United States Government Accountability Office

Report to Congressional Committees

February 2020

NAVY SHIP MAINTENANCE

Actions Needed to Address Maintenance Delays for Surface Ships Based Overseas

GAO-20-86

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GAO Highlights

Highlights of GAO-20-86, a report to congressional committees

Why GAO Did This Study

To meet operational demands, the Navy has doubled the number of ships based overseas since 2006. Navy ships based abroad represent about 14 percent of the total fleet and are there to provide presence, deter threats, quickly respond to crises, and build partnerships. Effective and timely maintenance is essential to meet strategic objectives, fulfill operational requirements, and ensure ships reach their expected service lives.

House Report 115-676 included a provision that GAO assess maintenance for ships based overseas. This report: (1) describes existing maintenance capacity and approaches the Navy uses for surface ships based overseas, (2) assesses the extent to which the Navy completed maintenance periods as scheduled in fiscal years 2014 through 2018 and analyzes factors contributing to any delays, and (3) evaluates the extent to which the Navy has assessed any challenges facing future overseas maintenance efforts. To address these objectives, GAO analyzed Navy policies and maintenance data from fiscal years 2012 through 2018, and interviewed officials, including from Naval Sea Systems Command and overseas fleets and maintenance centers.

What GAO Recommends

GAO is making five recommendations, including that the Navy comprehensively analyze and address maintenance delays, and assess the risks and analyze requirements of future overseas maintenance efforts. The Navy concurred with GAO's recommendations.

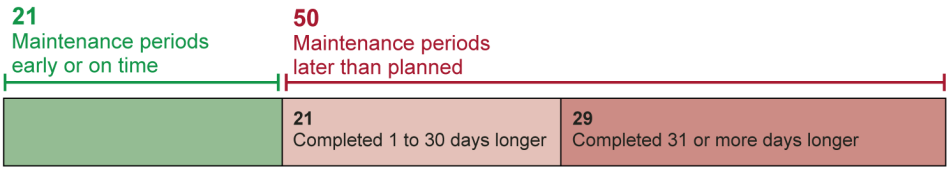
View GAO-20-86. For more information, contact Diana Maurer at (202) 512-9627 or maurerd@gao.gov.

What GAO Found

The Navy maintains the 38 surface ships based in Japan, Spain, and Bahrain through a mix of Navy-operated facilities and private contractors. The Navy uses different maintenance approaches at each location depending on the number and type of ships based there and the Navy and private contractor industrial base available to provide maintenance support. For example, to support the 12 surface ships based in Yokosuka, Japan, the Navy uses both private contractors and its Ship Repair Facility and Japan Regional Maintenance Center, which is subsidized by the government of Japan. In Rota, Spain, the Navy relies on one Spanish contractor to maintain the four ships based at that location.

Maintenance on surface ships based overseas took longer than planned for 50 of the 71 maintenance periods—or about 70 percent—started during fiscal years 2014 through 2018. More than half of these maintenance delays lasted a month or longer, which reduced the ships' availability for training and operations. Various factors contribute to delays, such as discovery that unanticipated additional repairs are needed, missed planning milestones, or shortages of key staff. However, the Navy's efforts to understand delays often solely focus on individual maintenance periods and result in steps to improve specific issues related to maintenance timeliness. The Navy has not conducted a comprehensive analysis of maintenance delays to systematically identify and address their root causes. Without such an analysis, the Navy cannot effectively target corrective actions, and risks continuing to underestimate maintenance needs and the time and resources required to address them.

The Navy Completed the Majority of the 71 Maintenance Periods Started during Fiscal Years 2014 through 2018 Later than Planned



Source: GAO analysis of Navy data. | GAO-20-86

The Navy has developed a new maintenance approach for ships in Japan, but has not assessed the risks associated with this approach or analyzed the overseas maintenance requirements for a growing fleet. The new maintenance approach calls for ships to obtain all required maintenance in the United States before and after going overseas, among other things. The Navy decided to implement this approach in Japan based on use of the approach in Spain—where ships have experienced few maintenance delays. However, the Navy has not assessed the risks posed by differences between the operating environments in Spain and Japan, or by shortfalls in maintenance capacity at U.S. facilities. The Navy also plans to replace aging ships in Bahrain as it grows the fleet to 355 ships, but it did not analyze or include overseas maintenance requirements in its long-range plan. Without assessing the risks challenges may pose to the success of its new maintenance approach in Japan or analyzing the requirements of a growing fleet, the Navy could be hindered in its ability to ensure these ships are ready and available for operations.

United States Government Accountability Office

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Abbreviations

CG	Cruiser
CNO	Chief of Naval Operations
CNRMC	Commander, Navy Regional Maintenance Center
DOD	Department of Defense
DDG	Destroyer
FDRMC	Forward Deployed Regional Maintenance Center
LCC	Amphibious Command Ship
LHA/LHD	Amphibious Assault Ship
LPD	Amphibious Transport Dock Ship
LSD	Dock Landing Ship
MCM	Mine Countermeasures Ship
NAVSEA	Naval Sea Systems Command
OMB	Office of Management and Budget
PC	Patrol Coastal Ship
SRF-JRMC	U.S. Naval Ship Repair Facility and Japan Regional Maintenance Center
SURFMEPP	Surface Maintenance Engineering Planning Program

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U.S. GOVERNMENT ACCOUNTABILITY OFFICE
441 G St. N.W.
Washington, DC 20548

February 26, 2020

Congressional Committees

The Navy bases ships overseas to increase U.S. presence in strategic areas, deter threats, quickly respond to crises, and build partnerships. To meet growing strategic and persistent operational demands, the Navy has doubled the number of ships assigned to overseas homeports from 20 in 2006 to 40 ships in 2019—representing about 14 percent of the total fleet.[1] These ships include 38 surface ships such as destroyers, cruisers, amphibious ships, and others that serve a variety of missions in the North Atlantic, Western Pacific, and Middle East.[2] The 2017 National Security Strategy and 2018 National Defense Strategy highlight the importance of these strategic areas, as well as the importance of growing the size of the force and maintaining its readiness to counter the growing influence of China and Russia.[3] To meet these objectives, the Navy seeks to grow its fleet from about 290 total ships in fiscal year 2020 to 355 ships by fiscal year 2034, and officials anticipate proportionate increases to the overseas-based fleet that will require maintenance abroad.[4]

The ability of the Navy to achieve its strategic objectives and planned growth relies on ships receiving sufficient maintenance to reach their expected service lives. However, our prior work has shown that the Navy has faced persistent challenges in maintaining its fleet. We found in 2015 that some ships based overseas had consistently deferred maintenance

[1]A homeport is where a ship is based, and the Navy assigns ships to homeports in the United States and overseas. During the time of our review in 2019, the Navy had 40 ships assigned to overseas homeports. This number may fluctuate as the Navy changes homeport assignments.

[2]We did not include the aircraft carrier in Yokosuka, Japan, and the command ship based in Italy in our review because the Navy maintains these under different processes from the other surface ships.

[3]The President of the United States, *National Security Strategy of the United States of America* (Washington, D.C.: December 2017); Department of Defense, *Summary of the 2018 National Defense Strategy of the United States of America: Sharpening the American Military's Competitive Edge* (Jan. 19, 2018). The full strategy is classified.

