

[National Nuclear Security Administration](#) [Leadership and Offices](#) [The U.S. Nuclear Weapons Stockpile](#)

The U.S. Nuclear Weapons Stockpile

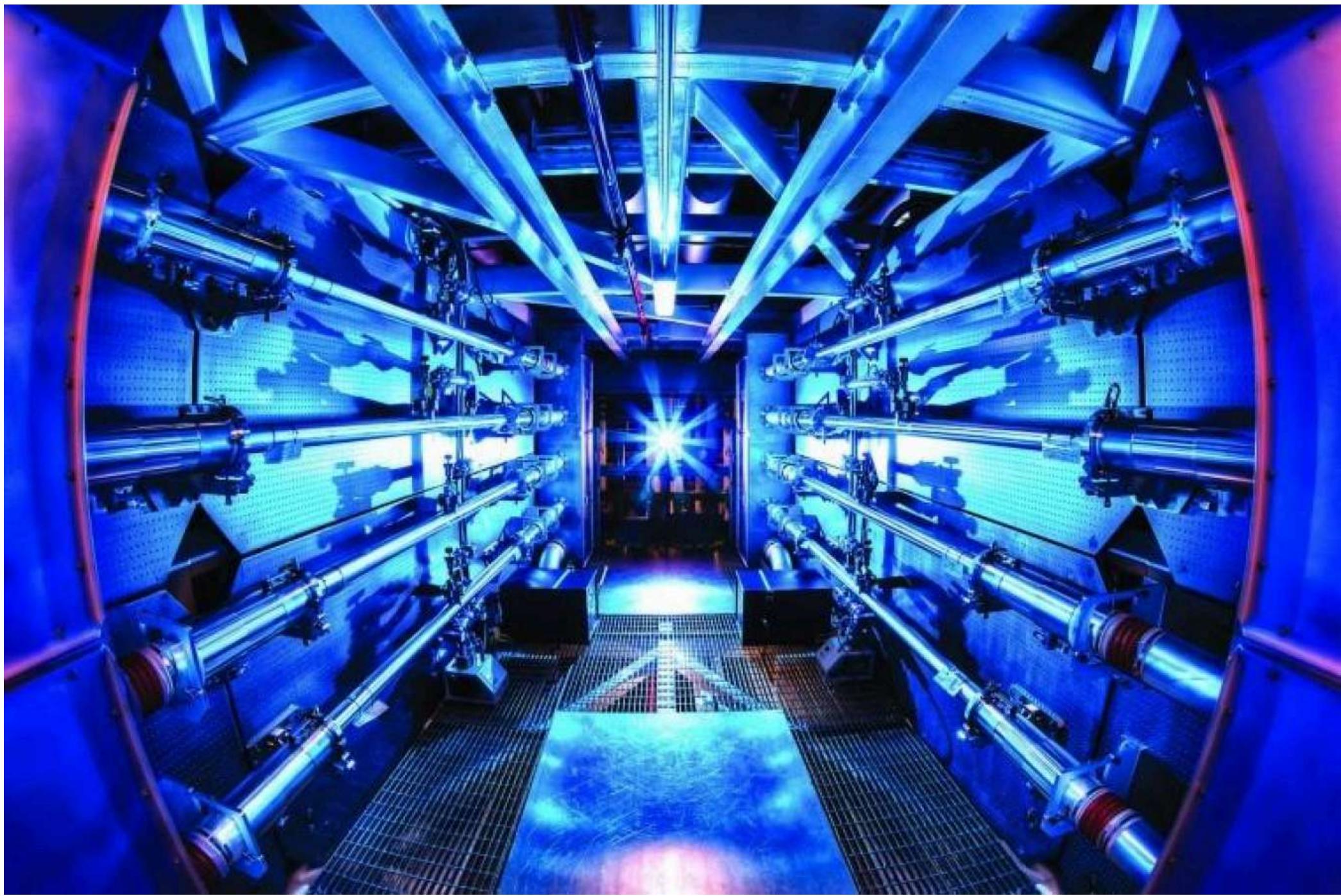




A B61-12 system being prepared for an acoustics test at Sandia National Labs.

One of NNSA's core missions is to ensure the United States maintains a safe, secure, and reliable nuclear stockpile. These weapons—along with the submarines, ballistic missiles, and aircraft that deliver them—constitute the nation's strategic deterrent. For more than 75 years the nuclear deterrent has underpinned America's security, deterring our adversaries, reassuring our allies and partners, and promoting global stability.

