United States Government Accountability Office

Report to Congressional Committees

November 2018

DEPOT MAINTENANCE

DOD Has Improved the Completeness of Its Biennial Core Report

Accessible Version

GAO-19-89

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GAO Highlights

Highlights of GAO-19-89, a report to congressional committees

Why GAO Did This Study

DOD uses both military depots and contractors to maintain its complex weapon systems and equipment. Recognizing the depots' key role and the risk of overreliance on contractors, section 2464 of title 10 of the U.S. Code requires DOD to maintain a core logistics capability that is government-owned and operated, involving a combination of personnel, facilities, equipment, processes, and technology. Section 2464 requires DOD to provide a Biennial Core Report to Congress that addresses 10 reporting elements, including information on its core capability requirements and projected workload for the next fiscal year.

Section 2464 includes a provision that GAO review DOD's Biennial Core Reports for compliance and completeness. In reviewing the 2018 Biennial Core Report, GAO assessed the extent to which DOD's report (1) addressed the 10 reporting elements required by section 2464(d), and (2) is complete. GAO reviewed and analyzed relevant legislation, DOD guidance, and the 2018 Biennial Core Report, and met with DOD and military service officials to discuss the processes used to develop the information in DOD's 2018 Biennial Core Report.

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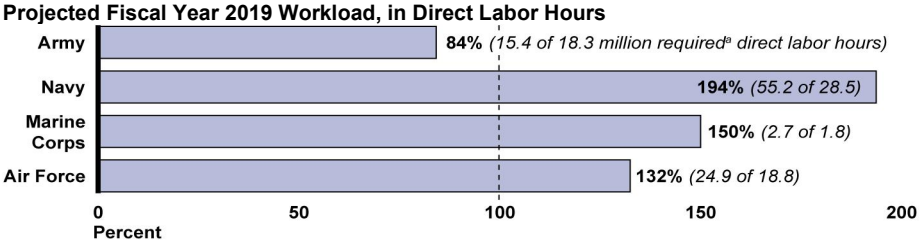
What GAO Found

In its 2018 Biennial Core Report, the Department of Defense (DOD) addressed 8 of 10 reporting elements. Specifically, DOD reported, by military service, its:

- depot maintenance workload required to sustain core maintenance capability requirements, based on contingency planning scenarios;
- projected fiscal year 2019 depot maintenance workloads; and
- projected fiscal year 2019 shortfalls (i.e., insufficient workload to sustain the required level of capability) and rationales and mitigations for those shortfalls.

The Army reported a projected workload for fiscal year 2019 that would meet about 84 percent of its identified core capability—a shortfall of 2.9 million direct labor hours (see figure). The Army identified numerous reasons—such as newly established software depot maintenance requirements—for its shortfalls. Furthermore, the Army presented mitigation plans for its shortfalls, such as moving software-related work from contractor to military sources.

Percentage of the Military Services' Core Depot Maintenance Capability Requirements Met by Projected Fiscal Year 2019 Workload, in Direct Labor Hours



Source: GAO analysis of DOD's 2018 Biennial Core Report. | GAO-19-89

[a]A direct labor hour is a common metric for measuring depot maintenance capability, workload, or capacity, representing 1 hour of direct work.

The other services did not report overall shortfalls, but some services reported shortfalls associated with specific types of work. For example, the Air Force reported a shortage associated with the repair of tactical missiles. As a mitigation plan, the Air Force stated that it plans to use workload associated with repairing strategic missiles to maintain this capability, since the electronics on the two types of missiles are very similar and require the same maintenance skill set.

DOD did not address two required reporting elements—progress in implementing mitigation plans from the 2016 biennial core report, and the degree to which projected workload reported in the 2016 biennial core report was executed. According to DOD officials, changes in its guidance and processes for developing the 2018 report resulted in the 2016 and 2018 reports not being directly comparable. However, DOD officials stated that they plan to address these two elements in the 2020 Biennial Core Report.

DOD's 2018 Biennial Core Report is generally complete, in that it lacks obvious errors and aligns with supporting information provided by the services. DOD's concerted efforts to implement better guidance and procedures—in part, according to DOD officials, by implementing GAO's prior recommendations from 2012, 2014, and 2016—assisted in improving the completeness of the report.

Contents

Abbreviations

DOD	Department of Defense
OASD L&MR	Office of the Assistant Secretary of Defense for Logistics and Materiel Readiness
OSD	Office of the Secretary of Defense

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November 14, 2018

Congressional Committees

The Department of Defense (DOD) has many complex weapon systems and equipment that require regular and emergency maintenance to continue meeting national security goals. Maintaining the capability to sustain these systems and equipment is critical for DOD. DOD uses its military depots—public-sector facilities that are government-owned and-operated—and its personnel to sustain its complex weapon systems and equipment, both in peacetime and in support of operations. DOD also uses private-sector contractors to help sustain these systems and equipment.

To ensure that this capability to sustain weapon systems and equipment is preserved within the government, section 2464 of title 10 of the United States Code requires DOD to maintain a core depot-level maintenance and repair capability that is government-owned and -operated. Maintaining this capability provides a ready and controlled source of technical competence and resources to enable effective and timely response to mobilizations, contingencies, or other emergencies. Additionally, DOD must assign these government-owned and -operated facilities (the depots) sufficient workload to ensure cost efficiency and technical competence during peacetime, while preserving the surge capacity and reconstitution capabilities necessary to fully support the strategic and contingency plans prepared by the Chairman of the Joint Chiefs of Staff.

Section 2464 also requires DOD, among other things, to submit to Congress a biennial report providing information on its core depot-level maintenance and repair capability requirements and workload. Specifically, subsection (d) of section 2464 identifies 10 elements that DOD must address for each of the armed services in its biennial report

concerning depot-maintenance requirements and workload.[1] Section 2464 also requires us to review DOD's report for compliance with section 2464, and to assess the completeness of the report.[2] DOD submitted its most recent biennial core report to Congress on May 23, 2018.

In this report, we assessed the extent to which DOD's 2018 Biennial Core Report (1) addressed the 10 reporting elements required by section 2464(d), and (2) is complete. We provided a briefing to your staff on July 19, 2018 of our preliminary observations on the extent to which DOD addressed the 10 reporting elements required by section 2464(d).[3] This report provides the final results of our analysis.