[4]See Office of the Chief of Naval Operations, *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020* (Washington, D.C.: March 2019) and Naval Sea Systems Command, *Report to Congress on the Long-Range Plan for Maintenance and Modernization of Naval Vessels for Fiscal Year 2020* (Washington, D.C.).

that degraded their material condition, jeopardizing their ability to reach their full service lives. We also found that the material condition of ships based overseas worsened slightly faster than that for U.S.-based ships over the preceding 5 years.[5]

In 2017, the Navy experienced four significant mishaps at sea, including two collisions involving ships based in Japan, which resulted in the loss of 17 sailors' lives and serious damage to its ships. Subsequent Navy reviews found that the Navy faced challenges balancing high operational demands, training, and maintenance.[6] Following these incidents, we reported that the Navy continued to experience challenges and persistent delays in maintaining its fleet. For example, in December 2018 we reported that the Navy completed only 30 percent of submarine, aircraft carrier, and surface ship maintenance on time from fiscal year 2012 through 2018, resulting in thousands of days that ships were unavailable for training or operations.[7]

House Report 115-676, accompanying a bill for the John S. McCain National Defense Authorization Act for Fiscal Year 2019, included a provision for us to review Navy maintenance for ships based overseas.[8] This report: (1) describes existing maintenance capacity and approaches the Navy uses for surface ships based overseas, (2) assesses the extent

[5]GAO, *Navy Force Structure: Sustainable Plan and Comprehensive Assessment Needed to Mitigate Long-Term Risks to Ships Assigned to Overseas Homeports*, GAO-15-329 (Washington, D.C.: May 29, 2015). In this report, we recommended that the Navy implement updated operational schedules for all ships based overseas, and conduct a comprehensive assessment of the risks associated with overseas homeporting. The Department of Defense (DOD) agreed with our recommendations but as of August 2019 had not fully implemented them.

[6]See U.S. Fleet Forces Command, *Comprehensive Review of Recent Surface Force Incidents* (Oct. 26, 2017); and U.S. Department of the Navy, *Strategic Readiness Review* (Dec. 3, 2017).

[7]GAO, *Navy and Marine Corps: Rebuilding Ship, Submarine, and Aviation Requirements Will Require Time and Sustained Management Attention*, GAO-19-225T (Washington, D.C.: Dec. 12, 2018). See also *Navy Readiness: Actions Needed to Address Persistent Maintenance, Training, and Other Challenges Affecting the Fleet*, GAO-17-798T (Washington, D.C.: Sept. 7, 2017) and GAO-17-809T (Washington, D.C.: Sept. 19, 2017). We have also previously found that the Navy has experienced delays and other challenges to completing ship maintenance on time in the United States. GAO, *Military Readiness: Progress and Challenges in Implementing the Navy's Optimized Fleet Response Plan*, GAO-16-466R (Washington, D.C.: May 2. 2016). For an overview of related past recommendations and the Navy's steps to address them, see GAO-19-225T.

[8]H.R. Rep. No. 115-676 at 88 (2018).

to which the Navy completed maintenance periods as scheduled in fiscal years 2014 through 2018 and analyzes factors contributing to any delays, and (3) evaluates the extent to which the Navy has assessed any challenges facing future overseas ship maintenance efforts.

For our first objective, we reviewed Navy information on maintenance capacity at overseas homeports—including U.S. Navy ship repair facilities and maintenance centers; the authorized maintenance workforce; the contractor industrial base; and the number of surface ships maintained.[9] This included information on the overseas facilities and maintenance centers' physical capacity, workforce and workload, and the capacity of foreign contractors used for ship maintenance. We also reviewed Navy maintenance plans and guidance that document Navy maintenance approaches and organizations at overseas homeports.[10] We conducted site visits to three overseas homeports (Yokosuka, Japan; Sasebo, Japan; and Manama, Bahrain) representing the majority of ships based overseas to observe their physical capacity and operations and interview maintenance center officials; we also interviewed maintenance center officials in Italy and Spain.

For our second objective, we analyzed U.S. Naval Sea Systems Command data on regularly scheduled, depot-level maintenance periods underway from 2014 through 2018 for surface ships.[11] Specifically, we compared the planned and actual durations of maintenance periods at each homeport to determine whether maintenance periods ran longer

[9]During the time of our review in 2019, these ships consisted of 38 ships based in Japan, Spain, and Bahrain, in addition to an aircraft carrier based in Yokosuka, Japan, and the Sixth Fleet command ship based in Gaeta, Italy, for a total of 40 ships. We did not include the aircraft carrier or command ship in our review since these ships are maintained under different processes. We did not include the amphibious ship assigned to Sasebo, Japan, in September 2019 since it had not received maintenance overseas at the time of our review. We did not include support ships operated by Military Sealift Command.

[10]For example, Commander, U.S. Fleet Forces Command Instruction 4790.3, *Joint Fleet Maintenance Manual* (Oct. 5, 2018) (incorporating revision C, change 7). In October 2019, the *Joint Fleet Maintenance Manual* was updated to incorporate revision D. The *Joint Fleet Maintenance Manual* incorporating revision C, change 7 was in use at the time the documentation we analyzed in our audit was created.

[11]The Navy refers to these regularly scheduled depot-level maintenance periods as Chief of Naval Operations maintenance availabilities, but for the purposes of this report we refer to them as maintenance periods. We analyzed maintenance in fiscal years 2014 through 2018 because this is the time period for which the most comprehensive Navy data was available at the start of our review. See Appendix I for more information on the data and time periods used for our analysis.

than planned and the length in days of any delays—which the Navy refers to "days of maintenance delay." We assessed the reliability of the data by checking (1) for missing data entries, (2) for duplicate records, and (3) to ensure the data was formatted consistently. We also reviewed documentation and interviewed cognizant officials, and we found the data to be reliable for reporting on the duration of maintenance periods and the number of days of maintenance delay.[12] We reviewed Navy policies and guidance governing overseas ship maintenance and requirements. We also reviewed documentation identifying certain reasons for delays of individual maintenance periods, and interviewed cognizant Navy officials. We compared this information to government standards including *Standards for Internal Control in the Federal Government,* our *Schedule Assessment Guide,* and OMB Circular No. A-123, *Management's Responsibility for Enterprise Risk Management and Internal Control.*[13]

For our third objective, we analyzed Navy guidance, plans, and other documentation on new maintenance approaches and requirements, potential challenges to overseas maintenance and Navy efforts to address them, and Navy data on maintenance delays as described above. We compared this information to government standards including *Standards for Internal Control in the Federal Government,* which include standards related to management's responsibility to analyze and respond to changes and risks, and the *DOD Product Support Business Case Analysis Guidebook.*[14] For all three objectives, we interviewed cognizant Navy officials who plan, execute, and manage overseas maintenance, including officials from all the overseas maintenance centers responsible for ships based overseas: the U.S. Naval Ship Repair Facility and Japan Regional Maintenance Center (SRF-JRMC) in Yokosuka, Japan, and its detachment in Sasebo, Japan, and the Forward Deployed Regional Maintenance Center (FDRMC) headquarters in Naples, Italy, and its

[12]According to Navy officials, this is the most reliable, available data on surface ship maintenance periods' planned and actual durations.

[13]GAO, *Standards for Internal Control in the Federal Government*, GAO-14-704G (Washington, D.C.: September 2014); GAO, *GAO Schedule Assessment Guide: Best Practices for Project Schedules*, GAO-16-89G (Washington, D.C.: December 2015); and Office of Management and Budget Circular A-123, *Management's Responsibility for Enterprise Risk Management and Internal Control* (July 15, 2016). For example, *Standards for Internal Control in the Federal Government* include principles pertaining to oversight responsibility, evaluating issues, and remediating deficiencies; OMB Circular A-123 includes guidance on conducting a root-cause analysis when developing corrective actions.

[14]GAO-14-704G; Department of Defense, *DOD Product Support Business Case Analysis Guidebook* (2011).

detachments in Rota, Spain, and Manama, Bahrain. We also interviewed operational commanders, ship crews, and other Navy personnel in the United States and overseas. See appendix I for additional detail on our scope and methodology.