The Office of Defense Programs is responsible for maintaining and modernizing the stockpile. Our engineers and technicians ensure the health of the weapons by studying and replacing components and materials as they age. Scientists conduct experiments using some of the most advanced facilities in the world to enhance our understanding of weapon performance. Production facilities manufacture the thousands of materials and components that comprise modern nuclear weapons, assuring their long-term reliability.

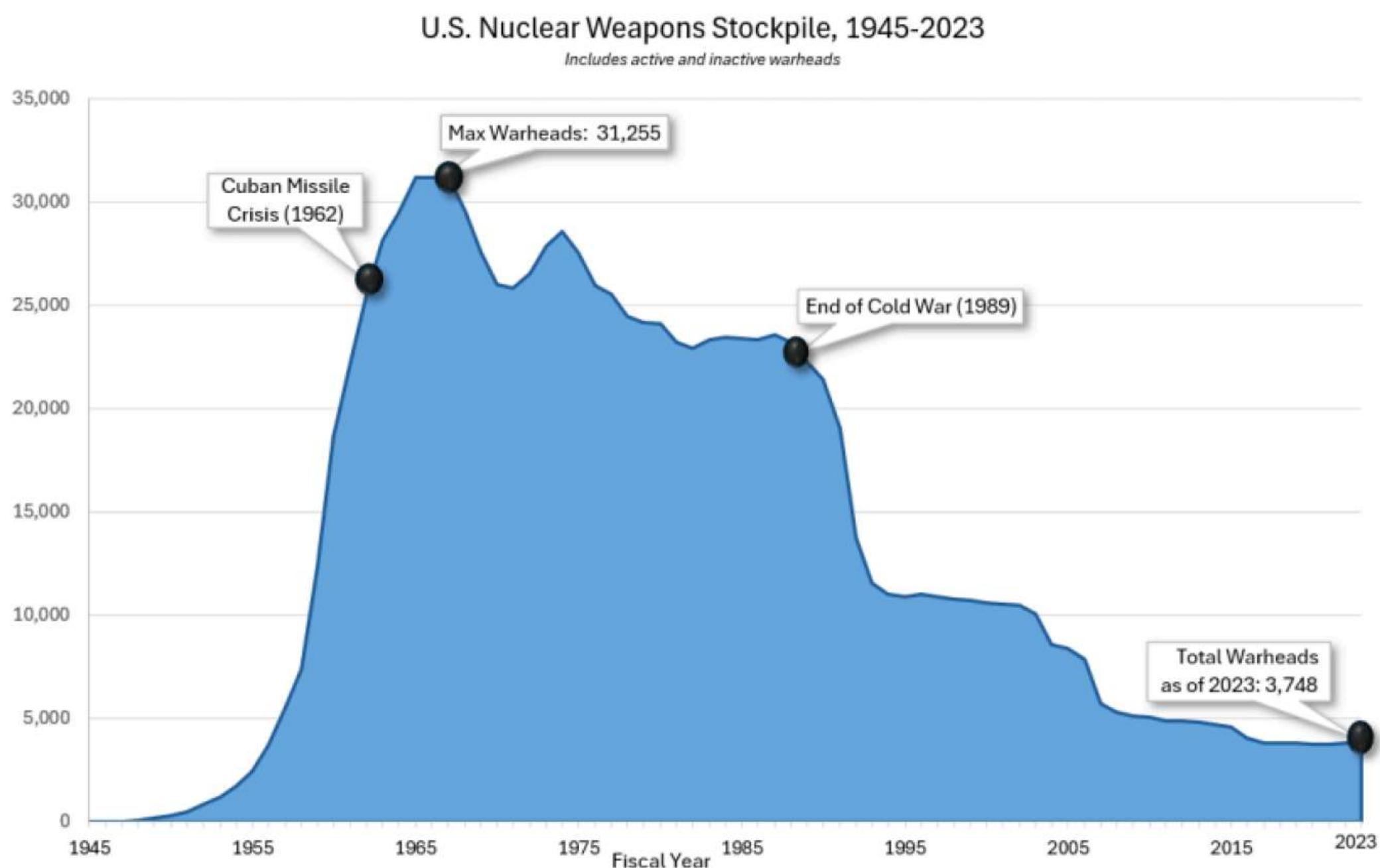


The National Ignition Facility at LLNL helps NNSA understand the physics of nuclear explosions and ensure the reliability of the stockpile.