For objective one, we analyzed the report, compared the content of the report with the elements required by the statute, and obtained information on the process by which DOD identified its core capability requirements and the projected workload needed to sustain its core maintenance capability for fiscal year 2019.[4] When the report explicitly included all parts of the required reporting element, we determined that DOD

[1]The National Defense Authorization Act for Fiscal Year 2013 amended section 2464 to require DOD to submit to Congress a biennial report addressing 3 elements for each of the armed services, during each even-numbered year. Pub. L. No. 112-239, § 322 (2013). The National Defense Authorization Act for Fiscal Year 2018 further amended section 2464, resulting in an additional 7 elements that must be addressed in DOD's biennial report. Pub. L. No. 115-91, § 332 (2017). See appendix I for the 10 elements as written in section 2464(d) and appendix II for a timeline of the statute and our related reports.

[2]For our purposes, "completeness of the report" signifies that it is based on data that do not contain obvious errors and that it aligns with supporting information provided by the military services.

[3]Section 2464 of title 10 requires us to review each DOD biennial core report and submit to the congressional defense committees our findings and recommendations with respect to the report no later than 60 days after the date DOD submits its report to Congress, which was May 23, 2018.

[4]DOD Instruction 4151.20 defines core capability requirement as the depot maintenance capability (including personnel, equipment, and facilities) maintained by DOD at government-owned and -operated facilities as the ready and controlled source of technical competence and resources necessary to ensure effective and timely response to a mobilization, national defense contingency situation, and other emergency requirements. Depot maintenance for the designated weapon systems and other military equipment is the primary workload assigned to DOD depots to support core depot maintenance capabilities. This same instruction identifies core sustaining workload as the depot-level maintenance and repair work necessary to ensure technical competence in peacetime while preserving the surge capacity and reconstitution capabilities necessary to fully support strategic and contingency plans. DOD Instruction 4151.20, *Depot Maintenance Core Capabilities Determination Process* (May 4, 2018).

"addressed" the element. When the report did not explicitly include any part of the element, we determined that DOD "did not address" the element. If the report included some aspects of an element, but not all, then we determined that DOD "partially addressed" the element. We also discussed our assessment of each element with department and military service officials to gain additional insight into their analysis and efforts to address the statutory requirements.

For objective two, we obtained and analyzed the fiscal year 2019 data used in compiling DOD's 2018 Biennial Core Report, including core capability requirements and projected sustaining workload. We also reviewed other information, such as projected workload shortfall data (that is, the amount by which core capability requirements exceed projected workload for fiscal year 2019) and reasons for it, which the Office of the Secretary of Defense (OSD) required the military service headquarters to submit in support of the report. In order to determine whether these data and information were complete, we performed a number of data check steps to identify transposition inconsistencies or errors, and we discussed our analyses with OSD and military service officials. We also discussed the department's guidance and the processes used to collect the data for the report with department and military service officials. As in our previous reviews of DOD's biennial core reports, we did not assess the reliability of the underlying data provided by the military services for the 2018 DOD Biennial Core Report. Lastly, we reviewed DOD's actions to address our prior recommendations that were targeted at improving the completeness of DOD's biennial reports. We discuss our scope and methodology in more detail in appendix III.

We conducted this performance audit from May 2018 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 that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

Determining and Reporting on Core Capability Requirements

DOD Instruction 4151.20, *Depot Maintenance Core Capabilities Determination Process*, requires the military services to apply a methodology to determine their core capability requirements—that is, to identify what core capabilities are required and what workload would be necessary to enable them to sustain these core capabilities at the depots. DOD's instruction also requires the military services to determine the estimated cost of workloads to sustain the core capability requirement.

The instruction describes a series of mathematical computations and adjustments that the military services are required to use to compute their core capability requirements, and to identify the projected workload needed to support these requirements.[5] Specifically, the instruction requires that the military services identify the weapon systems required to execute the Chairman of the Joint Chiefs of Staff's strategic and contingency plans, which, among other things, guide the use and employment of the military forces across all geographic regions and sustain military efforts over different durations of time. After the systems are identified, the military services compute annual depot maintenance capability requirements for peacetime, in direct labor hours, to represent the amount of time they will regularly take to execute required maintenance.[6] A military service may adjust calculated direct labor hours to address redundant capability requirements that are so similar to one another that they share common base repair processes.

DOD tracks core capability requirements using the following two metrics:

- direct labor hours, each of which represents 1 hour of effort directly allocated to a category of work; and

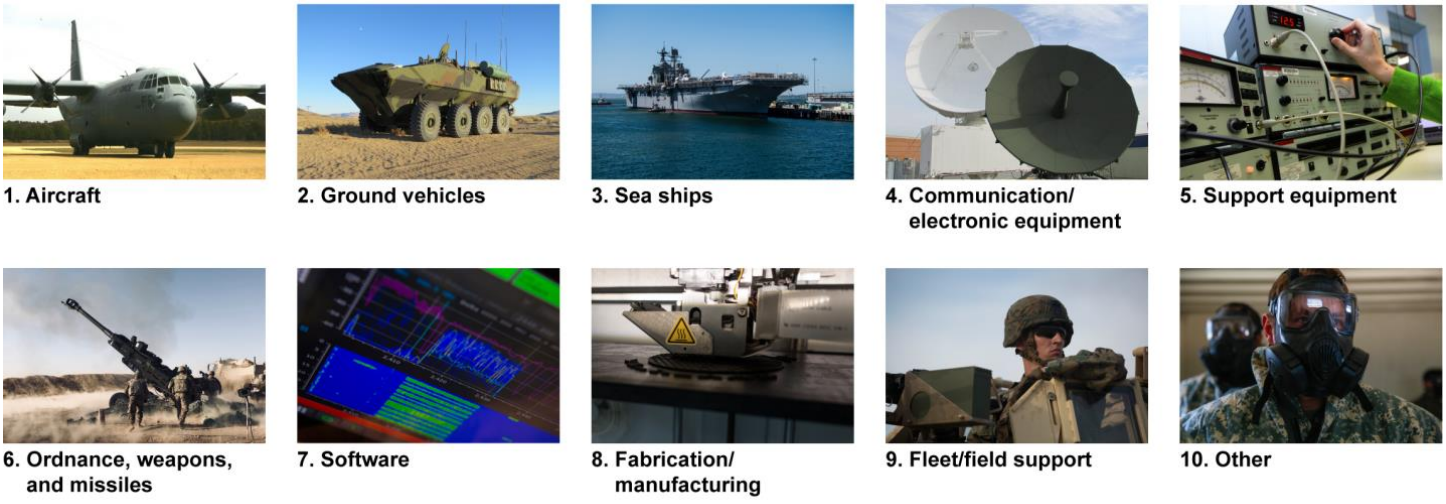
[5]DOD defines workload as an amount of depot maintenance work, usually specified in direct labor hours or workdays. Workload relates to specific weapon systems, equipment, components, or programs, and to specific services, facilities, and commodities.