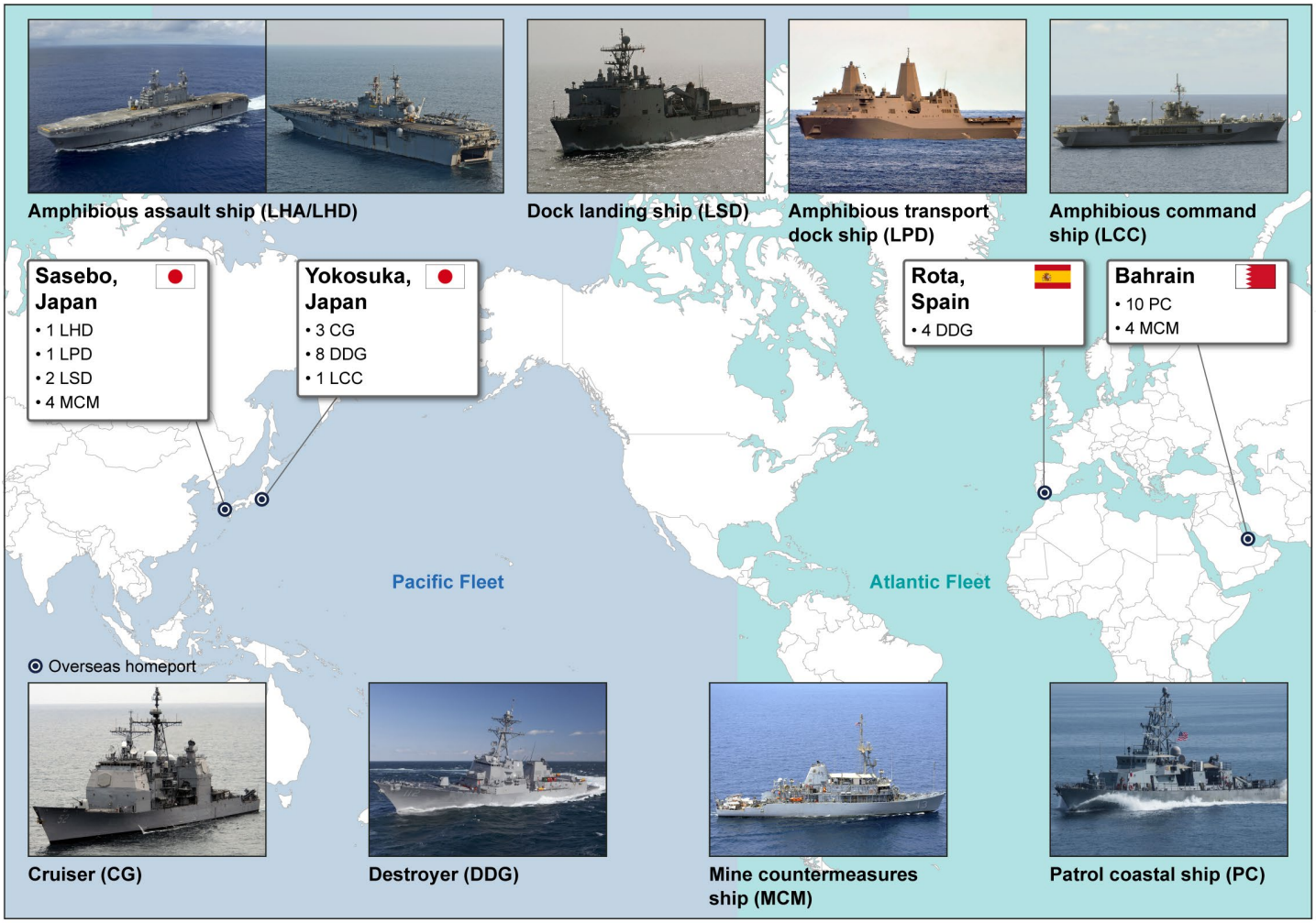
We conducted this performance audit from August 2018 to February 2020 in accordance with generally accepted government auditing standards. Those standards require we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based 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

Surface Ship Assignments to U.S. and Overseas Homeports

The Navy bases the majority of its surface ships at homeports in the United States, and five regional maintenance centers manage their maintenance. At the time of our review, the Navy had 38 surface ships assigned to overseas homeports, as illustrated in figure 1.

Figure 1: Overseas Locations of U.S. Navy Surface Ships and Homeports as of Fiscal Year 2019



Source: GAO analysis of Department of Defense data. | GAO-20-86

Note: Ships are based at U.S. and overseas locations, or homeports, which can change over the course of a ship's service life, and the number of ships at a given homeport may fluctuate as the Navy changes homeport assignments. A total of 40 ships were homeported overseas at the time of our review in fiscal year 2019, including an aircraft carrier in Japan and the Sixth Fleet command ship in Italy. These two ships were not part of our review due to the differences in their maintenance processes from the other 38 ships based overseas.

A homeport is where a ship is based and primarily managed and maintained. The Navy assigns all newly commissioned ships entering the fleet to a U.S. homeport, and the Navy may change a ship's homeport throughout its service life. The Navy may move a ship to an overseas homeport to respond to strategic needs or to relieve another ship

returning to a U.S. homeport. We found in May 2015 that basing ships at overseas homeports provides considerable additional time in strategic areas of operation and other benefits ranging from increased opportunities for collaboration with partners and allies to faster response time for emerging crises. However, we also found that the Navy's high pace of operations for its overseas-homeported ships affected the material condition of these ships, and that they had experienced a worsening trend in overall ship readiness when compared to U.S.-homeported ships over the preceding 5 years. We also reported that the Navy generally intended ships to be homeported overseas for about 7 to 10 years, according to officials, but that some ships in Japan had been based there for longer than 10 years.[15] In 2018 Congress instituted a 10-year cap on the length of time certain U.S. Navy ships may be based at overseas homeports.[16]

Maintenance Responsibilities for Surface Ships

A number of organizations and commands within the Navy share responsibilities for setting maintenance policies and planning, scheduling, and executing ship maintenance, from the offices of the Secretary of the Navy and Chief of Naval Operations, to fleet commanders and ships' crews.[17] Key organizations include:

Type Commanders. The Navy's type commanders for surface ships—Commander, Naval Surface Force, U.S. Pacific Fleet, and Commander, Naval Surface Force, U.S. Atlantic Fleet—are responsible for maintaining,

[15]GAO-15-329.

[16]Specifically, aircraft carriers, amphibious ships, cruisers, destroyers, frigates, and littoral combat ships may not be based at overseas homeports for more than 10 years unless the Secretary of the Navy submits a waiver and notifies the congressional defense committees of the expected end date, among other things. The Navy also has 3 years after enactment of the law to move to U.S. homeports Navy ships that have been deployed overseas in excess of 10 years. Pub. L. No. 115-232, § 323 (2018) (codified at 10 U.S.C. § 8690).

[17]The Navy categorizes ship maintenance at three levels: organizational maintenance, which is conducted by crews as part of their duties; intermediate maintenance, which exceeds the capacity of the crew and requires additional support, such as the use of fleet maintenance organizations; and depot-level maintenance, which exceeds the capacity of fleet and intermediate maintenance facilities and may be performed at a public or private shipyard. Office of the Chief of Naval Operations Instruction 4700.7M, *Maintenance Policy for Navy Ships* (May 8, 2019). For more information on specific roles and responsibilities of the Navy for surface ship maintenance, see GAO, *Navy Ship Maintenance: Action Needed to Maximize New Contracting Strategy's Potential Benefits*, GAO-17-54 (Washington, D.C.: Nov. 21, 2016).

training, and ensuring the readiness of the surface ships assigned to each fleet.[18]

Naval Sea Systems Command (NAVSEA). NAVSEA, among other things, maintains surface ships to meet fleet requirements within defined cost and schedule parameters. These offices perform contract administration, program management, and planning for future maintenance periods informed by the historical maintenance needs of Navy ships. For example, the following NAVSEA organizations have certain responsibilities for overseas ship maintenance:

- **NAVSEA's Deputy Commander for Ship Maintenance and Modernization (NAVSEA 21).** This office provides life-cycle management for surface ships and manages critical modernization, maintenance, training, and inactivation programs.
- **NAVSEA's Surface Maintenance Engineering Planning Program (SURFMEPP).** SURFMEPP provides life-cycle management of maintenance requirements for surface ships, including providing centralized class maintenance and modernization planning and management of maintenance strategies.
- **Commander, Navy Regional Maintenance Center (CNRMC).** This office oversees the regional maintenance centers in the United States, as well as the Forward Deployed Regional Maintenance Center (FDRMC) headquarters in Italy, and its detachments in Rota, Spain, and Manama, Bahrain, that manage the maintenance for the U.S. Navy ships homeported there.
- **NAVSEA's Logistics, Maintenance, and Industrial Operations (NAVSEA 04).** This office manages and oversees the naval shipyards and the Ship Repair Facility and Japan Regional Maintenance Center

[18]All ships are organized into categories by type of ship—e.g., aircraft carrier, submarine, and surface ship. The type commanders for these ships are responsible for developing the *Joint Fleet Maintenance Manual*, which establishes a unified set of maintenance requirements across all three types of ship, though different types of ship have different maintenance requirements. Commander, U.S. Fleet Forces Command Instruction 4790.3, *Joint Fleet Maintenance Manual* (Oct. 5, 2018) (incorporating revision C, change 7).