The deterioration of the global security environment has made clear that nuclear deterrence will remain a prominent feature of the international landscape for decades. As the United States confronts the unprecedented challenge of deterring two nuclear peers, the age of our stockpile requires an intensive modernization program. Likewise, our infrastructure has atrophied since the Cold War and must be recapitalized. As we revitalize our facilities and infrastructure, NNSA is building a responsive complex with modern technology, allowing us to adapt to changing requirements driven by shifting world conditions.

The transparency NNSA provides regarding our Nuclear Security Enterprise is unique among the world's nuclear weapon states. Details about nuclear weapons, the deterrence mission, and NNSA's management of the stockpile can be found in the current [Stockpile Stewardship and Management Plan](#) and the [Nuclear Matters Handbook](#).

At NNSA we are applying the power of science not simply to enhance U.S. security but in pursuit of a more peaceful, prosperous, and stable world.



The Post-Cold War Stockpile

The U.S. nuclear stockpile is the smallest it has been since 1960. As of 2023, the stockpile stood at [3,748 warheads](#)—a roughly 88 percent reduction in size since its peak of 31,255 warheads in the late 1960s. Most weapons in the current stockpile were produced during the 1970s and 1980s. At the time they were built, these weapons were not designed or intended to last indefinitely.

As a result of the voluntary moratorium on nuclear explosive testing the United States has observed since 1992, NNSA now ensures the reliability of the nation's nuclear weapons through the Stockpile Stewardship Program. Comprising a wide range of scientific activities, from modeling and simulation to subcritical nuclear experiments, this program allows us to assess and certify the stockpile with extraordinary confidence.

Nevertheless, maintaining the stockpile today is much more difficult than during the Cold War. In addition to designing, manufacturing, and sustaining weapons without nuclear explosive testing, we must accommodate arms control verification in our production processes and exercise care for the workforce and environment in every phase of the weapon lifecycle. Meeting these challenges depends on the unparalleled ingenuity and resourcefulness of NNSA's Nuclear Security Enterprise.

Composed of a nationwide network of national laboratories and production facilities and more than 65,000 nuclear security professionals, the enterprise conducts the research, development, testing, and production needed to deliver the nuclear stockpile to the U.S. military.

Interested in a career in Defense Programs?

NNSA shares responsibility for the nuclear deterrent with the Department of Defense (DoD). Senior leaders from NNSA and DoD sit on the [**Nuclear Weapons Council**](#), a forum for reaching consensus and establishing priorities relating to the quantity and characteristics of the weapons fielded to ensure U.S. national security.





A B61-12 joint test assembly is assembled at the Pantex Plant in Amarillo, Texas.

Stockpile Management

Nuclear deterrence has been the cornerstone of U.S. national security for more than 75 years, allowing us to preserve our way of life without fighting major wars. To succeed, deterrence requires our adversaries to understand that the costs of aggression against the United States or its allies and partners will always outweigh any conceivable benefits. The credibility of this guarantee requires a nuclear stockpile that is unfailingly reliable and effective.

NNSA's Stockpile Management Program encompasses the full range of a weapon's lifecycle, from design and development to production and maintenance and ultimately to dismantlement and disassembly. Each weapon type requires routine maintenance, repair, replacement of limited life components, surveillance (the thorough examination of a weapon), and other activities to ensure their safety, security, effectiveness, and reliability.

In the current stockpile, the average duration since a warhead was manufactured or refurbished is roughly 28 years. Over the next two decades, the stockpile will be sustained and modernized through vigorous surveillance, assessment, life extension, modification, acquisition, and dismantlement efforts. NNSA delivered more than 200 modernized weapons to the DoD in 2023 alone—the most since the end of the Cold War—and comparable demand is expected over the next decade and beyond.

Our scientists and engineers provide assurance that the United States can deliver militarily effective weapons. As we work with the DoD to evaluate the needs of the deterrent, NNSA will deliver new capabilities to fill deterrence gaps. NNSA is also undertaking transformative initiatives to protect against adversary subversion of nuclear weapons and associated capabilities.

Together we supply the crucial ingredient needed for deterrence to succeed—our adversaries' recognition that U.S. threats to retaliate swiftly and decisively against any strategic attack on the United States or its allies are backed by indisputable nuclear capabilities.

