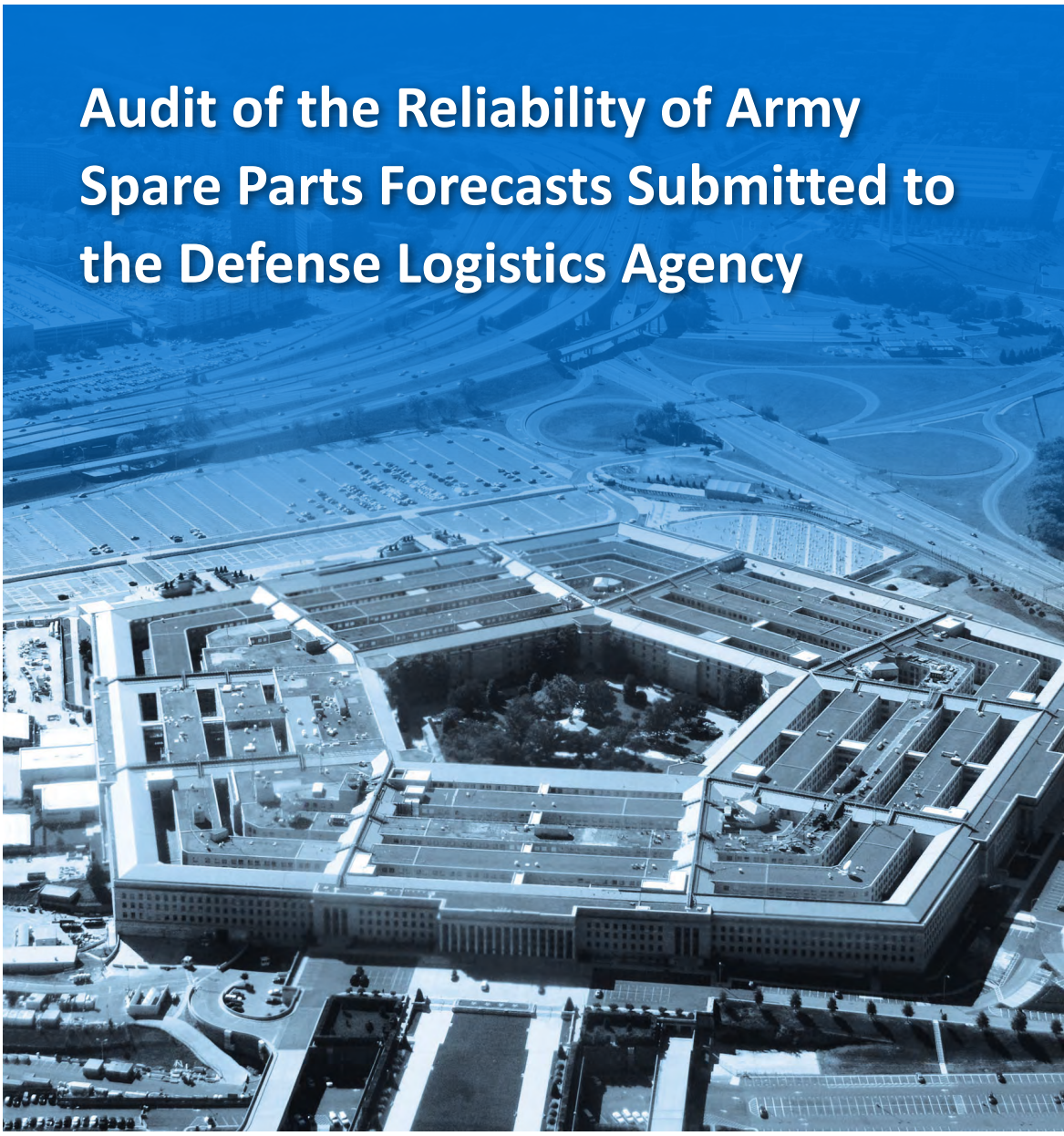
Report No. DODIG-2023-123

INSPECTOR GENERAL

U.S. Department of Defense

SEPTEMBER 20, 2023

Audit of the Reliability of Army Spare Parts Forecasts Submitted to the Defense Logistics Agency



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Results in Brief

Audit of the Reliability of Army Spare Parts Forecasts Submitted to the Defense Logistics Agency

September 20, 2023

Objective

The objective of this audit was to determine whether the Army submitted accurate spare parts forecasts to the Defense Logistics Agency (DLA) in support of planned depot maintenance programs.

Finding

The Army did not submit accurate spare parts forecasts to the DLA. Specifically, in FY 2021 the Army overstated its forecasts for some spare parts by $202 million and ordered $148 million in other spare parts that it did not forecast. In addition, the Army's spare parts forecast accuracy rate averaged only 20 percent throughout FY 2021.

Army process and system limitations prevented Army personnel from providing an audit trail (documentation) to recreate forecasts, which impeded our ability to identify the root causes for the overstated and understated forecasts. In addition, Army Materiel Command officials did not develop metrics and goals or establish guidance, procedures, controls, and training to ensure that the Army submitted accurate spare parts forecasts to the DLA.

Unreliable spare parts forecasts negatively affect the DLA's purchase decisions and the Army's readiness. Specifically, the DLA either buys too many parts, incurring unnecessary inventory costs and tying up funds that could be better spent on higher priorities, or does not purchase enough parts, negatively affecting depot operations and Army readiness.

DLA personnel were unable to identify the total value of the DLA's excess inventory attributed to inaccurate Army spare parts

Finding (cont'd)

forecasts. However, our detailed review of the spare parts forecasts for four items determined that inaccurate forecasts resulted in a $517,831 overprocurement and one canceled purchase request for $40,810 based on a corrected forecast. In addition, shortfalls in on-hand stock resulted in one depot buying parts to build an unavailable item, costing $2.8 million, to meet operational requirements.

Although we did not audit other Services (Navy, Air Force, or Marine Corps), we analyzed DLA data on other Services' FY 2021 spare parts forecasts and associated demands. The data showed that other Services also did not submit accurate spare parts forecasts to the DLA. Specifically, in FY 2021 other Services overstated their forecasts for some spare parts by $767 million and ordered $355 million in other spare parts that they did not forecast. In addition, the DLA reported a 20 percent spare parts forecast accuracy rate for all Services.

Recommendations

We recommend that the Under Secretary of Defense for Acquisition and Sustainment require the Services, in coordination with the DLA, to conduct an in-depth review of their respective spare parts forecasting process for DLA-managed items. The review should determine how the Services can improve the process and establish a plan of action with milestones with specific areas for improvement to address the deficiencies identified in this report.

Management Comments and Our Response

The Deputy Assistant Secretary of Defense for Logistics agreed with the recommendations and described actions planned to close the recommendations. The comments addressed our recommendations; therefore, the recommendations are resolved and will remain open. We will close the recommendations once we verify that the information provided and actions taken by management fully address the recommendations. Please see the Recommendations Table on the next page for the status of the recommendations.

Recommendations Table

Management	Recommendations Unresolved	Recommendations Resolved	Recommendations Closed
Under Secretary of Defense for Acquisition and Sustainment	None	1, 1.a, 1.b, 1.c, 1.d, 1.e, 1.f	None

Note: The following categories are used to describe agency management's comments to individual recommendations.

- **Unresolved** – Management has not agreed to implement the recommendation or has not proposed actions that will address the recommendation.
- **Resolved** – Management agreed to implement the recommendation or has proposed actions that will address the underlying finding that generated the recommendation.
- **Closed** – DoD OIG verified that the agreed upon corrective actions were implemented.

OFFICE OF INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
4800 MARK CENTER DRIVE
ALEXANDRIA, VIRGINIA 22350-1500

September 20, 2023

MEMORANDUM FOR UNDER SECRETARY OF DEFENSE FOR ACQUISITION AND SUSTAINMENT
COMMANDER, U.S. ARMY MATERIEL COMMAND
DIRECTOR, DEFENSE LOGISTICS AGENCY
AUDITOR GENERAL, DEPARTMENT OF THE ARMY

SUBJECT: Audit of the Reliability of Army Spare Parts Forecasts Submitted to the Defense Logistics Agency (Report No. DODIG-2023-123)

This final report provides the results of the DoD Office of Inspector General's audit. We previously provided copies of the draft report and requested written comments on the recommendations. We considered management's comments on the draft report when preparing the final report. These comments are included in the report.

The Deputy Assistant Secretary of Defense for Logistics agreed to address all the recommendations presented in the report; therefore, we consider the recommendations resolved and open. As described in the Recommendations, Management Comments, and Our Response section of this report, we will close the recommendations when you provide us documentation showing that all agreed-upon actions to implement the recommendations are completed. Therefore, please provide us within 90 days your response concerning specific actions in process or completed on the recommendations. Send your response to either followup@dodig.mil if unclassified or rfunet@dodig.smil.mil if classified SECRET.

If you have any questions, please contact me at [redacted]

FOR THE INSPECTOR GENERAL:

Carmen J. Malone
Assistant Inspector for Audit
Acquisition, Contracting, and Sustainment

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Introduction

Objective

The announced objective of this audit was to determine whether the actions taken by the Army in response to DoD Office of Inspector General (OIG) Report No. DODIG-2014-124, "Army Needs to Improve the Reliability of the Spare Parts Forecasts It Submits to the Defense Logistics Agency," September 29, 2014, improved the accuracy of the Army's spare parts forecasts. However, the Army's spare parts forecasting process changed since the issuance of DODIG-2014-124.[1] Therefore, the audit reviewed the accuracy of the spare parts forecasts that the Army submitted to the Defense Logistics Agency (DLA) to support planned depot maintenance programs using the current process. Specifically, we reviewed:

- the Army's accuracy rate for its spare parts forecasts for FY 2021,
- the DLA's data on the Army's spare parts forecasts and actual demands for FY 2021, and
- a sample of four individual item spare parts forecasts for which the value of the quantity forecasted significantly varied from the actual demand value in FY 2021.

In addition, we coordinated with the Office of the Under Secretary of Defense for Acquisition and Sustainment (OUSD[A&S]) and reviewed DLA data on the spare parts forecasts the Navy, Air Force, and Marine Corps submitted to the DLA and the associated demands for FY 2021. See Appendix A for our scope and methodology, use of computer-processed data, and prior coverage.

Background

DoD Spare Parts Demand Forecasting

Demand forecasting is the prediction of future demand for an item or group of items. The DoD uses demand forecasting to help optimize its spare parts inventory to ensure that sufficient spare parts are available to meet mission requirements while also minimizing the amount of spare parts on hand. The DLA is a DoD material manager that orders and maintains spare parts inventories and supplies them to DoD Components, including the Army, Marine Corps, Navy, and Air Force (Services). Specifically, the DLA:

- procures spare parts and other items from manufacturers and suppliers and provides them to the DoD and other Federal and state customers with services such as warehousing, packaging, and transportation; and
- contracts for spare parts and other items that manufacturers ship directly to military units and installations.