(SRF-JRMC) in Yokosuka, Japan, and its detachment in Sasebo, Japan.[19]

Surface Team One. This body of stakeholders from across the Navy's surface ship maintenance, modernization, and sustainment organizations collaborates for the purpose of setting and developing surface ship maintenance and modernization priorities, conducting analyses, and improving surface ship maintenance performance. A Senior Flag Oversight Council comprised of Commander, Naval Surface Force Pacific, and Commander, NAVSEA, provides strategic vision and directs Surface Team One's efforts, which may include knowledge-sharing networks, working groups, or deep-dive studies and business case analyses.

Types of Ship Maintenance Periods

The level of complexity of ship repair, maintenance, and modernization can affect the length of a maintenance period, which can range from a few weeks to 6 months or longer.[20] The types of maintenance periods include the following:

- **Chief of Naval Operations (CNO) maintenance.** CNO maintenance periods are scheduled to accomplish industrial, depot-level maintenance and modernization—work that cannot be conducted by ship's crews or goes beyond fleet capabilities. These depot-level maintenance periods can last 6 months or longer and the Navy generally schedules them every 2 to 3 years throughout a ship's service life.[21] This can include major repair, overhaul, or complete rebuilding of systems needed for ships to reach their expected service

[19]Following the 2017 ship collisions and other incidents, the Navy made a number of changes to its maintenance-related management and oversight overseas, including the transition of SRF-JRMC, which had been under U.S. Pacific Fleet, to NAVSEA in October 2018. The Navy also created new organizations in Japan and Bahrain to provide additional oversight of the Navy's manning, training, and maintenance of ships there—Commander, Naval Surface Group Western Pacific, and Commander, Naval Surface Squadron Five, respectively. For more information on NAVSEA offices that manage and participate in surface ship maintenance overseas, see appendix II.

[20]The Navy refers to the scheduled time within which maintenance, modernization, or repair is conducted as "maintenance availabilities." For the purposes of this and past reports, we refer to these as maintenance periods. For example, see GAO-19-225T.

[21]The Navy refers to these regularly scheduled depot-level maintenance periods as CNO availabilities, but for the purposes of this report we refer to them as depot-level maintenance periods. Some depot-level maintenance tasks may be accomplished outside of these maintenance periods, such as during continuous or voyage repair maintenance periods, but these periods are for brief or emergency ship maintenance needs, respectively.

life, and involve complex structural, mechanical, and electrical repairs. For example, in certain types of depot-level maintenance, ships are taken out of the water and put into a dry dock to perform maintenance on below-water parts of the ship (see fig. 2 for a photo of a dry dock at SRF-JRMC in Yokosuka, Japan). To inform the planning of the work package for this maintenance period, Navy officials or contractor representatives typically perform one or more "ship checks" to assess the material condition of the ship in advance of the maintenance period.

- **Continuous maintenance.** Continuous maintenance periods are to conduct maintenance outside of the longer CNO maintenance periods that can be done in short periods typically scheduled to be 2 to 6 weeks in duration. According to Navy officials, the schedules of these periods can vary, and commanders can adjust, postpone, or cancel them based on operational demands.
- **Voyage repair.** Voyage repair maintenance periods are solely to accomplish corrective maintenance of a mission- or safety-essential nature necessary for a ship to deploy or continue its deployment. For example, ships based in the United States that are deployed overseas on a temporary basis schedule mid-deployment voyage repair to ensure they can continue their deployment.[22]

[22]While ships based overseas may receive depot-level maintenance and continuous maintenance outside of the United States, ships based in the United States are generally prohibited from receiving maintenance outside of the United States except in the cases of voyage repair that is required for a ship to continue its deployment. 10 U.S.C. § 8680.

Figure 2: Navy Dry Dock at U.S. Naval Ship Repair Facility and Japan Regional Maintenance Center, Yokosuka, Japan

Source: GAO. | GAO-20-86

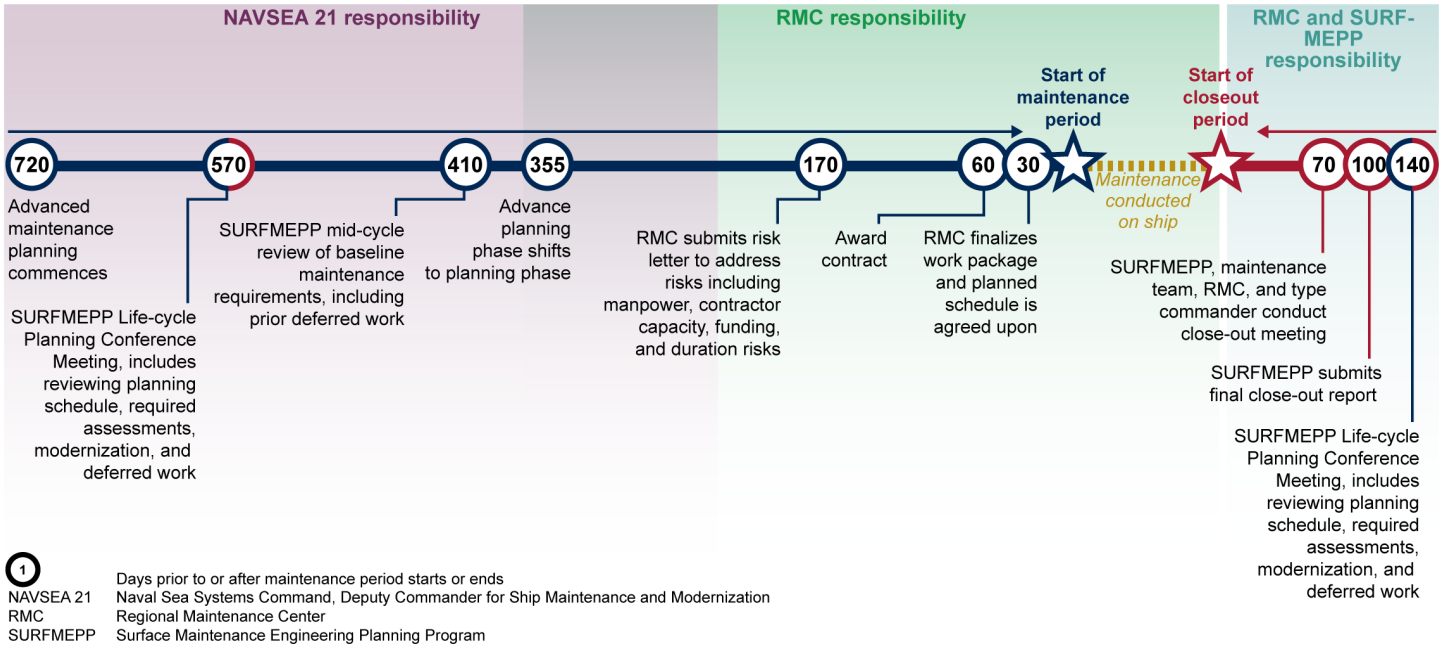
Planning Process for Surface Ship Depot-level Maintenance Periods

The process for planning surface ship depot-level maintenance periods (i.e., CNO maintenance periods), whether the ship is based overseas or in the United States, is contained in the Navy's *Joint Fleet Maintenance Manual.*[23] In general, the Navy begins planning for a ship's depot-level maintenance period 720 days—or roughly 2 years—before the planned start of the maintenance period. During this time, a variety of organizations within the Navy plan what will be repaired, how long it will

[23]The maintenance of aircraft carriers and submarines is also contained in the *Joint Fleet Maintenance Manual.* The Navy performs depot-level maintenance for aircraft carriers and submarines at the four public shipyards but generally contracts this maintenance to private companies and shipyards for surface ships. Commander, U.S. Fleet Forces Command Instruction 4790.3, *Joint Fleet Maintenance Manual* (Oct. 5, 2018) (incorporating revision C, change 7).

take, where the work will be done, as well as select the contractors to perform the work, among other things. This process also includes activities to close out the maintenance period once it is complete, which overlap with the start of the planning cycle for the next maintenance period. For example, certain milestones serve both planning and closeout purposes—such as the Life-cycle Planning Conference Meeting, which is to both closeout a ship's completed maintenance period and to begin planning for the next one by reviewing the maintenance requirements, deferred work, and planned schedules (see figure 3).