[6]DOD defines a direct labor hour as a common metric for measuring depot maintenance capability, workload, or capacity, representing 1 hour of direct work (for example, touch labor or other directly attributed effort).

- work breakdown structure categories, which bundle types of work according to weapon systems and equipment.

DOD uses work breakdown structure categories to organize data on its various core capability requirements and workloads, as well as to manage and report on its core capabilities. There are 10 first-level work breakdown structure categories, and these in turn are broken down into second-level subcategories, which are the major elements that make up the system or equipment in the first-level category. Figure 1 shows the 10 first-level categories of DOD's work breakdown structure. For the full work breakdown structure, see appendix IV.

Figure 1: First-Level Categories of the Department of Defense's (DOD) Work Breakdown Structure



Source: DOD Instruction 4151.20; Defense Visual Information Distribution Service (photos). | GAO-19-89

Finally, the instruction requires the military services to provide a reason for all projected shortfalls, strategies to mitigate the effects of each projected shortfall, and actions taken by the services to rectify any projected workload or capability shortfall. A projected shortfall exists if a military service does not expect to have sufficient workload to sustain the required level of capability that has been identified. For example, an armed service may have identified 10,000 direct labor hours of core capability requirements for ground vehicles, but have only 4,000 hours of projected depot maintenance work for ground vehicles—resulting in a projected workload shortfall of 6,000 hours.

DOD's Biennial Core Reports and Our Prior Reviews

In 2012 DOD submitted its first biennial core report to Congress, and we found that DOD did not provide sufficient explanations when reporting on the military services' shortfalls in core capability requirements.[7] In 2014 DOD submitted its second biennial core report to Congress, and we found that DOD did not have accurate and complete data in the report.[8] In 2016 DOD submitted its third biennial core report to Congress, and we found (1) data errors; (2) inaccurate inter-service workload across the military services due to lack of coordination in reporting this information; (3) inconsistent calculations or display of workload shortfalls across the military services; and (4) inconsistent calculations of the estimated cost of planned workload across the military services. We made recommendations to address each issue.[9] Further, we identified additional information that could increase the report's transparency, and we suggested that Congress consider amending section 2464 to include additional elements to increase the transparency of future biennial core reports. Consistent with our recommendations, Congress amended section 2464 and added additional reporting requirements.[10] We discuss DOD's actions to address our specific recommendations to improve the completeness of its 2018 Biennial Core Report later in this report.

DOD Addressed Eight of the Ten Reporting Elements and Plans to Address the Remaining Two in the 2020 Biennial Report

In the 2018 Biennial Core Report, DOD and the military services addressed 8 of 10 required reporting elements, as shown in table 1 and discussed in more detail below. According to department officials, the

[7]GAO, *Depot Maintenance: Additional Information Needed to Meet DOD's Core Capability Reporting Requirements*, GAO-13-194 (Washington, D.C.: Feb. 11, 2013).

[8]GAO, *Depot Maintenance: Accurate and Complete Data Needed to Meet DOD's Core Capability Requirements*, GAO-14-777 (Washington, D.C.: Sept. 18, 2014).

[9]Inter-service workload refers to any workload that one military service is providing to another military service. GAO, *Depot Maintenance: Improvements to DOD's Biennial Core Report Could Better Inform Oversight and Funding Decisions*, GAO-17-81 (Washington, D.C.; Nov. 28, 2016).

[10]Pub. L. No. 115-91, § 332 (2017).

department did not address two of the elements because changes to its guidance and processes for developing the 2018 report resulted in the 2016 and 2018 reports not being directly comparable. DOD officials stated that they plan to address these two elements in the 2020 Biennial Core Report.

Table 1: Assessment of the Department of Defense's (DOD) 2018 Biennial Core Report

Reporting Element Number	Reporting Element[a]	Assessment
1	Core depot-level maintenance and repair capability requirements and sustaining workloads, organized by work breakdown structure and expressed in direct labor hours.	Addressed
2	Workloads necessary to sustain such requirements, expressed in direct labor hours and cost.	Addressed
3	Detailed rationale for any and all shortfalls and a plan to either correct or mitigate the effects of the shortfalls.	Addressed
4	Any workload shortfalls at any work breakdown structure category designated as a lower-level category according to DOD Instruction 4151.20.	Addressed
5	A description of any workload executed at a category designated as a first-level category that could be used to mitigate shortfalls in similar categories.	Addressed
6	A description of any progress made in implementing mitigation plans developed pursuant to element 3.	Not addressed[b]
7	A description of core capability requirements and corresponding workloads at the first-level category.	Addressed
8	A description of the shortfall and an identification of the subcategory of the work breakdown structure in which the shortfall occurred.	Addressed
9	An explanation of any work breakdown structure category designated as a special interest item or other.	Addressed
10	Whether the core depot-level maintenance and repair capability requirements described in the report for the preceding fiscal year have been executed.	Not addressed[b]

Source: GAO analysis of the Department of Defense's 2018 Biennial Core Report. | GAO-19-89

[a]The reporting elements in this table are paraphrased. To see the elements as written in statute, see appendix I of this report.

[b]According to DOD officials, DOD did not address these elements because the 2018 and 2016 reports are not comparable. They said that DOD updated its guidance and process for developing the biennial core report in 2018 and those two elements require comparison of information from 2018 with information presented in the 2016 Biennial Core Report, which followed different guidance and standards. However, DOD officials said that the 2018 Biennial Core Report is the baseline for future reports and that the department plans to address these elements in its 2020 Biennial Core Report.

Military Services Identified Core Capability Requirements and Projected Workloads

To address reporting elements 1 and 2, the military services presented their respective requirements and projected workloads in direct labor hours and associated costs, using the work breakdown structure. Table 2 shows DOD's reported direct labor hours for the depots' core requirements, as well as projected maintenance workloads and costs of workloads to sustain core requirements by military service.

Table 2: Department of Defense's (DOD) Reported Fiscal Year 2019 Projected Labor and Sustainment Costs for Each Service's Depots

Service	Total adjusted core requirement[a]	Total fiscal year 2019 projected public sector depot maintenance workload	Estimated cost of total fiscal year 2019 projected workload
n/a	Direct labor hours	Direct labor hours	Dollars
Army	18.3 million	15.4 million	$3.3 billion
Navy	28.5 million	55.2 million	$2.9 billion
Marine Corps	1.8 million	2.7 million	$0.3 billion
Air Force	18.8 million	24.9 million	$4.6 billion
DOD Total	**67.4 million**	**98.2 million**	**$11.1 billion**

Source: GAO analysis of the Department of Defense's 2018 Biennial Core Report. | GAO-19-89

Note: Numbers have been rounded. We did not assess the reliability of the data sources and calculations used to generate these reported results.

