



November 2, 2018

Congressional Committees

## Nuclear Weapons Sustainment: Fiscal Year 2018 Nuclear Forces Budget Estimates

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.<sup>1</sup> 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) key facilities for nuclear weapons research, development, and production date back to the 1940s and 1950s.<sup>2</sup> DOD and DOE estimates show that nuclear sustainment and modernization efforts are expected to cost billions of dollars over the next decade. In February 2018, the administration released a new *Nuclear Posture Review* (NPR) which called for a continuation of DOD’s and DOE’s sustainment and modernization efforts, while also proposing a range of programmatic changes to the nuclear weapons enterprise.<sup>3</sup>

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, delivery systems, and command and control system for each of fiscal years 2013 through 2023.<sup>4</sup>

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<sup>1</sup> The nuclear weapons stockpile consists of seven weapon types. Nuclear delivery systems consist of a variety of platforms—including heavy bombers, air-launched cruise missiles, and ballistic missile submarines—operated by the Air Force and 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, the Defense Information Systems Agency, and other organizations.

<sup>2</sup> NNSA 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.

<sup>3</sup> Department of Defense, *Nuclear Posture Review* (Washington, D.C.: February 2018).

<sup>4</sup> See Pub. L. No. 112-81, § 1043(a) (2011), *amended by* the National Defense Authorization Act for Fiscal Year 2013, Pub. L. No. 112-239, § 1041 (2013), the National Defense Authorization Act for Fiscal Year 2014, Pub. L. No. 113-66, § 1054 (2013), the National Defense Authorization Act for Fiscal Year 2018, Pub. L. No. 115-91, § 1665 (2017), *and* the John S. McCain National Defense Authorization Act for Fiscal Year 2019, Pub. L. No. 115-232, § 1670 (2018). 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 reporting function was delegated to the Secretary of Defense and Secretary of Energy in 2012. See 77 Fed. Reg. 12,721 (Mar. 2, 2012).

DOD and DOE develop this annual report, which we refer to as the joint report.<sup>5</sup> The 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.<sup>6</sup> It must also include a detailed description of the costs included in the budget estimates and the methodology used to develop the estimates.<sup>7</sup>

Section 1043 of the National Defense Authorization Act for Fiscal Year 2012, as amended, also includes 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.<sup>8</sup> We most recently reported on the fiscal year 2017 joint report in July 2017.<sup>9</sup> On April 5, 2018, DOD and DOE submitted to Congress their fiscal year 2018 joint report. This report assesses the extent to which the fiscal year 2018 joint report provides accurate and complete information about nuclear sustainment and modernization budget estimates and related budget estimating methodologies. In October 2018, we provided a briefing to the congressional defense committees on the results of our work. This report formally transmits those briefing slides (see enclosure).

To assess the extent to which the fiscal year 2018 joint report provides accurate and complete information about nuclear sustainment and modernization budget estimates, we analyzed the budget data underlying the estimates in the joint report to identify changes from prior years. In addition, for DOD, we verified summary calculations and compared estimates and data from the fiscal year 2017 joint report to similar information from the fiscal year 2018 joint report. We did not conduct a comparison of the budget data to DOD's or DOE's internal 5-year funding plans, as we have in our prior reviews of the annual joint report, because DOD and DOE did not finalize their fiscal year 2018 5-year funding plans. To assess the methodologies used by DOD and DOE to develop their budget estimates, we determined whether DOD and DOE took actions to address the recommendations we made on those methodologies in prior joint reports. We assessed the reliability of the budget estimates data included in the joint report through the analysis described above. We also analyzed the 2018 NPR, and reviewed statements made by relevant DOD and DOE officials about changes resulting from the 2018 NPR. To support our analysis, we interviewed officials from various DOD and DOE offices, including the Office of the Secretary of Defense, the Navy, the Air Force, the Office of the DOD Chief Information Officer, the Office of the NNSA Administrator of Budget, the NNSA Office of Planning, Programming, Budget, and Evaluation, and NNSA Defense Programs.

We conducted this performance audit from November 2017 to November 2018 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.

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<sup>5</sup> Department of Defense and Department of Energy, *Fiscal Year 2018 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* (P.L. 112-81) (Washington, D.C.: Apr. 5, 2018).

<sup>6</sup> See § 1043(a)(2).

<sup>7</sup> See § 1043(a)(3).

<sup>8</sup> See § 1043(c) (added by Pub. L. No. 112-239, § 1041(a)(2)).

