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The W93/Mk7 Program: Ensuring the Future of U.S. Nuclear Deterrence

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KEY TAKEAWAYS

America's nuclear arsenal up to date is to support its decay into unilateral U.S. disarmament—an extremely dangerous result.

Adding the W93/Mk7 warhead to the arsenal will minimize risk to the sea leg of the U.S. deterrent, and restore critical workforce skills and increase flexibility.

Congress should support the President's funding request for the W93/Mk7 program for FY 2021, and the Administration should secure long-term support for the program.

Part of the current effort to maintain a viable U.S. nuclear deterrent is the development of a warhead dubbed the W93, the request for which was first introduced in the President's 2021 budget request. The W93, along with its Mark 7 (Mk7) re-entry vehicle that holds the warhead, will replace W76 and W88 warheads found atop the Navy's Trident II D5 submarine-launched ballistic missiles (SLBMs) with a safer design.

The announcement of the development of this warhead has ignited controversy, with some questioning the need for a "new" warhead. But as the nuclear arsenal continues to age, existing warheads will eventually all need to be replaced. Adding the W93/Mk7 to the U.S. arsenal will minimize technical risk to the sea leg of the U.S. deterrent while restoring critical workforce skills and contributing to the U.K.'s parallel warhead replacement program. To ensure that the W93/Mk7

program can move forward in a timely manner, Congress should fully fund the President's budget request for the program in fiscal year (FY) 2021.

What Is the W93/Mk7?

While the W93/Mk7 program is new this year, the plan to develop a replacement warhead for the Navy's SLBMs is not. Warheads do not last forever. The W76 and W88 warheads currently on SLBMs first entered the stockpile in 1978 and 1989, respectively, and were intended to last for only 20 years; longevity was not a priority in their designs.[1] The W76 underwent a life-extension program (LEP) in 2008 to produce the W76-1, which will allow the warhead to last another 30 years.[2] The ongoing W88 Alteration 370 makes changes to the W88 to prolong its life. Nonetheless, the W76 and W88 will eventually need to be replaced because their nuclear components are subject to aging.[3]

To address the inevitable warhead aging, the Obama Administration in 2013 laid out a 3+2 strategy to replace aging warheads. Under this strategy, the National Nuclear Security Administration (NNSA) would develop three interoperable warheads to top SLBMs as well as intercontinental ballistic missiles.[4] Eventually, the Pentagon's Nuclear Weapons Council determined that interoperable warheads were not the best path forward, and that each delivery platform would need its own replacement warheads. For the SLBMs, this meant the development of the Next Navy Warhead.[5]

The NNSA's FY 2020 Stockpile Stewardship and Management Plan introduced the Next Navy Warhead as a notional program being studied at the agency.[6] Since then, the Nuclear Weapons Council approved the W93/Mk7 as the best option to serve as the Next Navy Warhead. While most details of the W93's design are yet to be determined this early in the warhead's lifecycle, the W93 will reportedly be based on previously tested nuclear designs, and will be safer (less likely to detonate accidentally or release toxic materials) than existing warheads.[7] If approved by Congress, the W93/Mk7 would begin receiving funding in FY 2021, to include $53 million for the NNSA to perform initial design-feasibility work and $32 million for the Department of Defense (DOD) to begin work on the warhead's Mark 7 re-entry vehicle.[8] The NNSA plans to produce the first production unit of the W93 by the mid-2030s, just as the W76-1 and W88 begin to near the end of their life spans.[9]

Critics have raised objections to W93/Mk7 development because of a misplaced belief that the W93/Mk7 would be a "new" warhead, and that any addition to the U.S. stockpile would be inherently destabilizing. But, any

debate over adding a new warhead to the stockpile is one of pure semantics, because what defines a new warhead is up to interpretation. Warheads evolve as they go through LEPs, modifications, and alterations, including the replacement of old components with new or different ones. Considering that the W93/Mk7 will be based on previously tested designs and not require any explosive nuclear testing, versus being designed from scratch, and that it replaces a system, versus adding to the stockpile, it seems pointless to debate the "newness" of the W93/Mk7, and that that discussion would be better spent focusing on the program's merits.

Moreover, it is inevitable that all warheads in the stockpile will eventually age out and need to be replaced with completely new warheads. Otherwise, the stockpile will decay, and warheads will need to be retired without replacement. Taken to its logical end, to advocate against any sort of new weapon is to advocate for the U.S. arsenal to decay into unilateral disarmament—an extremely dangerous result so long as Russia and China continue to maintain and advance their own nuclear arsenals.[10]

Why the U.S. Must Proceed with W93/Mk7 Development

Part of the effort to maintain "modern, flexible, and resilient nuclear capabilities that are safe and secure" as mandated by the 2018 *Nuclear Posture Review* must include convincing adversaries that U.S. nuclear warheads will function as intended when employed.[11] By the time the NNSA produces the first W93 warhead in the mid-2030s, the nuclear components of the W88 and W76-1 will be 45 years old and 56 years old, respectively. While there are disagreements over exactly how long plutonium pits can last without replacement, in 2006 the National Laboratories estimated the life span of warhead plutonium to be between 45 years and 60 years.[12] This would leave very little leeway for the W93 to arrive in time to replace the W76 and W88, which are already far past their intended lifetimes. Adding the W93 to the SLBM warhead stockpile will hedge against technical risk to failure of warheads that have existed for half a century. It will also hedge against a reported excessive reliance on the W76-1 in the Navy's warhead mix, improving flexibility and the Navy's ability to hold all targets at risk.[13]