[1] This included the Army's conversion from using special program requirements to submit its spare parts forecasts to using the Army Supply Plan and the associated collaboration with the DLA and development of the Army Supply Plan workbook.

DoD Components forecast their future demand for spare parts based on factors such as planned maintenance schedules and spare parts usage rates. DoD Components submit their projected demands for spare parts electronically to the DLA to assist the DLA in building supply plans and making purchase decisions. The DLA makes purchase decisions based on a variety of information, including consideration of customer spare parts forecasts. The other information the DLA uses in its purchase decisions includes the customer ordering history for a given spare part, current inventory levels, and leadtime to replenish stock levels.

The DLA's major subordinate commands included in this audit were DLA Aviation and DLA Land and Maritime (L&M).

- DLA Aviation manages the supply chain for aviation weapon systems repair parts, flight safety equipment, maps, environmental products, and industrial plant equipment.
- DLA L&M manages the supply chain for ground-based and maritime weapon systems repair parts, small arms parts, and fluid-handling systems.

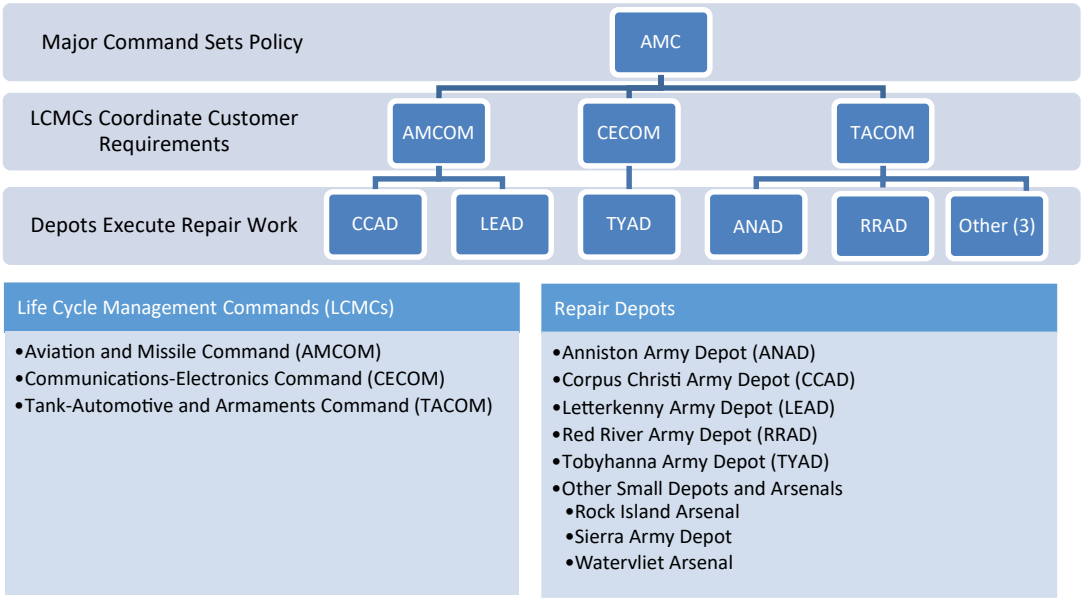
DoD guidance describes procedures for the DoD supply chain materiel management process associated with demand and supply planning, and the OUSD(A&S) as the originating Component responsible for overseeing the DoD supply chain planning process.[2] DoD guidance specifies that DoD Components will establish internal controls to ensure that information is as accurate as possible to improve the accuracy of demand forecasts. The required controls include establishing value-added metrics and maintaining supporting documentation that ensure the appropriateness and accuracy of the data submissions, correlating requisitions with related demand forecast data, and accurately documenting significant changes in demand forecasts in a timely manner.

Army Spare Parts Demand Forecasting Roles and Responsibilities

The Army Materiel Command (AMC), Army Lifecycle Management Commands (LCMCs), and the Army repair depots (depots) are involved with the Army's spare parts demand forecasting process. Figure 1 shows the structural relationship for the Army organizations involved with the Army spare parts forecasting process and execution of depot repair work.

[2] DoD Manual 4140.01, Volume 2, "DoD Supply Chain Materiel Management Procedures: Demand and Supply Planning," November 9, 2018.

Figure 1. AMC Structural Relationship for Army LCMCs and Repair Depots



Source: The DoD OIG.

Army Materiel Command

The AMC is the Army's lead materiel integrator and manages the global supply chain, synchronizing logistics and sustainment activities across the Army through its major subordinate commands. The AMC manages the Army's installations, arsenals, depots, and ammunition plants to ensure supply availability. The AMC and its subordinate commands use the Army Logistics Modernization Program (LMP) to generate spare parts forecasts and submit them to the DLA.[3] The AMC provides oversight of the LMP inventory analysis process and is responsible for ensuring that Army organizations prepare accurate repair parts forecasts in a timely manner in support of Army depot maintenance programs.

Army Life Cycle Management Commands

The Army's LCMCs integrate life cycle management across the materiel enterprise. These commands operate the Army's Organic Industrial Base, which maintains and modernizes everything from vehicles and helicopters to communications equipment. The LCMCs are responsible for ensuring that the Army depots comply with Army demand forecasting policy. The two LCMCs included in this audit were the U.S. Army Aviation and Missile Command (AMCOM) and the U.S. Army Tank-Automotive and Armaments Command (TACOM).

[3] The LMP is an enterprise resource planning system that enables materiel readiness and provides asset management and accountability, architecture, and acquisition compliancy.

- AMCOM manages two Army depots, and develops and is designed to deliver responsive aviation, missile, and materiel readiness to the Army to optimize joint warfighter capabilities at the point of need.
- TACOM manages five Army depots and the Army's ground equipment supply chain, and executes repair parts planning and supply chain management for Army ground combat systems.

Army Depots

An Army depot is an industrial-type facility that performs depot maintenance on weapon systems, equipment, and components. Army depots provide maintenance on materiel requiring major overhaul or a complete rebuilding of parts, assemblies, subassemblies, and end items. The depots are responsible for generating spare parts forecasts in the LMP for future maintenance requirements and submitting them to the DLA. The two Army depots included in this audit were the Corpus Christi Army Depot (CCAD) and the Anniston Army Depot (ANAD).

- CCAD is aligned under AMCOM and is the DoD's primary facility for rotary wing repair and a certified facility for aerospace industry maintenance repair and overhaul.
- ANAD is aligned under TACOM and is an Army maintenance center and munitions storage site and the DoD's Center of Industrial and Technical Excellence for most combat vehicles, assault bridging, artillery, small caliber weapons, locomotives, rail equipment, and non-tactical generators.

Army Spare Parts Demand Forecast Development Process

The AMC is responsible for ensuring that the Army LCMCs and depots provide forecasts to the DLA with sufficient time to acquire parts to meet scheduled requirements. The LCMCs and depots use the LMP system to plan depot maintenance projects and forecast spare parts requirements to the DLA. LCMC personnel load the repair program requirements into the LMP and create a unique project file. The repair program requirements include details such as:

- type of equipment needing maintenance,
- number of units requiring maintenance, and
- type of maintenance required.

This unique project file is typically prepared years in advance of the depot actually executing the work. Once LCMC personnel create the project file in the LMP, the system uses the repair program requirements information to select a parts list, also known as a bill of materials (BOM), which fits that type of work.[4] The parts list details

[4] The AMC Enterprise uses many types of BOMs in its day-to-day operations. The remanufacturing BOM is a list of all of the subassemblies, intermediates, parts, and raw materials that go into a parent assembly showing the quantity of each required to repair or overhaul an assembly using a depot overhaul factor.

the specific parts required to complete the planned project work. Army policy requires the depots to review and update BOMs at the completion of production programs and annotate changes in material usage probability and parts characteristics.[5]

Based on the information in the project file and in the parts list, the LMP will forecast spare parts requirements that the Army provides to the DLA.[6] The spare parts forecasts that the Army submits to the DLA are only for consumable items. A consumable item is an item of supply (except explosive ordnance and major end items of equipment) that is normally expended or used up beyond recovery in the use for which it is designed or intended. Army depot maintenance activities performing depot-level repairs are authorized to requisition and store spares, repair parts, and consumable items to support their maintenance programs.

Collaboration Between the Defense Logistics Agency and the Army Depots

DoD policy states that to improve the accuracy of demand forecasts, materiel managers and supply providers will collaborate with their customers to project expected future demand for items.[7] For formal collaboration between materiel managers and their customers, DoD Components should use tools such as the DLA Demand Data Exchange program. The DoD manual outlines how the program allows DoD customers to provide DLA materiel managers with a projected supply plan that consists of demand quantities for future months for customer-selected items. In October 2014, the Army transitioned to the Army Supply Plan (ASP).[8] The ASP is part of the DLA Demand Data Exchange program and is unique to the Army.[9] As part of the ASP, the Army submitted spare parts forecasts monthly to the DLA and submitted requirements up to 3 years in the future.[10]

The DLA and the Army established a process to collaborate on the Army's spare parts forecasts for a subset of items included in the ASP, using a web-based planning tool.[11] For certain items with a pattern of historical demands, the DLA uses the historical demands and calculates a statistical forecast to determine how many items to purchase at a given point in time to meet customer requirements.

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[5] AMC Regulation 750-55, "Maintenance of Supplies and Equipment: U.S. Army Materiel Command Organic Industrial Base (OIB) Operations Management," May 16, 2019.

[6] See Appendix B for additional details on the Army's spare parts forecasting process.

[7] DoD Manual 4140.01, Volume 2, "DoD Supply Chain Materiel Management Procedures: Demand and Supply Planning," November 9, 2018.

[8] Before October 2014 and the issuance of DODIG-2014-124, the Army submitted its spare parts demand forecasts to the DLA using the DoD special program requirements process.

[9] The DLA Demand Data Exchange program allows for the exchange of projected supply plan data, including customer requirements, between DoD customers and the DLA using a standardized transaction format.

