



## W88 Alteration 370

The National Nuclear Security Administration maintains and enhances the safety, security, and effectiveness of the U.S. nuclear weapons stockpile without nuclear explosive testing. The W88 Alteration 370 is essential to enabling the NNSA to accomplish its mission to certify the effectiveness of the nation's nuclear deterrent.

[https://www.energy.gov/sites/prod/files/migrated/nnsa/2017/11/f45/w88\\_alt\\_370.pdf](https://www.energy.gov/sites/prod/files/migrated/nnsa/2017/11/f45/w88_alt_370.pdf)

### Overview

The W88 nuclear warhead entered the stockpile in late 1988 and is deployed on the Navy's Trident II D5 Submarine-Launched Ballistic Missile (SLBM) system, carried onboard Ohio-class ballistic missile submarines. Deployed now for almost three decades, several updates are required to address aging issues and to maintain its current state of readiness. The W88 Alteration (Alt) 370 program replaces the arming, fuzing, and firing subsystem, adds a lightning arrestor connector, and refreshes the conventional high explosives within the weapon to enhance nuclear safety and support future life extension program options. The W88 Alt 370 program is scheduled to be completed concurrent with planned exchanges of limited-life, or routinely replaced, components, including the gas-transfer system and neutron generators. These will not change the military requirements or capabilities of the warhead.

### History & Schedule

The W88 Alt 370 program has been in the Development Engineering phase since 2012. During this phase, the National Nuclear Security Administration (NNSA), in coordination with the Department of Defense (DOD), conducted experiments, tests, and analyses to validate design options. Additionally, NNSA production facilities assessed their ability to produce the proposed design, initiate process development activities, and produce test hardware.

In 2014, the Nuclear Weapons Council expanded the W88 Alt 370 program to include refresh of the conventional high explosive in the warhead. This decision was based on analysis of ongoing surveillance data on the W88 warhead by Los Alamos National Laboratory and was formally peer-reviewed by Lawrence Livermore National Laboratory. NNSA accelerated activities associated with refreshing the conventional high explosive to facilitate entry into Production Engineering in February 2017. During Production Engineering, NNSA will complete the acquisition of capital equipment, define and qualify tooling, gauges, handling gear, and testers, and produce process prove-in components. NNSA will also work closely with the Navy to conduct qualification flight tests. NNSA is on schedule to provide the W88 Alt 370 first production unit in December 2019, and will complete all production by 2024.



The Ohio-class ballistic submarine USS Alabama returns to Naval Base Kitsap from a deterrent patrol. The USS Alabama is one of 14 Ohio-class submarines, which are currently armed with the W88 nuclear warhead.

## NNSA Nuclear Security Enterprise Roles

**Los Alamos National Laboratory** and **Sandia National Laboratories** are the design and engineering labs for the W88 Alt 370, while multiple nuclear security enterprise facilities are responsible for other aspects of the W88 Alt 370:

- **Sandia National Laboratories** produces the neutron generators.
- **Los Alamos National Laboratory** produces detonator assemblies.
- **Kansas City National Security Campus** produces the gas transfer system and the arming, fuzing, and firing subsystem.
- **Savannah River Site** is responsible for testing, evaluating, and replenishing the gas transfer system.
- The **Pantex Plant** is responsible for producing the conventional high explosives and final assembly of the complete W88 Alt 370 for delivery to the U.S. Navy.

## Major Accomplishments

The Nuclear Weapons Council approved entry of the W88 Alt 370 program into Development Engineering in October 2012.

In fiscal year (FY) 2014, the W88 Alt 370 completed two major flight tests to demonstrate the functional performance of the upgraded weapon system in ballistic missile flight environments: the Critical Radar Arming and Fuzing Test and the Follow-On Commander Evaluation Test-51. The Critical Radar Arming and Fuzing Test successfully measured radar performance during the harsh conditions of hypersonic atmospheric re-entry. The Follow-On Commander Evaluation Test measured vibration and shock environments in flight, transmitting data to ground- and sea-based receiving stations to evaluate the effects of flight environments, and to validate the engineering design of the weapon's critical components.



Sandia National Laboratories performs a drop test for the W88 Alt 370 program from its 185-foot Drop Tower Facility.



Launch of a Trident II D5 Missile Test

On November 7, 2015, the fourth successful qualification flight test for the W88 Alt 370 program was conducted. These full-scope tests demonstrate that the weapon system alteration is functional and in line with NNSA's commitment to complete weapon development on schedule and within military requirements.

In September 2016, the W88 Alt 370 completed a preliminary review by the DOD Design Review and Acceptance Group, certifying that the current design met all military requirements.

In February 2017, NNSA approved entry of the W88 Alt 370 program into Production Engineering.