Figure 3: Overview of Maintenance Planning Process Milestones and Responsibilities for Surface Ship Maintenance Overseas



1 Days prior to or after maintenance period starts or ends
NAVSEA 21 Naval Sea Systems Command, Deputy Commander for Ship Maintenance and Modernization
RMC Regional Maintenance Center
SURFMEPP Surface Maintenance Engineering Planning Program

Source: GAO analysis of Navy information. | GAO-20-86

Note: The *Joint Fleet Maintenance Manual* lays out more than 100 milestones that are to occur over the course of this planning process. The manual emphasizes the importance of meeting planning milestones to identify, estimate, and schedule the work to be done in the maintenance period. These milestones are intended to provide the overall timeline for the planning and closeout of maintenance periods, so the timing is approximate and may not occur exactly on the given day. See Commander, U.S. Fleet Forces Command Instruction 4790.3, *Joint Fleet Maintenance Manual* (Oct. 5, 2018) (incorporating revision C, change 7). In August 2019 the Navy adjusted certain milestones for ship maintenance based on awarding the contract 120 days prior to planned maintenance start rather than 60 days. However, this revision did not apply to the ships in the time period we reviewed, does not specifically apply to ships based overseas, and was not incorporated in the October 2019 revision D of the *Joint Fleet Maintenance Manual.* The Navy plans to update these milestones in subsequent revisions to the manual.

NAVSEA 21, including SURFMEPP, is generally responsible for the advanced planning of maintenance periods, which includes setting the baseline requirements and early estimates of how long maintenance might take. In general, regional maintenance centers have overall responsibilities for meeting milestones approximately a year prior to the start of maintenance through execution and closeout, as illustrated in figure 3 above. Overseas, the responsible regional maintenance centers are the SRF-JRMC at the homeport in Yokosuka, Japan, and its detachment at the homeport in Sasebo, Japan, and the FDRMC detachments at the homeports in Rota, Spain, and Manama, Bahrain.[24] Naval Supply Systems Command's Fleet Logistics Centers offices overseas are responsible for soliciting and awarding maintenance contracts, for ships based overseas, among other things.

The Navy's Ship Maintenance Capacity and Approach Varies by Overseas Location

The Navy has developed different maintenance capacity and approaches to maintain the 38 surface ships based in Japan, Spain, and Bahrain. The Navy maintains these ships through a mix of Navy, host government, and contractor industrial base facilities and resources that are different at each location. The Navy has tailored the maintenance approaches it uses at each homeport considering the available Navy and contractor capacity, as well as the number and type of ships, according to Navy documents and officials. Table 1 provides an overview of the Navy and contractor industrial base capacity for depot-level maintenance of surface ships based at the four main overseas homeports.

[24]The FDRMC headquarters, which manages and oversees the FDRMC detachments in Spain and Bahrain, is co-located with the Sixth Fleet in Naples, Italy.

Table 1: U.S. Navy and Contractor Industrial Base Available for Depot-level Maintenance of U.S. Surface Ships Based at Homeports in Japan, Spain, and Bahrain, as of September 2018

U.S. Navy maintenance organization	Surface ships based at homeport[a]	U.S. Navy maintenance facilities and capacity[b]	Contractor industrial base capacity
		Pacific Fleet Area of Responsibility	
U.S. Naval Ship Repair Facility and Japan Regional Maintenance Center (SRF-JRMC) Yokosuka, Japan	12 surface ships[c] • 8 Destroyers (DDG) • 3 Cruisers (CG) • 1 Amphibious command ship (LCC)	Navy dry-dock capacity: 6 • 3 Navy-certified docks can accommodate DDG, CG, and LCC • 1 Navy-certified dock can fit approximately MCM-sized ships • 2 dry docks not certified SRF-JRMC authorized workforce[c] • U.S. military and civilian: 380 • Japanese nationals: 2,341	Dry-dock capacity • Work generally conducted on base; possible contractor docks available Contractor industrial base • One contractor for most work • Additional smaller contractors and vendors
SRF-JRMC Detachment Sasebo Sasebo, Japan	8 surface ships[d] • 1 Amphibious assault (LHD) • 1 Amphibious transport dock (LPD) • 2 Dock landing ships (LSD) • 4 Mine countermeasures (MCM)	Navy dry-dock capacity: 2 • 1 Navy-certified dry dock fits LSD; does not easily fit larger amphibious ships • 1 larger dry dock not certified SRF-JRMC authorized workforce • U.S. military and civilian: 105 • Japanese nationals: 450	Dry-dock capacity • Work generally conducted on base; possible contractor docks available Contractor industrial base • About a dozen smaller Japanese contractors and vendors
		Fleet Forces Area of Responsibility	
Forward Deployed Regional Maintenance Center (FDRMC) Detachment Rota Rota, Spain	4 surface ships • 4 DDG	Navy dry-dock capacity: 0 FDRMC authorized workforce • U.S. military and civilian: 81	Dry-dock capacity • No contractor dry docks used for ships based in Spain Contractor industrial base • One contractor provides depot-level maintenance
FDRMC Detachment Bahrain Manama, Bahrain	14 surface ships[e] • 10 Patrol Coastal (PC) • 4 MCM	Navy dry-dock capacity: 0 FDRMC authorized workforce • U.S. military and civilian: 130 (including 14 direct-hire foreign-national civilian positions)	Dry-dock capacity • 4 contractor docks for PC and MCM based in Bahrain; could accommodate some larger ships Contractor industrial base • Two main contractors provide depot-level maintenance

Source: GAO analysis of Navy information and discussions with Navy officials. | GAO-20-86

[a]In addition to scheduled, depot-level maintenance periods for surface ships based at each location, or homeport, the Navy maintenance centers also support voyage repairs for U.S. Navy ships in their areas of responsibility.

[b]The U.S. civilian and military workforce overseas generally serve program management and oversight functions, not direct maintenance. The Japanese workforce at SRF-JRMC in Yokosuka and Sasebo provide direct maintenance to ships at those locations. Workforce numbers are authorized positions according to Navy documentation as of September 2018. The Navy also supplements its

overseas workforce with Navy or contractor personnel from the United States for specialized assistance as needed.

[c]SRF-JRMC in Yokosuka also provides maintenance support to the aircraft carrier homeported in Yokosuka. We did not include the aircraft carrier in our review because its maintenance occurs under different processes from the surface ships based overseas.

[d]As of September 2019, the Navy had moved the LHD that had been based in Sasebo to be homeported in Norfolk, Virginia, and had assigned an LHA-class amphibious assault ship to Sasebo. In December 2019, the Navy also added another LPD to be homeported in Sasebo. Maintenance for these ships was not included in our review because it was not homeported in Sasebo during the timeframe of our analysis.

[e]The Navy has also homeported an additional ship in Manama, Bahrain—the expeditionary sea base USS *Lewis B. Puller*. This ship was not homeported overseas during the time of our analysis. According to Navy officials, this homeport shift occurred in October 2019, and maintenance and other responsibilities are shared with Military Sealift Command.

