



December 2015

NUCLEAR WEAPONS SUSTAINMENT

Improvements Made
to Budget Estimates
Report, but
Opportunities Remain
to Further Enhance
Transparency

Accessible Version

GAO Highlights

Highlights of [GAO-16-23](#), a report to congressional committees

Why GAO Did This Study

DOD and DOE are undertaking extensive efforts to sustain and modernize aging U.S. nuclear weapons capabilities, which are expected to take decades and cost hundreds of billions of dollars. Section 1043 of the National Defense Authorization Act for Fiscal Year 2012, as amended, requires submission of an annual report to congressional committees on DOD's and DOE's plans for related matters and includes a provision that GAO review aspects of that report. In its reviews of the fiscal years 2014 and 2015 joint reports, GAO recommended that future joint reports provide more thorough documentation of the methodologies used to develop the estimates and comparative information on changes in the estimates from the prior year.

GAO assessed the extent to which the fiscal year 2016 joint report provides (1) budget estimates that are consistent with the departments' internal funding and modernization plans and (2) complete, transparent information on the methodologies used to develop those estimates. GAO analyzed the departments' internal plans and budget estimates and interviewed DOD and DOE officials.

What GAO Recommends

GAO believes its recommendations to provide more thorough documentation of methodologies and comparative information on changes in estimates from the prior year have merit and is not making new recommendations in this report. DOD and DOE said they are working to include additional information in subsequent joint reports based on GAO's prior recommendations.

View [GAO-16-23](#). For more information, contact Joe Kirschbaum at (202) 512-9971 or kirschbaumj@gao.gov or David Trimble at (202) 512-3841 or trimbled@gao.gov.

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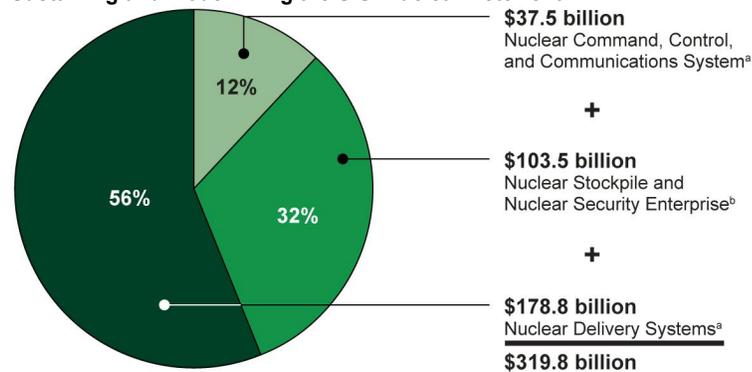
Nuclear Weapons Sustainment

Improvements Made to Budget Estimates Report, but Opportunities Remain to Further Enhance Transparency

What GAO Found

The fiscal year 2016 joint report, submitted to Congress by the Department of Defense (DOD) and the Department of Energy (DOE) in April 2015, includes 10-year budget estimates for sustaining and modernizing U.S. nuclear weapons. These estimates are generally consistent with the departments' internal funding and modernization plans—with some exceptions. GAO could not fully verify that DOD's command and control estimates were consistent with its internal funding plans, because DOD did not document the methodological assumptions and limitations associated with these estimates, as GAO had recommended in June 2014.

Departments of Defense (DOD) and Energy (DOE) Fiscal Year 2016 10-Year Estimates for Sustaining and Modernizing the U.S. Nuclear Deterrent



Source: GAO analysis of Department of Defense (DOD) and Department of Energy (DOE) data. | GAO-16-23

Note: DOD inadvertently reported an incorrect figure in its estimate for Nuclear Delivery Systems and the figure above reflects corrected data.

^aDOD provides budget estimates for the nuclear command, control, and communications system, which includes early warning radars, aircraft, and communications networks, and for delivery systems, which consist of a variety of platforms such as heavy bombers, air-launched cruise missiles, and ballistic-missile submarines.

^bDOE provides budget estimates for the nuclear weapons stockpile (seven types of weapons), and the nuclear security enterprise (eight geographically dispersed sites).

The fiscal year 2016 report includes information that was not included in the fiscal year 2015 report—such as general descriptions of the methodologies used to develop the budget estimates—but does not include thorough documentation of the methodologies used or comparative information about changes in the estimates that could improve transparency. Further, DOD did not ensure the accuracy of the estimates it reported, inadvertently over stating the 10-year estimate for the Air Force's long-range strike bomber. As GAO reported in July 2015, without thorough documentation of the methodologies used and comparative information on changes from year to year, it may be difficult for Congress to understand the basis for the estimates or assess long-term affordability when allocating resources. DOD partially agreed and DOE agreed with GAO's July 2015 recommendations to develop thorough documentation, but DOD noted that information on changes is not required by Section 1043.

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Abbreviations

DOD	Department of Defense
DOD CIO	Department of Defense Chief Information Officer
DOE	Department of Energy
FYDP	Future Years Defense Program
FYNSP	Future Years Nuclear Security Program
ICBM	Intercontinental Ballistic Missile
NC3	Nuclear Command, Control, and Communications
NNSA	National Nuclear Security Administration
SLBM	Submarine-launched Ballistic Missile
SSBN	Ship Submersible Ballistic Nuclear (ballistic missile submarine)

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December 10, 2015

Congressional Committees

The Department of Defense (DOD) and the Department of Energy (DOE) are undertaking an extensive, multifaceted effort to sustain and modernize U.S. nuclear weapons capabilities, including the nuclear weapons stockpile; the research and production infrastructure; delivery systems; and the nuclear command, control, and communications (NC3) system.¹ The strategic missiles, submarines, and aircraft—and the nuclear weapons carried by these delivery systems—are aging and being deployed beyond their intended service lives. Many of the National Nuclear Security Administration’s (NNSA)² key facilities for nuclear weapons research, development, and production date back to the 1940s and 1950s and, according to the 2010 *Nuclear Posture Review Report*, require modernization to ensure a safe, secure, and effective nuclear arsenal for as long as such weapons exist.³ DOD and DOE estimates show that nuclear sustainment and modernization efforts are expected to cost billions of dollars over the next decade.

Section 1043 of the National Defense Authorization Act for Fiscal Year 2012, as amended, requires the President, in consultation with the Secretary of Defense and the Secretary of Energy, to submit a report on the plan for the nuclear weapons stockpile, complex,⁴ delivery systems, and

¹The nuclear weapons stockpile consists of seven weapon types. Nuclear delivery systems consist of a variety of platforms including heavy bombers, air-launched cruise missiles, dual-capable fighter aircraft, and land-based intercontinental ballistic missiles operated by the Air Force as well as submarines and submarine-launched ballistic missiles operated by the Navy. The NC3 system consists of satellites, early warning radars, aircraft, communications networks, and other systems that are managed by the Air Force, the Navy, Defense Information Systems Agency, and other organizations.

²NNSA is a separately organized agency within DOE that is responsible for the management and security of DOE’s nuclear weapons, nuclear nonproliferation, and naval reactor programs.

³Department of Defense, *Nuclear Posture Review Report* (Washington, D.C.: Apr. 6, 2010).

⁴Except when referencing the statutory requirement, this report hereafter refers to the “nuclear weapons complex” as the “nuclear security enterprise,” which consists of eight geographically dispersed government-owned, contractor-operated sites, such as laboratories and production plants.

command and control system for each of fiscal years 2013 through 2019.⁵ DOD and DOE developed this annual report, which we refer to as the joint report.⁶ This joint report is to include nuclear sustainment and modernization plans as well as associated budget estimates for the 10 years following the date of the report and must also include a detailed description of the costs included in the budget estimates and the methodology used to develop the estimates.⁷ The fiscal year 2016 joint report, which DOD and DOE submitted to Congress on April 2, 2015, identified approximately \$336.5 billion in estimated budget requirements from fiscal years 2016 through 2025.⁸ However, that estimate has been revised to \$319.8 billion to correct an error in the 2016 joint report for the 10-year long-range strike bomber estimate that was identified after the report had been submitted.

The National Defense Authorization Act for Fiscal Year 2013 included a provision that we review each joint report for accuracy and completeness with respect to the budget estimates and the methodologies that were used to develop the estimates.⁹ We reported on the fiscal year 2014 joint report in June 2014 and the fiscal year 2015 joint report in July 2015.¹⁰ In our

⁵See Pub. L. No. 112-81, § 1043(a) (2011), *amended by* National Defense Authorization Act for Fiscal Year 2013, Pub. L. No. 112-239, § 1041 (2013) *and* National Defense Authorization Act for Fiscal Year 2014, Pub. L. No. 113-66, § 1054 (2013). The report is to be transmitted to the congressional defense committees, the Senate Committee on Foreign Relations, and the House Committee on Foreign Affairs. § 1043(a)(1). The President has delegated this reporting function to the Secretary of Defense and Secretary of Energy. See 77 Fed. Reg. 12,721 (Mar. 2, 2012).

⁶DOD and DOE, *Fiscal Year 2016 Report on the Plan for the Nuclear Weapons Stockpile, Nuclear Weapons Complex, Nuclear Weapons Delivery Systems, and Nuclear Weapons Command and Control System Specified in Section 1043 of the National Defense Authorization Act for Fiscal Year 2012* (Washington, D.C.: April 2, 2015).

⁷See § 1043(a)(2), (3).

⁸We refer to the report as the 2016 joint report. In our previous reports, GAO, *Nuclear Weapons: Ten-Year Budget Estimates for Modernization Omit Key Efforts, and Assumptions and Limitations Are Not Fully Transparent*, [GAO-14-373](#) (Washington, D.C.: June 10, 2014), and GAO, *Nuclear Weapons Sustainment: Improvements Made to Budget Estimates, but Opportunities Exist to Further Enhance Transparency*, [GAO-15-536](#) (Washington, D.C.: July 31, 2015), we referred to the fiscal years 2014 and 2015 joint reports by the dates they were submitted—the July 2013 and May 2014 joint reports. In this report, we identify the joint report by the fiscal year it covers to better delineate between the subject of the report and the date it was submitted and to be consistent with the way DOD refers to these reports.

⁹See Pub. L. No. 112-239, § 1041(a)(2) (adding § 1043(c)).

¹⁰[GAO-14-373](#) and [GAO-15-536](#).