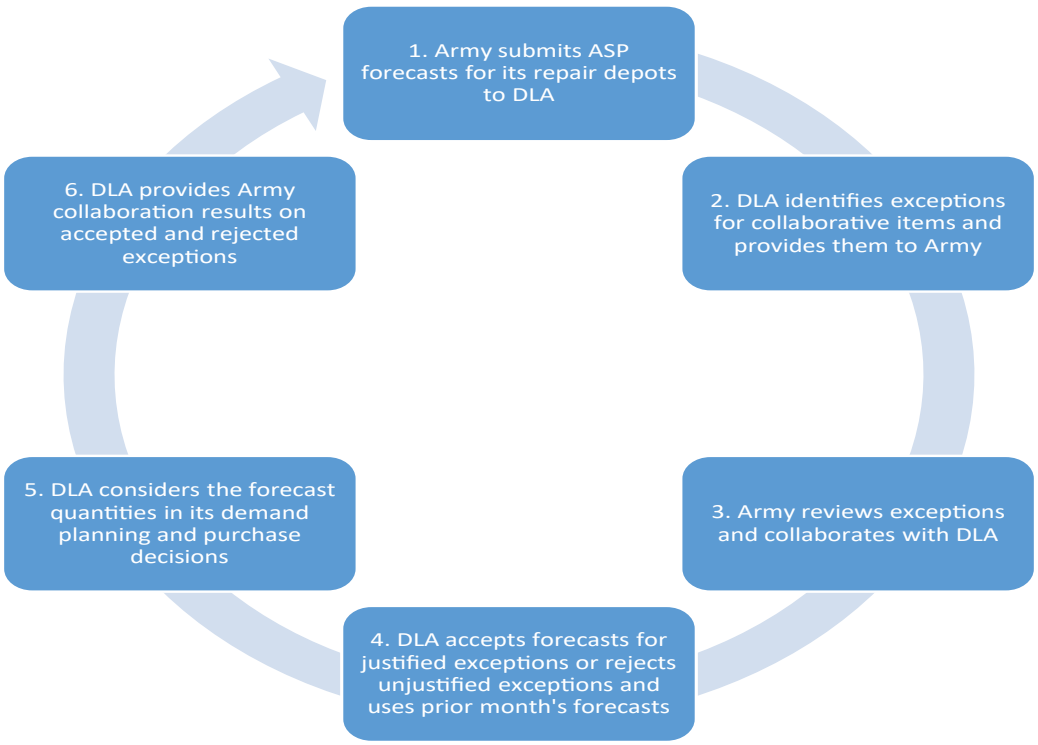
[10] The DLA Demand Data Exchange program projected supply plan period can range from a minimum of 12 months to a maximum of 60 months. At the time of this audit, the Army was submitting 36 months of projected supply data.

[11] Process error codes categorize items as collaborative or noncollaborative. Process error code "0" identifies collaborative items.

On a monthly basis, the DLA uses a set of business rules to identify significant forecast changes and significant differences from the DLA statistical forecast or customer buying pattern. Based on those business rules, the DLA identifies exceptions and provides these items to the Army. One type of exception, referred to as a hard exception, involves items with a $50,000 difference between the annual collaboration dollar amount and the new annual forecast in dollars. Army depot personnel are responsible for entering information to support the forecasts flagged as hard exceptions into a web-based tool used by Army depot and DLA personnel for collaboration. When the system identifies a hard exception, the DLA will not accept the forecast until the DLA Demand Planner approves the exception. Once approved, the DLA Demand Planner can incorporate the forecast into the DLA demand plan. However, if the DLA does not approve the exception or the customer does not take any action to support the forecast change, then the DLA Demand Planner incorporates the prior month's forecast into the DLA demand plan for consideration in any purchase decisions.

The Army depots designated an ASP lead to resolve, or assist in resolving, issues that affect ASP forecasting. The depot ASP lead collaborated with the LCMC and the DLA planners to validate spare parts forecasts. Figure 2 shows the intended process for Army and DLA collaboration for Army spare parts forecasts.

Figure 2. Army and DLA Collaboration Process for Army Spare Parts Forecasts



Source: The DoD OIG.

Finding

The Army Did Not Submit Accurate Spare Parts Forecasts

The Army did not submit accurate spare parts forecasts to the DLA. Specifically, in FY 2021 the Army overstated its forecasts for some spare parts by $202 million and ordered $148 million in other spare parts that it did not forecast.[12] In addition, the Army's spare parts forecast accuracy rate averaged only 20 percent throughout FY 2021.[13]

Army process and system limitations prevented Army personnel from providing an audit trail (documentation) to recreate forecasts, which impeded our ability to identify the root causes for the overstated and understated forecasts for specific spare parts. In addition, AMC officials did not:

- develop metrics and goals to measure spare parts forecast accuracy;
- establish procedures and controls for monitoring spare parts forecast accuracy;
- establish procedures and controls for identifying, tracking, and analyzing the primary causes of inaccurate spare parts forecasts and using the data to improve the accuracy of future forecasts; or
- establish guidance and provide recurring training to depot personnel on the process for evaluating the accuracy of spare parts forecasts and collaborating with the DLA, including level of research and information required to justify forecasts.

Unreliable spare parts forecasts negatively affect the DLA's purchase decisions and the Army's readiness. Specifically, the DLA either buys too many parts, incurring unnecessary inventory costs and tying up funds that could be better spent on higher priorities, or does not purchase enough parts, negatively affecting depot operations and Army readiness. DLA personnel were unable to identify the total value of the DLA's excess inventory attributed to inaccurate Army spare parts forecasts. However, our detailed review of the spare parts forecasts for four items determined that inaccurate forecasts resulted in a $517,831 overprocurement

[12] We reviewed the ASP forecasts for collaborative items that Army submitted to the DLA on October 1, 2020, and compared the value of the quantity forecasted to the value of the demands that occurred during FY 2021. The Army ordered $284 million in spare parts during FY 2021. We did not review all of the DLA's purchases compared to the Army's actual needs.

[13] The 20 percent is the average of the Army's monthly spare parts forecast accuracy rate during FY 2021 and does not specifically tie to the $195 million total overstated and $146 million understated forecasts. See Appendix C for details on the calculation of the Army's spare parts forecast accuracy rate.

and one canceled purchase request for $40,810 based on a corrected forecast. In addition, shortfalls in on-hand stock resulted in one depot buying parts to build the unavailable item, costing $2.8 million, to meet operational requirements.

Although we did not audit other Services, we analyzed DLA data on other Services' FY 2021 spare parts forecasts and associated demands. The data showed that other Services also did not submit accurate spare parts forecasts to the DLA. Specifically, in FY 2021 other Services overstated their forecasts for some spare parts by $767 million and ordered $355 million in other spare parts that they did not forecast. In November 2022, OUSD(A&S) officials informed us that they did not monitor the accuracy of the spare parts forecasts the individual Services submitted to the DLA and that they were not aware of any associated metrics or goals.

Army Spare Part Demand Forecast Accuracy

The Army did not submit accurate spare parts forecasts to the DLA. Specifically, the Army overstated its forecasts by $202 million and ordered $148 million in spare parts that it did not forecast in FY 2021.[14] We reviewed the ASP forecasts for FY 2021 submitted to the DLA on October 1, 2020, and compared the forecasts to the actual demands that occurred during FY 2021. In addition, the Army's accuracy rate for its spare parts forecasts averaged 20 percent during FY 2021. We reviewed the Army's methodology for reporting the accuracy of its spare parts demand forecasts and analyzed the Army's reported accuracy rate for FY 2021.

The Army's Methodology for Reporting the Accuracy of its Spare Parts Demand Forecasts

The DLA sends the Army several data files each month related to the ASP forecasts. These files contain details on the accuracy of the spare parts demand forecasts (referred to as Demand Plan Accuracy [DPA]), overstated forecasts, understated forecasts, collaborative forecast exceptions, and ASP forecasts at the individual item level.[15] The DLA measures the DPA of the Army's spare parts forecasts by comparing the forecasted demands to the actual orders submitted by the Army to purchase the associated spare parts.[16]

AMC personnel review the data files provided by the DLA and summarize the data in a series of spreadsheets and charts. AMC personnel create a monthly ASP workbook and upload it to an Army SharePoint site for the Army LCMCs and depots to review. The ASP workbook contains information on the DPA for all individual forecasts at the individual National Item Identification Number level, and

[14] The Army's total forecast value for FY 2021 was $339 million.

[15] The files also contain details on material availability and backorders, but this audit did not review that information.

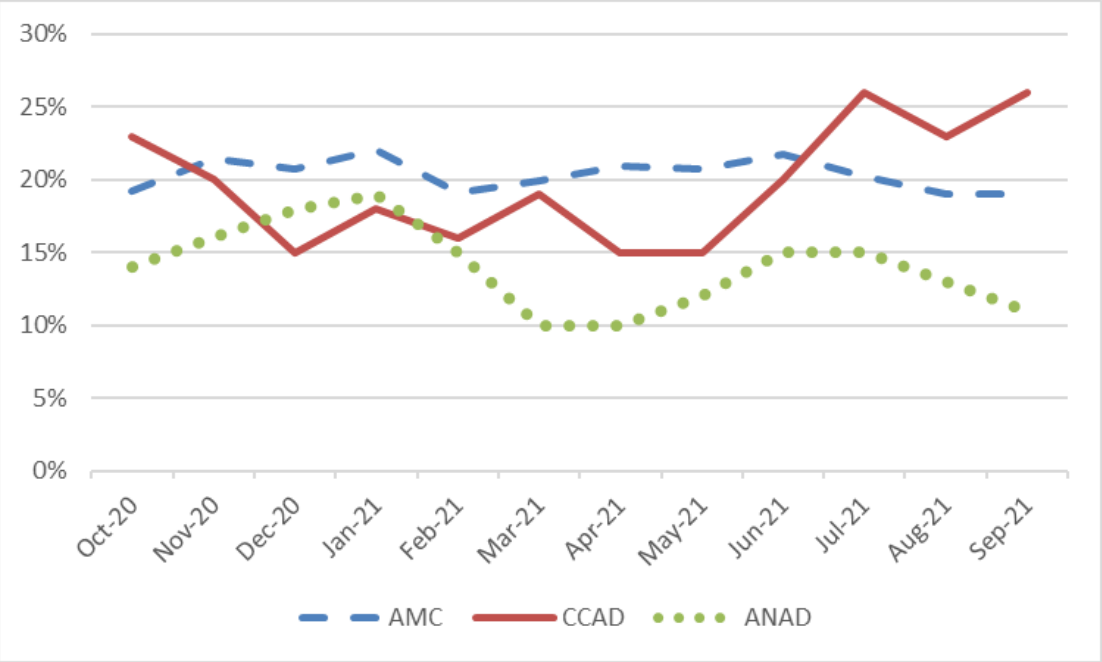
[16] See Appendix C for details on the DPA calculation.

users can filter the data to show the DPA for each Army depot.[17] ASP workbook users can also filter views to show the DPA at the aggregate level by all depots that fall under each LCMC or for the AMC as a whole.

Analysis of the Army's Demand Plan Accuracy

We analyzed the AMC's overall DPA for all AMC depots as shown in Figure 1 of the Background section of this report, and for ANAD and CCAD for all items reported in the ASP workbooks for the FY 2021 forecast period.[18] The DPA for all AMC depots averaged 20 percent throughout FY 2021. The DPA for ANAD averaged 14 percent, and the DPA for CCAD averaged 20 percent throughout FY 2021. Figure 3 shows the DPA for AMC, CCAD, and ANAD during FY 2021.