[a]Core adjusted requirements consider a service's requirements as well as other military services' requirements for which it conducts maintenance.

Military Services Identified Key Information by Work Breakdown Structure

The military services presented core requirements and workloads, down to the second-level subcategories, to address reporting element 7.[11] This structure represents all of the sub-specialties required to maintain core depot-level capabilities across the 10 categories of the work breakdown structure. For example, the aircraft category is broken down into 7 second-level subcategories: rotary, vertical/short take-off and landing, cargo/tanker, fighter/attack, bomber, unmanned systems, and aircraft engines.

[11]See appendix IV for the full work breakdown structure used by DOD in its report.

The Army, Navy, and Air Force also identified the items they placed into the "Other" category to address reporting element 9. The Marine Corps did not place any core requirements in the "Other" category in the 2018 Biennial Core Report and therefore was not required to address this reporting element. Specifically:

- The Army identified requirements associated with items such as air conditioners, food service hygiene equipment, chemical defense equipment, and water purification;
- The Navy identified requirements associated with specialty aircraft and aircraft components that are common across multiple platforms; and
- The Air Force identified requirements associated with specialty items such as surveillance aircraft, missile components, and communications/electronic equipment that do not fall under other distinct work breakdown structure subcategories.

Military Services Identified Projected Shortfalls and Mitigation Plans

The military services each identified projected shortfalls at the first- and second-levels of the work breakdown structure (elements 3 and 4), reasons for those shortfalls (element 3), and mitigation plans for the projected shortfalls (element 3). This includes—in some cases—leveraging excess core capabilities in one workload category to mitigate projected shortfalls in another category (elements 5 and 8). Specifically:

Army: The Army reported a total projected shortfall of about 2.9 million direct labor hours, as shown in table 3. It identified projected shortfalls in 5 of the 10 first-level work breakdown structure categories, and in 13 of the 33 second-level categories.

Table 3: Army Core Sustaining Projected Workload Shortfalls in Direct Labor Hours, Fiscal Year 2019

Category	Work breakdown structure category		Projected workload shortfalls[a]
Aircraft	1.	Aircraft	(580,997)
Aircraft		1.1 Rotary	(851,284)
Aircraft		1.6 Unmanned Systems	(49,423)
Ground Vehicles	2.	Ground Vehicles	(1,605,222)

Category	Work breakdown structure category		Projected workload shortfalls[a]
Ground Vehicles	2.	2.1 Combat Vehicles	(1,726,305)
Ground Vehicles		2.4 Construction Equipment	(237,638)
Communication/Electronic Equipment	4.	Communication/Electronic Equipment	—[b]
Communication/Electronic Equipment		4.2 Radio	(104,694)
Communication/Electronic Equipment		4.3 Wire	(10,208)
Communication/Electronic Equipment		4.5 Navigational Aids	(166,189)
Communication/Electronic Equipment		4.7 Crypto	(24,076)
Support Equipment	5.	Support Equipment	(104,222)
Support Equipment		5.2 Generators	(201,243)
Support Equipment		5.3 Test, Measurement, and Diagnostic Equipment	(10,221)
Ordnance, Weapons, and Missiles	6.	Ordnance, Weapons, and Missiles	(560,878)
Ordnance, Weapons, and Missiles		6.6 Small Arms/Personal Weapons	(20,005)
Ordnance, Weapons, and Missiles		6.8 Tactical Missiles	(541,843)
Software	7.	Software	(340,800)
Software		7.1 Weapon System	(514,648)
n/a	**Total Shortfalls**		**(2,964,200)**

Source: GAO analysis of the Department of Defense's 2018 Biennial Core Report. | GAO-19-89

Note: We did not assess the reliability of the data sources and calculations used to generate these reported results.

[a]The projected shortfalls identified for the subcategories cannot be totaled to obtain the shortfall in the first-level category or the total shortfalls for the Army. The shortfall at the first-level category is determined by aggregating shortfall and excess workload identified in the sub-categories.

[b]There is no projected overall shortfall for this first-level category. For this category, workload exceeds the core requirement by 106,906 direct labor hours.

The Army identified a number of reasons for these projected shortfalls. Army officials stated that these reasons generally contributed to shortfalls across the various work breakdown categories. They also noted the challenge of calculating shortfalls based on comparing current workloads with predicted workloads that were based on potential future Army strategies. The Army identified the following specific reasons for shortfalls:

- DOD's updated defense planning scenarios increased the Army's equipment requirements. These additional requirements resulted in a greater total core depot requirement for the Army, which in turn contributed to projected shortfalls.
- The Army noted that DOD's most recent Future Years Defense Program lacked sufficient depot maintenance funding (that is, money to pay for direct labor hours) to meet core capability requirements.[12]
- The Army cited newly established software depot maintenance requirements as one of the reasons for its shortfall. Specifically, DOD updated requirements for reporting depot resources associated with upgrading and maintaining software in weapon systems. According to the Army's 2018 core report submission, the Army previously determined this requirement based on the number of people assigned to the Army's software sustainment activities. However, the Army revised its methodology for calculating its software sustainment workload to reflect actual workload, not just the number of people conducting the work.

After identifying projected shortfalls, officials used that information to determine how best to close gaps and mitigate risks in future implementation. Specifically, the Army is currently working to move software-related direct labor hours from contractor to military sources, which will help the Army mitigate—that is, shrink—its projected shortfall by fiscal year 2020. The Army reported that it plans to mitigate many of its projected core shortfalls by using skill sets similar to those required for maintaining a core capability in repairing equipment for foreign militaries. Officials stated that the Army plans to hire and train maintenance personnel to conduct maintenance work associated with the foreign military sales program. This workload will also assist the Army in meeting its core capability requirements for Army systems, increasing the total projected workload, and decreasing estimated shortfalls. Additionally, the Army identified mitigations for specific shortfalls—for example, replacing old generators with a new system by fiscal year 2025 will mitigate its shortfall in support equipment.