July 2015 report, we found that DOD's and DOE's budget estimates in the fiscal year 2015 joint report were generally consistent with the departments' funding and modernization plans through fiscal year 2024—with a few exceptions—and that the report included information that had not been included in the fiscal year 2014 joint report. However, we identified shortcomings in the fiscal year 2015 joint report and recommended that, to improve the completeness and transparency of the budget estimates in future joint reports, and to provide decision makers with better information to identify significant changes from year to year, DOD and DOE include (1) more thorough documentation of the methodologies used to develop the budget estimates and ensure the accuracy and completeness of the information included and (2) comparative information on changes in the budget estimates from the prior year and the reasons for those changes. The agencies' responses to and status of the recommendations are discussed later in this report. This report assesses the extent to which the fiscal year 2016 joint report provides (1) budget estimates for nuclear sustainment and modernization that are consistent with DOD's and DOE's internal funding plans and long-term¹¹ nuclear modernization plans and (2) complete and transparent information about the development of the budget estimates for nuclear sustainment and modernization.

We performed our work at the Office of the Secretary of Defense, the Air Force, the Navy, the DOD Chief Information Officer (DOD CIO), and NNSA. To address our objectives, we followed a methodology similar to the one we used during our reviews of the fiscal years 2014 and 2015 joint reports. Specifically, we examined the departments' plans and budget estimates for sustaining and modernizing the nuclear deterrent in three areas: (1) DOD nuclear delivery systems, (2) the DOD NC3 system, and (3) DOE nuclear weapons and the nuclear weapons complex. We applied the following approach:

First, to determine the extent to which the budget estimates in the 2016 joint report are consistent (accurate and complete) with DOD's and DOE's internal funding and long-term modernization plans, we obtained and analyzed the plans and estimates from the 2016 joint report and compared them with each department's funding plans, including DOD's

¹¹For the purpose of this report, we use the term “long-term” to refer to DOD and DOE plans that go beyond the five-year period of the Future Years Defense Program (FYDP) and the Future Years Nuclear Security Program (FYNSP) (in this case, beyond fiscal year 2020).

Future Years Defense Program (FYDP) and DOE's Future Years Nuclear Security Program (FYNSP). We compared DOD's and DOE's estimates in the joint report with the FYDP and the FYNSP, because these are used by the two departments to formulate projected budget requests for the current year and at least 4 subsequent years. In this report, we refer to the FYNSP and FYDP as "internal funding plans." Because DOD has not prepared formal funding plans that it will use to develop projected defense budget requests beyond fiscal year 2020, and the 2016 joint report includes budget estimates through fiscal year 2025, we reviewed Air Force and Navy plans as well as Defense Information Systems Agency plans, which informed the DOD CIO's NC3 estimates; we also discussed DOD's long-term budget estimates in the joint report with relevant DOD officials. If the budget estimates in the 2016 joint report were consistent with the departments' funding plans, including the FYDP and FYNSP, we determined them to be sufficiently accurate and complete. To assess budget estimates beyond fiscal year 2020 for DOE, we evaluated DOE's *Stockpile Stewardship and Management Plan*, which is updated annually and includes DOE's budget estimates for nuclear weapons sustainment and modernization for the next 25 years.

Second, to assess the extent to which the 2016 joint report included complete and transparent information about the methodology DOD and DOE used to develop their budget estimates for nuclear sustainment and modernization, we drew on the work we had performed for our review of the fiscal years 2014 and 2015 joint reports.¹² We identified changes in 5- and 10-year estimates from the fiscal year 2015 joint report. Additionally, we discussed with relevant officials whether the guidance and methodologies DOD and DOE used to prepare their 10-year estimates for the 2016 joint report were the same as those they had used for the fiscal year 2015 joint report. In instances where different methodologies were used, we discussed the reasons why with cognizant officials. For our 2014 report, we derived general principles for developing and preparing long-term funding plans by reviewing key federal and departmental guidance, standards, and practices for cost estimating, budget preparation, financial

¹²[GAO-14-373](#) and [GAO-15-536](#).

planning, and public reporting.¹³ We then applied these derived principles as criteria for evaluating the information in the 2016 joint report. To the extent that we determined there were differences between the principles we derived and the information in the 2016 joint report, we discussed the causes and potential effects of these differences with relevant DOD and DOE officials.

We conducted this performance audit from May 2015 to December 2015 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. Appendix I provides more details on our scope and methodology.

Background

The 2010 *Nuclear Posture Review Report* outlined the administration's approach to maintaining the U.S. nuclear deterrent capability while showing its intent to make new investments in developing strategic delivery systems, upgrading the NC3 system, and modernizing NNSA's government-owned, contractor-operated nuclear security enterprise.¹⁴ It identified long-term modernization goals and plans—including sustaining a safe, secure, and effective nuclear arsenal by extending the lives of existing nuclear weapons; increasing investments to rebuild and modernize the nation's nuclear

¹³GAO-14-373. Such federal guidance included the following: Executive Office of the President, Office of Management and Budget, *Preparation, Submission, and Execution of the Budget*, Circular No. A-11 (Washington, D.C.: July 2013); *V 3.0 Capital Programming Guide: Supplement to Circular No. A-11: Planning, Budgeting, and Acquisition of Capital Assets* (Washington, D.C.: July 2013); and *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies*, accessed August 14, 2013, http://www.whitehouse.gov/omb/fedreg_final_information_quality_guidelines; and GAO, *GAO Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs*, GAO-09-3SP (Washington, D.C.: Mar. 2, 2009).

¹⁴Section 1070 of the National Defense Authorization Act for Fiscal Year 2008, Pub. L. No. 110-181 (2008), required the Secretary of Defense, in consultation with the Secretary of Energy and Secretary of State, to conduct a comprehensive review of the nuclear posture of the United States for the next 5 to 10 years. DOD published the conclusions and recommendations from that review in the April 2010 *Nuclear Posture Review Report*. Department of Defense, *Nuclear Posture Review Report* (Washington, D.C.: Apr. 6, 2010).

infrastructure; and strengthening the science, technology, and engineering base.¹⁵

Section 1043 of the National Defense Authorization Act for Fiscal Year 2012, as amended, requires that the annual joint report include 10-year budget estimates related to sustaining and modernizing U.S. nuclear weapons capabilities, among several other elements.¹⁶ The other required elements include detailed descriptions of DOD's and DOE's plans to

- enhance the safety, security, and reliability of the U.S. nuclear weapons stockpile;
- sustain and modernize the nuclear weapons complex;
- maintain, modernize, and replace delivery systems for nuclear weapons;
- sustain and modernize the nuclear weapons command and control system; and
- retire, dismantle, or eliminate any nuclear weapons, delivery systems, or silos/submarines that carry such weapons or delivery systems.¹⁷

Section 1043 was recently amended again, to require the Congressional Budget Office to submit to the congressional defense committees a related report for odd-numbered fiscal years, to include estimates of certain costs for nuclear weapons and delivery systems. The Congressional Budget Office report is to include an estimate of costs

¹⁵Ibid.

¹⁶See Pub. L. No. 112-81, § 1043(a)(2) (as amended). Specifically, section 1043 requires that the joint report include a detailed estimate of the budget requirements associated with sustaining and modernizing the U.S. nuclear deterrent and nuclear weapons stockpile, including the costs associated with various plans, over the 10-year period following the date of the report. § 1043(a)(2)(F). The budget requirements are to include applicable and appropriate costs associated with DOD's procurement; military construction; operation and maintenance; and research, development, test, and evaluation accounts. *Id.* The joint report is also to include a detailed description of costs included in the budget estimates and the methodology used to develop the estimates. § 1043(a)(3).

¹⁷§ 1043(a)(2). The report must also include a detailed description of the steps taken to implement the plan submitted in the previous year, including difficulties encountered in implementation. § 1043(a)(2)(G).

during a 10-year period associated with fielding and maintaining the current U.S. nuclear weapons and nuclear weapon delivery systems; an estimate of the costs during a 10-year period of any anticipated life extension, modernization, or replacement of those nuclear weapons and delivery systems; and an estimate of the relative percentage of total defense spending represented by these costs during that period.¹⁸

The FYDP is DOD's 5-year funding plan; it is updated annually and provides DOD's current budget request and budget estimates for at least 4 subsequent fiscal years. The FYDP includes thousands of discrete program elements, each of which may include funding projections for DOD appropriations accounts—including operation and maintenance; research, development, test, and evaluation; and procurement. DOD's Director of Cost Assessment and Program Evaluation maintains the FYDP and works with the Office of the Under Secretary of Defense (Comptroller) to ensure that the data presented in annual budget-justification materials match the FYDP at the appropriation account level.

The FYNSP is NNSA's 5-year funding plan, encompassing programs for which it is responsible, including Weapons Activities, Defense Nuclear Nonproliferation, and Naval Reactors. The FYNSP is included in the budget justifications submitted in connection with the President's budget request.¹⁹ NNSA develops the FYNSP with inputs from its subordinate offices, including the Office of Defense Programs and the Office of Defense Nuclear Nonproliferation. NNSA also describes its long-term modernization plans and budget estimates in its *Stockpile Stewardship and Management Plan*—a more detailed planning document on which DOE's portion of the 2016

¹⁸See Carl Levin and Howard P. "Buck" McKeon National Defense Authorization Act for Fiscal Year 2015, Pub. L. No. 113-291, § 1643 (2014) (amending § 1043(b)). If the joint report submitted for an even-numbered fiscal year contains a significant change affecting the estimates that the Congressional Budget Office included in the prior year's report, the Congressional Budget Office must submit a letter describing the changes. See § 1043(b)(2) (as amended). The Congressional Budget Office submitted its latest report on projected costs of U.S. nuclear forces on January 22, 2015. See Congressional Budget Office, *Projected Costs of U.S. Nuclear Forces, 2015-2024* (Washington, D.C.: January 22, 2015).

¹⁹NNSA refers to the cost figures included in its budget materials during the FYNSP period as "the budget" and those after the FYNSP as "budget requirement estimates." We refer to both types of cost figures as "budget estimates" throughout this report. NNSA officials stated that both sets of figures are informed by cost estimates.

joint report is based—and provides information on modernization and operations plans and budget estimates over the next 25 years.²⁰

DOE's major modernization efforts are centered on life extension programs and alterations²¹ for nuclear weapons and on major construction or refurbishment of facilities to modernize DOE's uranium and plutonium capabilities. DOE has plans to conduct at least four life extension programs per year simultaneously during the FYNSP period and the five years beyond the FYNSP period. Construction efforts to complete DOE's Uranium Processing Facility are scheduled to be completed by fiscal year 2025; these efforts include moving uranium processing activities from a decades-old building into new facilities. DOE's facilities to support its updated plutonium strategy—which include optimizing current infrastructure and providing additional space to support pit production—are scheduled to achieve a production capacity of 50 to 80 pits per year by 2030.