Figure 3. Army Demand Plan Accuracy for FY 2021



Source: The AMC.

The Army Lacked Controls and Oversight for Its Spare Parts Demand Forecasting Process

Army process and system limitations prevented Army personnel from providing an audit trail to recreate forecasts, which impeded our ability to identify the root causes for the overstated and understated forecasts. In addition, the Army lacked

[17] A National Item Identification Number is a 9-digit numeric code that DoD organizations use to manage inventory items.

[18] The AMC ASP workbook only reported the DPA for all ASP items and did not calculate the DPA at the collaborative item level.

metrics and goals to measure spare part forecast accuracy and had not established procedures and controls for monitoring spare parts forecast accuracy. The Army also lacked procedures and controls for identifying, tracking, and analyzing the primary causes of inaccurate spare parts forecasts. Further, the Army lacked guidance and training on the process for evaluating the accuracy of spare parts forecasts and collaborating with the DLA, including guidance on the level of research and information required to justify forecast exceptions.

Information supporting the ASP forecasts comes from the LMP, which is a live system with constantly changing information, and that does not retain an audit trail of information supporting historical forecasts. Therefore, the data were not available for us to determine why the actual demands varied from the spare parts forecasts for FY 2021. We asked AMC, LCMC, and depot personnel if they formally tracked the causes for inaccurate forecasts. Army personnel stated that program quantity and schedule changes involving increases, decreases, cancellations, and unplanned workload created challenges with spare parts forecasting. However, Army personnel stated that they did not track the causes for inaccurate forecasts. Therefore, they were unable to provide evidence supporting the specific reasons for the number and extent of inaccurate Army spare parts forecasts.

Although the AMC publishes the ASP workbook data, it did not provide any guidance, benchmarks, goals, or training on how the LCMCs or depots should use the data to improve the accuracy of the Army's spare parts forecasts. We met with personnel from TACOM, AMCOM, ANAD, and CCAD and asked if they used the ASP workbook to identify and correct spare parts forecasting problems. None of the Army personnel that we spoke with at these organizations provided evidence that they used the ASP workbook data to improve the accuracy of their spare parts forecasts. Some personnel stated that they were unsure how to access the ASP workbook and others stated that they had not accessed the workbook in a long time. Personnel also cited concerns regarding the lack of guidance on how to use the data and explained that they realized the DPA was low but were unsure of what a "good or bad DPA looked like." Army personnel also cited concerns with significant turnover in key positions involved with the ASP process and expressed a need for training.

Unreliable Spare Parts Forecasts Negatively Affect Purchase Decisions and Readiness

Unreliable spare parts forecasts negatively affect the DLA's purchase decisions and the Army's readiness. Specifically, the DLA either buys too many parts, incurring unnecessary inventory costs and tying up funds that could be better spent on higher priorities, or does not purchase enough parts, negatively affecting depot operations and Army readiness.

DLA personnel acknowledged that accurately forecasting spare parts is challenging within the DoD due to the difficulty of determining and planning for failure rates for older weapon systems. As such, DLA personnel also explained that there is a bias toward overforecasting for spare parts and they want to ensure that the overstated forecasts do not affect the DLA's working capital fund availability.[19] DLA personnel were unable to identify the total value of their excess inventory attributed to inaccurate Army spare parts forecasts. DLA personnel explained that the forecasts do not exclusively drive purchasing and that their system planning methodology considers other forecast and demand requirements.[20]

We sampled two forecasts submitted to the DLA by ANAD and two forecasts submitted to the DLA by CCAD where the value of the quantity forecasted varied significantly from the actual demand value in FY 2021. Specifically, we reviewed ANAD forecasts for shock absorber housings and optical instrument mirrors used for maintenance on the M1A1 or M1A2 Abrams tanks and we reviewed CCAD forecasts for sheath assemblies and spindle bearing assemblies used for maintenance on the UH-60 Blackhawk helicopter. We requested and reviewed support for the forecasted quantities from Army depot personnel and for the reason the quantity forecasted varied significantly from the actual demand value. We also interviewed DLA personnel to determine whether the inaccurate forecast affected the DLA's purchase decisions.

Our review of the four items determined that inaccurate forecasts resulted in a $517,831 overprocurement and one canceled purchase request for $40,810 based on a corrected forecast. In addition, shortfalls in on-hand stock resulted in one depot buying parts to build the unavailable item, costing $2.8 million, to meet operational requirements. The following discussion provides additional details on the four forecasts we reviewed.

[19] The DoD uses working capital funds to finance inventories of supplies and provide working capital for industrial and commercial activities that provide common services within or among DoD Components.

[20] These requirements include leadtime, stock on hand, economic order quantities, historical demands, and other factors.

Anniston Army Depot Forecast for Shock Absorber Housings

In its October 2020 ASP, ANAD forecasted a need for 415 shock absorber housings during FY 2021 for planned maintenance on the M1A1 and M1A2 Abrams tanks.[21] Figure 4 is a picture of the M1A1 Abrams tank.

Figure 4. M1A1 Abrams Tank
Source: ANAD.

Even though ANAD forecasted a need of 415 housings for FY 2021, DLA data showed that ANAD ordered only 232 of the parts during FY 2021. Table 1 shows the forecast and demand difference in quantity and value for FY 2021.

Table 1. ANAD Forecast and Demand Difference for Shock Absorber Housings

	Quantity	Total Value
ANAD Forecast	415	$3,031,982
ANAD Demand (Orders)	232	1,694,987
Difference	**183**	**$1,336,995**

Source: The DLA.

In January 2022, in response to our inquiries, TACOM and ANAD personnel acknowledged that there was an error in the BOM, which is one of several factors that the LMP uses to calculate the forecast for this item.[22] Specifically, an anomaly

[21] The Abrams tank is a full-tracked, low-profile, land combat assault weapon and is the Army's primary ground combat system.

[22] See Appendix B for details on the Army spare parts forecasting process and the BOM.

with the BOM caused the LMP to multiply the forecast by nine, but TACOM and ANAD personnel were unable to explain why this occurred. TACOM personnel stated that forecasting for the BOM items started in March 2019, and ANAD personnel thought the error occurred at that time. TACOM personnel corrected the ASP forecast for this item for January 2022 through December 2024, which reduced the requirement by 453 shock absorber housings and $3.3 million. However, DLA personnel said that the overstated forecast by ANAD did not affect the DLA's inventory levels for the shock absorber housings. According to TACOM personnel, this error affected the entire production order used for maintenance on the M1A1 Abrams tank and resulted in a $7.4 million overstatement to forecasts for our sampled item and 32 other items on the same production order. TACOM personnel also corrected the ASP forecast for the other 32 items for January 2022 through December 2024.

Although Army personnel took prompt corrective actions to revise the overstated forecasts in response to our inquiries, they resulted in the DLA overprocuring $517,831 in stock for one item. In addition, the revised forecasts resulted in the DLA canceling a $40,810 purchase request for one item.

The FY 2021 monthly forecasts submitted for the shock absorber housings varied significantly from a high of 415 to a low of 0. ANAD personnel informed us that the information supporting the ASP forecasts came from the LMP, which is a live system with constantly changing information, and Army personnel did not retain information supporting the audit trail for the forecasts. Without the ability to review the elements that factored into the monthly ANAD forecasts for FY 2021, we were unable to determine why the forecasts varied significantly.

The DLA generated hard exceptions for 9 months during FY 2021 that required collaboration between DLA and ANAD personnel to ensure that the Army's forecasts were valid.[23] For example, the April 2021 ANAD forecast was 279, and the DLA created a hard exception. DLA personnel did not accept ANAD's response to the hard exception stating that the DLA would not accept the forecast to prevent overforecasting and instead used the previously published lower forecast of 267 for March 2021. DLA personnel recommended that ANAD personnel continue to update the information in the LMP so that it would generate accurate forecasts. For this item, ANAD personnel only compared what the LMP showed at that time to the ASP forecast. DLA collaborators accepted ANAD's responses for 7 of the 9 months, but the forecasts did not negatively impact the DLA's inventory levels for

[23] DLA uses a set of business rules to identify significant dollar value forecast changes and quantity differences from the DLA statistical forecast or customer buying pattern. Based on those business rules, the DLA identifies exceptions and provides these items to the Army. One type of exception, referred to as a hard exception, involves items with a $50,000 difference between the annual collaboration dollar amount and the new annual forecast in dollars.

the shock absorber housings as DLA personnel did not rely solely on the forecasts for its purchasing decisions. ANAD personnel's limited research allowed the forecasting error to go undetected until we requested information for this item. ANAD personnel cited the need for training as the reason the hard exceptions were not properly researched.

Anniston Army Depot Forecast for Optical Instrument Mirrors

In the October 2020 ASP forecast submitted to the DLA, ANAD personnel forecasted a need for 98 optical instrument mirrors during FY 2021 for planned maintenance on the M1A1 Abrams tank.[24] Although ANAD forecasted a need of 98 optical instrument mirrors for FY 2021, the DLA data showed that ANAD ordered 136 during FY 2021. Table 2 shows the forecast and demand difference in quantity and value for FY 2021.

Table 2. ANAD Forecast and Demand Difference for Optical Instrument Mirrors

	Quantity	Total Value
ANAD Forecast	98	$434,826
ANAD Demand (Orders)	136	603,432
Difference	**38**	**$168,606**

Source: The DLA.

In response to our inquiries, ANAD personnel stated that they were unable to provide, without a labor-intensive effort, documentation to support the October 2020 ASP forecast for the optical instrument mirrors submitted to the DLA. In addition, ANAD personnel provided us with varying amounts for the quantity of optical instrument mirrors forecasted and ordered and the amounts differed from the amounts provided by the DLA as shown in Table 2. As a result, we found the quantities that ANAD provided to be unreliable and obtained confirmation of the correct quantities from TACOM personnel, which matched the data that the DLA provided. In addition, ANAD personnel were not able to adequately explain the cause for the difference of 38 optical instrument mirrors forecasted and ordered in FY 2021. ANAD personnel stated that the difference was a result of a backorder. However, it was unclear how a backorder would result in ANAD personnel ordering an additional 38 optical instrument mirrors than what they forecasted.

[24] ANAD personnel explained that the optical instrument mirror is the main mirror for an assembly on the gunner's primary sight on the M1A1 Abrams tank.