U.S. Naval Ship Repair Facility and Japan Regional Maintenance Center (SRF-JRMC), Yokosuka, Japan. The Navy's largest overseas maintenance facility, SRF-JRMC is located in Yokosuka and is responsible for the maintenance of 12 surface ships homeported there—including the most destroyers and the only cruisers based outside of the United States. According to Navy officials, SRF-JRMC in Yokosuka operates as a public shipyard would in the United States, with three on-base dry docks that fit all sizes of ships based there, as well as other smaller dry docks. SRF-JRMC employs a Japanese workforce that conducts the majority of the maintenance workload through a cost-sharing agreement between the United States and Japan.[25] For example, in fiscal year 2018, SRF-JRMC directly conducted about two-thirds of the total ship maintenance workload, with about one-third conducted by local contractors, according to SRF-JRMC workload reporting documentation.[26] For the contracted work, SRF-JRMC relies on one main contractor, Sumitomo Heavy Industries, for ship maintenance in Yokosuka, though

[25]As part of a bilateral agreement between the United States and the Government of Japan to support the U.S. military presence there, the Government of Japan pays for a variety of labor and facility costs for the U.S. military across Japan, including paying for the employment of more than 20,000 Japanese nationals by the U.S. military. This arrangement includes the approximately 2,800 Japanese personnel employed as the organic workforce for the SRF-JRMC in Yokosuka and Sasebo.

[26]The workload information provided by SRF-JRMC for Yokosuka and Sasebo was not disaggregated by type of maintenance, so it includes other work such as modernization, and SRF-JRMC Yokosuka's portion of the maintenance on the aircraft carrier there. According to Navy officials, the maintenance of the aircraft carrier is a substantial part of SRF-JRMC's mission in Yokosuka, Japan, though its maintenance is also supported by a detachment of the Puget Sound Naval Shipyard and Intermediate Maintenance Facility and other temporary personnel from the United States.

additional smaller contractors are also used. Most contracted work also takes place at Navy facilities on base, according to SRF-JRMC officials.

Ships in Yokosuka are able to receive deeper, more complex maintenance than other ships based overseas because of the Navy maintenance capacity at SRF-JRMC, according to NAVSEA officials. SRF-JRMC in Yokosuka also conducts detailed planning for maintenance periods that other regional maintenance centers do not, according to NAVSEA officials. Specifically, it plans all the individual maintenance and repair tasks to be conducted in each maintenance period, while other U.S. and overseas maintenance centers can rely on the contractors to plan the work they do. For additional information on SRF-JRMC in Yokosuka, Japan, see appendix III.

SRF-JRMC Detachment, Sasebo, Japan. The Navy also operates its own shipyard with a Japanese workforce at the SRF-JRMC detachment in Sasebo, though it primarily relies on the local contractor base to conduct maintenance work. In fiscal year 2018, the SRF-JRMC detachment directly conducted about one-third of the total maintenance workload, with nearly two-thirds performed by contractors according to SRF-JRMC workload reporting documentation. For the contracted work, the Navy relies on about 14 smaller contractors, and while the SRF-JRMC detachment coordinates the work of the multiple contractors that may contribute to a single maintenance period, the contractors directly plan and manage their portion of the work, according to Navy officials.

The SRF-JRMC detachment in Sasebo includes two Navy dry docks, though only one is used for depot-level maintenance periods. As a result, dry-dock maintenance and modernization can be conducted on ships based in Sasebo, but it is generally limited to the four MCM and two LSD ships. The other amphibious ships based in Sasebo receive depot-level maintenance that has been planned from about 2 to as long as nearly 9 months, but this does not include dry-dock maintenance. A unique maintenance consideration in Sasebo is the deployment schedule of the amphibious ships based there. These ships typically deploy three at a time with U.S. Marines based in Okinawa on board. As a result, there are times when all ships are in port and require maintenance, so the detachment tries to stagger the work with the MCMs and closely coordinate with contractors there in an effort to manage workload, according to SRF-JRMC officials. For additional information on the SRF-JRMC detachment in Sasebo, Japan, see appendix IV.

Forward Deployed Regional Maintenance Center (FDRMC) Detachment, Rota, Spain. The FDRMC detachment and four destroyers are based in Rota, Spain, where a single state-owned contractor, Navantia, performs all depot-level maintenance on the ships.[27] Beginning in 2014, the Navy deployed four destroyers to Spain to support the U.S. ballistic missile defense mission to the North Atlantic Treaty Organization. The Navy designed the maintenance approach for these ships with the understanding that they would not require access to Navy- or contractor-operated dry docks during the time they are based in Spain, according to Navy officials. The Navy initially expected these destroyers to be in Spain for about 6 years and to receive maintenance every 2 years. However, in 2015 the Navy updated its maintenance strategy for these ships to provide shorter, but more frequent maintenance periods to support a longer time basing them in Spain. Under the updated approach, the Navy plans for each destroyer to receive six maintenance periods during a roughly 8-year time period based in Spain. For additional information on the FDRMC detachment in Rota, Spain, see appendix V.

FDRMC Detachment, Manama, Bahrain. The FDRMC detachment in Bahrain is responsible for the depot-level maintenance of the 10 patrol coastal and 4 mine countermeasures ships based there—the most ships based at an overseas homeport.[28] While the Navy does not operate any dry docks or depot-level repair facilities in Bahrain, it relies on two main contractors, Bahrain Ship Repairing and Engineering Company and Arab Shipbuilding and Repair Yard, to conduct ship maintenance in Bahrain.

The ships in Bahrain receive depot-level maintenance at contractor facilities there. Both contractors in Bahrain have dry docks or similar capacity to fit the MCMs and PCs based there, as well as some larger Navy ships.[29] A unique capacity consideration for ships visiting Bahrain, according to officials there, is that the Navy does not have dedicated pier

[27]Navantia may also perform intermediate-level maintenance during depot-level maintenance periods, according to Navy officials, and the Spanish Navy has an intermediate maintenance facility that can support the U.S. ships as well. FDRMC headquarters in Italy also provides command and control, financial management, and other functions for its detachments in Spain and Bahrain.

[28]The Navy is developing a nascent intermediate maintenance capability at FDRMC Bahrain, according to officials, and FDRMC headquarters in Italy provides command and control, financial management, and other functions for its detachments in Spain and Bahrain.

[29]Navy officials stated that in October 2019 the USS *Lewis B. Puller*, an expeditionary sea base ship, was officially homeported in Bahrain—for a total of 15 ships based there.

space for ships when they come into port. As a result, the Navy must rely on contractor space for maintenance, and on other pier space when visiting ships are at the homeport—which they share with others, such as commercial cruise lines. For additional information on FDRMC detachment in Manama, Bahrain, see appendix VI.

In addition to the depot-level maintenance periods for the surface ships we reviewed, the Navy maintenance centers in Japan, Spain, and Bahrain, also support additional maintenance functions, such as voyage repairs or technical assistance for visiting U.S. ships; coordinating intermediate-level maintenance that may be conducted there; and providing additional maintenance support to overseas ships outside of scheduled depot-level periods.

The Navy Did Not Complete the Majority of Maintenance on Time during Fiscal Years 2014 through 2018 for Ships Based Overseas, and Its Analysis on the Causes of Delays Is Limited

The Navy did not complete the majority of the maintenance periods performed on ships based overseas on time during fiscal years 2014 through 2018. Navy officials identified a variety of factors that contribute to delays, such as the discovery of additional work requirements after maintenance has begun or staff shortages affecting management and oversight of maintenance. The Navy collects information on overseas maintenance at individual homeports, but its analysis of factors contributing to the delays is generally focused on the planning and execution of individual maintenance periods.