[Stockpile Sustainment](#)

[Warhead Modernization](#)

[Production Operations](#)

[Nuclear Enterprise Assurance](#)

[More Information on Stockpile Management](#)



Sandia National Labs tests a prototype of the Mark 21 fuze to ensure it meets requirements and specifications.

Research, Development, Test, and Evaluation

Deterrence of America's adversaries hinges on the credibility of our nuclear capabilities, and the very foundation of the U.S. nuclear deterrent is the scientific knowledge resident in and generated by the Nuclear Security Enterprise. Until 1992, the United States demonstrated the reliability of the stockpile in part through nuclear explosive tests. Since the end of nuclear explosives testing, NNSA has established credibility by operating state-of-the-art science facilities, where research and development, modeling of nuclear weapons performance, and computer simulations serve as substitutes for nuclear explosive tests.



The 29-foot-radius indoor centrifuge used for flight environment testing at Sandia National Labs' Centrifuge Complex.

Nuclear fusion breakthroughs at the [National Ignition Facility](#) are advancing our understanding of the stockpile, deriving knowledge once accessible only through nuclear explosive tests. Our scientists are performing cutting-edge research on high-performance computers, including El Capitan, the world's fastest exascale computing platform. Our modeling capabilities are being used to mitigate the effects of aging on the stockpile and design new systems.

In a turbulent and uncertain world, the scientists and engineers of the nuclear security enterprise are bolstering the reliability of the current stockpile even as they design and deploy new systems. Their scientific insights also identify novel technological threats, helping to defend the nation against technically advanced adversaries. At NNSA we are applying the power of science not simply to enhance U.S. security but in pursuit of a more peaceful, prosperous, and stable world.