DLA L&M personnel provided data showing that ANAD's forecasted need of optical instrument mirrors fluctuated significantly in FY 2021 from a high of 146 to a low of 0. DLA L&M personnel explained that due to the leadtime, planning purchases of the optical instrument mirrors was risky if they did not have stock on hand or due in and they hope there is not significant change in the monthly forecast. DLA L&M personnel also stated that when a forecast exceeds the time it takes for DLA to obtain an item from a vendor, referred to as leadtime, there is not as much of an impact.[25] However, if the forecast is within the leadtime, it can generate a purchase. DLA L&M personnel did not purchase any optical instrument mirrors in FY 2021 because they had sufficient quantities in stock.

Corpus Christi Army Depot Forecast for Sheath Assemblies

In the October 2020 ASP, CCAD forecasted a need for 283 sheath assemblies during FY 2021 for planned maintenance on the UH-60 Blackhawk helicopter rotary blade.[26] Figure 5 is a picture of the UH-60 Blackhawk helicopter.[27]

Figure 5. UH-60 Blackhawk Helicopter
Source. The U.S. Army.

Although CCAD forecasted a need for 283 sheath assemblies, the DLA's data showed that CCAD only ordered 77 of the parts during FY 2021. Table 3 shows the forecast and demand difference in quantity and value for FY 2021.

[25] Procurement leadtime is the amount of time from initiation of a purchase request until receipt of the first significant delivery of purchased materiel into the supply system. DoD Components use the procurement leadtime as a forecast of the likely future interval between identifying a requirement and receiving the materiel.

[26] CCAD personnel explained that a sheath assembly is a lightweight compressed fiberglass sheath used to cover the forward-facing edge to the center of a UH-60 model main rotor blade and is bonded to the blade frame in the repair or manufacturing processes and is critical to the blade's actual structure and operation.

[27] The UH-60 Blackhawk is the Army's utility tactical transport helicopter and provides assault, general support, aeromedical, evacuation, command and control, and special operations support.

Table 3. CCAD Forecast and Demand Difference for Sheath Assemblies

	Quantity	Total Value
CCAD Forecast	283	$7,636,763
CCAD Demand (Orders)	77	2,077,847
Difference	**206**	**$5,558,916**

Source: The DLA.

We requested CCAD provide support for the October 2020 forecasted quantities for FY 2021. However, in response to our inquiries, CCAD personnel stated that they were unable to go back and recreate the forecasted quantities. In addition, the forecast varied significantly during FY 2021 from a high of 283 to a low of 0.

CCAD personnel explained that AMCOM's program reductions to the FY 2020 and FY 2021 main rotor blade project decreased requirements for sheath assemblies, so they reduced their ASP forecasts during FY 2021. Specifically, AMCOM personnel reduced the:

- FY 2020 project from 120 blades to 95, for a reduction of 25; and
- FY 2021 project from 120 blades to 77, for a reduction of 43.

AMCOM's program reductions resulted in a total reduction of 68 blades for both projects. CCAD uses one sheath assembly for the maintenance of one blade so the program reductions contributed to only a portion of the difference of 206 sheath assemblies forecasted and ordered during FY 2021. CCAD personnel were unable to provide the cause for the remaining difference.

DLA Aviation personnel stated that the difference between the forecasts and demands did not affect the DLA. DLA Aviation personnel explained that since FY 2018, the item had been on a customer-direct, long-term contract to a vendor, which reduced the risk of forecast and leadtime variability and incentivized vendor performance. DLA Aviation personnel also explained that the DLA transmitted all customer orders electronically to the vendor that was responsible for supporting the customers. DLA Aviation personnel stated that the DLA did not stock the item and that the DLA turned planning responsibilities over to the vendor that was responsible for holding sufficient stock to support customers within DoD standards. DLA Aviation personnel stated that they coordinated with CCAD and the vendor to ensure that the vendor provided support.

Corpus Christi Army Depot Forecast for Spindle Bearing Assemblies

In the October 2020 ASP, CCAD forecasted a need for 162 spindle bearing assemblies during FY 2021 for planned maintenance on the UH-60 Blackhawk helicopter.[28] The bearing assemblies are aviation critical safety items.[29] However, the DLA's data showed that CCAD did not obtain any of the parts from the DLA during FY 2021. We requested CCAD provide support for the October 2020 forecasted quantities for FY 2021. However, in response to our inquiries, CCAD personnel stated that they were unable to go back and recreate the forecasted quantities.

CCAD personnel stated that they did not order any spindle bearing assemblies from the DLA in FY 2021 because the DLA did not have any stock on hand. CCAD personnel stated that the DLA initially provided an estimated delivery date of January 2021 for the spindle bearing assemblies but later changed the date to September 2021. CCAD personnel explained that the spindle bearing assembly was a higher assembly composed of lower assembly items, so CCAD personnel established a workaround by purchasing the lower assemblies and other parts to use for maintenance until the spindle bearing assembly became available. In FY 2021, CCAD built approximately 117 spindle bearing assemblies as part of the workaround.[30] CCAD personnel stated that the workaround did not affect the production schedule but cost approximately $2.8 million in material and labor costs beyond what it would have cost if the spindle bearing assemblies had been available at the DLA.[31]

DLA Aviation personnel provided historical data showing that CCAD started forecasting requirements for spindle bearing assemblies in FY 2018 and continued submitting forecasts through FY 2021. For example, CCAD's ASP submission, dated October 1, 2019, forecasted an FY 2021 requirement of 170. DLA Aviation personnel stated that they considered CCAD's forecasts in their demand planning and purchase decisions but explained that several other factors involving acquisition, engineering, and manufacturing contributed to their delay in supporting CCAD's spindle bearing assembly requirements. DLA Aviation provided contract award and delivery information showing that it awarded two initial

[28] CCAD personnel explained that they need the spindle bearing assembly for the rotor head buildup phase, and it is critical to the operation of the rotor head apparatus.

[29] An aviation critical safety item is any part of an aircraft or aviation weapon system that, if it fails, malfunctions, or is absent, could cause catastrophic or critical failure, resulting in serious damage to the aircraft or weapon system, personal injury, loss of life, or unintentional engine shutdown.

[30] We calculated this number based on FY 2021 usage data for the lower assembly items that CCAD used to build the spindle bearing assembly.

[31] CCAD personnel stated that the workaround took place between November 2018 and July 2021 because of issues with obtaining the bearing assemblies from the DLA during that time.

contracts in September 2019, but the deliveries to the DLA did not occur until nearly 2 years later. Although several factors contributed to the delays with this item, this example illustrates the negative impact that can occur if the DLA does not have stock on hand to meet the customer's forecasted requirements.

DoD's Prior Concerns with the Services' Spare Parts Forecasts Submitted to the Defense Logistics Agency

In a June 2020 memorandum, the OUSD(A&S) cited concerns with the Services requesting the DLA procure and stock parts which they then failed to order.[32] The OUSD(A&S) explained in the memorandum that the condition raised inventory levels, unnecessarily tied up funding better spent on priorities, and increased costs. The OUSD(A&S) also explained that while the DLA's models based on historical demand were more accurate than the Services' forecasts, input from the Services was important to a responsive supply system.

Although we did not audit other Services, we analyzed DLA data on other Services' FY 2021 spare parts forecasts and associated demands. The data showed that other Services also did not submit accurate spare parts forecasts to the DLA. Specifically, in FY 2021 other Services overstated their forecasts for some parts by $767 million and ordered $355 million in other spare parts that they did not forecast.

Table 4 shows the value of other Services' total, overstated, and understated spare parts forecasts for FY 2021.

Table 4. Other Services' FY 2021 Total, Overstated, and Understated Forecast Value

	Total Forecast Value	Overstated Forecast Value	Understated Forecast Value
Air Force	$770,313,749	$749,313,500	$346,413,750
Marine Corps	19,166,570	13,337,974	7,822,725
Navy	6,752,379	4,710,286	753,288
Total	**$796,232,698**	**$767,361,760**	**$354,989,763**

Note: Overstated Forecast Value is the amount the Services forecasted in excess of what they ordered. Understated Forecast Value is the amount the Services ordered in excess of what they forecasted. Both values were calculated at the individual item level and summarized to arrive at the total.

Source: The DLA.

[32] OUSD(A&S) Information Memorandum, "Incentives/Disincentives for Consuming Service-Requested Defense Logistics Agency Stock/Parts," June 6, 2020.

In addition, the DLA reported a 20-percent spare parts forecast accuracy rate for all Services.[33] In November 2022, OUSD(A&S) officials informed us that they did not monitor the accuracy of the spare parts forecasts the individual Services submitted to the DLA, and that they were not aware of any associated metrics or goals.

We recommend that the OUSD(A&S) require the Services, in coordination with the DLA, to conduct an in-depth review of their respective spare parts forecasting process for DLA-managed items. The review should determine how the Services can improve the process and establish a plan of action with milestones with specific areas for improvement to address the deficiencies identified in this report. (Recommendation 1)

Conclusion

The Army did not submit accurate spare parts forecasts to the DLA. Specifically, the Army overstated its forecasts for some spare parts by $202 million and ordered $148 million in other spare parts that it did not forecast in FY 2021. In addition, the Army's DPA averaged only 20 percent during FY 2021. The Army can reduce the associated risks that could affect the DLA's purchase decisions and Army readiness by addressing the problems this audit identified and improving the reliability of its spare parts forecasts. The Army continues to provide the DLA with forecasts of its future spare parts requirements, forecasting a need for $732 million in parts to support planned depot maintenance work for FY 2023 through FY 2025. Considering the significant dollar value associated with the Army's future forecasts, even slight improvements could have a major effect on DLA and Army operations.

In addition, other Services also did not submit accurate spare parts forecasts to the DLA. Specifically, other Services overstated their forecasts for some spare parts by $767 million and ordered $355 million in other spare parts that they did not forecast in FY 2021. OUSD(A&S) officials previously cited concerns with the Services' spare parts forecasts, did not monitor the accuracy of the spare parts forecasts the individual Services submitted to the DLA, and were not aware of any associated goals or metrics.

[33] DLA FY Inventory Management Review, March 2022.

Recommendations, Management Comments, and Our Response

Recommendation 1

We recommend that the Under Secretary of Defense for Acquisition and Sustainment require the Services, in coordination with the Defense Logistics Agency, to conduct an in-depth review of their respective spare parts forecasting process for Defense Logistics Agency-managed items. The review should evaluate the number and value of items forecasted, resources involved in the forecasting and collaboration processes, and the accuracy of the forecasts. The review should also determine how the Services can improve the process and establish a plan of action with milestones with specific areas for improvement to address the deficiencies identified in this report including:

Deputy Assistant Secretary of Defense for Logistics Comments

The Deputy Assistant Secretary of Defense for Logistics, responding for the Under Secretary of Defense for Acquisition and Sustainment, agreed with the recommendation, stating that their office will direct the Military Services and the DLA to conduct in-depth reviews of their forecasting processes used for DLA-managed items, identify issues and constraints, and establish a plan of action with milestones including specific areas for improvement. The results of these reviews and corresponding action plans will be presented to the Working Capital Fund–Logistics Executive Steering Committee. The estimated completion date for these actions is the second quarter of FY 2024.