²⁰The *Stockpile Stewardship and Management Plan* is NNSA's formal means for communicating to Congress the status of certain activities and its long-range plans and budget estimates for sustaining the stockpile and modernizing the nuclear security enterprise. The Ike Skelton National Defense Authorization Act for Fiscal Year 2011 mandated that GAO study and report annually on whether NNSA's nuclear security budget materials provide for funding that is sufficient to modernize and refurbish the nuclear security enterprise. Pub. L. No. 111-383, § 3113 (2011), as amended by Pub. L. No. 112-239, § 3132(a)(2) (codified as amended at 50 U.S.C. § 2455).

²¹Life extension programs extend, through refurbishment, the operational lives of weapons in the nuclear stockpile by 20 to 30 years and certify these weapons' military performance requirements without underground nuclear testing. Much like a nuclear weapon life extension program, a weapon alteration refurbishes components of a weapon to ensure that the weapon can continue to meet military requirements. However, an alteration generally refurbishes fewer components than a life extension program. NNSA officials consider three nuclear weapons refurbishment programs in particular to be major modernization efforts—the B61-12 and W80-4 life extensions programs, and the W88 Alteration 370—however, this report includes all such refurbishment programs under way during the ten years covered by the joint report in its analysis.

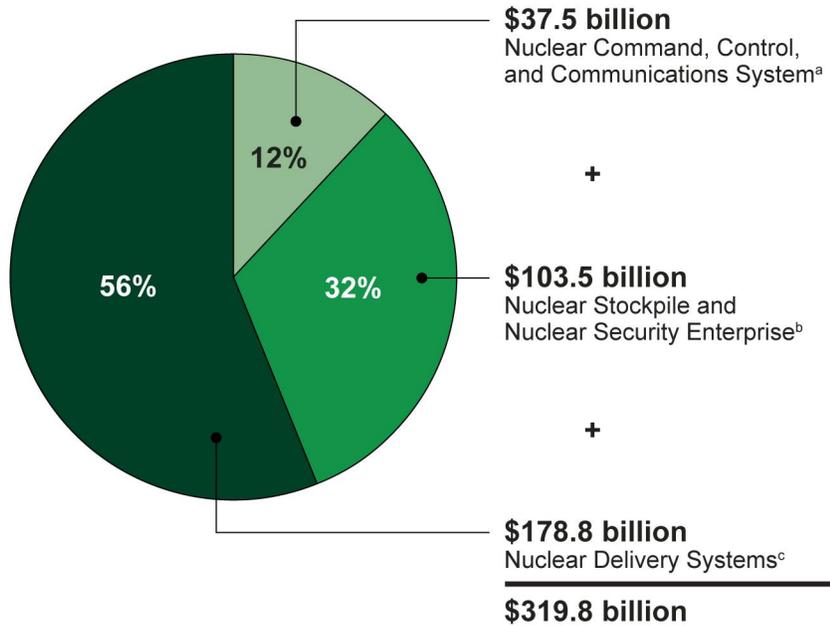
The Joint Report's Estimates are Generally Consistent with Both Departments' Internal Funding Plans and Long-Term Nuclear Modernization Plans, with Some Exceptions

In the fiscal year 2016 joint report, DOD's and DOE's estimates for sustaining and modernizing nuclear delivery systems, the NC3 system, the nuclear stockpile, and the nuclear security enterprise are generally consistent with their internal funding plans and long-term nuclear modernization plans, with some exceptions. DOD's estimates for sustaining and modernizing nuclear delivery systems are generally consistent with its internal funding plans, although it is unclear whether its estimates for the NC3 system are consistent with the FYDP. DOE's 5-year estimates for modernizing the nuclear stockpile and nuclear security enterprise are generally consistent with its internal funding plans, but its estimates beyond the FYNSP may not fully align with future budgets and cost estimates in its long-term modernization plans.

The Joint Report Includes Budget Estimates from Both DOD and DOE

DOD's and DOE's estimates for sustaining and modernizing nuclear delivery systems, the NC3 system, the nuclear stockpile, and the nuclear security enterprise are generally consistent with their internal funding plans and long-term nuclear modernization plans. The 2016 joint report estimated the 10-year budget for sustaining and modernizing U.S. nuclear weapons capabilities at \$336.5 billion; however, the total was revised to \$319.8 billion to correct an error in the 2016 joint report for the 10-year long-range strike bomber estimate that was identified after the report had been submitted. This 10-year estimate comprises DOD's estimates for nuclear delivery systems and the NC3 system and DOE's estimates for the nuclear stockpile and the nuclear security enterprise. DOD's portion of the revised estimate is approximately \$216.3 billion, or about 68 percent of the total, and DOE's portion is approximately \$103.5 billion, or about 32 percent of the total. Figure 1 shows the total 10-year sustainment and modernization estimate.

Figure 1: Departments of Defense (DOD) and Energy (DOE) Fiscal Year 2016 10-Year Estimates for Sustaining and Modernizing the U.S. Nuclear Deterrent



Source: GAO analysis of Department of Defense (DOD) and Department of Energy (DOE) data. | GAO-16-23

Note: In the 2016 joint report provided to Congress in April 2015, DOD inadvertently reported an incorrect figure for the long-range strike bomber; the budget estimates for Nuclear Delivery Systems shown in this figure reflect corrected data. DOD provided an addendum to the 2016 joint report with corrected budget estimates for the long-range strike bomber and an explanation for the error on November 18, 2015.

^aDOD provides budget estimates for the nuclear command, control, and communications (NC3) system, which consists of satellites, early warning radars, aircraft, communications networks, and other systems.

^bDOE provides budget estimates for the nuclear weapons stockpile, which currently consists of seven weapon types, and the nuclear security enterprise, which consists of eight geographically dispersed government-owned, contractor-operated sites, such as laboratories and test sites.

^cDOD provides budget estimates for nuclear delivery systems, which consist of a variety of platforms such as heavy bombers, air-launched cruise missiles, and ballistic-missile submarines.

DOD's Estimates for Nuclear Delivery Systems Are Generally Consistent with Its Internal Funding Plans and Long-Term Nuclear Modernization Plans, but It Is Unclear Whether the NC3 Estimates Are Consistent with Those Plans

In the 2016 joint report, DOD provided budget estimates associated with sustaining and modernizing nuclear delivery systems—such as the Minuteman III, heavy bombers, and the Ohio-class submarine—and for the NC3 system. DOD's \$178.8 billion sustainment and modernization estimate for nuclear delivery systems is comprised of estimates developed by the Air Force and the Navy for the individual systems. We found that the combined Air Force and Navy budget estimates for nuclear delivery systems are generally consistent with DOD's FYDP for specific accounts, such as procurement; research, development, test, and evaluation; operation and maintenance; and military personnel through fiscal year 2020. These estimates²² include

- \$16.4 billion in procurement and military construction²³
 - Air Force: \$3.4 billion
 - Navy: \$13.0 billion
- \$26.4 billion in research, development, test, and evaluation
 - Air Force: \$20.7 billion
 - Navy: \$5.7 billion
- \$31 billion in operation and maintenance and military personnel
 - Air Force: \$18.1 billion
 - Navy: \$12.9 billion

DOD provides its plans for sustaining and modernizing nuclear delivery systems in a variety of documents, including the joint report, budget justification materials, and other planning documents. These plans include maintaining current systems while developing new ones. For example:

²²The totals for these estimates may not match totals in table 1, due to rounding.

²³This estimate does not include approximately \$0.8 billion in NNSA funding for nuclear reactor design for the Navy's Ohio-replacement submarine.

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- **Heavy Bombers.** The Air Force plans to maintain its long-range bomber capabilities through a combination of sustainment and modernization programs as well as a new bomber acquisition. Concurrently, the Air Force plans to modernize the B-2 and B-52 bombers to enable them to retain long-range strike capabilities through the 2030s. The B-52—a 50-plus years old aircraft—is being modernized in areas such as communications, internal weapons bay upgrades, and replacement of various legacy systems, to keep it viable until at least 2040. For the B-2, the Air Force plans to modernize communications systems and upgrade armaments capabilities to integrate new or advanced weapons, among other areas, to maintain the B-2’s expected service life through 2058. The Air Force also plans to acquire 80 to 100 new long-range strike bombers in the mid-2020s, which it expects to perform both conventional missions and nuclear deterrence.
 - **Cruise Missiles.** The Air Force plans to sustain the air-launched cruise missile through 2030, in part by performing service life extension programs, because some of the missile’s components are expected to become non-supportable prior to 2030. The Air Force is updating the missile’s software and associated test procedures and test equipment, among other things. The Air Force has stated that the continuing need for a standoff capability makes development of a new cruise missile, the long-range standoff missile, essential to the overall nuclear modernization effort. In fiscal year 2015, DOD delayed the long-range standoff missile program for three years, due to higher department priorities. However, for fiscal year 2016, the Air Force restored funding to a level that enables the program to meet U.S. Strategic Command’s²⁴ operational requirements and realigns Air Force efforts with the NNSA life extension program to produce a long-range standoff missile warhead.
 - **Ballistic Missile Submarines (SSBN).** Through its Ohio Replacement Program, the Navy plans to design and build 12 ballistic missile submarines to replace the current force of 14 Ohio-class submarines. The Navy wants to begin procurement funding in fiscal year 2017, with the first new submarine procured in fiscal year 2021. In the meantime, the Navy is performing intermediate maintenance

²⁴The U.S. Strategic Command is a combatant command responsible for developing operational plans and identifying targets for nuclear forces.

and industrial support for the incremental overhaul, repair, and refueling of the Ohio-class submarines, among other things. The Navy began a life extension program for the Trident II submarine-launched ballistic missile so that it would remain capable throughout the life of the Ohio class submarine. The program includes replacement of the solid rocket motors and redesign and replacement of missile guidance and electronic systems, among other things.

DOD's 5-year and 10-year budget estimates for sustaining and modernizing nuclear delivery systems are summarized in table 1.

Table 1: Department of Defense's (DOD) Fiscal Year 2016 5-Year and 10-Year Estimates for Sustaining and Modernizing Nuclear Delivery Systems

Delivery system	Sub-Category	Fiscal years 2016-2020 (Dollars in Billions^a)	Fiscal years 2016-2025 (Dollars in Billions^a)
Heavy bombers	B-2 and B-52	13.7	25.3
	Long-range strike bomber ^b	13.9	41.7
	B61-12 tail kit assembly	1.1	1.1
Cruise missiles	Air-launched cruise missile	0.4	0.7
	Long-range standoff missile	1.8	4.7
Intercontinental ballistic missile (ICBM)	Minuteman III	7.8	14.1
	Ground Based Strategic Deterrent	0.9	8.4
	ICBM fuze modernization ^c	0.8	Merged with Ground Based Strategic Deterrent
Dual-capable aircraft^d	N/A	1.6	3.2
Fleet ballistic missile submarine (SSBN)	Ohio-class submarine	9.3	18.5
	Ohio-replacement program	10.6	35.3
	Ohio-replacement program reactor design (NNSA)	0.8	1.0
	Submarine-launched ballistic missile (SLBM) (Trident II)	11.8	24.8
Total^e	N/A	74.5	178.8

Source: DOD data. | GAO-16-23

Totals may not add due to rounding.