<sup>9</sup> GAO, *Nuclear Weapons Sustainment: Budget Estimates Report Contains More Information than in Prior Fiscal Year, but Transparency Can Be Improved*, GAO-17-557 (Washington, D.C.: Jul. 20, 2017).

In summary, the fiscal year 2018 joint report, including the estimates therein, was based on the fiscal year 2018 President's Budget issued in May 2017 and NNSA's fiscal year 2018 *Stockpile Stewardship and Management Plan*, the more detailed planning document on which DOE's portion of the joint report is based, issued in November 2017.<sup>10</sup> Therefore, the joint report did not capture key programmatic changes in nuclear weapon modernization plans resulting from the February 2018 NPR. Examples of such changes include the proposal for a low-yield submarine-launched ballistic missile warhead and a new nuclear-armed sea-launched cruise missile. DOD and DOE officials stated that they expect the fiscal year 2019 joint report will be issued in fall 2018 and will begin to reflect NPR-based changes. Our assessment of the DOD budget estimates found that they were generally accurate and complete based on the underlying data used by DOD to create them. DOE provided budget estimates for only 1 of 10 required years in the joint report, given the timing of the issuance of the NPR. DOE noted in the joint report that it "will make a policy judgment" on budget amounts for future years in accordance with the NPR. Our assessment of DOD's and DOE's budget estimating methodologies found that the departments had taken some steps to address our prior recommendations on their methodologies, though the recommendations have not been fully addressed. For example, DOD provided more information about its NC3 methodology in the fiscal year 2018 joint report than it had in previous joint reports; however, it did not explain certain assumptions related to the methodology. We expect to further evaluate any actions taken in response to our recommendations when we evaluate the fiscal year 2019 joint report.

### **Agency Comments**

We provided a draft of this report to DOD and DOE for comment. The departments responded that they had no comments.

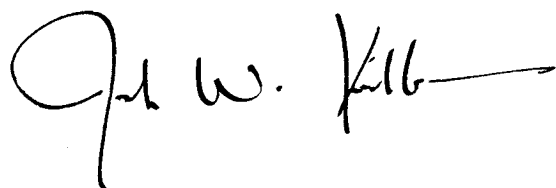
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We are sending copies of this report to the appropriate congressional committees, the Secretary of Defense, and the Secretary of Energy. In addition, the report is available at no charge on the GAO website at <https://www.gao.gov>.

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<sup>10</sup> 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.

Should you or your staff have questions concerning this report, please contact Joseph Kirschbaum at (202) 512-9971 or [KirschbaumJ@gao.gov](mailto:KirschbaumJ@gao.gov) or Allison Bawden at (202) 512-3841 or [BawdenA@gao.gov](mailto:BawdenA@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 key contributions to this report include Penney Harwell Caramia, Assistant Director; Jason Holliday, Assistant Director; William Hoehn, Assistant Director; Usman Ahmad; Robert Grace; Pamela Davidson; Pamela Nicole Harris; Joanne Landesman; Karen Richey; Michael Shaughnessy; and Edwin Yuen.

A handwritten signature in black ink that reads "Joe W. Kirschbaum" with a long horizontal stroke extending to the right.

Joseph W. Kirschbaum  
Director, Defense Capabilities and Management

A handwritten signature in black ink that reads "Allison Bawden" in a cursive style.

Allison Bawden  
Director, Natural Resource and Environment

Enclosure

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# **Nuclear Weapons Sustainment**

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**Fiscal Year 2018 Nuclear Forces Budget Estimates  
Briefing for Congressional Defense Committees  
October 2, 2018**

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## Introduction

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The Departments of Defense (DOD) and Energy (DOE) are jointly managing an extensive effort to sustain and modernize nuclear weapons capabilities. The National Nuclear Security Administration (NNSA), a separately organized agency within DOE, manages DOE's portion of nuclear weapons programs.

- Nuclear weapon delivery systems—strategic missiles, submarines, and aircraft—and the nuclear weapons carried by these systems are aging and being deployed beyond their intended service lives.



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## Introduction

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Section 1043 of the National Defense Authorization Act (NDAA) for FY 2012, as amended, requires the President, in consultation with the Secretaries of Defense and Energy, to annually submit a report including, among other things, 10-year budget estimates related to the nuclear weapons stockpile, complex, delivery systems, and command and control system, as well as the methodologies used to develop the budget estimates.<sup>1</sup> We refer to this report as the joint report.