Our Response

Comments from the Deputy Assistant Secretary addressed the specifics of the recommendation; therefore, the recommendation is resolved but will remain open. We will close the recommendation once we verify that the Military Services, in coordination with the DLA, conducted in-depth reviews of their forecasting processes used for DLA-managed items, identified issues and constraints, and established a plan of action with milestones that includes specific areas for improvement and we verify that the plan adequately addresses the deficiencies this audit identified.

a. Determining whether the Services' information systems accurately calculate the spare parts forecasts as intended and can maintain an audit trail to support the forecasts.

Deputy Assistant Secretary of Defense for Logistics Comments

The Deputy Assistant Secretary of Defense for Logistics, responding for the Under Secretary of Defense for Acquisition and Sustainment, agreed with the recommendation, stating that the required in-depth reviews of the Military Services' forecasting processes for DLA-managed items will assess the accuracy of spare parts forecasts and develop a standardized process to maintain an audit trail to support the forecasts. The estimated completion date for this action is the second quarter of FY 2025.

Our Response

Comments from the Deputy Assistant Secretary addressed the specifics of the recommendation; therefore, the recommendation is resolved but will remain open. We will close the recommendation once we verify that the Military Services, in coordination with the DLA, conducted in-depth reviews of their forecasting processes for DLA-managed items that adequately assessed the accuracy of spare parts forecasts and developed a standardized process to maintain an audit trail to support the forecasts.

b. Developing metrics and goals to measure spare parts forecast accuracy.

Deputy Assistant Secretary of Defense for Logistics Comments

The Deputy Assistant Secretary of Defense for Logistics, responding for the Under Secretary of Defense for Acquisition and Sustainment, agreed with the recommendation stating that their office, in coordination with DLA and the Military Services, through the monthly Supply Chain Metrics Working Group, will develop metrics and goals to assess the accuracy of the Military Services' forecasts provided to DLA for consumable repair parts required to support depot maintenance. The estimated completion date for this action is the second quarter of FY 2025.

Our Response

Comments from the Deputy Assistant Secretary addressed the specifics of the recommendation; therefore, the recommendation is resolved but will remain open. We will close the recommendation once we verify that the Deputy Assistant Secretary, in coordination with DLA and the Military Services, through the monthly Supply Chain Metrics Working Group, adequately developed metrics and goals to assess the accuracy of the Military Services' forecasts provided to DLA for consumable repair parts required to support depot maintenance.

c. Establishing procedures and controls for monitoring spare parts forecast accuracy.

Deputy Assistant Secretary of Defense for Logistics Comments

The Deputy Assistant Secretary of Defense for Logistics, responding for the Under Secretary of Defense for Acquisition and Sustainment, agreed with the recommendation, stating that their office, in coordination with DLA and the Military Services, will establish procedures and controls to monitor the Military Services' spare parts forecasts and to assess the accuracy of the Military Services' forecasts provided to DLA for consumable repair parts required to support depot maintenance. The estimated completion date for this action is the fourth quarter of FY 2025.

Our Response

Comments from the Deputy Assistant Secretary addressed the specifics of the recommendation; therefore, the recommendation is resolved but will remain open. We will close the recommendation once we verify that the Deputy Assistant Secretary, in coordination with the DLA and the Military Services, established procedures and controls to monitor the Military Services' spare parts forecasts and to assess the accuracy of the Military Services' forecasts provided to DLA for consumable repair parts required to support depot maintenance.

d. Establishing procedures for identifying, tracking, and analyzing the primary causes of inaccurate spare parts forecasts and using the data to improve the accuracy of future forecasts.

Deputy Assistant Secretary of Defense for Logistics Comments

The Deputy Assistant Secretary of Defense for Logistics, responding for the Under Secretary of Defense for Acquisition and Sustainment, agreed with the recommendation, stating that their office, in coordination with DLA and the Military Services, will establish procedures for identifying, tracking, and analyzing the primary causes of inaccurate consumable repair parts forecasts and use the data generated by these procedures to improve the accuracy of future forecasts. The estimated completion date for this action is the fourth quarter of FY 2025.

Our Response

Comments from the Deputy Assistant Secretary addressed the specifics of the recommendation; therefore, the recommendation is resolved but will remain open. We will close the recommendation once we verify that the Deputy Assistant Secretary, in coordination with the DLA and the Military Services, established procedures for identifying, tracking, and analyzing the primary causes of inaccurate consumable repair parts forecasts and use the data generated by these procedures to improve the accuracy of future forecasts.

e. Establishing guidance and providing recurring training to depot personnel on the process for evaluating the accuracy of spare parts forecasts and the level of research and information required to justify forecasts during monthly collaboration with the Defense Logistics Agency.

Deputy Assistant Secretary of Defense for Logistics Comments

The Deputy Assistant Secretary of Defense for Logistics, responding for the Under Secretary of Defense for Acquisition and Sustainment, agreed with the recommendation, stating that their office will establish guidance and provide direction to the Military Services to train depot personnel on the process for evaluating the accuracy of spare parts forecasts and the level of research and information required to justify forecasts during monthly collaboration with DLA. The Military Services will be required to brief the Working Capital Fund–Logistics Executive Steering Committee on their efforts. The estimated completion date for this action is the third quarter of FY 2026.

Our Response

Comments from the Deputy Assistant Secretary addressed the specifics of the recommendation; therefore, the recommendation is resolved but will remain open. We will close the recommendation once the Deputy Assistant Secretary, in coordination with the DLA and the Military Services, established procedures for identifying, tracking, and analyzing the primary causes of inaccurate consumable repair parts forecasts and use the data generated by these procedures to improve the accuracy of future forecasts.

f. Requiring the Services to coordinate with the Under Secretary of Defense for Acquisition and Sustainment and the Defense Logistics Agency to determine whether their spare parts forecasts add value to the Defense Logistics Agency's demand planning and purchase decisions and whether corrective actions are improving accuracy rates. The Services and the Defense Logistics Agency should consider removal of specific items from collaboration if the forecast accuracy rate cannot be improved or while forecast accuracy improvement plans are being implemented. The Services should justify keeping items with continuously low accuracy rates in the collaboration category and maintain a supporting audit trail.

Deputy Assistant Secretary of Defense for Logistics Comments

The Deputy Assistant Secretary of Defense for Logistics, responding for the Under Secretary of Defense for Acquisition and Sustainment, agreed with the recommendation, stating that their office will publish guidance to the Military

Services requiring the Military Services to coordinate with the DLA to assess if their spare parts forecasts add value to DLA's demand planning and purchase decisions and whether corrective actions are improving consumable item accuracy rates. The guidance will include direction to the DLA to consider removing specific items from collaboration if forecast accuracy rates cannot be improved, direction to the Military Services to justify keeping items with continuously low accuracy rates in collaboration, and a requirement to present the joint assessment and recommendations to the Working Capital Fund–Logistics Executive Steering Committee for endorsement to the Joint Logistics Resource Requirement Board. The estimated completion date for this action is the third quarter of FY 2026.

Our Response

Comments from the Deputy Assistant Secretary addressed the specifics of the recommendation; therefore, the recommendation is resolved but will remain open. We will close the recommendation once we verify that the Deputy Assistant Secretary published guidance to the Military Services requiring the Military Services to coordinate with the DLA to assess if their spare parts forecasts add value to DLA's demand planning and purchase decisions and whether corrective actions are improving consumable item accuracy rates. We will also verify that the guidance includes direction to the DLA to consider removing specific items from collaboration if forecast accuracy rates cannot be improved, direction to the Military Services to justify keeping items with continuously low accuracy rates in collaboration, and a requirement to present the joint assessment and recommendations to the Working Capital Fund–Logistics Executive Steering Committee for endorsement to the Joint Logistics Resource Requirement Board.

Headquarters, Department of the Army, Office of the Deputy Chief of Staff G-4 (Logistics) Comments

The Office of the Deputy Assistant Secretary of Defense for Logistics coordinated its comments to our draft report with the Services. The Acting Deputy Chief of Staff, Headquarters, Department of the Army G-4 (Logistics) responded and partially agreed with the report. The Acting Deputy Chief of Staff agreed with all of the recommendations but did not agree with the findings and conclusions, stating that they did not sufficiently account for factors, such as changing requirements, influenced by circumstances outside of the ASP process. We met with officials from the Headquarters, Department of the Army, Office of the Deputy Chief of Staff G-4 (Logistics) in July 2023 and discussed their concerns, but we did not change the findings or conclusions in our report.

Appendix A

Scope and Methodology

We conducted this performance audit from September 2021 through June 2023 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.

The announced objective of this audit was to determine whether the actions taken by the Army in response to Report No. DODIG-2014-124, "Army Needs to Improve the Reliability of the Spare Parts Forecasts It Submits to the Defense Logistics Agency," September 29, 2014, improved the accuracy of the Army's spare parts forecasts. However, the Army's spare parts forecasting process changed since the issuance of DODIG-2014-124. Therefore, the audit reviewed the accuracy of the spare parts forecasts that the Army submitted to the DLA to support planned depot maintenance programs using the current process. This audit focused on the DLA, the AMC, AMCOM, TACOM, ANAD, and CCAD because these organizations were the focus of DODIG-2014-124. In addition, this audit involved coordination with the OUSD(A&S).

We reviewed the following criteria.

- DoD Manual 4140.01, Volume 2, "DoD Supply Chain Materiel Management Procedures: Demand and Supply Planning," November 9, 2018
- Defense Logistics Manual 4000.25, Volume 1, "Defense Logistics Management System Concepts and Procedures," May 19, 2014
- Defense Logistics Manual 4000.25, Volume 2, "Defense Logistics Management System Supply Standards and Procedures," June 13, 2012
- Army Regulation 710-1, "Centralized Inventory Management of the Army Supply System," November 28, 2016
- Army Regulation 750-1, "Army Materiel Maintenance Policy," October 28, 2019
- AMC Regulation 750-55, "Maintenance of Supplies and Equipment: U.S. Army Materiel Command Organic Industrial Base (OIB) Operations Management," May 16, 2019
- AMC Pamphlet 750-55, "Organic Industrial Base (OIB) Processes in Logistics Modernization Program (LMP)," May 14, 2021

We interviewed and conducted data calls with officials from the following DoD organizations to determine whether the Army had improved the accuracy of its spare parts forecasts since the issuance of DODIG-2014-124.