Note: In the 2016 joint report provided to Congress in April 2015, DOD inadvertently reported an incorrect figure for the long-range strike bomber, and the budget estimates in this table reflect corrected data.

^aEstimated amounts include military personnel; operation and maintenance; research, development, test, and evaluation; and procurement and ship construction. DOD activities do not include overhead costs such as personnel assigned to higher headquarters who work on nuclear deterrence-related issues.

^bThe long-range strike bomber is expected to perform both conventional and nuclear deterrent missions.

^cDOD expects to merge fuze modernization with Ground Based Strategic Deterrent starting in fiscal year 2021. It does not expect subsequent reports to separately report fuze modernization.

^dDual-capable aircraft are fighter aircraft capable of delivering nuclear weapons. These figures include operation and maintenance funding for the F-16C and F-15E squadrons based overseas and nuclear weapons storage as well as funds for F-35 dual-capable aircraft research, development, test, and evaluation. The 10-year projections were computed using inflation rates of 1.8 percent for the military personnel appropriations account and 2 percent for other appropriation accounts.

^eAmounts shown may include nuclear command and control system integration costs, which are also included in NC3 amounts.

The 2016 joint report shows that the 5-year estimate for the NC3 system for fiscal years 2016 through 2020 totals \$19.9 billion, and the 10-year estimate for fiscal years 2016 through 2025 totals \$37.5 billion. The DOD CIO prepared the plans and budget estimates for the NC3 system. The fiscal years 2016 through 2020 estimates include

- \$2.1 billion in research, development, test, and evaluation;
- \$7.7 billion in procurement; and
- \$10.1 billion in operation and maintenance.

However—as we found for the fiscal years 2014 and 2015 joint reports—it is unclear whether these estimates for the NC3 system are consistent with DOD’s internal funding plans. We were able to verify some of the calculations that DOD used to develop its estimates, but we were not able to compare the estimates with the FYDP, because the DOD CIO did not always link projects and activities with specific FYDP programs. While the DOD CIO did provide some information in the 2016 report about the methodology used to develop the NC3 budget estimates, it did not clearly document all of the assumptions used in developing those estimates or the limitations associated with the data from which the estimates were derived. In our June 2014 report, we recommended that for future joint reports the Secretary of Defense direct the DOD CIO to document in the report the methodological assumptions and limitations affecting the report’s estimates for sustaining and modernizing the NC3 system.²⁵ DOD

²⁵[GAO-14-373](#).

agreed with our recommendation and stated that in future joint reports it would include all key assumptions and potential limitations of the methodology used to develop NC3 system estimates; however, the fiscal years 2015 and 2016 joint reports do not include this information. We continue to believe that our June 2014 recommendation has merit and should be fully implemented. Because the 2016 joint report does not provide clear documentation of the methodological assumptions and limitations, it was not always possible for us to determine how a given estimate was developed. We discuss the limitations of the DOD CIO's methodology for developing the estimates later in this report.

DOE's Estimates in the Joint Report May Not Fully Align with Future Budgets and Cost Estimates in Its Long-Term Modernization Plans

In the fiscal year 2016 joint report, DOE provided budget estimates for sustaining and modernizing the nuclear stockpile and nuclear security enterprise. NNSA developed these budget estimates through preparation of the FYNSP and the fiscal year 2016 *Stockpile Stewardship and Management Plan*, which formed the basis for the \$103.5 billion budget estimates included in the joint report. The DOE estimates in the joint report match those reported in the FYNSP and the *Stockpile Stewardship and Management Plan*. However, in the 5 years beyond the FYNSP, the DOE budget estimates for modernization in the joint report exceed figures referred to in the joint report as the President's budget figures, raising questions about the alignment of NNSA's modernization funding needs with potential future budgets. In addition to this overall alignment concern, we found that several individual modernization program budget estimates may not fully align with NNSA's internal cost range estimates.²⁶ DOE's 5-year and 10-year budget estimates for sustaining and modernizing the nuclear stockpile and nuclear security enterprise are summarized in table 2.²⁷

²⁶We have ongoing work examining NNSA's modernization efforts in more detail as part of our annual review on whether NNSA's nuclear security budget materials provide for funding sufficient to modernize and refurbish the nuclear security enterprise. Specifically, we are assessing (1) the extent to which NNSA's budget estimates and plans for modernization activities reflected in its fiscal year 2016 nuclear security budget materials differ, if at all, from those in its fiscal year 2015 budget materials and (2) the extent to which the fiscal year 2016 nuclear security budget materials align with modernization plans. We plan to issue a final report in early 2016.

²⁷DOE's NNSA's fiscal year 2016 budget consists of four appropriation accounts: (1) Defense Nuclear Nonproliferation, (2) Naval Reactors, (3) Federal Salaries and Expenses, and (4) Weapons Activities. DOE's estimates in the joint report and in the *Stockpile Stewardship and Management Plan* represent the Weapons Activities appropriation account.

Table 2: Department of Energy’s (DOE) Fiscal Year 2016 5-Year and 10-Year Nuclear Modernization Budget Estimates

Category	Fiscal Years 2016-2020 (Dollars in Billions)	Fiscal Years 2021-2025 (Dollars in Billions)	Total (Dollars in Billions)
Directed Stockpile Work	17.6	21.8	39.4
Research, Development, Testing, and Evaluation ^a	9.4	10.6	20.0
Infrastructure ^b	13.7	17.2	30.9
All other weapons activities ^c	6.5	6.7	13.2
Total	47.2	56.4	103.5

Source: GAO analysis of DOE data. | GAO-16-23

Totals may not add due to rounding.

^aThe fiscal year 2014 joint report used the term “Science, Technology, and Engineering Capabilities” for this category, but the fiscal year 2015 joint report changed the name to Research, Development, Testing, and Evaluation.

^bActivities that had been funded in Readiness in Technical Base and Facilities in past years are now funded in either Readiness in Technical Base and Facilities or in Infrastructure and Safety. The “Infrastructure” total combines both these amounts.

^cAll other weapons activities include budget estimates associated with nuclear weapon security and transportation as well as legacy contractor pensions, among other things, that are also included in DOE’s Weapons Activities.

Note: The Directed Stockpile Work category includes DOE activities to ensure the reliability of the nuclear weapons stockpile. Among other things, this includes the nuclear weapon life extension programs. The Infrastructure category includes DOE activities to operate, maintain, and refurbish infrastructure in the nuclear security enterprise, including major construction projects, such as those to modernize DOE’s uranium and plutonium capabilities.

In the 2016 joint report, DOE estimated a total of \$47.2 billion for modernization activities during fiscal years 2016 through 2020 and a total of \$56.4 billion for fiscal years 2021 through 2025. These modernization budget estimates match those reported in NNSA’s FYNSP and *Stockpile Stewardship and Management Plan* over the 10-year period. However, DOE’s budget estimates in the 2016 joint report for fiscal years 2021 through 2025 exceed what the joint report described as the President’s budget figures for nuclear modernization and sustainment activities over the same time period. Specifically, in addition to DOE’s budget estimates, the joint report included information on estimates described as the President’s budget figures for Weapons Activities for fiscal years 2016 through 2025.²⁸ DOE’s overall budget estimates for fiscal years 2021

²⁸According to officials, these figures were provided by the Office of Management and Budget. These figures were escalated by 2 percent in the years beyond the FYNSP.

through 2025 total \$56.4 billion, but the estimates identified as the President's budget figures included in the joint report total \$52.2 billion during those years, or \$4.2 billion less than DOE's budget estimates (see table 3).²⁹

Table 3: Comparison of Department of Energy's (DOE) Fiscal Year 2016 Weapons Activities Budget Estimates and the Figures Identified by DOE As Associated with the President's Budget for Fiscal Years 2021 through 2025

Fiscal Year(dollars in billions)	2021	2022	2023	2024	2025	2021-2025 (Total)
Joint Report Budget Estimates Total for Weapons Activities	10.8	11.0	11.2	11.5	11.8	56.4
President's Budget Figures Total for Weapons Activities	10.0	10.2	10.4	10.6	10.9	52.2
Amount by which Joint Report Estimates Exceed President's Budget Figures Estimates	0.8	0.8	0.8	0.9	0.9	4.2

Source: GAO analysis of DOE data. | GAO-16-23

Totals may not add due to rounding.

Note: DOE stated that amounts identified in the joint report as President's budget figures were provided by the Office of Management and Budget.

The differences between DOE's estimates and the estimates described as the President's budget figures raise questions about the alignment of DOE's modernization plans with potential future budgets. According to an NNSA official who coordinates production of the *Stockpile Stewardship and Management Plan*, the President's budget figures were included in the fiscal year 2016 joint report at the request of the Office of Management and Budget. This official told us that the figures DOE included in the joint report represent the department's evaluation of what modernization activities will cost for these years, based on current plans and available information. However, according to this official, the estimates beyond the FYNSP have not undergone the same programming scrutiny as those in the FYNSP. This official stated that he believed the President's budget information was included in the joint report to show that the Administration has not yet adopted NNSA's budget estimates beyond the FYNSP. These differences could require NNSA to reevaluate its estimates beyond the FYNSP in future planning cycles. In addition, NNSA officials stated that there is a high level of

²⁹This information described as President's budget figures was not included in prior versions of the joint report.

uncertainty in the budget estimates beyond the FYNSP, which makes planning beyond 5 years difficult.

In addition, we found several instances where NNSA's budget estimates for major modernization efforts may not fully align with cost range estimates for each life extension program. As noted above, NNSA's budget estimates from the FYNSP and the fiscal year 2016 *Stockpile Stewardship and Management Plan* formed the basis for the budget estimates included in the joint report. The joint report contains high-level budget estimates for activities such as Directed Stockpile Work, which includes life extension programs and stockpile service activities, among other things. The Directed Stockpile Work category in the FYNSP and the *Stockpile Stewardship and Management Plan* contains more detailed budget information on life extension programs that includes specific budget estimates for each life extension program as well as high and low cost range estimates that NNSA developed for them.³⁰ Because the joint report does not include this level of budget detail, we analyzed the budget estimates and the cost range estimates for the life extension programs from these sources. Specifically, we analyzed NNSA's budget estimates in the FYNSP and the *Stockpile Stewardship and Management Plan* for each life extension program over the 10-year period—the W76-1, the B61-12, the W88 Alteration 370, the W80-4, the Interoperable Warhead-1, and the Interoperable Warhead-2—by comparing them against the high and low cost range estimates that NNSA prepared for each.

