W87-1 Modification Program

National Nuclear Security Administration

"The W87-1 is necessary to ensure a more flexible, resilient, and ready U.S. nuclear deterrent."

- Dr. Charles Verdon, Deputy Administrator for Defense Programs

Overview

NNSA resumed work on a W78 warhead replacement, designated as the W87-1, in fiscal year (FY) 2019 following the 2018 Nuclear Posture Review. By replacing the legacy W78, the W87-1 will maintain continuity for the ground-based leg of the U.S. nuclear deterrent. The warhead is named the W87-1 to reflect that it has a similar primary design to the W87-0 and will fly in a similar reentry vehicle. The W87-1 is based on a previously-tested nuclear component and will include an insensitive high explosive primary that had been designed and tested with advanced safety features. The warhead will be fielded by FY 2030 on the U.S. Air Force (USAF)'s Ground Based Strategic Deterrent. The W87-1 will not provide new military capabilities, yet it will provide enhanced safety and security compared to the legacy W78. The W87-1 will be certified without the need for additional underground nuclear explosive testing.

History

The current W78, one of the oldest warheads in the U.S. nuclear weapons stockpile, was first deployed in 1979 on USAF Minuteman III Intercontinental Ballistic Missiles. In September 2010, a W78-1 life extension program (LEP) entered Concept Assessment, or Phase 6.1 of the nuclear weapons lifecycle (see graphic below). At this point, NNSA and the Department of Defense (DoD) determined the best path forward and DoD established a mandatory requirement to enhance the safety and security of the replacement warhead. In June 2012, the W78-1 LEP entered Phase 6.2, Feasibility Study & Design Options, with expanded scope from the Nuclear Weapons Council (NWC) to design a warhead that could be interoperable with the USAF Mk-21 and the U.S. Navy Mk-5 reentry vehicles. The program was renamed W78/88-1 LEP and referred to as Interoperable Warhead 1, or simply IW1. In 2014, the NWC paused the program with a planned restart in FY 2020.

Minuteman III Intercontinental Ballistic Missile test launch

Progress

The W87-1 Modification Program restarted Phase 6.2, Feasibility Study and Design Options, in January 2019. NNSA is focused on maturing the design identified during W78-1 Phase 6.1 and W78/88-1 Phase 6.2 while also supporting the U.S. Navy by exploring potential use of the W87-1 nuclear explosive package in the Mk 5 reentry body per direction from the NWC. NNSA will continue to refine cost estimates for the W87-1 during Phase 6.2. A baseline cost for the W87-1 will not be established until phase 6.2A, Design Definition & Cost Study. Completion of the first production unit is scheduled for FY 2030. Throughout this process, NNSA's principal goal is to replace the aging W78 with a warhead that meets military requirements, including improved safety and security.

The U.S. nuclear warhead lifecycle begins with Phase One: Concept Study and ends with Phase Seven: Retirement, Dismantlement, and Disposition. All of NNSA's LEPs are in Phase Six: Quantity Production and Stockpile Maintenance and Evaluation.