- OUSD(A&S)
- Office of the Deputy Chief of Staff, Army, G-4 (Logistics)
- AMC
- AMCOM
- TACOM
- CCAD
- ANAD
- DLA

We obtained a data file from the DLA containing the September 2020 ASP and the associated Army demands that occurred in FY 2021. We used nonstatistical methods to identify four items for which the forecast differed significantly from the actual demands. Specifically, we selected two items from ANAD and two items from CCAD. Because we used nonstatistical methods, our sample cannot be projected to a population or any subpopulation of Army spare parts forecasts.

We then obtained a data file from the DLA containing the October 2020 ASP for FY 2021 and the associated Army demands that occurred in FY 2021 and used this data for our universe and sample item analysis. We focused on the items coded for collaboration, which included 58,655 records at a total value of $329 million. This included 8,217 CCAD records, valued at $81 million, and 11,922 ANAD records, valued at $98 million. Based on information provided by the DLA, we analyzed and compared the October 2020 ASP forecasts for FY 2021 to actual demands that occurred during FY 2021.

We reviewed the Army processes for developing the forecasts and collaborating with the DLA on any changes to the forecasts that occurred during FY 2021. We interviewed and obtained data from Army personnel at the AMC, AMCOM, TACOM, CCAD, and ANAD to determine whether the depots were using the best available information to prepare future forecasts in accordance with DoD and Army policy. We also interviewed personnel from DLA Headquarters, DLA Aviation, and DLA Land and Maritime to determine how they used the Army's forecasts and if the inaccurate forecasts affected the DLA's demand planning and purchase decisions.

Although we did not audit other Services, we analyzed DLA data on their FY 2021 spare parts forecasts and associated demands and coordinated with the OUSD(A&S) concerning the Services' spare parts forecasts.

Internal Control Assessment and Compliance

DoD Instruction 5010.40 requires DoD organizations to implement a comprehensive system of internal controls that provides reasonable assurance that programs are operating as intended and to evaluate the effectiveness of the controls.[34] We assessed internal controls and compliance with laws and regulations necessary to satisfy the audit objective. In particular, we assessed whether the Army provided accurate spare parts forecasts to the DLA. However, because our review was limited to these internal control components and underlying principles, we may not have disclosed all internal control deficiencies that may have existed at the time of our audit.

Use of Computer-Processed Data

We used computer-processed data extracted from the DLA's Enterprise Business System and the Army's LMP to perform this audit.[35] Specifically, we used ASP data generated by the LMP and processed through the DLA's Enterprise Business System. We obtained a data file from the DLA that contained the Army's October 2020 ASP forecasts for FY 2021 and 12 months of demand history for FY 2021. We used the file to select a nonstatistical sample of Army spare parts forecasts for FY 2021 for four items coded for collaboration. To test the reliability of the data, we interviewed Army and DLA personnel, and compared the DLA Enterprise Business System data to the forecast data generated by the Army's LMP. We determined that the Army LMP and DLA Enterprise Business System data were sufficiently reliable for sampling and reviewing selecting spare parts forecasts and determining whether the Army had improved its spare parts forecasting process.

Prior Coverage

During the last 5 years, the Government Accountability Office (GAO) issued two reports discussing the Army's spare parts forecasts. Unrestricted GAO reports can be accessed at http://www.gao.gov.

[34] DoD Instruction 5010.40, "Managers' Internal Control Program Procedures," May 30, 2013 (Incorporating Change 1, June 30, 2020).

[35] The Enterprise Business System is the DLA's primary information technology solution designed to manage the system processes of order fulfillment, planning, technical and quality assurance, acquisition and financial.

Report No. GAO-20-401, "Army and Marine Corps Need to Improve Efforts to Address Challenges in Measuring Performance and Planning Maintenance Work," July 2020

The Senate Armed Services Committee, in a bill for the National Defense Authorization Act for Fiscal Year 2019, included a provision for the GAO to review Army and Marine Corps depots. The GAO evaluated the extent to which the Army met its planned maintenance goals and addressed any challenges in measuring depot performance, and how the Army identified and addressed any key challenges in completing planned maintenance. The GAO made four recommendations to the Secretary of the Army: (1) ensure that the AMC Commander develops procedures to help ensure that it will incorporate depot stakeholder input into the new metrics framework for the Army's organic industrial base; (2) ensure that the AMC Commander develops guidance that synchronizes the Army's timeline for required inputs from Army depot maintenance customers with the depots' timelines for development of their finalized budget estimate submissions to the AMC; (3) ensure that the AMC Commander provides its non-Army customers with guidance that will help ensure that the depots updated maintenance needs in sufficient detail from non-Army customers before the depots' finalized budget estimate submissions to the AMC; and (4) ensure that the Army Organic Industrial Base Corporate Board oversees a study that includes a recurring, comprehensive, and systematic analysis of Army depot data to identify trends and causes behind changes in depot maintenance schedules; and that it uses this analysis to recommend actions to reduce unplanned maintenance work, as appropriate and necessary. The DoD concurred with all four recommendations.

Report No. GAO-19-452, "DoD Should Adopt a Metric That Provides Quality Information on Funded Unfinished Work," July 2019

Congress asked the GAO to review the DoD's historical carryover and the metrics presented by the DoD. The GAO concluded that the DoD allows depots to carry over billions of dollars of funded unfinished work from one fiscal year to the next to facilitate the smooth flow of work. Excessive carryover may reflect an inefficient use of resources that otherwise might be redirected to other priorities. The DoD considered three metric options for calculating depot maintenance carryover; however, the metrics do not fully address key attributes of providing quality information that is reliable, complete, consistent, and appropriate and have varied depot management implications. Ensuring that the carryover metric meets key attributes for providing quality information would improve decision-makers' ability to assess whether depots are managed as efficiently and effectively as possible, and determine the amount of carryover

sufficient to support smooth operations from year to year. Until the DoD adopts a carryover metric that addresses the attributes for providing quality information, decision makers may not know whether the billions of dollars invested for work performed at depots are being used efficiently or might be redirected for other purposes.

Appendix B

Army Spare Parts Forecasting Process

The Army's spare parts forecasting process consists of four primary steps. The process is described below and illustrated on page 32.

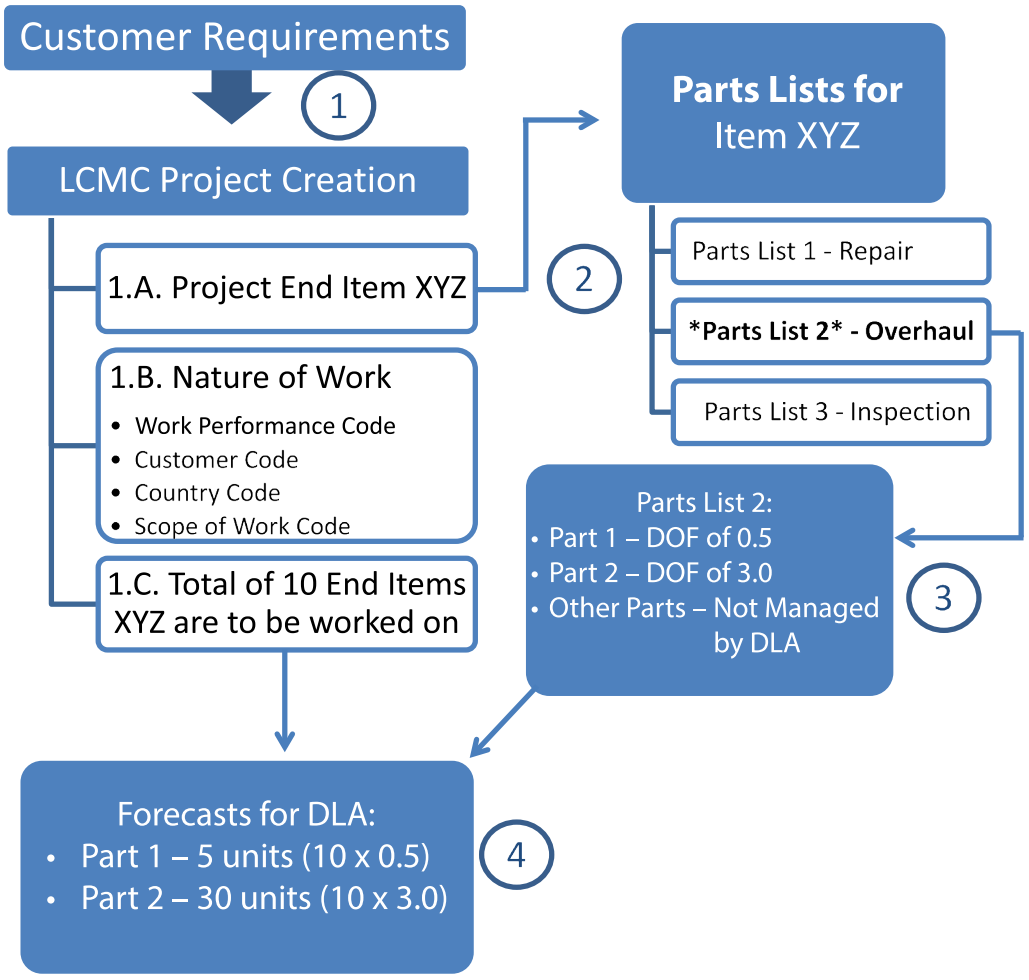
1. Personnel at the relevant Army LCMC build a project in the Army's LMP system based primarily on customer requirements. In addition to other information, the project in the LMP contains the following information.
    - 1.A The project's end item – This is the item on which the depot performs maintenance. It can be a full piece of equipment such as a tank, or can be a component such as an engine. In the accompanying flowchart, the project end item is "Item XYZ."
    - 1.B The nature of the project work – Personnel use several data elements in the LMP to describe the work depot personnel will perform for the project. These indicate the type of work performed (work performance code), an identification of the customer (customer code), whether the work is for a DoD or Foreign Military Sales customer (country code), and additional specifics on the work performed (scope of work code).
    - 1.C The project quantity – The project also indicates a quantity of end items depot personnel will work on over the course of the project. In the accompanying flowchart, the project quantity is 10.
2. The LMP selects a parts list that depot personnel will use to complete the project work (commonly known as a "BOM"). In advance of building the project, Army personnel (typically at the depots) will have loaded one or more parts lists into the LMP for each project end item. When this process works correctly, the LMP will evaluate the preloaded parts lists for the project end item and choose the parts list which best matches the nature of the project work. In the accompanying flowchart, the selected parts list is Parts List 2.
3. The LMP uses the selected parts list to generate a list of required spare parts. Along with the supply source, the depots will obtain the parts from the DLA or another supply source such as a vendor. For each required part, the parts list includes the number of units of the part the depots will require to complete the maintenance of one project end item or assembly. This is referred to as a Depot Overhaul Factor (DOF) and is expressed as a percentage. For example, an assembly has one each of Part A and typically Part A only needs repair or replacement 50 percent of

the time. Therefore, the DOF would be reflected in the BOM as 0.5. In the accompanying flowchart, the depots only order Part 1 and Part 2 from the DLA, and these parts have DOFs of 0.5 and 3.0, respectively.