For each life extension program, we assessed the extent to which the budget estimates aligned with its high-low cost range estimates.³¹ Specifically, we examined instances where the low end of the cost range estimates for the life extension program was greater than the budget estimates. In general, over the 10-year period covered by the joint report, we found that NNSA's life extension program budget estimates aligned with (i.e., fell within) the high and low cost range estimates for those programs. However, for some years, the low cost range estimates that DOE

³⁰Because the W76-1 life extension program is the only weapon program that has been through the development phase and the majority of the production phase, DOE uses it as the primary basis for modeling cost range estimates for all future life extension programs. As a result, NNSA does not prepare high and low cost range estimates for it.

³¹Because NNSA does not prepare high and low cost range estimates for the W76-1, we compared the budget estimates for each fiscal year with the internal cost estimates NNSA developed for the life extension program.

developed exceeded the budget estimates for some life extension programs, suggesting the potential for a funding shortfall for those programs in those years. For instance, we found that

- The B61-12 life extension program's budget estimates during the period covered by the FYNSP generally align with NNSA's cost range estimates. However, the low cost range estimate of \$195 million for the final year of production in fiscal year 2025 exceeds the budget estimate of \$64 million. An NNSA official said that this difference is not a concern, because this shortfall occurs during the final year of the life extension program effort and represents a difference in the expected rate at which the program could wind down.
- The low cost range estimate for the W88 Alteration 370 exceeds its budget estimate for fiscal year 2020. The budget materials report that the budget estimate for the program that year is \$218.3 million; however, the low point of the cost range is \$247 million. An NNSA official stated that this shortfall is not a concern because there is flexibility to address possible shortfalls in future programming cycles.
- The W80-4 life extension program's low range cost estimate of \$476 million exceeds its budget estimates of \$459 million for fiscal year 2020. An NNSA official stated that because the budget estimates for this life extension program are above the low point of its estimated cost range during other years, the shortfall in fiscal year 2020 represents a small incongruity in an otherwise sound life extension program profile.
- The budget estimates for the Interoperable Warhead-1 and Interoperable Warhead-2 life extension programs are both within the high and low estimated cost ranges for most years. However, the low cost range estimate of \$175 million for the Interoperable Warhead-1 exceeds its budget estimate of \$113 million in fiscal year 2020, which is its first year of funding. A DOE official said that shifting dollars projected for fiscal year 2021 into 2020 could keep the Interoperable Warhead-1 budget estimates within the low end of the cost range.

For the W76-1 life extension program, we compared the budget estimates in the FYNSP and the *Stockpile Stewardship and Management Plan* for each fiscal year with the internal cost estimates NNSA developed for the life extension program. We found that the budget estimates for all years within the FYNSP, except for fiscal year 2018, are below NNSA's internal cost estimates for that program, raising questions about whether the budget for the life extension program is aligned with anticipated costs.

According to an NNSA official, the W76-1 life extension program is nearing completion, and the model used to develop internal cost estimates for the W76-1 is predicting the life extension program's end-of-program costs in a way that may not reflect the rate at which the program winds down.

NNSA officials stated that their intent in providing budget estimates and cost range estimates for each life extension program is to show general agreement between the two sets of estimates. Notwithstanding the differences we identified between budget estimates and low-end cost range estimates for certain life extension programs in certain years, NNSA officials believed the budget estimates and the cost range estimates are in general agreement for each life extension program in terms of total costs and trend, and they attributed the differences to separate teams involved and methodologies used in preparing the estimates. In addition, NNSA officials stated that there is some flexibility in the funding for the life extension programs, and that the programs may carry over some funds from one year to the next if needed to cover costs, depending on the reason for the shortfall, among other things.

In our August 2015 report on NNSA's nuclear security budget materials,³² we found that shortfalls in life extension program budget estimates compared with the life extension program cost range estimates can pose risks to the achievement of program objectives and goals, such as increases in program costs and schedule delays. NNSA agreed with our recommendation from that report to provide more transparency in its budget materials with regard to shortfalls. Specifically, NNSA said that it would include, as appropriate, statements in future *Stockpile Stewardship and Management Plans* on the effect of funding a life extension program effort at less than the amount suggested by a planning estimate cost range. NNSA plans to incorporate this recommendation, among others, into the agency's fiscal year 2017 budget materials.

³²GAO, *Modernizing the Nuclear Security Enterprise: NNSA Increased its Budget Estimates, But Estimates for Key Stockpile and Infrastructure Programs Need Improvement*, [GAO-15-499](#) (Washington, D.C.: Aug. 6, 2015).

The 2016 Joint Report Contains More Information than the Prior Two Years' Reports, but Additional Information Could Improve Transparency

The 2016 joint report contains some information that was not included in the fiscal years 2014 or 2015 joint reports, but it does not include explicit information on methodological assumptions and limitations, and DOD did not ensure the accuracy of its fiscal year 2016 budget estimates. Further, the report does not include comparative information on the budget estimates or explain why some of the estimates had changed from those in the prior year's report.

The 2016 Joint Report Describes the Methodologies Used to Develop Budget Estimates, but the Descriptions Lack Detail and DOD Did Not Ensure That Its Estimates Were Accurate

Documentation of Methodologies

In the 2016 joint report, both departments describe the methodologies they used to develop their estimates for sustaining and modernizing nuclear delivery systems, the NC3 system, and the nuclear security enterprise, as DOE had done in the previous joint report. In our July 2015 report,³³ we recommended that DOD and DOE provide more thorough documentation of the methodologies they used to develop the budget estimates—including information that may also be available in related planning documents. DOD and DOE agreed with our recommendation, and DOD

³³[GAO-15-536](#).

stated that it had included in the 2016 report information on the methodologies it used to develop the estimates and would consider including further information in subsequent reports.

In the 2016 joint report, DOD provided general information on the methodology the Air Force, Navy, and DOD CIO used to develop their 5- and 10-year budget estimates for sustaining and modernizing nuclear delivery and NC3 systems. For example, the report notes that the Air Force based its 10-year budget estimates on the Air Force long-range programming plan,³⁴ while the Navy developed its 10-year operations and sustainment estimates using a 1.8 percent inflation factor for pay and a 2 percent inflation factor for non-pay accounts. The report further specifies that the Navy's budget estimates for the Ohio Replacement Program were developed separately, taking into account factors unique to the naval ship building environment. However, the information lacks detail regarding some of the assumptions and potential limitations of the methodologies. DOD officials said that providing more thorough information could further clarify the methodologies used to develop the budget estimates, and DOD is considering including additional information in the fiscal year 2017 joint report.

In addition, DOD included in the 2016 joint report information on the methodology the DOD CIO used to develop its \$37.5 billion estimate for sustaining and modernizing the NC3 system through fiscal year 2025. However, DOD did not make its methodology fully transparent, because it did not document some of the assumptions and potential limitations of this methodology in the report. As in the prior two joint reports, the DOD CIO prepared the plans and the 10-year budget estimates for sustaining the NC3 system.³⁵ DOD notes in the 2016 joint report that the DOD CIO applied weighted analysis to program elements and budget line items in the fiscal

³⁴The Programmed Force Extended, a force structure and resource allocation plan, is a result of the annual Air Force strategic planning process, which merges prior plans, current programs, adjustments in strategic and fiscal guidance, and senior leader priorities in a constrained budget environment. The only exception is the U.S. Air Force squadron component in Europe, for which the Air Force used a 1.8 percent inflation factor for pay and 2 percent inflation factor for non-pay accounts, because the Programmed Force Extended does not include specific planning data for major commands.

³⁵The NC3 system consists of satellites, early warning radars, aircraft, communications networks, and other systems that are managed by the Air Force, Navy, Defense Information Systems Agency, and other organizations. Many systems that make up the NC3 system also support nonnuclear military operations.

year 2016 President's Budget. DOD further noted that the estimates for the five years beyond the FYDP (fiscal years 2021-2025) were calculated using a 2 percent inflation factor.

As we reported in June 2014 and again in July 2015, the DOD CIO used Defense Information Systems Agency's October 2011 *Nuclear Command, Control, and Communications (C3) System Program Tracking Report*³⁶ as a source to identify relevant programs in the FYDP and for determining how much funding from each of these programs should be allocated to the NC3 mission.³⁷ In our prior reports we found that the use of the 2011 Defense Information Systems Agency report led to a key methodological limitation, because that report did not link all projects and activities with specific FYDP programs. For example, we found in 2014 that the Defense Information Systems Agency report did not link any operation and maintenance activities with FYDP programs, and it did not link 28 percent of the procurement activities directly with FYDP programs; as a result, the DOD CIO did not have a direct way to prepare budget estimates for these projects and activities. DOD did not disclose this limitation in the fiscal years 2014 or 2015 joint reports. The DOD CIO made certain assumptions to overcome the limitation, thereby covering affected NC3 activities in the 10-year estimate. However, DOD did not document in the 2014 and 2015 joint reports the assumptions that had been made in developing these estimates. In our 2014 report, we recommended that the Secretary of Defense direct the DOD CIO to document in future joint reports the methodological assumptions and limitations affecting the estimates.³⁸ DOD agreed with this recommendation and stated that in future reports it would include all of its key assumptions and the potential limitations of the methodologies it used in developing its NC3 system estimates.

DOD CIO officials said that for consistency within the department and for external consumers of funding information, they continued to use the same methodology in preparing the 2016 joint report that they had used for the fiscal years 2014 and 2015 joint reports. Officials added that while their methodology remained the same in that they continued to use the 2011 Defense Information Systems Agency report to identify relevant

³⁶Defense Information Systems Agency, *Nuclear C3 System Program Tracking Report* (Washington, D.C.: Oct. 2011).

³⁷[GAO-14-373](#) and [GAO-15-536](#).

³⁸*Ibid.*

activities from which to allocate projected estimates to the NC3 system, they used the fiscal year 2016 FYDP data to develop the estimates. However, in the description it provided in the 2016 joint report, DOD did not document the Defense Information Systems Agency report's limitation and the potential effect of that limitation on the estimates. The usefulness and transparency of the joint report could be further improved if DOD implemented our previous recommendation to document the methodological assumptions and limitations affecting the NC3 system estimate. Therefore, we continue to believe that this recommendation has merit and should be fully addressed.

The 2016 joint report also provides some information on how DOE's estimates were generally prepared. For example, the report states that the estimates used for the FYNSP were generated as part of the DOE planning and programming process that informed the development of DOE's portion of the fiscal year 2016 President's Budget. The report states that these estimates were developed in part with input from nuclear security enterprise contractors and federal program managers, and were based on both historical costs and the most current plans for programs and projects. For fiscal year 2016, NNSA included contributions from these subject matter experts for planning life extension programs, which was a change from how the agency had prepared estimates for fiscal year 2015. NNSA officials said that input from these experts helped NNSA address program uncertainty.