Materials Research

Primary Nuclear Hydrodynamics

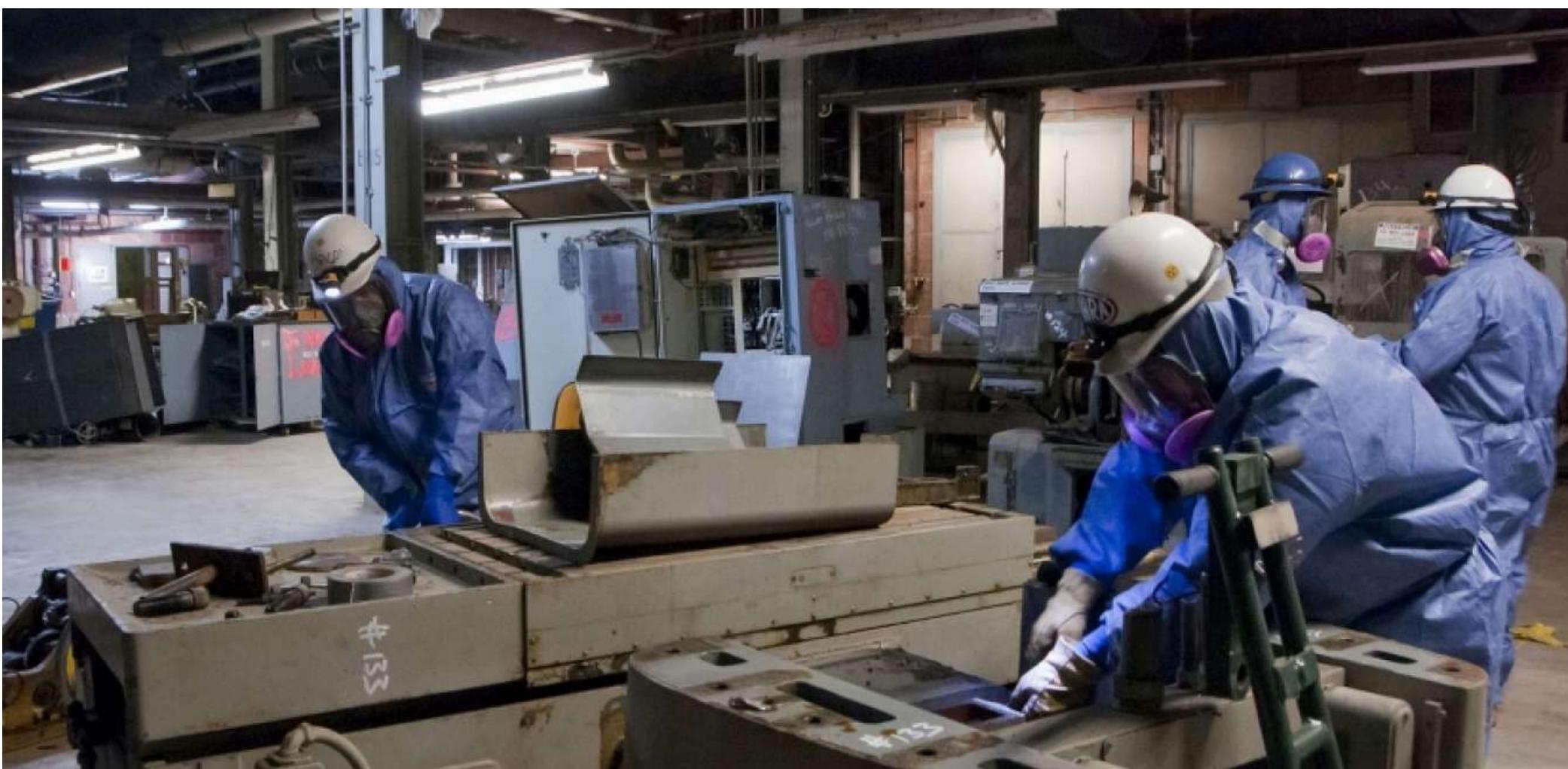
High Energy Density Physics

Modeling and Simulation

Integrated Assessments

Weapon Technology and Manufacturing Maturation

Engineering



Workers at the Y-12 National Security Complex in Oak Ridge, Tennessee.

Production Modernization and Materials Management

Modern U.S. nuclear weapons are among the most sophisticated devices ever developed, composed of thousands of materials and components that are designed and manufactured to precise specifications. In addition to the fissile cores of the weapons, high explosives are used to generate a nuclear detonation, and a multitude of non-nuclear components enable the reliable functioning of the weapons.

Much of the production base that made these materials and components during the Cold War has since been shuttered. The United States is now recapitalizing its production facilities and infrastructure as part of a broader strategy to modernize the nuclear deterrent. This revitalized enterprise will enable timely adaptation to changing requirements driven by a shifting global security environment, all while avoiding much of the waste, inefficiency, and environmental toll that characterized the first decades of the nuclear age.

Major construction projects are underway across the country to refurbish existing facilities and build new, state-of-the-art production complexes for the nuclear stockpile. In particular, facilities are being built to manufacture the plutonium “pits” at the heart of our nuclear weapons and process uranium, lithium, and tritium for the stockpile. Such investments are critical to answering the challenge of deterring two nuclear peer adversaries in the coming decades and assuring America’s allies and partners over the long term.

These projects require extraordinary choreography to maintain current rates of production while simultaneously building the capacity for the future stockpile. Furthermore, like many U.S. defense systems, nuclear weapons rely on commercially manufactured parts and components, requiring close partnerships between NNSA and private sector companies to provide assurance that the quantity and quality of each meets the nation’s needs.

As the current weapons in our inventory age, NNSA must ensure the nuclear stockpile is properly sized and militarily effective for many decades to come.

Plutonium Pit Production

[Lithium Modernization](#)[Tritium Modernization](#)[Domestic Uranium Enrichment](#)[Enriched Uranium Modernization](#)[Depleted Uranium Modernization](#)[High Explosives and Energetics](#)[Non-nuclear Components](#)

Technology and Partnerships

NNSA maintains partnerships with federal and non-federal entities to apply outside technical and commercial knowledge to sustain the nuclear deterrent and advance broader national security missions. To ensure a pipeline of qualified technical talent to the nuclear security enterprise, the Technology and Partnerships Office (TPO) oversees NNSA's investment in [Academic Programs](#) that fund scientific research in areas crucial to nuclear weapon science. We also provide fellowships for exceptional students in key science, technology, engineering, and mathematics fields.

The Stevenson-Wydler Technology Innovation Act of 1980 began the requirement that federal laboratories must budget for and participate in [Technology Transfer](#)—the process by which knowledge, facilities, or capabilities developed with federal research and development funds are used to fulfill public and private needs. The TPO works with NNSA's laboratories, plants, and sites and oversees technology transfer activities to commercialize viable NNSA innovations for the benefit of the nation.



