

W93/Mk7 Navy Warhead – Developing Modern Capabilities to Address Current and Future Threats

Today the United States faces a security environment characterized by renewed competition between existing nuclear powers and a growing threat from regional nuclear-capable states. Over recent decades, the United States reduced its Cold War nuclear stockpile and only modestly invested in basic nuclear sustainment and life-extensions of its remaining nuclear force and infrastructure. At the same time, our competitors modernized and increased the numbers, types and capabilities of nuclear weapons and delivery systems in their stockpiles. They also expanded the conditions under which they may employ nuclear weapons.

As the United States continues the long-deferred recapitalization of its nuclear forces and supporting infrastructure, it must urgently respond to the dangerous trends presented by our potential adversaries. Part of this response is adapting the current modernization program, in particular our nuclear warhead strategy, while mitigating geopolitical, technological, operational and programmatic risk. Adaptation is particularly critical with our ballistic missile submarine (SSBN) force, the most survivable Triad leg, and the area where we can least afford risk.

To mitigate risk to the sea-leg of the Triad, and if authorized and funded by Congress, DoD and NNSA will pursue the W93/Mk7 submarine-launched ballistic missile (SLBM) warhead program. The W93/Mk7 warhead would be a new program of record based on extensive stockpile component and material experience. This design will emphasize increasing design margins and will not require additional nuclear explosive testing to certify. While it will be anchored on previously tested nuclear components, it will incorporate modern technologies to improve safety, security and flexibility, and be designed for ease of manufacturing, maintenance and certification. The Mk7 will meet DoD's need to reinvigorate U.S. aeroshell production capability to support not only new reentry body programs, but also new life-extension programs for existing reentry bodies. As described below, the W93 warhead and Mk7 reentry body together provide unique and necessary attributes to maintain the sea-leg's viability into the future.

Background: Given the importance of maintaining SSBN operational effectiveness, the imperative to develop and field the W93/Mk7 arises from a combination of three factors: the evolving threat environment marked by improving adversary defenses; the composition and age of our current SLBM warhead stockpile; and the impending transition to a smaller SLBM force with the COLUMBIA-class SSBN.

Today's OHIO-class SSBN force is supported by two warhead families—the W76/Mk4 and Mk4A, and the W88/Mk5. In 2019, the W76 completed a life extension program to extend its life into the 2040s, while the W88 is undergoing an alteration ("Alt 370") to procure hardware and refresh the system's conventional high explosive to meet required service life. The current SLBM stockpile is comprised of significantly more W76s than W88s. As a result of the unexpected closure of the Rocky Flats Plant in 1989 (where plutonium pits were made) and the 1991 Presidential Nuclear Initiatives, fewer W88s were produced than originally planned. In the coming years, the imbalance between the numbers of W76s and W88s will grow due to attrition of W88s during Alt 370 activities as well as planned surveillance prior to retirement.

Further, in the 2020s, the Navy will begin transitioning to a smaller COLUMBIA-class SSBN force (12 v. 14 boats) with fewer launch tubes per boat (16 v. 20 tubes). This transition places a premium on efficient and flexible capabilities needed to ensure credible deterrence. With this background, the W93/Mk7 is needed for the following reasons:

1. **Better Meets USSTRATCOM Operational Requirements:** The transition to a smaller SSBN force combined with the aging W76/W88 warhead stockpile makes it increasingly critical that the W93 be developed and fielded in order to maintain an effective nuclear deterrent, and provide a decisive response if deterrence fails.

- First, although the current SLBM warhead mix can achieve military objectives with sufficient levels of confidence, over time (as the number of deployable W88s decreases due to attrition), the ability to achieve objectives will decrease—an issue caused by the yield difference between the lower-yield W76 and the higher-yield W88. The W93/Mk7 will improve the SSBN force's ability to hold all targets in current plans at risk.
- Second, the W93's lighter weight will ensure the Trident II missile continues to be able to range all strategic targets, thereby enhancing SSBN survivability by expanding potential SSBN patrol areas as adversary anti-submarine warfare capabilities improve. It will also allow for more efficient targeting by expanding the footprint of targets the warhead can hit, thereby increasing targeting flexibility and efficiency. These will become increasingly important as we transition to COLUMBIA with fewer available launchers.

2. **Supports the United Kingdom's Continuous At Sea Deterrent:** The W93/Mk7 program is also vital for continuing our longstanding commitment of support to the United Kingdom, which is likewise addressing aging issues in its nuclear force. The United Kingdom will pursue a separate but parallel warhead development program alongside the W93, and will be highly dependent on our Mk7 aeroshell technology development work. As an allied but independent nuclear power that contributes to NATO's nuclear deterrent posture, the UK's nuclear deterrent is important to U.S. national security and critical to NATO.

3. **Mitigates the Simultaneous Age-Out of W76/W88:** Because of aging, both the W76 and the W88 will need to be replaced nearly simultaneously in the 2030-2040s. Thus both warheads will undergo life extension or replacement at nearly the same time, not only stressing the nuclear enterprise, but increasing risk that the Navy will not be able to deploy sufficient ballistic missile warheads to meet USSTRATCOM's requirements. By beginning a program now, with production in the mid-2030s, the W93/Mk7 will ensure a viable warhead is available during that period of transition should the W76 or W88 life extensions or replacements encounter delays. Further, introduction of the W93/Mk7 will be offset by corresponding reductions in deployed W76/W88 quantities.