<sup>1</sup>The report is to be submitted for each of the fiscal years 2013 through 2023. See Pub. L. No. 112-81, § 1043(a) (2011), *amended by* the NDAA for Fiscal Year 2013, Pub. L. No. 112-239, § 1041 (2013), the NDAA for Fiscal Year 2014, Pub. L. No. 113-66, § 1054 (2013), the NDAA for Fiscal Year 2018, Pub. L. No. 115-91, § 1665 (2017), *and* the John S. McCain NDAA for Fiscal Year 2019, Pub. L. No. 115-232, § 1670 (2018).

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## Introduction

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Both DOD and DOE annually produce 5-year funding plans that inform their budget requests. The DOD plan is known as the Future Years Defense Program (FYDP), and the DOE 5-year funding plan is known as the Future-Years Nuclear Security Program (FYNSP).

DOD's portion of the joint report is drawn from information provided by the military departments and defense agencies, including FYDP information, as well as information from the President's Budget for the fiscal year of the joint report.

DOE's portion of the joint report is drawn directly from its Stockpile Stewardship and Management Plan (SSMP), including FYNSP information. The SSMP provides information on modernization plans and budget estimates for NNSA programs over the next 25 years. In past years, DOE's budget estimates in the joint report have included estimates for the FYNSP period plus an additional 5 years of funding.

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## Source of Work and Objective

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Section 1043 of the NDAA for FY 2012, as amended, includes a provision for GAO to review each joint report for accuracy and completeness with respect to the budget estimates and the methodologies that were used to develop these estimates.<sup>2</sup>

This briefing presents our preliminary observations on the extent to which the FY 2018 joint report provides accurate and complete information about nuclear sustainment and modernization budget estimates and related budget estimating methodologies.

<sup>2</sup>See § 1043(c).

# Scope and Methodology

To address our objective, we

- analyzed the budget data underlying estimates in the joint report to identify changes from prior years;
  - in addition, for DOD, we verified summary calculations and
  - compared budget estimates from the FY 2018 joint report to estimates from the FY 2017 joint report through calculations of the percentage change in reported amounts for fiscal years 2018 through 2021, which were the FYDP years that were common between the two joint reports;
- analyzed the Nuclear Posture Review (NPR) and public statements made by DOD and DOE officials about potential changes resulting from the 2018 NPR;<sup>3</sup>
- did not conduct a comparison of the budget data to the FYDP or FYNSP, as we have in our prior reviews of the annual joint report, because DOD and DOE did not finalize their FY 2018 FYDP and FYNSP;
- assessed the methodologies that DOD and DOE used to develop their budget estimates in order to determine whether they took actions to address our prior recommendations related to their methodologies; and
- assessed the reliability of the data through the analyses described above.

<sup>3</sup>Department of Defense, *Nuclear Posture Review*, February 2018. The NPR assesses the global threat environment and establishes policy on U.S. nuclear forces.

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# Scope and Methodology

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To support our analyses, we met with officials in the following offices:

- Air Force Headquarters-Strategic Deterrence and Nuclear Integration (A10);
- Air Force Headquarters- Strategic Plans (A8X);
- Chief of Naval Operations Sea-Based Strategic Deterrence Programs (N97);
- Chief of Naval Operations- Nuclear Policy (N514);
- Office of the DOD Chief Information Officer (DOD CIO) National Leadership Command and Control Management Office;
- Office of the Under Secretary of Defense for Policy;
- Office of Cost Assessment and Program Evaluation;
- Office of the NNSA Administrator of Budget;
- NNSA Office of Planning, Programming, Budget, and Evaluation; and
- NNSA Defense Programs.

We obtained technical comments on the content of this briefing from DOD and DOE and have incorporated them as appropriate.

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# Summary of Preliminary Observations

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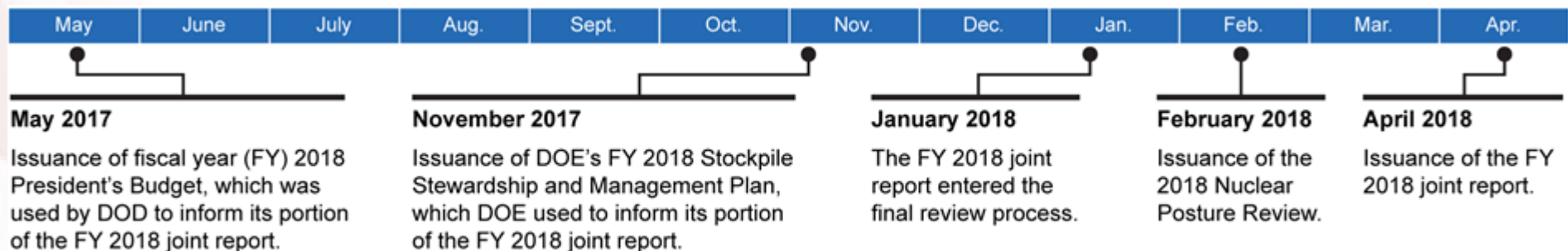
Through our assessment of the accuracy and completeness of the FY 2018 joint report we found:

- DOD's budget estimates in the joint report were generally accurate and complete based on the underlying data that DOD used to create them. DOE provided budget estimates for only 1 of 10 required years in the joint report, given the timing of the issuance of the NPR.
- DOD and DOE took some steps to address our prior recommendations on budget estimating methodologies. GAO expects to further evaluate any actions taken in response to these recommendations when it evaluates the FY 2019 joint report, which DOD and DOE expect to issue in fall 2018.

# Accuracy and Completeness of the FY 2018 Joint Report Budget Estimates and Methodologies

The FY 2018 joint report was based on the FY 2018 President’s Budget and the FY 2018 SSMP. Therefore, the budget estimates in the report did not account for key programmatic changes in nuclear weapons modernization plans resulting from the NPR. As shown in figure 1, the draft FY 2018 joint report entered its final review in January 2018. The NPR was issued the following month. The FY 2018 joint report was issued in April 2018.

Figure 1: Timeline of the Development of the FY 2018 Joint Report



Source: GAO analysis of Department of Defense (DOD) and Department of Energy (DOE) information and interviews.

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## Accuracy and Completeness of the FY 2018 Joint Report Budget Estimates and Methodologies

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The NPR called for new nuclear weapons programs and changes to existing programs, such as:

- Modification to lower the yield of some existing submarine-launched ballistic missile (SLBM) warheads (which NNSA now refers to as the W76-2 program).
- Pursuit of a nuclear-armed, sea-launched cruise missile.
- Reevaluation of the interoperable warhead approach, under which NNSA has studied options for a warhead usable on both SLBMs and intercontinental ballistic missiles.
- Sustainment of the B83-1 bomb past its currently planned retirement date.

DOD and DOE officials said they expect the FY 2019 joint report, to be issued in fall 2018, to begin reflecting these programmatic changes.



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# Accuracy and Completeness of the FY 2018 Joint Report Budget Estimates and Methodologies

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## *DOD Budget Estimates*

- Our assessment of DOD budget estimates in the FY 2018 joint report found that they were generally accurate and complete, based on the underlying data that DOD used to create them.
- For the FYDP years that were covered by the budget estimates in both the FY 2017 and FY 2018 joint reports (fiscal years 2018-2021), the estimated amounts for some programs changed significantly in the FY 2018 joint report.
  - **Columbia class submarines.**<sup>4</sup> Estimates *increased* by approximately 8.8 percent because, according to Navy officials, program officials were able to better forecast costs as the program matured. The Navy also reported additional planned funding, such as military construction funding, and an increase in procurement funding.

<sup>4</sup>The Columbia class submarine is a planned class of ballistic missile submarines that the Navy intends to develop and build as a replacement for the Ohio-class submarine.

# Accuracy and Completeness of the FY 2018 Joint Report Budget Estimates and Methodologies

## *DOD Budget Estimates*

- **UH-1N helicopter.**<sup>5</sup> Estimates *increased* by 20.5 percent because, according to Air Force officials, the program office changed its acquisition strategy and accelerated its acquisition time line.
- **Long Range Stand-Off Missile.**<sup>6</sup> Estimates *increased* by 10.8 percent. According to Air Force officials, they used the Air Force's service cost position for the program to develop the budget estimates. Previous budget estimates were based on a cost estimate produced by the program office.<sup>7</sup>

<sup>5</sup>The UH-1N helicopter is a utility helicopter used by the Air Force. Security and surveillance of off-base nuclear weapons convoys is one of the primary missions of this helicopter.

<sup>6</sup>The Long-Range Stand-Off Missile is a new air-launched cruise missile being developed for the Air Force.

<sup>7</sup>According to Air Force Instruction 65-508, *Cost Analysis Guidance and Procedures* (June 6, 2012), a service cost position is the Air Force's official cost estimate and, unlike the program office estimate, it is approved by the Deputy Assistant Secretary of the Air Force for Cost and Economics for certain programs.