Few details on the W93 warhead design have been made public, but DOD officials have stated that the W93 warheads will replace deployed legacy warheads on a one-to-one basis, so the W93 program will not increase the size of the inventory of deployed warheads.[14] This one-to-one replacement plan forestalls criticisms that the W93/Mk7 will hinder disarmament or arms control goals. And until a viable path to disarmament exists, the

United States must not unilaterally let its arsenal decay, especially as China, North Korea, and Russia continue to build brand new warheads.[15] Claims that deploying the W93 will incentivize other countries to build their own new warheads have no merit, as these countries have done so even though the U.S. has not developed a new warhead for 30 years; rather, in this case, the United States needs to catch up. Finally, the confirmation that the W93 will be based on previously tested designs further precludes any criticism that the program will require nuclear testing.

The W93/Mk7 program will give the NNSA the opportunity to build a safer, more secure, and more modern warhead. All existing warheads were designed during the Cold War to optimize a warhead's power, or yield, while minimizing its size.[16] Such optimization left a warhead with little margin for failure, and sometimes came at the expense of enhanced safety features. For instance, the W88 was designed to deliver a high-explosive yield but be small enough so that multiple warheads could be fitted on a submarine's missile.[17] One result of this design was the decision to use conventional high explosives in the warhead, which take up less space, as opposed to modern insensitive high explosives, which are much safer to manufacture, store, and transport.[18] The NNSA has yet to decide on specific components, such as the high explosives used in the W93, but certainly has the opportunity to use the W93/Mk7 program to build a safer, more secure, and more reliable warhead than those built during the Cold War.

The W93/Mk7 program will also enable the NNSA workforce to regain some of the warhead design and development skills that have eroded since the United States stopped producing warheads from scratch after the Cold War. Most NNSA experts with hands-on experience in designing weapons have retired; few of today's remaining experts have the experience of taking a warhead from initial concept to a "clean sheet" design, engineering development, production, and fielding.[19] These skills remain important because ensuring the safety, security, and reliability of the U.S. stockpile requires a reliance on the judgment of experienced scientists and engineers. The W93 program will allow the NNSA's current generation of scientists and engineers to develop these lost warhead production skills and pass them on to future generations.

Finally, the W93 program enables robust collaboration with the United Kingdom, which is also developing a replacement warhead for its SLBMs, and will run a simultaneous and cooperative program to the W93/Mk7. As the U.S. and U.K. proceed in their development of their replacement warheads, they have a unique opportunity to share technologies and obtain significant cost savings. The U.K. no longer manufactures certain

non-nuclear components, so it needs to align its warhead replacement program with the W93/Mk7 in order to purchase certain components from the United States. For the U.K. to replace its own aging SLBM warhead in the 2030s and maintain its continuous at-sea deterrent (CASD), it is critical that the W93/Mk7 program proceed on time.

As the only other state to commit its nuclear forces to NATO, the U.K.'s independent strategic nuclear force contributes significantly to the overall security of the Alliance and directly benefits the United States. The U.K.'s CASD reduces the burden on the United States' sea-based deterrent and provides a second, independent, center of decision-making that plays directly into adversary calculus, contributing to extended deterrence by U.S. allies and partners by reducing the likelihood of adversary miscalculation.

Recommendations for the U.S.

To ensure that the U.S. nuclear deterrent remains viable, Congress should:

- **Fulfill the President's full funding request for the W93/Mk7 program for FY 2021,** to include both the $53 million to the NNSA and $32 million to the DOD.

- **Provide additional funding to the Stockpile Responsiveness Program for the workforce to practice weapon-design capabilities.** Beginning to restore these eroded skills now will help to maintain a workforce capable of addressing potential future weapon-design issues throughout the W93/Mk7's life cycle.

The Administration should:

- **Educate Congress and the public on the importance of developing the W93/Mk7,** the effort for which will span multiple Congresses and Administrations. A consensus ought to be developed in the United States that can help ensure long-term support for the program.

The NNSA should:

- **Implement lessons learned from other warhead acquisition programs**, such as the W88 Alt 370 and the B61-12, to ensure that the W93/Mk7 does not face similar cost overruns and delays.[20]

Admiral Charles Richard, Commander of U.S. Strategic Command, put it best when he stated: "Given the potential severity of impacts on overall deterrence from late delivery of the W93/MK7, it is imperative the [nuclear] complex work to identify opportunities to accelerate the development timeline and invest in technologies to reduce schedule risk."[21] To avoid risking the U.S. strategic deterrence in an uncertain threat environment, Congress and the executive branch must press on with W93/Mk7 development beginning in FY 2021.

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