However, the joint report does not clearly describe the methodologies used to develop DOE's estimates for major modernization efforts.

- **Life Extension Programs.** The fiscal year 2016 joint report indicates that the *Stockpile Stewardship and Management Plan* contains information regarding the life extension program budget estimates and the methodologies used to develop them.
- **Construction Projects.** The fiscal year 2015 joint report does not include information on the methodology used to develop the budget estimates for the major construction projects, nor does it reference the *Stockpile Stewardship and Management Plan* or other documentation that might describe them.

An NNSA official told us that the department does not provide more detail in the joint report because additional detail is available for review in the *Stockpile Stewardship and Management Plan* and DOE's budget justification materials accompanying the President's Budget request and,

therefore, the level of detail that DOE currently provides in the joint report is responsive to the requirements.

Section 1043, as amended, requires that the joint report include a detailed description of the costs included in the budget estimates and the methodology used to develop these estimates.³⁹ Key principles for preparing funding plans, which for our June 2014 report we derived from several federal guidance documents, indicate that potential methodological limitations should be disclosed in order to enhance the quality of the funding plan by improving transparency.⁴⁰ These principles further indicate that including all relevant costs can help to enhance accuracy and completeness. We continue to maintain, as we concluded in prior work,⁴¹ that unless explicit information on the methodologies used to develop the budget estimates is explained in the joint report—including any potential limitations associated with the methodologies—it may be difficult for Congress, as it assesses long-term affordability when allocating resources, to readily understand the basis for the estimates and be assured of the estimates' accuracy and completeness.

Accuracy of Budget Estimates

DOD did not ensure the accuracy of the budget estimates it reported in the 2016 joint report, and it unintentionally over stated the 10-year estimate for the Air Force's long-range strike bomber by \$16.7 billion. In the 2016 joint report, DOD reported that the 10-year estimate for the long-range strike bomber was \$58.4 billion, an increase of about 76 percent (approximately \$25.3 billion) over the \$33.1 billion estimate in the fiscal year 2015 report. In response to our inquiry regarding the significant increase in the 10-year estimate, Air Force officials explained that the estimate had been reported incorrectly as a result of an administrative

³⁹§ 1043(a)(3).

⁴⁰Such federal guidance included the following: *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies*, accessed August 14, 2013, http://www.whitehouse.gov/omb/fedreg_final_information_quality_guidelines; GAO, *GAO Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs*, [GAO-09-3SP](#) (Washington, D.C.: Mar. 2, 2009); and Executive Office of the President, Office of Management and Budget, *Preparation, Submission, and Execution of the Budget*, Circular No. A-11 (Washington, D.C.: July 2013); *V 3.0 Capital Programming Guide: Supplement to Circular No. A-11: Planning, Budgeting, and Acquisition of Capital Assets* (Washington, D.C.: July 2013).

⁴¹[GAO-14-373](#) and [GAO-15-536](#).

error. DOD subsequently provided Congress with an addendum to the 2016 and 2015 joint reports with corrected budget estimates for the long-range strike bomber and an explanation for the error on November 18, 2015.⁴² The addendum shows that the fiscal year 2016 10-year estimate for the long-range strike bomber should have been \$41.7 billion instead of \$58.4 billion. Furthermore, the addendum shows that the 10-year estimate for the long-range strike bomber in the fiscal year 2015 report was also incorrect and should have been reported as \$41.4 billion rather than \$33.1 billion, an increase of \$8.3 billion or about 25 percent.⁴³

Key principles that we derived from federal budgeting and cost-estimating guidance (e.g. *GAO Cost Estimating Guide*)⁴⁴ indicate that long-term funding plans should include all relevant budget estimates for a program, in order to assist decision makers as they determine how to allocate resources. These principles also indicate that agencies should develop a process to ensure that high quality information is included in records they disseminate. High quality information is accurate and complete. By not ensuring the accuracy and completeness of the budget estimates, DOD overstated the total anticipated cost of its sustainment and modernization activities.⁴⁵ In our July 2015 report, as part of the recommendation that

⁴²DOD, *Air Force Addendum to the Fiscal Year 2015 and Fiscal Year 2016 Reports on the Plan for the Nuclear Weapons Stockpile, Nuclear Weapons Complex, Nuclear Weapons Delivery Systems, and Nuclear Weapons Command and Control System Specified in Section 1043 of the National Defense Authorization Act for Fiscal Year 2012* (Washington, D.C.: Nov. 18, 2015).

⁴³In July 2015, we reported that the fiscal year 2015 10-year estimate for sustaining and modernizing the U.S. nuclear deterrent was \$298.1 billion, based on the budget estimate reported by DOD and DOE in the fiscal year 2015 joint report; however, DOD's revision to the fiscal year 2015 long-range strike bomber estimate increases this figure to \$306.4 billion.

⁴⁴Such federal guidance included the following: *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies*, accessed August 14, 2013, http://www.whitehouse.gov/omb/fedreg_final_information_quality_guidelines; GAO, *GAO Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs*, *GAO-09-3SP* (Washington, D.C.: Mar. 2, 2009); and Executive Office of the President, Office of Management and Budget, *Preparation, Submission, and Execution of the Budget*, Circular No. A-11 (Washington, D.C.: July 2013); *V 3.0 Capital Programming Guide: Supplement to Circular No. A-11: Planning, Budgeting, and Acquisition of Capital Assets* (Washington, D.C.: July 2013).

⁴⁵DOD's addendum to the fiscal year 2015 and 2016 joint reports shows it also understated the total anticipated cost of its sustainment and modernization activities in the fiscal year 2015 joint report.

DOD and DOE provide more thorough documentation on the methodologies they used to develop the budget estimates, we also recommended that they ensure the accuracy and completeness of the information included in the report. Both departments agreed with the overall recommendation; however, neither stated in its response what steps it would take to ensure accuracy and completeness as it develops future reports. We continue to believe it is important that the information included in the joint reports be accurate and complete and that the Departments fully implement this recommendation.

DOD and DOE Did Not Include Comparative Data or Explain Why Some Budget Estimates in the Joint Report Had Changed from Those in the Prior Year’s Report

Although some of the budget estimates changed from the fiscal year 2015 to the fiscal year 2016 joint reports, DOD and DOE did not report these changes or the reasons for them in the 2016 joint report.⁴⁶ Specifically, DOD provided some information on changes to programs, but it did not directly link the information on changes to programs with the budget estimates it provided in the report or provide comparative information regarding the change in budget estimates across years. Table 4 shows changes from the fiscal year 2015 joint report to the 2016 joint report in DOD’s 5-year and 10-year estimates for sustaining and modernizing nuclear delivery systems.

Table 4: Changes in Department of Defense’s (DOD) 5-Year and 10-Year Budget Estimates for Sustaining and Modernizing Nuclear Delivery Systems from the Fiscal Year 2015 to the Fiscal Year 2016 Joint Report

Delivery system	Sub-Category	5-Year Dollar Change (Dollars in Billions)	5-Year Percent Change (Dollars in Billions)	10-Year Dollar Change (Dollars in Billions)	10 Year Percent Change (Dollars in Billions)
Heavy bombers	B-2 and B-52	0.4	3	0.9	4
	Long-range strike bomber	2.5	22	0.3	1
	B61-12 tail kit assembly	-0.1	-8	-0.2	-15

⁴⁶In July 2015, we recommended that in future joint reports DOD and DOE provide comparative information about changes in the budget estimates from the prior year and explain the reasons for those changes. However, the 2016 joint report was issued in April 2015, before we published our review of the 2015 joint report. As a result, DOD and DOE were not able to incorporate any changes to the joint report based on the 2015 recommendations.

Delivery system	Sub-Category	5-Year Dollar Change (Dollars in Billions)	5-Year Percent Change (Dollars in Billions)	10-Year Dollar Change (Dollars in Billions)	10 Year Percent Change (Dollars in Billions)
Cruise missiles	Air-launched cruise missile	0.1	33	0.1	17
	Long-range standoff missile	1.6	800	1.9	68
Intercontinental ballistic missile (ICBM)	Minuteman III	1.1	16	2.5	22
	Ground Based Strategic Deterrent	0.9	Not previously reported	2.4	40
	ICBM fuze modernization	0.1	14	-1.4	Merged with Ground Based Strategic Deterrent
Dual-capable aircraft	N/A	0.4	33	0.5	19
Fleet ballistic missile submarine (SSBN)	Ohio-class submarine	-0.1	-1	-0.5	-3
	Ohio replacement program	0.6	6	0.1	0
	Ohio replacement program reactor design (NNSA)	0	0	-0.1	-9
	Submarine-launched ballistic missile (SLBM) (Trident II)	0.2	2	0.6	2
Total	N/A	7.7	12	7.1	4

Source: GAO analysis of DOD data. | GAO-16-23

Totals may not add due to rounding.

Note: In the 2016 and 2015 joint reports, DOD inadvertently reported an incorrect figure for the long-range strike bomber; the budget estimates in this table reflect corrected data from DOD's addendum to the fiscal year 2015 and 2016 joint reports.

DOD's 10-year estimate of \$178.8 billion for nuclear delivery systems reflects an increase of about 4 percent (or \$7.1 billion) over the estimate in the fiscal 2015 joint report of \$171.7 billion.⁴⁷ According to DOD officials, the greatest increase in the 10-year estimate was due to DOD accelerating the long-range standoff missile program by two years. In fiscal year 2015, DOD delayed the long-range standoff missile program for three years, due to higher priorities.

The biggest change to the Navy's estimates was an increase in the estimate for the submarine-launched ballistic missile, Trident II, of about 2

⁴⁷In July 2015, we reported that DOD's 10-year estimate for nuclear delivery systems was \$163.4 billion; however, DOD's revision to the fiscal year 2015 long-range strike bomber estimate from \$33.1 billion to \$41.4 billion increases this figure to \$171.7 billion.

percent (approximately \$600 million)—from \$24.2 billion in the prior report to \$24.8 billion in the 2016 joint report. Navy officials said the budget for Trident II funding remained effectively the same over the FYDP (fiscal years 2016-2020); however, there were some programming adjustments made, as the Navy developed its estimates relative to the fiscal year 2015 President’s Budget. For the following 5 years (fiscal years 2021-2025), the Navy applied DOD’s common inflation factor of 1.8 percent for pay and 2 percent for non-pay costs for each of its delivery system estimates, except for the Ohio-replacement submarine. Therefore, the 10-year estimate in the 2016 joint report showed a slight increase.