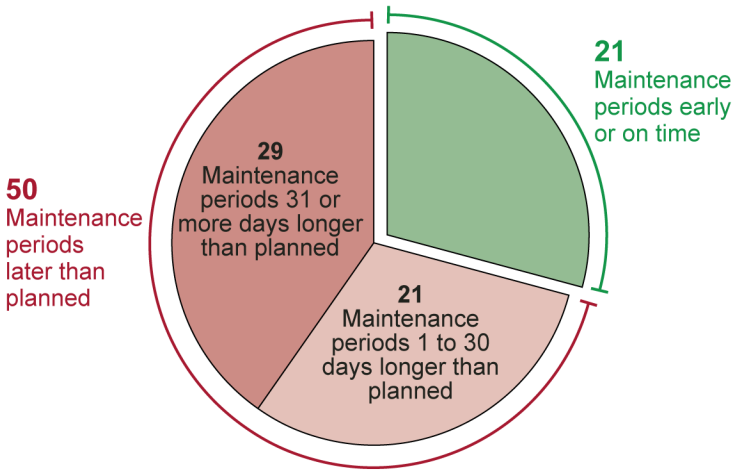
The Navy Underestimated Time Required to Complete the Majority of Maintenance Periods for Ships Based Overseas

The Navy underestimated the time needed to complete maintenance for 50 of the 71 maintenance periods—about 70 percent—started during fiscal years 2014 through 2018.[30] Specifically, 21 maintenance periods ended early or on time and 50 maintenance periods ran beyond their planned schedules, as illustrated in figure 4. More than half of the maintenance periods that were completed late—29 of 50—went 31 or more days beyond the Navy's planned schedule. As a result, from 2014 through 2018 there were 29 times when ships based overseas were

[30]Our analysis of on-time completion of maintenance period schedules included those started during fiscal years 2014 through 2018.

unavailable for operational requirements, certain training, or other purposes for 31 or more unplanned days. During this time period, the Navy completed more maintenance periods a month or more later than planned than it completed early or on time.

Figure 4: 50 of 71 of Overseas Maintenance Periods Started during Fiscal Year 2014 through 2018 Were Completed Later than Planned

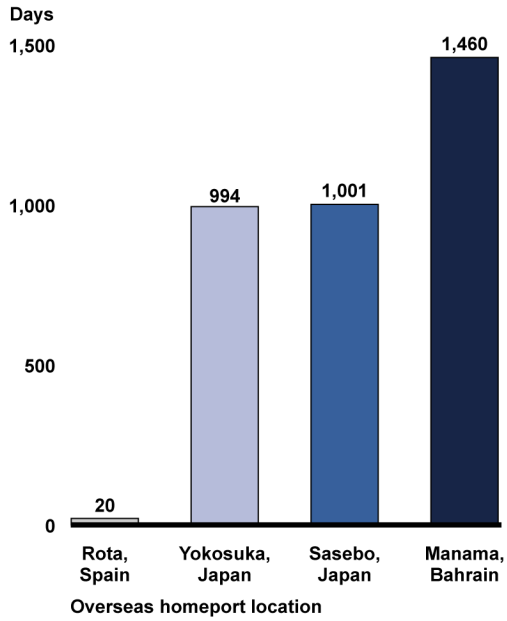


Source: GAO analysis of Navy data. | GAO-20-86

As a result of maintenance schedules not being completed on time, all four overseas Navy homeports with surface ships we analyzed—Yokosuka, Japan; Sasebo, Japan; Rota, Spain; and Manama, Bahrain—experienced a total of 3,475 days ships were in maintenance beyond their expected durations—referred to in this report as days of maintenance delay.[31] As illustrated in figure 5, Manama, Bahrain, experienced the most days of maintenance delay during fiscal years 2014 through 2018, while Rota, Spain, experienced the least.

[31]Previous GAO reports have referred to delayed time as "lost operational days," but we refer to them in this and other recent reports as days of maintenance delay to align with NAVSEA terminology. For example, see GAO, *Navy Maintenance: Persistent and Substantial Ship and Submarine Maintenance Delays Hinder Efforts to Rebuild Readiness*, GAO-20-257T (Washington, D.C.: Dec. 4, 2019); *Navy and Marine Corps: Rebuilding Ship, Submarine, and Aviation Readiness Will Require Time and Sustained Management Attention*, GAO-19-225T (Washington, D.C.: Dec. 12, 2018); *Military Depots: Actions Needed to Improve Poor Conditions of Facilities and Equipment That Affect Maintenance Timeliness and Efficiency*, GAO-19-242 (Washington, D.C.: Apr. 29, 2019); *Naval Shipyards: Actions Needed to Improve Poor Conditions that Affect Operations*, GAO-17-548 (Washington, D.C.: Sept. 12, 2017); and GAO-16-466R.

Figure 5: Total Number of Days the Navy Experienced Surface Ship Maintenance Delays at Overseas Homeports, Fiscal Years 2014 through 2018

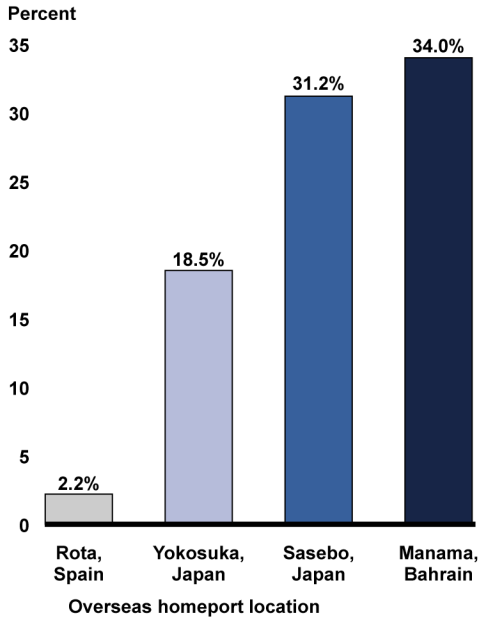


Source: GAO analysis of Navy data. | GAO-20-86

Note: A homeport is where a ship is based.

We also analyzed delays at overseas homeports by calculating the days of delay experienced as a percentage of its total workload in terms of total days of maintenance conducted. Using this analysis, we found that ships in Bahrain experienced the highest rate of delay at 34 percent while ships based in Rota, Spain, experienced only a 2.2 percent rate of delay (as illustrated in figure 6).

Figure 6: Navy Surface Ship Maintenance Delay Rates at Overseas Homeports, Fiscal Years 2014 through 2018



Source: GAO analysis of Navy data. | GAO-20-86

Note: A homeport is where a ship is based. For each homeport, we calculated maintenance delay rates as the percentage of the number of days maintenance was delayed divided by the total number of calendar days maintenance was conducted. We allocated the days of delay and the total number of days maintenance was conducted to the fiscal years in which they occurred.

Taking workload into account illustrates some difference in the rate at which each of these homeports experiences ship maintenance delays. For example, ships in Sasebo and Yokosuka experienced a similar total number of days ship maintenance was delayed—1,001 days and 994 days over the 5-year time period, respectively. However, when port workload is taken into account, Sasebo's rate of delay is higher. Specifically, ships based in Sasebo experienced a maintenance delay rate of 31.2 percent compared with 18.5 percent of the time for the surface ships in Yokosuka.

Various Factors Contribute to Maintenance Delays for Ships Based Overseas

According to Navy maintenance center officials and crewmembers from the ships we visited, and our analysis of Navy information, a number of interrelated factors and issues contribute to maintenance delays for the surface ships based overseas including:

Discovery of additional, unplanned work after maintenance is underway. According to maintenance officials in Bahrain and Japan, the

discovery of the need for additional maintenance and repair work after the work planned for the maintenance period has been finalized is a key driver of maintenance delays. This additional work can be in the form of growth in the magnitude of planned work, or identification of the need for new work that was not previously planned. For example, maintenance officials in Japan attributed maintenance delays they experienced on ships at both Yokosuka and Sasebo during fiscal years 2016 through 2018 to this growth in planned work or new work. Similarly, officials in Bahrain said that growth and new work is one of many contributing factors to maintenance delays for the aging MCMs and PCs based there. For example, officials from Commander, Naval Surface Squadron Five that track their ships' depot maintenance identified that additional work to stern tubes on the USS *Squall,* which is homeported in Bahrain, resulted in the ship's maintenance schedule being extended by 137 days. Navy officials also stated that the reason growth and new work is such a key driver of delays is that it can add further delays beyond that needed to complete the repair, due to time required for additional contract actions and ordering parts that are needed to conduct the added work.[32] A number of factors can cause or further exacerbate growth and new work, according to Navy officials. For example, the Navy has made efforts to catch up on backlogs of deferred maintenance and improve the health and condition of the ship, so the Navy may decide to extend the maintenance period to ensure all identified maintenance has been completed rather than deferring it to a subsequent maintenance period. Additionally, officials pointed to ships' complex propulsion, communication, and weapons systems that have complicated maintenance and modernization requirements that cannot always be fully anticipated.[33]

Missing or late maintenance planning milestones. The *Joint Fleet Maintenance Manual* emphasizes the importance of meeting planning milestones to identify, estimate, and schedule the work to be done in the

[32]We reported in May 2016 on the effect of growth and new work on ship maintenance in the United States. We found that on average from 2011 to 2014, the surface ships analyzed experienced a 34 percent increase in unplanned maintenance requirements, resulting in average annual cost increases of $164.8 million. See GAO-16-466R.