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# Accuracy and Completeness of the FY 2018 Joint Report Budget Estimates and Methodologies

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## *DOE Budget Estimates*

- DOE provided budget estimates for only 1 of 10 required years in the FY 2018 joint report, given the timing of the issuance of the NPR. The FY 2018 joint report states that DOE/NNSA “will make a policy judgment” on budget amounts for future years in accordance with the NPR.
- In the joint report, DOE cited new baseline cost reports for some of its programs. A baseline cost report formally updates a program’s preliminary cost estimates.
  - **B61-12 Life Extension Program.**<sup>8</sup> The baseline cost report of \$8.3 billion for the life of the program is a 1.2 percent *increase* over a preliminary estimate established in FY 2013. According to the joint report, the increase is due to funding shortfalls in activities initially funded by other programs within NNSA and now funded by the B61-12 life extension program, as well as improved design definition and an increase in labor costs.

<sup>8</sup>The B61-12 is a nuclear gravity bomb.

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# Accuracy and Completeness of the FY 2018 Joint Report Budget Estimates and Methodologies

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## *DOE Budget Estimates*

- **W88 Alteration 370.**<sup>9</sup> The baseline cost report of \$2.6 billion for the life of the program is an 11 percent *increase* over an estimate reported in FY 2015. According to the joint report, the increase is due to increases in test and qualification activities, increased rigor in program management, increased planning margins for the treatment of program technical risks, and some offsetting reduction in scope associated with nuclear components.

<sup>9</sup>The W88 is a nuclear warhead for the Navy's Trident II ballistic missiles.

# Accuracy and Completeness of the FY 2018 Joint Report Budget Estimates and Methodologies

## *Budget Estimating Methodologies*

- In our past reviews of the annual joint report, we made recommendations related to methodology that have not yet been fully addressed. DOD and DOE concurred with these recommendations, which include, but are not limited to:
  - documenting assumptions and limitations that affect DOD's nuclear command, control, and communications (NC3) budget estimates;<sup>10</sup>
  - more thoroughly documenting methodologies used to develop the DOD and DOE budget estimates;<sup>11</sup>
  - explaining how DOD selects NC3 programs for inclusion in the estimates, determines weighted analysis ratios, and differentiates its calculations for operation and maintenance estimates;<sup>12</sup> and
  - providing more information about Air Force programmatic changes and explaining how changes may affect year-to-year comparisons.<sup>12</sup>

<sup>10</sup>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).

<sup>11</sup>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).

<sup>12</sup>GAO, *Nuclear Weapons Sustainment: Budget Estimates Report Contains More Information than in Prior Fiscal Years, but Transparency Can Be Improved*, GAO-17-557 (Washington, D.C.: July 20, 2017).

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# Accuracy and Completeness of the FY 2018 Joint Report Budget Estimates and Methodologies

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## *DOD Budget Estimating Methodologies*

- Our assessment of DOD's budget estimating methodologies in the FY 2018 joint report found that DOD has taken some steps to address some of our prior recommendations related to methodologies. For example, DOD CIO
  - provided more information about its methodology in the joint report than it had provided about the methodology used for earlier reports;
  - told us it has used existing lists of NC3 systems to create a new, more definitive and inclusive list of NC3 systems; and
  - for multi-mission systems, relied on relevant military departments and defense agencies to identify a percentage of each system's estimated funding for its NC3 mission and reported these amounts.

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# Accuracy and Completeness of the FY 2018 Joint Report Budget Estimates and Methodologies

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## *DOD Budget Estimating Methodologies*

- However, DOD has not yet fully addressed our prior recommendations. For example:
  - DOD CIO did not explain assumptions made in determining the percentage used to calculate amounts of funding for multi-mission systems that were reported in their NC3 estimates, and
  - the Air Force did not provide information about certain programmatic changes that affected year-to-year comparisons of their budget estimates.
- We continue to believe that DOD should take further action to address our prior recommendations. We plan to further evaluate any actions taken in response to our recommendations when we evaluate the FY 2019 joint report.

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# Accuracy and Completeness of the FY 2018 Joint Report Budget Estimates and Methodologies

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## *DOE Budget Estimating Methodologies*

- Our assessment of DOE's budget estimating methodologies found that DOE had taken some steps in the FY 2018 joint report to address some of our prior recommendations.
  - For example, DOE provided more methodological information in the joint report than in prior reports.
- However, as previously noted, DOE provided budget estimates for only 1 year in the joint report and will make a policy judgment on budget amounts for future years in accordance with the NPR.
- We plan to more fully evaluate actions taken in response to our recommendations when we evaluate the FY 2019 joint report.



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