Navy: The Navy reported that it did not project an overall shortfall, nor did it project any shortfalls at the first- or second-level of the work breakdown structure, and therefore it did not provide mitigation plans. Navy and OSD

[12]The Future Years Defense Program is a DOD database and internal accounting system that summarizes forces and resources associated with programs approved by the Secretary of Defense.

officials noted that the Navy and the department differ regarding the definition of software sustainment. Specifically, a Navy official stated that the service views software sustainment as an engineering function, not a depot maintenance function. This official observed that while the Navy believes software sustainment to be critical to maintaining its weapon systems, it believes that managing software sustainment as depot maintenance is not the most effective approach for the Navy. As a result, the Navy did not report any software core capability requirement or projected workload for fiscal year 2019. OSD defined software maintenance and reporting requirements in its guidance requesting data from the military services for the biennial core report. In spite of differing perspectives between OSD and the Navy, OSD accepted the Navy's core report submission, in which the Navy reported no core software maintenance capability requirements.[13]

Marine Corps: The Marine Corps reported that it did not project a total shortfall, but did project a shortfall of 82,971 direct labor hours in one second-level subcategory—that is, construction equipment—that falls in the ground vehicle first-level category. The Marine Corps identified a rationale and mitigation plan for its projected shortfall in construction equipment. The Marine Corps reported that general factors affecting maintenance workload and funding contributed to the shortfall, including: (1) After drawdowns from Iraq and Afghanistan, the Marine Corps repaired equipment to a desired level of combat effectiveness in line with current mission requirements and available resources. This led to fewer current maintenance needs and therefore reduced core maintenance workloads, creating projected shortfalls in some skill sets; and (2) The Marine Corps made changes to its force structure, which led to having more equipment in inventory, less equipment in use, and therefore less required maintenance. This created a shortfall in the skill set for construction equipment. To address this shortfall, the Marine Corps plans to use the excess workload in amphibious vehicles to mitigate the projected shortfall in construction equipment. Marine Corps officials stated that these second-level subcategories involve similar, tracked vehicles, which can be maintained using the same skill set.

Air Force: The Air Force reported that it did not project a total shortfall, but did project shortfalls within the work breakdown structure, as shown in

[13]We currently have a review of DOD's software sustainment policy, organizations, and practices underway and plan to issue a report on the topic before the end of 2018.

table 4. The Air Force identified projected overall shortfalls in 1 of the 10 first-level work breakdown structure categories, and in 7 of the 33 second-level work breakdown structure categories.

Table 4: Air Force Projected Core Sustaining Workload Shortfalls in Direct Labor Hours, Fiscal Year 2019

Category	Work breakdown structure category		Projected workload shortfalls[a]
Aircraft	1.	Aircraft	n/a[b]
Aircraft		1.1 Rotary	(8,796)
Aircraft		1.2 Vertical/Short Takeoff and Landing	(12,216)
Aircraft		1.6 Unmanned Systems	(297,701)
Communication/Electronic Equipment	5.	Communication/Electronic Equipment	(91,096)
Communication/Electronic Equipment		4.1 Radar	(750)
Communication/Electronic Equipment		4.2 Radio	(91,720)
Communication/Electronic Equipment		4.3 Wire	(16,974)
Ordnance, Weapons, and Missiles	6.	Ordnance, Weapons, and Missiles	n/a[b]
Ordnance, Weapons, and Missiles		6.8 Tactical Missiles	(41,773)
n/a	**Total Shortfalls**		**n/a[c]**

Source: GAO analysis of the Department of Defense's 2018 Biennial Core Report. | GAO-19-89

Note: We did not assess the reliability of the data sources and calculations used to generate these reported results.

[a]The projected shortfalls identified for the subcategories cannot be totaled to obtain the shortfall in the first-level category or the total shortfalls for the Air Force. The shortfall at the first-level category is determined by aggregating shortfall and excess workload identified in the subcategories.

[b]There is no projected overall shortfall for this first-level category. For these categories, workload exceeds the core requirement when considering all second-level subcategories.

[c]The Air Force does not project a total shortfall, but rather workload-exceeded core requirements, by 6,171,905 direct labor hours.

The Air Force identified reasons and provided detailed explanations, as well as mitigation plans, for each projected shortfall. For example, it projected a shortfall in rotary workload according to Air Force officials because of staffing and supply issues with HH-60 Pave Hawk

maintenance at Corpus Christi Army Depot.[14] According to these officials, these maintenance issues have resulted in the Air Force's using more contracted depot maintenance work on the HH-60 Pave Hawk in order to meet demand. As a result of the more extensive contracting of maintenance, planned workload at Corpus Christi Army Depot has been reduced, thereby creating a projected shortfall. The Air Force, Army, and Navy formed a team to address this projected shortfall. Air Force officials stated that contracts are being reduced and that they expect to resolve the maintenance issues before the 2020 Biennial Core Report. To address its projected shortfall in tactical missiles, the Air Force plans to identify Letterkenny Army Depot as the Technology Repair Center for this requirement, as the workloads are small in volume and the Letterkenny Army Depot can meet this requirement. In addition, the Air Force projected an overage of about 176,000 direct labor hours in strategic missiles. The Air Force believes that its projected workload in strategic missiles will allow it to maintain capability to repair tactical missiles—an area in which it projects a shortfall of about 42,000 direct labor hours. According to Air Force officials, the electronics on these two types of missiles are very similar and require the same skill set.

DOD Did Not Address the Two Elements Concerning Progress in Implementing Mitigation Plans and Executing Reported Workloads

DOD in the 2018 Biennial Core Report did not address progress made in implementing mitigation plans from the prior core report (element 6), nor did they address the degree to which projected workload reported in the prior core report was executed (element 10). According to Office of the Assistant Secretary of Defense for Logistics and Materiel Readiness (OASD L&MR) officials, they did not address these elements because the elements require DOD to compare information in the 2018 Biennial Core Report with information in the 2016 Biennial Core Report. Since DOD updated its guidance and processes for developing the 2018 Biennial Depot Core Report—in response to new statutory requirements and our prior recommendations—a meaningful comparison was not possible in

[14]In August 2018 we reported that HH-60G Pave Hawks undergoing depot-level maintenance spent an average of 332 days undergoing such maintenance in fiscal year 2017, as compared with 233 days in fiscal year 2007—more than a 40-percent increase. See GAO, *Military Readiness: Air Force Plans to Replace Aging Personnel Recovery Helicopter Fleet*, GAO-18-605 (Washington, D.C.: Aug. 16, 2018).

the 2018 Biennial Core Report, according to OSD and military service officials. Additionally, DOD did not fully provide mitigation plans in its 2016 Biennial Core Report, as we reported in 2016.[15] Therefore, DOD was unable to provide progress reports on 2016 mitigation plans.

DOD officials told us that they plan to use the 2018 Biennial Core Report as a baseline for future biennial core reports, which will allow them to address elements 6 and 10. Specifically, they stated that they plan to provide progress reports on the mitigation plans they identified in the 2018 Biennial Core Report. Additionally, officials stated their intent to provide a comparison of the fiscal year 2019 projected workload reported in the 2018 Biennial Core Report with the actual workload for fiscal year 2019 contained in the 2020 Biennial Core Report.

