpredictable. Additionally, any "special" deterrence value ascribed to LYNWs is nulled by the fact that, in reality, warring states do not set kiloton yield limits before engaging in battle and in most cases would not have time to assess damage before retaliating. As Michael Krepon argues: "if two states have screwed up so badly that they have used nuclear weapons on a battlefield, how are they supposed to agree on the number of detonations and yields?"[21]

While proponents of low-yield nuclear weapons argue that these weapons strengthen deterrence, proponents also maintain that a war involving their use could remain small in scale and not necessarily progress to an all-out nuclear war.[22] This assumption is key to such an argument, but can easily be dissolved, as was discussed previously. While I would argue that nuclear war of any scope should be avoided, some see a limited nuclear war as a reasonable possibility. Experts like Elbridge Colby argue that a nuclear war conducted using only low-yield weapons would be an acceptable risk to take for the supposed increase in deterrence.[23] If the argument that LYNWs increase deterrence is sound, why is Colby's argument necessary? The limited actual usefulness of low yield warheads off of the battlefield and the probability of extensive civilian casualties are too significant to ignore in discussions of the supposed deterrent properties of low-yield weapons.[24]

Firstly, low-yield weapons may not be practical for battlefield use, as their sheer size and possible unpredictability could possibly endanger weapon-deploying combatants and could interfere with attempts to advance into irradiated territory.[25] This could drive the deployment and detonation away from the main arena of combat to an alternative site, possibly one near civilians, where "ease" of use is more assured. Aside from causing civilian casualties by way of civilian-targeted retaliation, expanding beyond military targets could encourage the use of more, possibly higher-yield weapons and escalate the conflict to a traditional nuclear war.

Secondly, "low-yield" weapons are still incredibly deadly. According to expert Daniel Hooey, "initial wargames and exercises in the 1950s [with low-yield nuclear weapons] revealed that 'in only 9 days of simulated nuclear combat, West Germany was judged to have suffered three times the civilian casualties of [World War II].'... LYNWs introduce additional factors that must be carefully considered, such as increased potential for miscalculation, nuclear accidents, and unauthorized use."[26] The outcomes of this simulation demonstrate how destructive even an exclusively low-yield war could be. When the difficulty of limiting weapons in a nuclear war to a smaller yield is

[17] Burns

[18] Hussain, Jamal. 2014. "Impact of the Induction of Tactical Nuclear Weapons by Pakistan on overall Deterrence." *Defence Journal* 17 (7) (02): 22-25.

[19] Facini

[20] Hooey, Daniel. "Pakistan's Low Yield in the Field: Diligent Deterrence or De-Escalation Debacle." *Joint Force Quarterly: JFQ* no. 95 (Fourth, 2019): 40.

[21] Krepon

[22] Hussain, 24.

[23] Colby, 4.

[24] Krepon

[25] Thomas-Noone

[26] Hooey, 40.

considered, the scale of this supposedly preferable war begins to look very similar to the scale that would assure mutual destruction.

The recent U.S. deployment of new LYNWs as a response to the Russian "escalate to de-escalate" plan discussed previously brings up another issue behind arguments advocating for LYNWs: these weapons and their deployment may not be truly motivated by strategy at all. Supporters of the anti-low-yield position, including Michael Krepon, argue that the Russian "escalate to de-escalate" plan that is considered the most compelling justification for LYNW deployment is essentially non-existent. They argue that the deployment of LYNWs is due to the U.S. military's desire to build up the nuclear arsenal based on groundless rumor.[27] In her 2016 analysis of Russian nuclear doctrine, Olga Oliker argues that there is no evidence that the "escalate to de-escalate" tactic is part of any legitimate Russian war plan.[28] As the tactic involves shifting from conventional to nuclear weaponry, this tactic would require Russia to lower their nuclear threshold, and increase their willingness to shift from conventional to nuclear weapons, which would be a bold and dangerous choice.[29] She argues that if the US were to incorporate low-yield weapons into their arsenal and lower their nuclear threshold to match Russian actions, particularly if accompanied by the development of more "usable" nuclear weapons,[30] both states would significantly increase the risk of nuclear war.[31] Oliker adds that, even if Russia is considering the deployment of LYNWs as a part of their "escalate to de-escalate" plan, Russia might see increased American investment in LYNWs as an indication of the weakness of the U.S. conventional war machine, further encouraging aggressive action from Russia.[32]