U.S. Strategic Command at Offutt Air Force Base near Omaha, Nebraska.

Systems Engineering and Integration

The nuclear deterrence mission is extraordinarily complex, involving numerous military specifications and national policies to deliver a safe, secure, and reliable deterrent. At the intersection of these requirements sits a team of experts who provide the tailored processes, tools, and training for the federal workforce to manage nuclear stockpile programs and projects.

The Office of Systems Engineering and Integration is responsible for enabling informed decision-making across the nuclear security enterprise. This process involves systematically defining and implementing enterprise-level requirements to align stockpile activities with the policy drivers of the deterrence mission. The office serves as the connective tissue between NNSA's eight national laboratories, plants, and sites in assessing and managing risk to the stockpile mission. Experts lead strategic planning and portfolio analyses concerning the workforce and production capacity, including modeling and simulation of NNSA's ability to deliver nuclear weapons to the Department of Defense on schedules consistent with national security.

Another key function of the office is engaging with stakeholders inside and outside of the U.S. Government. Experts lead negotiations with DoD counterparts concerning military requirements for U.S. nuclear weapons, engaging with the U.S. Air Force, Navy, Joint Staff, Office of the Secretary of Defense, and combatant commands. The office also works closely with partners in the private sector, performing industrial base monitoring to ensure suppliers of components and materials for the stockpile are commercially viable. As part of this portfolio, we conduct supply chain risk management to confirm that critical supplies are available and free from foreign subversion or manipulation. Together these activities provide assurance that the nuclear security enterprise can deliver a reliable and militarily effective stockpile for as long as our national security depends on it.



How NNSA moves nuclear weapons and materials

NNSA's Office of Secure Transportation (OST) is responsible for the safe and secure transport of U.S. nuclear weapons, components, and special nuclear materials such as enriched uranium and plutonium in the contiguous United States. This classified cargo is transported in highly secure tractor-trailers and escorted by armed Federal Agents in other vehicles, who provide security and respond in the event of emergencies.



An OST armored convoy vehicle.

A wide range of activities across the nuclear security enterprise depends on secure transportation—warhead modernization, component exchanges, surveillance, dismantlement, and many others. OST ensures the machinery of the enterprise operates smoothly and securely, allowing NNSA to deliver to the nation the security that our nuclear deterrent uniquely provides.



An OST armored tractor and safeguards transporter.

Since its establishment in 1975, OST has accumulated more than 140 million miles of over-the-road experience transporting special cargo—greater than the distance from the Earth to Mars—with no fatal accidents or releases of radioactive material. OST serves as a model for other nuclear-armed countries, demonstrating the extraordinary care that must be taken to ensure neither accident nor foul play jeopardizes nuclear weapons or materials in transit.

Learn about the qualifications and training to join the ranks of elite Nuclear Materials Couriers: [How you can become a part of OST](#)

[Transportation and Emergency Control Center](#)

[Safety and Security](#)

[Law Enforcement and Emergency Management Liaison](#)

[Office of Secure Transportation History](#)

[OST Geographic Regions](#)

NNSA's Defense Programs news and press releases

NNSA completes B61-12 Life Extension Program

NNSA demonstrates transparency in its operations and support for the Comprehensive Nuclear-Test-Ban Treaty by hosting visitors at Sandia and Nevada site

NNSA demonstrates transparency during arms control and nonproliferation experts' visit to Nevada

W80-4 Life Extension Program Enters Phase 6.4, Production Engineering

NNSA completes and diamond-stamps first plutonium pit for W87-1 warhead

Asian Pacific American Heritage Month Spotlight: Shahnaz Punjani, Defense Programs

NNSA delivers 2024 Stockpile Stewardship and Management Plan to Congress

NNSA delivers 2023 Stockpile Stewardship and Management Plan to Congress

[View More](#)

Committed to Restoring America's Energy Dominance.

Quick Links

[Leadership & Offices](#)

[Mission](#)

[Contact Us](#)

[Careers](#)

Follow Us



Subscribe To Our Newsletter

Email

[Subscribe](#)

Resources

[Budget & Performance](#)

[Directives, Delegations, & Requirements](#)

[Freedom of Information Act \(FOIA\)](#)

[Inspector General](#)

[Privacy Program](#)

Federal Government

[USA.gov](#)

[The White House](#)

[Vote.gov](#)