4. For the items the depots procure from the DLA, the LMP multiplies the DOF by the project quantity, resulting in the total number of DLA-sourced parts. Multiplying the DOFs by the project quantity of 10, the LMP forecasts a requirement for 5 units of Part 1 and 30 units of Part 2. The LMP combines the total requirement for DLA-sourced parts with other stock information to produce the ASP spare parts forecasts. This includes combining the project's requirements with other projects' requirements for the same parts. The LMP then nets the total requirement against any parts the depot already has on hand and has not specifically designated to other projects. The LMP transmits the net forecast requirement to the DLA on one or more forecasts.

Figure 6 shows the process described with numbering corresponding to the four steps in the ASP spare parts forecast generation process.

Figure 6. Army Spare Parts Forecast Generation



Source: The DoD OIG.

Appendix C

Defense Logistics Agency Demand Plan Accuracy Measurement

The DLA measures the Demand Plan Accuracy (DPA) of the Army's spare parts forecasts by comparing the forecasted demands to the actual orders (demands) submitted by the Army to purchase the associated spare parts. DLA personnel calculate the DPA on a monthly basis and provide the results to the Army for all of the ASP forecasts that the Army submitted to the DLA. The calculation for the DPA is as follows:

DPA = 1 – (Absolute Error/Greater of Forecast or History) * 100

For example, an item's spare parts forecast for a specific time period was 4 and the actual demand was 1, so the resulting absolute error would be 3 (4-1=3). This would result in a DPA of 25 percent.

DPA = 1 – (3/4) or 1 – (0.75) = 0.25 * 100 = 25%

During our review, DLA personnel were calculating the DPA using a 3-month, lag 2 methodology. This involved looking at the quantity forecasted (forecast) over a previous 3-month period and comparing it to the quantity ordered (history) over a previous 3-month period with a 2-month lag between the forecast and history periods. Table 5 shows how DLA personnel would have calculated the DPA for orders through a 3-month period ending August 31, 2021.

Table 5. DPA Calculated Using a 3-Month, Lag 2 Methodology

	Begin Forecast Date	End Forecast Date*	Begin History Date	End History Date*	Absolute Error (27-13 = 14)	DPA 1 - (14/27) *100
Dates	4/1/2021	**6/30/2021**	6/1/2021	**8/31/2021**		
Quantity	27 Forecasted		13 Ordered		14	48%

*2-month lag between the End Forecast Date (6/30/2021) and the End History Date (8/31/2021).
Source: The DLA.

Management Comments

Office of the Assistant Secretary of Defense for Sustainment

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
3500 DEFENSE PENTAGON
WASHINGTON, DC 20301-3500

SUSTAINMENT

MEMORANDUM FOR DEPARTMENT OF DEFENSE OFFICE OF INSPECTOR GENERAL, OFFICE OF AUDIT ACQUISITION, CONTRACTING, AND SUSTAINMENT

SUBJECT: Response to Draft Report - Audit of the Reliability of Army Spare Parts Forecasts Submitted to the Defense Logistics Agency (Project No. D2021-D000AX-0163.000)

As requested, I am providing responses to the general content and recommendations contained in the subject report.

Draft Report Recommendation 1:
We recommend that the Under Secretary of Defense for Acquisition and Sustainment require the Services, in coordination with the Defense Logistics Agency, to conduct an in-depth review of their respective spare parts forecasting process for Defense Logistics Agency-managed items. The review should evaluate the number and value of items forecasted, resources involved in the forecasting and collaboration processes, and the accuracy of the forecasts.

Response to Recommendation 1: Concur. The Assistant Secretary of Defense for Sustainment's oversight of the Department's secondary item inventory includes reviewing and monitoring spare parts forecasting. The Office of the Deputy Assistant Secretary of Defense for Logistics (ODASD(Log)) will direct the Military Services and the Defense Logistics Agency (DLA) to conduct in-depth reviews of their forecasting processes utilized for DLA-managed items, identify issues and constraints, and establish a plan of action with milestones including specific areas for improvement. The results of these reviews and corresponding action plans will be presented to the Working Capital Fund – Logistics Executive Steering Committee (WCF-LESC). The estimated completion date (ECD) for these actions is the second quarter of Fiscal Year (FY) 2024.

The review should also determine how the Services can improve the process and establish a plan of action with milestones with specific areas for improvement to address the deficiencies identified in this report including:

a. Determining whether the Services' information systems accurately calculate the spare parts forecasts as intended and can maintain an audit trail to support the forecasts.

Response to Recommendation 1.a: Concur. The in-depth reviews of the Military Services' forecasting processes for DLA-managed items will assess the accuracy of spare parts forecasts and develop a standardized process to maintain an audit trail to support the forecasts. The ECD for this action is the second quarter of FY 2025.

b. Developing metrics and goals to measure spare parts forecast accuracy.

Office of the Assistant Secretary of Defense for Sustainment (cont'd)

Response to Recommendation 1.b: Concur. The ODASD(Log), in coordination with DLA and the Military Services, through the monthly Supply Chain Metrics Working Group (SCMG), will develop metrics and goals to assess the accuracy of the Military Services' forecasts provided to DLA for consumable repair parts required to support depot maintenance. The ECD for this action is the second quarter of FY 2025.

c. Establishing procedures and controls for monitoring spare parts forecast accuracy.

Response to Recommendation 1.c: Concur. The ODASD(Log), in coordination with DLA and the Military Services, will establish procedures and controls to monitor the Military Services' spare parts forecasts and to assess the accuracy of the Military Services' forecasts provided to DLA for consumable repair parts required to support depot maintenance. The ECD for this action is the fourth quarter of FY 2025.

d. Establishing procedures for identifying, tracking, and analyzing the primary causes of inaccurate spare parts forecasts and using the data to improve the accuracy of future forecasts.

Response to Recommendation 1.d: Concur. The ODASD(Log), in coordination with DLA and the Military Services, will establish procedures for identifying, tracking, and analyzing the primary causes of inaccurate consumable repair parts forecasts and use the data generated by these procedures to improve the accuracy of future forecasts. The ECD for this action is the fourth quarter of FY 2025.

e. Establishing guidance and providing recurring training to depot personnel on the process for evaluating the accuracy of spare parts forecasts and the level of research and information required to justify forecasts during monthly collaboration with the Defense Logistics Agency.

Response to Recommendation 1.e: Concur. The ODASD(Log) will establish guidance and provide direction to the Military Services to train depot personnel on the process for evaluating the accuracy of spare parts forecasts and the level of research and information required to justify forecasts during monthly collaboration with DLA. The Military Services will be required to brief the WCF-LESC on their efforts. The ECD for this action is the third quarter of FY 2026.

f. Requiring the Services to coordinate with the Under Secretary of Defense for Acquisition and Sustainment and the Defense Logistics Agency to determine whether their spare parts forecasts add value to the Defense Logistics Agency's demand planning and purchase decisions and whether corrective actions are improving accuracy rates. The Services and the Defense Logistics Agency should consider removal of specific items from collaboration if the forecast accuracy rate cannot be improved or while forecast accuracy improvement plans are being implemented. The Services should justify keeping items with continuously low accuracy rates in the collaboration category and maintain a supporting audit trail.

Office of the Assistant Secretary of Defense for Sustainment (cont'd)

Response to Recommendation 1.f: Concur. The ODASD(Log) will publish guidance to the Military Services requiring the Military Services to coordinate with DLA to assess if their spare parts forecasts add value to DLA's demand planning and purchase decisions and whether corrective actions are improving consumable item accuracy rates. The guidance will include direction to DLA to consider removing specific items from collaboration if forecast accuracy rates cannot be improved, direction to the Military Services to justify keeping items with continuously low accuracy rates in collaboration, and a requirement to present the joint assessment and recommendations to the WCF-LESC for endorsement to the Joint Logistics Resource Requirement Board. The ECD for this action is the third quarter of FY 2026.

For questions or to request additional information, my point of contact for this effort is [redacted], who may be reached at [redacted].

METHOD.LEIGH.E.[redacted] Digitally signed by METHOD.LEIGH.E.[redacted] Date: 2023.07.20 16:10:46 -04'00'

Leigh E. Method, SES
Deputy Assistant Secretary of Defense
for Logistics

Office of the Assistant Secretary of Defense for Sustainment (cont'd)

COORDINATION SUMMARY

SUBJECT: Response to Draft Report - Audit of the Reliability of Army Spare Parts Forecasts Submitted to the Defense Logistics Agency (Project No. D2021-D000AX-0163.000) (USA001346-23)

Organization	Name	Comment	Date
Army	HOYLE.HEIDI.JO. [redacted] Digitally signed by [redacted] Date: 2023.07.13 22:12:02 -04'00' HEIDI J. HOYLE MG, USA Acting Deputy Chief of Staff, G-4	The Army partially concurs with the following comments: The Army concurs on recommendations (1 and 1.a – 1.f) DoDIG made to USD (A&S) and will support ODASD(Log)'s planned assessment and improvement actions with an ECD: Q2 FY24. While the Army acknowledges the significance of accurate Organic Industrial Base (OIB) repair parts forecast collaboration within Working Capital Fund (WCF) oversight, the Army requests USD(A&S) align the planned actions/endorsement to the Logistics Executive Steering Committee (LESC) and the Joint Logistics Board with updates in the WCF-LESC and Joint Logistics Resource Requirements Board as appropriate. While the Army agrees with the need to continually assess, collaborate, and improve upon the Army Supply Plan (ASP) forecast that we provide to DLA for the OIB, the Army non-concurs with the findings and conclusions as they do not sufficiently account for factors such as changing requirements, influenced by external factors outside of the control of the ASP process. The Army recommends that DoDIG work with HQDA G-4 management through an exit conference (or other coordination as appropriate) to adjudicate unaccounted for factors in the findings and conclusions before the final report is published.	

UNCLASSIFIED

Acronyms and Abbreviations

AMC	Army Materiel Command
AMCOM	Aviation and Missile Command
ANAD	Anniston Army Depot
ASP	Army Supply Plan
BOM	Bill of Materials
CCAD	Corpus Christi Army Depot
DLA	Defense Logistics Agency
DLA L&M	Defense Logistics Agency Land and Maritime
DOF	Depot Overhaul Factor
DPA	Demand Plan Accuracy
LCMC	Life Cycle Management Command
LMP	Logistics Modernization Program
OUSD(A&S)	Office of the Under Secretary of Defense for Acquisition and Sustainment
TACOM	Tank-Automotive and Armaments Command

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For more information about DoD OIG reports or activities, please contact us:

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