DOD's 2018 Biennial Core Report Is Generally Complete

DOD's 2018 Biennial Core Report is generally complete in that it lacks any obvious errors and aligns with supporting information provided by the military services. Specifically, unlike previous biennial core reports, data submissions provided to DOD by the military services are identical to the data in the 2018 Biennial Core Report, and there are no transposition errors.[16] Further, based on our review of the services' submissions to OSD, data and other information provided by the military services were accurately and appropriately included in DOD's 2018 Biennial Core Report. Finally, our analysis of the report and the military services' submissions did not identify errors in the summation of the data.

DOD's focused efforts in 2017 and 2018 to develop better guidance and procedures assisted in improving the completeness of DOD's 2018 Biennial Core Report—in part, according to DOD officials, due to our prior recommendations. Specifically, in 2017 the OASD L&MR began drafting new guidance to identify required depot maintenance core capabilities and the associated workloads needed to sustain those capabilities. This guidance was finalized and issued by the Office of the Under Secretary of Defense for Acquisition and Sustainment in May 2018. Officials from

[15]GAO-17-81.

[16]For more information on our transposition analyses, see appendix III.

OASD L&MR and the military services told us that they used the methodology in this new guidance to complete the 2018 Biennial Core Report in late 2017 and early 2018.

Officials told us that our prior recommendations, based on our reviews of the 2012, 2014, and 2016 biennial core reports, served to guide DOD's update of its guidance and procedures. The changes made by Congress to section 2464 were also incorporated into DOD's new guidance to ensure compliance with the 10 reporting elements, as we previously discussed. During the course of our review, we found that DOD had addressed all of the recommendations from our prior reports on the 2012, 2014, and 2016 Biennial Core Reports.

First, in our review of the 2012 Biennial Core Report, we found that DOD did not include explanations for each identified projected shortfall.[17] We recommended that DOD include in its biennial core report to Congress detailed explanations for why the military services did not have the workloads to meet core maintenance requirements for each projected shortfall identified in the report. Officials with OASD L&MR said that the May 2018 updated version of DOD Instruction 4151.20 was revised to require the submission of a detailed rationale for any and all shortfalls, and a plan to either correct or mitigate the effects of the shortfalls. The instruction states further that the detailed rationale and plan will identify the reason for the shortfall; contain a strategy to mitigate the effects of the shortfall (for example, specific transferrable workload, transfer of private-sector workload); and include actions to rectify any capability or workload shortfalls, including a description of planned capital investment, timing, and planned workarounds until the new capabilities or workloads are available. DOD's 2018 Biennial Core Report as previously discussed provided rationales for shortfalls.

Second, in our review of the 2014 Biennial Core Report, we found that some data were incomplete.[18] We recommended that DOD review its processes and implement needed improvements to help ensure accuracy and completeness. In response to this and our other prior recommendations, DOD updated DOD Instruction 4151.20 to include additional steps and more controls that ensure more complete and accurate data submissions. According to OSD officials, changes to the

[17]GAO-13-194.

[18]GAO-14-777.

guidance included deleting data fields unrelated to core requirements; streamlining and clarifying reporting instructions; ensuring that service submissions be reviewed and approved by general, flag, or senior executive service officials; determining the weapon systems or other platforms that are in the Chairman of the Joint Chiefs of Staff strategic and contingency plans; addressing inter-service workloads; having the worksheet automatically calculate shortfalls; and defining "software" and "software maintenance."

Most recently, in our review of the 2016 Biennial Core Report, we found (1) data errors; (2) inconsistent capture of inter-service workloads across the military services; (3) inconsistent calculations or transpositions of projected workload shortfalls across the military services; and (4) inconsistent calculations of the estimated cost of projected workloads across the military services.[19] We recommended that DOD update its guidance—in particular DOD Instruction 4151.20—to require future biennial core reports to include instructions to the reporting agencies on how to (1) report additional depot workloads performed that have not been identified as core requirements; (2) accurately capture inter-service workloads; (3) calculate projected shortfalls; and (4) estimate the cost of projected workloads. DOD took steps to address each of these issues. Specifically, DOD did the following:

- Issued guidance stating that the total adjusted core capability requirements and the total projected public-sector depot maintenance workloads both reflect core workloads, as well as workloads that have not been identified as sustaining core.
- Developed and provided to each of the military services a worksheet on which to submit their projected inter-service workloads. OSD also held a meeting with all of the military services to resolve any discrepancies between their respective submissions.
- Created worksheets with formulas to automatically calculate the projected shortfalls at the subcategory level of the work breakdown structure for each service.
- Issued updated guidance to indicate that the estimated costs of the projected workloads to sustain the core capability requirements were to be included. According to OSD officials, these estimates are developed in accordance with financial management regulations and

[19]GAO-17-81.

then applied to the estimated core sustaining workloads for each work breakdown structure, thereby providing a common baseline and process.

In meetings with OSD and the military services, officials offered ideas for possible changes in future reports, such as including additional information on inter-service workloads to increase congressional visibility regarding coordination on depot maintenance across the military services. Additionally, OSD officials noted that they were considering the inclusion of additional information in future reports on how costs of projected workloads are calculated. Information on this is provided in DOD Instruction 4151.20, but not in its biennial core report. According to OSD officials, the department plans to consider these and other proposed changes from the military services and other stakeholders to its biennial core reporting process and supporting guidance. Given that DOD has made considerable progress by improving both the completeness of the 2018 Biennial Core Report and its guidance on the development of the report, we are not making recommendations at this time.

Agency Comments

We provided a draft of this report to DOD for comment. DOD provided technical comments, which we included as appropriate.

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

If you or your staff have any questions about this report, please contact Diana Maurer at (202) 512-9627 or maurerd@gao.gov. Contact points for our Office 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 are listed in appendix V.