In addition, while the US government would perhaps argue that deploying their own low-yield warheads would be intended purely for defense and deterrence, increased investment in and improvement of U.S. offensive capabilities could be interpreted by Russia as a response to their own earlier development and deployment of low-yield nuclear weaponry. This is a classic example of the security dilemma[33] and means that the deployment of new US low-yield weapons would probably only increase tensions between the US and Russia. The fact that the U.S. government's primary justification for the recent and continued development of low-yield weapons is a hypothetical, unconfirmed Russian war plan demonstrates that arguments for adding more LYNWs to the arsenal may be more motivated by a nuclear-focused and aggressive military culture than by actual benefits to nuclear deterrence.

Lastly, this discussion of nuclear deterrence in the context of LYNWs begets a larger question about the actual efficacy of nuclear deterrence as a means of dissuading conflict: is deterrence as a whole — that is, the total cost/benefit analysis of all aspects of warfare — as opposed to nuclear deterrence the operative mechanism in obstructing potential world war? Perhaps the U.S. and Russia never felt that a full-on war, be it nuclear or conventional, would be worth the costs, given what little gain would come from war based on idealistic differences with no extant threat to either homeland.[34] Perhaps ordinary deterrence, not mutually assured destruction, was what prevented the Cold War from ever becoming hot; without the long range, immensely destructive capabilities of nuclear weapons, war perhaps never would have happened.[35] If this is the case, then there is no need for any further nuclear proliferation, which has the potential to escalate quickly, and even accidentally, from the use of low-yield weapons, because then deterrence would not be based on nuclear capabilities at all.[36] Even if MAD has indeed been the only means of preventing war, filling the small theoretical gap in deterrence with low-yield weapons is not worth the risk of a lowered threshold to nuclear escalation. Since we can never know exactly the reason why large scale nuclear war has never become a reality, it is never advisable to introduce new nuclear weapons into an already massively destructive stockpile.

Rather than contributing to deterrence, LYNWs weaken deterrence by making nuclear weapons appear as a more realistic option for use on the battlefield. LYNWs do not carry the stigma of traditional nuclear weapons, and therefore may be considered for practical use in military plans, weakening the all-or-nothing deterrence of MAD and encouraging nuclear war. Additionally, since MAD or nuclear deterrence may not be the main factor in preventing war in all cases, stockpiling additional LYNWs would only increase international tensions. Warring states would not be able to assess damage or yield before retaliating without missing a crucial second-strike window and would be compelled to escalate conflict. In addition, most LYNWs are housed in multi-purpose launch systems, meaning that a targeted nation would have no way of knowing what kind of weapon had been launched. In the case of recent events, many arguments for the deployment of LYNWs center around the Russian "escalate to de-escalate" tactic and hold that additional U.S. LYNWs are necessary to maintain a deterrent balance between the US's and Russia's

[27] Michael Krepon,"Escalating to De-Escalate." *Arms Control Wonk*. Accessed May 15, 2020. https://www.armscontrolwonk.com/archive/1204755/escalating-to-de-escalate/.

[28] Olga Oliker, "Russia's Nuclear Doctrine." *Center for Strategic and International Studies*, April 23, 2019: 11.

[29] Oliker, 11.

[30] Ibid., 10

[31] Ibid., 11.

[32] Ibid., 12.

[33] The security dilemma holds that actions taken by a state intended to increase its own security, such as military build-up or weapons deployment, will likely be taken by other states as a threat to their own security. The other state(s) will then build up their own military, and the first will build up more, and so on, leading to a tense situation in which both states are less secure and at a higher risk of war than when they started.

[34] Cheryl Rofer, "Low-Yield Nukes Are a Danger, Not a Deterrent," *Foreign Policy*, February 11, 2020.

[35] Rofer

[36] Ibid.

nuclear capabilities. However, the legitimacy of the pro-LYNWs argument is undercut by the possible fictitiousness of the Russian war plan itself. The fact that real US deployments have been justified by questionable intelligence from Russia indicates that perhaps these deployments are not strategic, but rather a product of a nuclear-focused defense apparatus and an administration inclined towards intimidation through stockpiling. The lowering of the threshold for nuclear war that the adoption of low-yield nuclear weapons would likely assure demonstrates that LYNWs do not contribute to the protection of peace through nuclear deterrence and that further deployment would be dangerous and unnecessary.