DOD’s 10-year estimate of \$37.5 billion for nuclear command and control systems reflects an increase of about 8 percent (or \$2.9 billion) over the estimate in the fiscal 2015 joint report of \$34.6 billion. This increase is primarily attributable to the addition of procurement estimates for satellite communications systems, including a classified program and the family of advanced beyond line-of-sight terminals program. The family of advanced beyond line-of-sight terminals program is intended to provide a family of satellite communications terminals for airborne and ground-based users, to replace many program-unique terminals. The terminals are designed to work with current and future communications capabilities and technologies, and are expected to provide voice and data over military satellite communications networks for nuclear and conventional forces.

In addition, DOE’s portion of the 2016 joint report does not explain changes from the 2015 joint report. However, NNSA describes key changes in the 2016 *Stockpile Stewardship and Management Plan*, the more detailed planning document on which DOE’s portion of the 2016 joint report is based. Table 5 shows changes in budget estimates from the fiscal year 2015 joint report to the 2016 joint report in DOE’s 5-year and 10-year estimates for modernizing the nuclear stockpile and the nuclear security enterprise.

Table 5: Changes in Department of Energy’s (DOE) 5-Year and 10-Year Budget Estimates for Sustaining and Modernizing the Nuclear Stockpile from the Fiscal Year 2015 to the Fiscal Year 2016 Joint Report

Category	5-Year Dollar Change (dollars in billions)	5-Year Percent Change (dollars in billions)	10-Year Dollar Change (dollars in billions)	10-Year Percent Change (dollars in billions)
Directed Stockpile Work	2.3	14.9	5.5	16.4
Research, Development, Testing, and Evaluation	-0.2	-1.7	0	-0.3
Infrastructure	1	8.1	1.1	3.6

Category	5-Year Dollar Change (dollars in billions)	5-Year Percent Change (dollars in billions)	10-Year Dollar Change (dollars in billions)	10-Year Percent Change (dollars in billions)
All other weapons activities	-1.6	-20.1	-3.2	-19.3
Total	1.5	3.3	3.4	3.4

Source: GAO analysis of DOE data. | GAO-16-23

Totals may not add due to rounding.

In the fiscal year 2016 joint report, DOE’s 10-year estimate of \$103.5 billion for its nuclear modernization efforts reflects an increase of about 3.4 percent (or \$3.4 billion) over the estimate of \$100.1 billion in the fiscal year 2015 joint report. According to the *Stockpile Stewardship and Management Plan*, part of that is due to an increase in the budget estimates for some individual programs, including increases in estimates for some life extension programs as a result of shifts in schedule, among other things, which in turn led to an increase in the budget estimates for Directed Stockpile Work. However, the actual increase in these budget estimates is greater, as a result of a structural change in the NNSA budget for fiscal year 2016, which is not discussed in the joint report. Specifically, in the fiscal year 2016 budget documents, DOE shifted two counterterrorism programs—which had been included in the fiscal year 2015 budget estimates and which together totaled \$2.7 billion over 10 years—from the Weapons Activities account of the NNSA budget to Defense Nuclear Nonproliferation. As a result, the overall net increase in DOE’s budget estimates in the 2016 joint report totals \$6.1 billion.

In our July 2015 report, we recommended that in future joint reports DOD and DOE provide comparative information about changes in the budget estimates from the prior year and explain the reasons for those changes. DOE agreed, and DOD partially agreed, stating that Section 1043 of the National Defense Authorization Act for Fiscal Year 2012 does not require a comparative year-to-year analysis, and it recommended that Congress amend the existing Section 1043 language to require that the report include an additional subsection providing a quantitative comparison of current budget estimates with the previous year’s estimates. However, we noted that while Section 1043 does not require a comparative year-to-year analysis, the departments are not restricted from including such information in the joint report. The 2016 joint report was issued in April 2015, before we published our review of the 2015 joint report. As a result, DOD and DOE were not able to incorporate any changes to the joint report based on the 2015 recommendations. We maintain that providing comparative information on changes in the estimates from year to year and explanations for the changes would be beneficial to congressional

decision makers. Further, had DOD provided comparative information about changes in the budget estimates from the 2015 joint report to the 2016 joint report, it might have identified the error in its 10-year estimate for the long-range strike bomber.

As we reported in July 2015, key principles for preparing long-term funding plans stress the importance of including all relevant costs in the plan, clearly documenting any assumptions and limitations, and disclosing when possible any errors or omissions in the supporting data that affect the quality of the plan's estimates.⁴⁸ In the 2016 joint report, DOD and DOE continued to omit thorough descriptions of the methodologies they used to develop the budget estimates, such as key methodological limitations for NC3 estimates. Additionally—as we found DOE had done in the fiscal year 2015 joint report by omitting budget estimates for planned programs—DOD inadvertently made an error that affected the accuracy and completeness of the budget estimates it included in the 2016 joint report. Furthermore, the 2016 joint report does not include comparative information on changes in budget estimates from the previous year. We believe that fully implementing our June 2014 and July 2015 recommendations would help ensure that DOD and DOE improve their estimates and provide more accurate and complete information to decision makers, and this recommendation should be considered as the departments develop their joint report for fiscal year 2017.

Agency Comments and Our Evaluation

We are not making new recommendations in this report. We provided a draft of this report to DOD and DOE for review and comment and we received written comments from both departments, which are reprinted in appendixes II and III, respectively. Both departments also provided technical comments that have been incorporated as appropriate.

⁴⁸The federal guidance from which we derived these principles included the following: *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies*, accessed August 14, 2013, http://www.whitehouse.gov/omb/fedreg_final_information_quality_guidelines; GAO, *GAO Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs*, [GAO-09-3SP](#) (Washington, D.C.: Mar. 2, 2009); and Executive Office of the President, Office of Management and Budget, *Preparation, Submission, and Execution of the Budget*, Circular No. A-11 (Washington, D.C.: July 2013); *V 3.0 Capital Programming Guide: Supplement to Circular No. A-11: Planning, Budgeting, and Acquisition of Capital Assets* (Washington, D.C.: July 2013).

In their comments, both departments said they are working to include additional information into subsequent joint reports based on the recommendations made in our June 2014 and July 2015 reports. For example, DOD reiterated that it plans to include additional information on the estimating methodologies utilized in subsequent reports.

We are sending this report to the appropriate congressional committees and to the Secretaries of Defense and Energy; Chairman, Joint Chiefs of Staff; Secretary of the Air Force; Secretary of the Navy; Secretary of Energy; and Administrator of NNSA. This report is also available at no charge on the GAO website at <http://www.gao.gov>.

Should you or your staffs have any questions about this report, please contact Joe Kirschbaum at (202) 512-9971 or kirschbaumj@gao.gov, or David Trimble at (202) 512-3841 or trimbled@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made contributions to the report are listed in appendix IV.



Joseph W. Kirschbaum
Director
Defense Capabilities and Management



David C. Trimble
Director
Natural Resources and Environment

List of Committees

The Honorable John McCain
Chairman
The Honorable Jack Reed
Ranking Member
Committee on Armed Services
United States Senate

The Honorable Thad Cochran
Chairman
The Honorable Richard Durbin
Ranking Member
Subcommittee on Defense
Committee on Appropriations
United States Senate

The Honorable Lamar Alexander
Chairman
The Honorable Dianne Feinstein
Ranking Member
Subcommittee on Energy and Water Development
Committee on Appropriations
United States Senate

The Honorable Mac Thornberry
Chairman
The Honorable Adam Smith
Ranking Member
Committee on Armed Services
House of Representatives

The Honorable Rodney Frelinghuysen
Chairman
The Honorable Pete Visclosky
Ranking Member
Subcommittee on Defense
Committee on Appropriations
House of Representatives

The Honorable Mike Simpson
Chairman
The Honorable Marcy Kaptur
Ranking Member
Subcommittee on Energy and Water Development
Committee on Appropriations
House of Representatives

Appendix I: Objectives, Scope, and Methodology

To conduct our work, we reviewed the April 2, 2015 joint report to Congress from the Department of Defense (DOD) and the Department of Energy (DOE). The joint report describes the departments' plans and 10-year budget estimates for sustaining and modernizing U.S. nuclear weapons capabilities. Section 1043 of the National Defense Authorization Act for Fiscal Year 2012, as amended, includes a provision for us to review each joint report for accuracy and completeness with respect to the budget estimates and the methodologies used to develop them.¹ We assessed the extent to which the joint report provides (1) budget estimates for nuclear weapons sustainment and modernization that are consistent with DOD's and DOE's internal funding plans and long-term² nuclear modernization plans and (2) complete and transparent information on the methodology used to develop these budget estimates. To address our objectives, we followed a methodology similar to the one we used during our review of the fiscal years 2014 and 2015 joint reports.³ We assessed the accuracy and completeness of the budget estimates in the report by determining whether they were consistent with the departments' internal funding plans and whether the report provides complete information and includes a transparent methodology for how the estimates were developed. We examined the departments' plans and budget estimates for sustaining and modernizing the nuclear deterrent in three areas: (1) DOD nuclear delivery systems, (2) the DOD NC3 system, and (3) DOE nuclear weapons and the nuclear weapons complex.

To determine the extent to which the budget estimates in the fiscal year 2016 joint report are consistent (accurate and complete) with DOD's and DOE's internal funding and long-term modernization plans, we compared the plans and estimates in the 2016 joint report with each department's funding plans. For our review of DOD's estimates for nuclear delivery systems and the NC3 system, we compared the estimates in the fiscal year 2016 joint report with funding plans in the Future Years Defense

¹See Pub. L. No. 112-81, § 1043(c) (as amended).

²For the purpose of this report, we use the term "long-term" to refer to DOD and DOE plans that go beyond the five-year period of the FYDP and the FYNP (in this case, beyond fiscal year 2020).

³We previously reported on the fiscal year 2014 joint report in June 2014 and the fiscal year 2015 joint report in July 2015. GAO, *Nuclear Weapons: Ten-Year Budget Estimates for Modernization Omit Key Efforts, and Assumptions and Limitations Are Not Fully Transparent*, [GAO-14-373](#) (Washington, D.C.: June 10, 2014). GAO, *Nuclear Weapons Sustainment: Improvements Made to Budget Estimates, but Opportunities Exist to Further Enhance Transparency*, [GAO-15-536](#) (Washington, D.C.: July, 30 2015).