Diana Maurer
Director
Defense Capabilities and Management

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The Honorable Jack Reed
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Committee on Armed Services
United States Senate

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Committee on Appropriations
United States Senate

The Honorable Kay Granger
Chairwoman
The Honorable Pete Visclosky
Ranking Member
Subcommittee on Defense
Committee on Appropriations
House of Representatives

Appendix I: Complete Text of 10 U.S.C. § 2464(d)

(d) Biennial core report. Not later than April 1 of each even-numbered year, the Secretary of Defense shall submit to Congress a report identifying, for each of the armed forces (except for the Coast Guard), for the fiscal year after the fiscal year during which the report is submitted, each of the following:

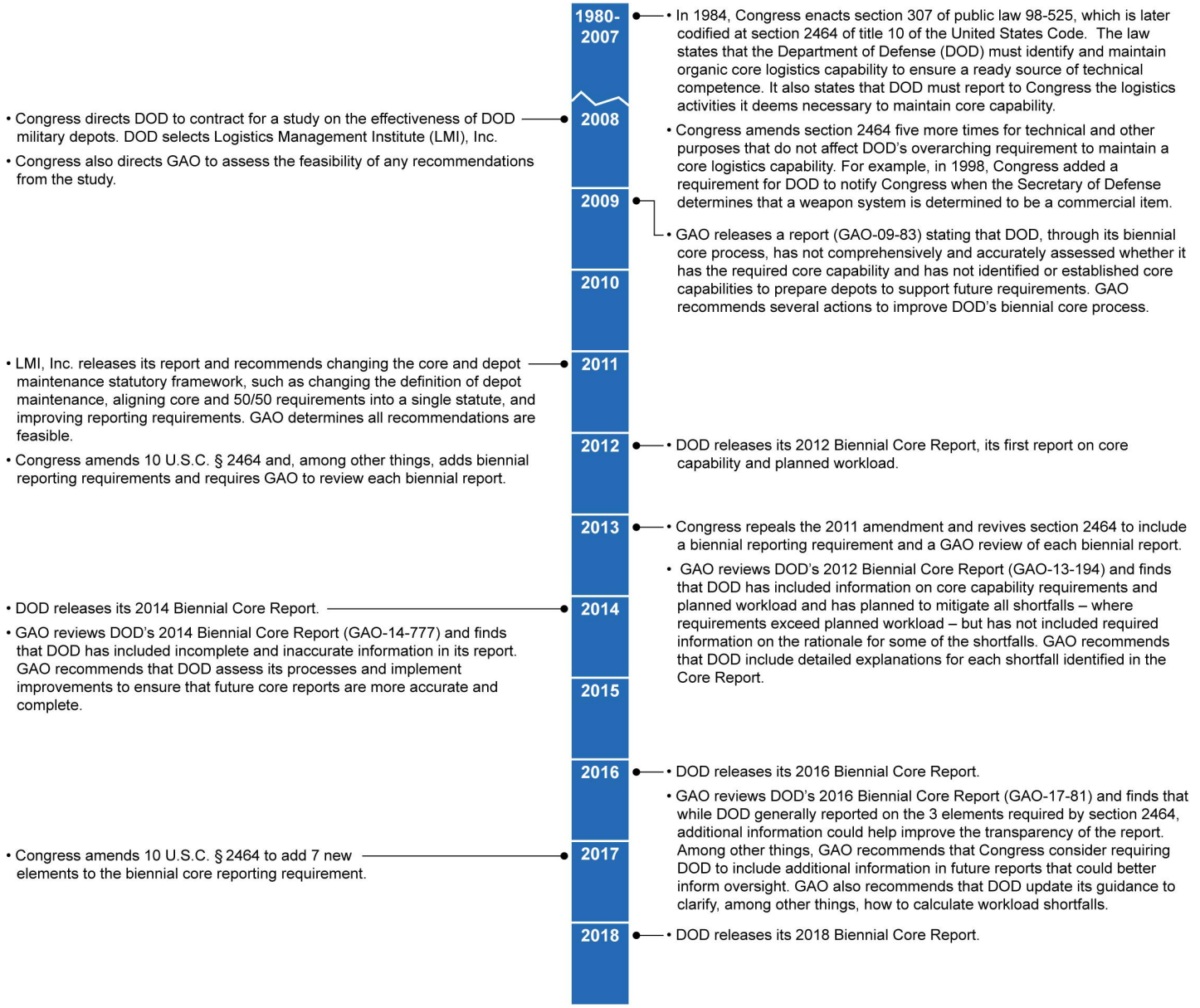
1. The core depot-level maintenance and repair capability requirements and sustaining workloads, organized by work breakdown structure, expressed in direct labor hours.
2. The corresponding workloads necessary to sustain core depot-level maintenance and repair capability requirements, expressed in direct labor hours and cost.
3. In any case where core depot-level maintenance and repair capability requirements exceed or are expected to exceed sustaining workloads, a detailed rationale for any and all shortfalls and a plan either to correct or mitigate the effects of the shortfalls.
4. Any workload shortfalls at any work breakdown structure category designated as a lower-level category pursuant to Department of Defense Instruction 4151.20, or any successor instruction.
5. A description of any workload executed at a category designated as a first-level category pursuant to such Instruction, or any successor instruction, that could be used to mitigate shortfalls in similar categories.
6. A description of any progress made on implementing mitigation plans developed pursuant to paragraph (3).
7. A description of core capability requirements and corresponding workloads at the first level category.
8. In the case of any shortfall that is identified, a description of the shortfall and an identification of the subcategory of the work breakdown structure in which the shortfall occurred.
9. In the case of any work breakdown structure category designated as a special interest item or other pursuant to such Instruction, or any successor instruction, an explanation for such designation.

10. Whether the core depot-level maintenance and repair capability requirements described in the report submitted under this subsection for the preceding fiscal year have been executed.

Appendix II: Timeline of 10 U.S.C. § 2464 and Related GAO Reports

In 1984 Congress passed legislation limiting the private contracting of certain core logistics functions. This law required the Department of Defense (DOD) to maintain a logistics capability to ensure a ready and controlled source of technical competence and resources. In 1988 Congress codified this law, as amended, at section 2464 of title 10 of the U.S. Code. While section 2464 has been amended multiple times since then, the requirement for DOD to maintain a core logistics capability that is government-owned and government-operated has persisted. In 2011 Congress added a requirement for DOD to provide a biennial core report. Most recently, in fiscal year 2018 Congress added additional elements that DOD is required to address in its biennial core reports. Among other things, changes to the statute are illustrated in figure 2 below.

Figure 2: Timeline of 10 U.S.C. § 2464 and Related GAO Reports



Source: GAO analysis. | GAO-19-89

Appendix III: Scope and Methodology

Section 2464(d) of Title 10 of the United States Code requires the Department of Defense (DOD), among other things, to submit to Congress a biennial report providing information on its core depot-level maintenance and repair capability requirements and workload. Specifically, section 2464(d) identifies 10 elements that DOD must address for each of the armed services (except for the Coast Guard) in its biennial report concerning depot-maintenance requirements and workload.[1] Section 2464 also requires us to review DOD's report for compliance with section 2464 and assess the completeness of the report.[2] DOD submitted its most recent biennial core report to Congress on May 23, 2018.