4. **Provides a Technical Hedge:** The current SLBM stockpile consists of significantly more W76s than W88s. Were the United States to have a significant technical problem with the W76 we would be without a hedge in the sea-based leg, placing at risk the credibility of the deterrent. A balanced force prevents overreliance on any one warhead and mitigates risk. Hedging with bomber weapons would reduce responsiveness, while hedging with fixed intercontinental ballistic

missiles would increase reliance on a launch under attack posture.

5. **Develops the Industrial Base:** DoD has a need to revitalize the aeroshell industrial base to support not only new reentry body programs, but also new life-extension programs for existing reentry bodies. The W93/Mk7 will rebuild the national reentry body industrial base that is needed to support both Navy and Air Force ballistic missile force modernization. The United States has not produced an aeroshell since the early 1990s. The investment in the W93/Mk7 will help develop critical skills and materials needed to support any future warhead programs of record, to include legacy materials replacement, production methodologies, identification of alternative materials facility activation planning, and qualification test capability and modeling. The FY21 investment will ensure that the industrial base is prepared to support the timely design, development, and production of the Mk7 and future reentry systems.

Conclusion: The W93/Mk7 program will enhance operational effectiveness and mitigate a variety of risks that are present in the current force. The W93/Mk7 is also crucially important to the United Kingdom's Royal Navy, which provides an added benefit to both the United States and NATO nuclear deterrence.

FY2021 Budget Request

<i>DoD – Navy SSP, Aeroshell and Concept Studies</i>	<i>\$32.48 M</i>
<i>DOE – NNSA, Phase I Conceptual Design</i>	<i>\$53M</i>

W93 Talking Points

- The Navy's ballistic missile submarine force is the most survivable leg of the Triad and is currently equipped with two warhead types—the W76 and W88. These warheads provide approximately 2/3 of the total U.S. deployed force. This is where we can least afford to take risk in DoD's number one priority mission.
- The W93 will ensure the continued viability of USSTRATCOM's operational flexibility and effectiveness as we transition from OHIO-class submarines (14 submarines with 20 operational tubes each) to a smaller fleet of COLUMBIA-class submarines (12 submarines with 16 missile tubes each).
- Both the W76 and W88 are aging and will need replacement. We must get started now on the next warhead for the Navy to avoid the risk of a technical failure in one of these warheads before a replacement is fielded. The W93 will provide a hedge against technical risk in existing SLBM warheads and reduce current over-reliance on the W76.
- The W93 will incorporate modern technologies to improve safety, security, and flexibility to address future threats—and will be designed for ease of manufacturing, maintenance, and certification.
- Carrying out the W93 program is vital for continuing our longstanding support to the United Kingdom, which is also modernizing its nuclear forces. As an allied but independent nuclear power that contributes to NATO's nuclear deterrence posture, the UK's nuclear deterrent is critical to U.S. national security.
- All of the W93s key nuclear components will be based on currently deployed and previously tested nuclear designs, as well as extensive stockpile component and materials experience. It will not require additional nuclear explosive testing to certify.
- Based on current projections, fielding the W93 will not increase the size of the U.S. deployed strategic stockpile. How the W93 will swap into the force and which warheads it may replace or augment will be decided as the threat environment evolves and as the W93 design matures.

W93 Q&A

1. Is the W93 a new weapon?

ANSWER: If authorized and funded by Congress, the W93 will be a new program of record based on previously nuclear tested designs and extensive stockpile component and material experience. It will not require additional nuclear explosive testing to certify.

While anchored on previously tested nuclear components, the W93 will incorporate modern technologies to improve safety, security, and flexibility to address future threats—and be designed for ease of manufacturing, maintenance, and certification.

2. Why do we need a new weapon?

ANSWER: Our most survivable nuclear missiles are on ballistic missile submarines, but the W76 and W88 warheads for those missiles are aging. The W93 will hedge against technical risks in those warheads—and reduce current over-reliance on the W76—while providing the opportunity to include modern technologies that improve safety, security, and flexibility to address future threats.

In addition, carrying out the W93 program is vital for continuing our longstanding support to the United Kingdom, which is also modernizing its nuclear forces. As an allied but independent nuclear power that contributes to NATO's nuclear deterrence posture, the UK's continuous at-sea nuclear deterrent is critical to U.S. and allied security.

3. Will the W93 replace one of the existing warheads or will it be a third warhead?

ANSWER: The W93 will be a new program of record that will produce an additional submarine launched ballistic missile (SLBM) warhead type in the 2030s. Given the pending age-out of the W76 and W88 warheads, the Department has an urgent need to start the W93 warhead program. It mitigates risk to the sea leg of the Triad caused by the changing strategic environment identified by USSTRATCOM. In addition, the W93 will ensure USSTRATCOM's operational flexibility and effectiveness as the United States transitions to the smaller fleet of COLUMBIA-class ballistic missile submarines, which have fewer missile tubes than the current OHIO-class.

4. Will the W93 increase the size of the nuclear stockpile?

ANSWER: Based on current projections, fielding the W93 will not increase the size of the deployed strategic stockpile. How the W93 will swap into the force and what warheads it may replace or augment will be decided as the threat environment evolves and as the W93 design matures.

5. Why is it named the W93?

ANSWER: During the Cold War, the United States undertook many nuclear development programs, almost one per year—hence the myth that the number in the warhead's name derives from the year it was developed. This was simply a coincidence for certain warheads: the number is sequential and the W93 is next in line. The W89–W92 were in development in the late-1980s, but were terminated at the end of the Cold War.