Program (FYDP).⁴ Because DOD had not prepared internal funding plans beyond fiscal year 2020 to be used to project estimated budget requests, and the fiscal year 2016 joint report includes budget estimates through fiscal year 2025, we reviewed DOD plans for Air Force delivery systems, Navy plans for its delivery systems, and Defense Information Systems Agency plans—including the Nuclear Command, Control, and Communications (C3) Program Tracking Report—and we discussed DOD’s long-term budget estimates in the joint report with relevant DOD officials. At DOD, we met with officials from a range of offices responsible for developing the department’s contributions to the joint report. In addition to the Air Force, Navy, and Department of Defense Chief Information Officer (DOD CIO), we met with officials from the Office of the Under Secretary of Defense (Policy); Office of the Under Secretary of Defense (Comptroller); Office of the Director, Cost Assessment and Program Evaluation; Office of the Under Secretary of Defense (Acquisition, Technology and Logistics); Joint Staff; and U.S. Strategic Command. For our review of DOE’s plans and estimates, we compared DOE’s estimates in the joint report with National Nuclear Security Administration’s (NNSA) funding plans in the Future Years Nuclear Security Program (FYNSP) and the *Fiscal Year 2016 Stockpile Stewardship and Management Plan*, which includes estimated funding requirements for NNSA’s modernization plans that cover the time required for the joint report and beyond.⁵ We determined the estimates in the fiscal year 2016 joint report to be sufficiently accurate and complete if they were consistent with the departments’ funding plans, including the FYDP and FYNSP.⁶ We have previously reported on

⁴The FYDP is a centralized DOD report that is updated annually and provides DOD’s current budget request and budget estimates for at least 4 subsequent fiscal years. The FYDP includes thousands of discrete program elements, each of which may include funding projections for DOD appropriations accounts, including research, development, test, and evaluation; procurement; and operation and maintenance.

⁵Department of Energy, *Fiscal Year 2016 Stockpile Stewardship and Management Plan Report to Congress* (Washington, D.C.: March 2015). The *Stockpile Stewardship and Management Plan* is NNSA’s formal means for communicating to Congress the status of certain activities and its long-range plans and budget estimates for sustaining the stockpile and modernizing the nuclear security enterprise. The *Stockpile Stewardship and Management Plan* includes 25-year budget estimates for NNSA’s plans.

⁶We did not assess the overall reliability of DOD’s and DOE’s internal funding plans themselves or the departments’ underlying budget-estimating process, because such analysis exceeded the scope of the mandate. We also did not independently verify the reliability of DOD’s or DOE’s specific budget estimates.

DOD's and DOE's challenges in generating reliable budget estimates and programming data.⁷

To assess whether the fiscal year 2016 joint report includes complete and transparent information from DOD and DOE for nuclear sustainment and modernization budget estimates, we drew on work we performed for our review of the fiscal years 2014 and 2015 joint reports.⁸ At DOD, we obtained Air Force, Navy, and DOD CIO documentation of the methodologies they used to develop DOD's 10-year estimates for sustaining and modernizing nuclear delivery systems and the NC3 system. We also obtained guidance in the form of a briefing from the Office of the Under Secretary of Defense for Policy, as well as tasking documents from the Joint Staff, and we interviewed officials from that office and from the Joint Staff and U.S. Strategic Command. For DOE, we drew upon our current work reviewing the fiscal year 2016 *Stockpile Stewardship and Management Plan* to assess estimates in the joint report for sustaining and modernizing the nuclear security enterprise and nuclear weapons stockpile.⁹ We also asked NNSA officials for information on how the joint report was prepared. We then compared the information in the joint report with key principles for developing and preparing long-term funding plans that we derived for our 2014 report by reviewing key federal and departmental guidance, standards, and practices for cost estimating, budget preparation, financial planning, and public reporting. Such federal guidance included Circular No. A-11, Preparation, Submission, and Execution of the Budget,¹⁰ Capital Programming Guide Version 3.0,¹¹ and

⁷GAO, *Department of Energy: Observations on Project and Program Cost Estimating in NNSA and the Office of Environmental Management*, [GAO-13-510T](#) (Washington, D.C.: May 8, 2013); *Modernizing the Nuclear Security Enterprise: NNSA's Reviews of Budget Estimates and Decisions on Resource Trade-offs Need Strengthening*, [GAO-12-806](#) (Washington, D.C.: July 31, 2012); *DOD Weapon Systems: Missed Trade-off Opportunities During Requirements Reviews*, [GAO-11-502](#) (Washington, D.C.: June 16, 2011); and *Modernizing the Nuclear Security Enterprise: NNSA Increased its Budget Estimates, But Estimates for Key Stockpile and Infrastructure Programs Need Improvement*, [GAO-15-499](#) (Washington, D.C.: Aug. 6, 2015).

⁸[GAO-14-373](#) and [GAO-15-536](#).

⁹We have ongoing work looking at whether NNSA's nuclear security budget materials provide for funding that is sufficient to modernize and refurbish the nuclear security enterprise. As we finalize work in this area, we plan to issue a final report in 2016.

¹⁰Executive Office of the President, Office of Management and Budget, *Preparation, Submission, and Execution of the Budget*, Circular No. A-11 (Washington, D.C.: July 2013).

Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility and Integrity of Information Disseminated by Federal Agencies,¹² all published by the Office of Management and Budget, as well as the GAO Cost Estimating and Assessment Guide.¹³ To the extent that we determined there were differences between the principles we derived and information that was provided in the fiscal year 2016 joint report, we discussed the causes and potential effects of these differences with relevant DOD and DOE officials. At DOD, we met with officials from the Air Force; Navy; DOD CIO; the Office of the Under Secretary of Defense (Policy); Office of the Under Secretary of Defense (Comptroller); Office of the Director, Cost Assessment and Program Evaluation; Office of the Under Secretary of Defense (Acquisition, Technology and Logistics); Joint Staff; and U.S. Strategic Command. At DOE, we met with officials in the Office of Defense Programs.

We conducted this performance audit from May 2015 to December 2015 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

¹¹Executive Office of the President, Office of Management and Budget, *V 3.0 Capital Programming Guide: Supplement to Circular No. A-11: Planning, Budgeting, and Acquisition of Capital Assets* (Washington, D.C.: July 2013).

¹²Executive Office of the President, Office of Management and Budget, *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies*, accessed August 14, 2013, http://www.whitehouse.gov/omb/fedreg_final_information_quality_guidelines.

¹³GAO, *GAO Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs*, [GAO-09-3SP](#) (Washington, D.C.: Mar. 2, 2009).

Appendix II: Comments from the Department of Defense

GAO received DOD's letter on November 12, 2015.

DOD's technical comments attachment is not included in this appendix, but incorporated where appropriate in this report.



STRATEGY, PLANS
AND CAPABILITIES

ASSISTANT SECRETARY OF DEFENSE
2400 DEFENSE PENTAGON
WASHINGTON, D.C. 20301-2400

10 OCT 2015

Mr. Joseph Kirschbaum
Director, Defense Capabilities Management
U.S. Government Accountability Office
441 G Street, NW
Washington, DC 20548

Dear Mr. Kirschbaum:

This is the Department of Defense (DoD) response to the GAO Draft Report, GAO-16-23, "NUCLEAR WEAPONS SUSTAINMENT: Improvements Made to Budget Estimates Report, but Opportunities Remain to Further Enhance Transparency," dated September 29, 2015 (GAO Code 352033).

The Department is providing its official written comments for inclusion in the report. DoD is working to include additional information on the estimating methodologies utilized and in subsequent reports. Additionally, the DoD Chief Information Officer, the Services, and Congressional Staffers are working in conjunction with the DoD Comptroller to provide even greater fidelity and transparency to our overall nuclear command and control, and communications budget estimates. Thank you for your review and consideration.

Sincerely,

A handwritten signature in blue ink, appearing to read "Robert M. Scher".

Robert M. Scher

Attachment:
TAB A: DoD comments

Appendix III: Comments from the Department of Energy



Department of Energy
Under Secretary for Nuclear Security
Administrator, National Nuclear Security Administration
Washington, DC 20585



November 16, 2015

Mr. David C. Trimble
Director, Natural Resources
and Environment
U.S. Government Accountability Office
Washington, DC 20548

Dear Mr. Trimble:

Thank you for the opportunity to review the Government Accountability Office's (GAO) draft report titled, "Nuclear Weapons Sustainment: Improvements Made to Budget Estimates, but Opportunities Exist to Further Enhance Transparency" (GAO-16-23). As you are aware, this report comes only two months after GAO's final assessment of the Fiscal Year (FY) 2015 Joint 1043 Report, which highlighted the same suggested areas for enhanced transparency. The results of that audit were therefore not available to inform and impact the FY 2016 Joint Report. As we committed to in our response to that assessment (GAO-15-536), NNSA will incorporate additional information into the FY 2017 Joint 1043 Report to be issued in March 2016.

Technical comments for your consideration for improving the clarity and accuracy of the report have been provided under separate cover. If you have any questions regarding this response, please contact Dean Childs, Director, Audit Coordination and Internal Affairs, at (301) 903-1341.

Sincerely,


Frank G. Klotz



Appendix IV: GAO Contacts and Staff Acknowledgments

GAO Contacts

Joseph W. Kirschbaum, (202) 512-9971 or kirschbaumj@gao.gov
David C. Trimble, (202) 512-3841 or trimbled@gao.gov

Staff Acknowledgments

In addition to the contacts named above, Penney Harwell Caramia, Assistant Director; William Hoehn, Assistant Director; Jennifer Andreone, Colin Chambers, Jennifer Echard, Bridget Grimes, Aaron Karty, Joanne Landesman, Amie Lesser, Steven Putansu, and Michael Shaughnessy made key contributions to this report.

Appendix V: Accessible Data

Agency Comment Letter

Text of Appendix II: Comments from the Department of Defense

Page 1

ASSISTANT SECRETARY OF DEFENSE

2400 DEFENSE PENTAGON

WASHINGTON, D.C. 20301-2400

10 OCT 2015

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Director, Defense Capabilities Management

U.S. Government Accountability Office

441 G Street, NW

Washington, DC 20548

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Robert M. Scher

Attachment:

TAB A: DoD comments

Text of Appendix III:
Comments from the
Department of Energy

Page 1

Department of Energy

Under Secretary for Nuclear Security Administrator,

National Nuclear Security Administration

Washington, DC 20585

November 16, 20 15

Mr. David C. Trimble

Director, Natural Resources and Environment

U.S. Government Accountability Office

Washington, DC 20548

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Sincerely,

Frank G. Klotz

Data Tables

Data Table for Highlights Figure and Figure 1: Departments of Defense (DOD) and Energy (DOE) Fiscal Year 2016 10-Year Estimates for Sustaining and Modernizing the U.S. Nuclear Deterrent

Nuclear Command, Control, and Communications System	12%
Nuclear Stockpile and Nuclear Security Enterprise	32%
Nuclear Delivery Systems	56%

Source: GAO analysis of Department of Defense (DOD) and Department of Energy (DOE) data | GAO-16-23

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