To determine the extent to which the DOD 2018 Biennial Core Report complies with section 2464(d), we analyzed the text of the report and obtained supporting information on DOD's process to determine its core maintenance capability for fiscal year 2019. Two GAO analysts independently reviewed DOD's report to determine the extent to which it addressed each element required by the statute. All initial disagreements between the two GAO analysts were discussed and resolved through consensus. For the military services, when the report explicitly included all parts of the required reporting element, we determined that DOD "addressed" the element. When the report did not explicitly include any part of the element, we determined that DOD "did not address" the element. If the report included some aspects of an element, but not all,

[1]The National Defense Authorization Act for Fiscal Year 2013 amended section 2464 to require DOD to submit to Congress a biennial report addressing three elements for each of the military services, during each even-numbered year. Pub. L. No. 112-239, § 322 (2013). The National Defense Authorization Act for Fiscal Year 2018 further amended section 2464 resulting in an additional seven elements that must be addressed by DOD's biennial report. Pub. L. No. 115-91, § 332 (2017). See appendix I for the 10 elements as written in section 2464(d) and appendix II for a timeline of the statute and our related reports.

[2]We have defined completeness as the report being based on data that do not contain obvious errors and that align with supporting information provided by the military services. As in past reviews of DOD's biennial core reports, we did not assess the reliability of the underlying data provided by the military services for the 2018 DOD Biennial Report.

then we determined that DOD "partially addressed" the element. We compared the types of information and data provided by each of the military services with the data that the Office of the Secretary of Defense (OSD) included in the 2018 Biennial Core Report, to assess consistency. We also discussed our preliminary analyses with OSD and military service officials to gain additional insight into their analysis and efforts to address the statutory requirements.

To assess the report's completeness, we obtained and analyzed the fiscal year 2019 data used in compiling DOD's 2018 Biennial Core Report, including core capability requirements and projected sustaining workload expressed in direct labor hours and cost and other information, such as workload shortfall explanations.[3] We compared the reporting agencies' submissions with the reporting template in DOD Instruction 4151.20 in order to determine the extent to which the reporting agencies submitted the information required by DOD's instruction, and we identified any inconsistencies or errors.[4] In order to determine whether these data and information were complete, we performed a number of data check steps to identify transposition inconsistencies or errors, and we discussed our analyses with OSD and military service officials. These steps included (1) reviewing each military service's submission to verify that it had consistently calculated and reported the direct labor hours identified as the total adjusted requirements and the workload needed to sustain depot maintenance core capability requirements; and (2) reconciling the information in the report against each military service's submission, for accuracy. However, as in the past reviews of DOD's biennial core reports, we did not assess the reliability of the underlying data provided by the military services for the 2018 DOD Biennial Core Report. The team also met with OSD and reporting agency officials responsible for overseeing the data collection and preparing the data submissions, to obtain clarification and understanding of the content of the submissions, as well as to discuss the department's guidance and processes used to collect the data for the report. Lastly, we reviewed DOD's actions to address our prior recommendations that were targeted at improving the completeness of DOD's biennial report.

[3] Completeness refers to accurate data and supporting information from the reporting agencies. Workload shortfall refers to the core capability requirements that exceed projected workload for fiscal year 2019.

[4] DOD Instruction 4151.20, *Depot Maintenance Core Capabilities Determination Process* (May 4, 2018).

We conducted this performance audit from May 2018 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 that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix IV: Category Levels from the Department of Defense's (DOD) Depot Maintenance Core Capability Worksheet

Table 5: Category Levels from the Department of Defense's Depot Maintenance Core Capability Worksheet

Category	Work Breakdown Structure Category
Aircraft	1. Aircraft
Aircraft	1.1 Rotary
Aircraft	1.2 Vertical/Short Takeoff and Landing
Aircraft	1.3 Cargo/Tanker
Aircraft	1.4 Fighter/Attack
Aircraft	1.5 Bomber
Aircraft	1.6 Unmanned Systems
Aircraft	1.7 Aircraft Engines
Ground Vehicles	2. Ground Vehicles
Ground Vehicles	2.1 Combat Vehicles
Ground Vehicles	2.2 Amphibious Vehicles
Ground Vehicles	2.3 Tactical (Wheeled) Vehicles
Ground Vehicles	2.4 Construction Equipment
Ground Vehicles	2.5 Unmanned Systems
Sea Ships	3. Sea Ships
Sea Ships	3.1 Aircraft Carriers
Sea Ships	3.2 Submarines
Sea Ships	3.3 Surface Combatants
Communication/Electronic Equipment	4. Communication/Electronic Equipment
Communication/Electronic Equipment	4.1 Radar
Communication/Electronic Equipment	4.2 Radio

Category	Work Breakdown Structure Category
Communication/Electronic Equipment	4.3 Wire
Communication/Electronic Equipment	4.4 Electronic Warfare
Communication/Electronic Equipment	4.5 Navigational Aids
Communication/Electronic Equipment	4.6 Electro-Optics/Night Vision
Communication/Electronic Equipment	4.7 Crypto
Communication/Electronic Equipment	4.8 Computers
Support Equipment	5. Support Equipment
Support Equipment	5.1 Ground Support Equipment
Support Equipment	5.2 Generators
Support Equipment	5.3 Test, Measurement, and Diagnostic Equipment
Support Equipment	5.4 Calibration
Ordnance, Weapons, and Missiles	6. Ordnance, Weapons, and Missiles
Ordnance, Weapons, and Missiles	6.1 Nuclear Weapons
Ordnance, Weapons, and Missiles	6.2 Chemical Weapons
Ordnance, Weapons, and Missiles	6.3 Biological Weapons
Ordnance, Weapons, and Missiles	6.4 Conventional Weapons
Ordnance, Weapons, and Missiles	6.5 Explosives
Ordnance, Weapons, and Missiles	6.6 Small Arms/Personal Weapons
Ordnance, Weapons, and Missiles	6.7 Strategic Missiles
Ordnance, Weapons, and Missiles	6.8 Tactical Missiles
Software	7. Software
Software	7.1 Weapon System
Software	7.2 Support Equipment
Fabrication/Manufacturing	8. Fabrication/Manufacturing
Fleet/Field Support	9. Fleet/Field Support
Other	10. Other

Source: DOD Instruction 4151.20 | GAO-19-89

Appendix V: GAO Contacts and Staff Acknowledgments

GAO Contacts

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Staff Acknowledgments

In addition to the named contact above, John Bumgarner, Assistant Director; Thomas Gosling, Assistant Director; Pat Donahue, Amie Lesser, Shahrzad Nikoo, Bethann E. Ritter Snyder, Walter Vance, Cheryl Weissman, and Melissa Wohlgemuth contributed to this report.

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