[33]In addition to unplanned maintenance during ships' individual maintenance periods, unscheduled emergency maintenance may affect timely completion of other ships' maintenance schedules. For example, Navy officials stated that the USS *Fitzgerald* and USS *John S. McCain* collisions in the second half of fiscal year 2017, as well as the incident with the USS *Antietam* earlier in 2017, caused some capacity, personnel, and other resources from SRF-JRMC to be reprioritized to assist those ships in salvage and repair efforts.

maintenance period. These milestones include steps to guide advanced planning of initial maintenance requirements and schedules, and to further refine and develop the work, cost, and schedule estimates for each maintenance period. For example, these milestones include assessments of the ship's condition and other ship checks to identify and validate planned work intended to minimize growth and new work; to identify and mitigate risks to planned schedules; and to provide deadlines for developing and awarding contracts to do the work. Adherence to these planning milestones becomes more critical as the planned start of the maintenance period approaches to ensure work can be contracted and begun on time. The final contract is awarded about 2 months prior to work beginning, and the Navy finalizes the planned duration and schedule of the maintenance period about a month before maintenance is scheduled to begin.[34]

According to Navy officials, missing or late planning milestones can contribute to maintenance delays. For example, NAVSEA and overseas maintenance officials emphasized that getting on board a ship at various points in the planning process to assess the ship's condition and validate planned work is critical to developing accurate work scope, cost estimates, and schedules—otherwise, growth and new work or other issues can emerge once maintenance is underway. According to the *Joint Fleet Maintenance Manual,* ship checks are needed to inform specific planning milestones, to validate planned work, and should be done as early in the planning process as possible.[35] The Navy requires this validation to ensure needed maintenance work is sufficiently defined, problems are accurately diagnosed, and feasible resolutions are recommended. However, even though ship condition assessments are important milestones to limit growth and new work, NAVSEA officials part of Surface Team One said that these assessments and other checks are

[34]In August 2019 the Navy adjusted certain contracting milestones for ship maintenance in the United States based on a contract-award milestone of 120 days prior to planned maintenance start to provide more time to help ensure parts are available for the planned maintenance. These adjusted milestones do not specifically apply to ships based overseas, and were not incorporated in the October 2019 revision D of the *Joint Fleet Maintenance Manual*, which still gives contract award at 60 days, or about 2 months prior to the planned start of maintenance. The Navy plans to update these milestones in subsequent revisions to the manual.

[35]The Navy further defined the requirements for ship checks in the October 2019 revision D to the *Joint Fleet Maintenance Manual*, updating the October 2018 revision we reviewed. The Navy now requires these ship checks to occur no later than 210 days prior to the start of planned maintenance. See Commander, U.S. Fleet Forces Command Instruction 4790.3, *Joint Fleet Maintenance Manual* (Oct. 16, 2019) (incorporating revision D).

regularly postponed, which can prevent work from being identified with sufficient time to plan for it. Similarly, maintenance officials in Japan said that, due to the operational tempo in Yokosuka and Sasebo, ships are often not available for required ship checks until the ship arrives in port at the start of its maintenance period.

Though officials could not provide the frequency that such milestones are missed, they said missing assessments and other milestones can contribute to schedule delays and result in maintenance periods exceeding planned resources. For example, the Naval Inspector General found that the shortage of personnel at the FDRMC and Fleet Logistics Center in Bahrain resulted in contracting milestones being routinely missed for ships based there, and once these ships were in maintenance, the growth in work to be completed grew by an average of $830,000 for maintenance periods in fiscal years 2017 and 2018.[36]

Shortages of experienced and skilled personnel for planning, management, and oversight. According to NAVSEA and overseas maintenance center officials, shortages of U.S. personnel that perform maintenance planning, contracting, and oversight roles, particularly staff with critical skills and experience, can affect ship maintenance and contribute to delays. For example:

- *Personnel shortages hinder staffing of project teams.* FDRMC Bahrain officials said that due to personnel shortages, they are often unable to assign staff to the project teams until the maintenance period starts. According to the *Joint Fleet Maintenance Manual,* a project team is assigned to manage an individual maintenance period, and is composed of personnel with specific skills and responsibilities.[37] Additionally, according to CNRMC Instruction 4790.4B, the project team is responsible for key maintenance planning and execution activities and related milestones from as early as a year before the maintenance begins.[38] CNRMC Instruction 4790.4B also states that such maintenance planning milestones are to aid in developing project plans, identifying and mitigating risks, and tracking progress of

[36]Naval Inspector General, *Area Assessment of Naval Activities in Bahrain* (Washington, D.C.: Apr. 26, 2019).

[37]Commander, U.S. Fleet Forces Command Instruction 4790.3, *Joint Fleet Maintenance Manua*l (Oct. 5, 2018) (incorporating revision C, change 7).

[38]Commander, Navy Regional Maintenance Center Instruction 4790.4B, *Integrated Project Team Development (IPTD) Program* (Sept. 24, 2015).

planning. Project teams are also responsible for overseeing contracted maintenance work and ensuring it meets quality standards. For example, prior to the start of the maintenance period, project teams are responsible for identifying and mitigating risks to completing maintenance within the planned schedule and budget. However, officials in Bahrain stated that as a result of persistent staffing shortages, they have been unable to staff these project teams until the maintenance period begins, and have also been unable to provide sufficient oversight of the contractors' performance during the maintenance period, which has resulted in maintenance delays.[39]

- *Shortages of personnel with relevant experience affect management and oversight of maintenance.* Officials in Japan and Bahrain stated that insufficient numbers of personnel with ship maintenance experience can negatively affect maintenance timeliness. For example, the Fleet Logistics Center in Bahrain—which manages the contracting process for ships based there—had only eight of 18 authorized U.S. civilian contracting-related positions filled, as of March 2019, according to officials. Additionally, of the filled positions, only one contracting officer had prior experience with ship maintenance contracting, according to Fleet Logistics Center officials.[40] Officials in Japan said that experience levels of U.S. civilians at SRF-JRMC have decreased as a result of high turnover in recent years with the average amount of work experience for U.S. civilians managing ship

[39]The U.S. military faces maintenance staffing challenges and shortages across the military services, including the Navy. For example, in December 2018 we reported that DOD depots identified a variety of workforce challenges, such as hiring personnel in a timely manner and shortages in experienced personnel, which DOD officials identified as contributing to delays in the maintenance of some weapons systems. We recommended and the department agreed that the military services, including the Navy, assess the effectiveness of actions they have taken to maintain critical skills at the military depots. See GAO, *DOD Depot Workforce: Services Need to Assess the Effectiveness of Their Initiatives to Maintain Critical Skills,* GAO-19-51 (Washington, D.C.: Dec. 14, 2018).

[40]In commenting on a draft of this report in January 2020, Fleet Logistics Center Bahrain officials stated that since March 2019, aggressive recruitment efforts have resulted in 17 of the 18 positions being filled.

maintenance in Sasebo declining from over 5 years in 2014 to 3 years in 2017.[41]

- *Staff shortages on ships affect crews' ability to conduct maintenance.* Navy officials also emphasized the importance of ship crews in identifying and providing needed maintenance work, but noted that ship crew shortages negatively affect on-board ship maintenance. This can increase the amount of work required during depot-level maintenance periods. In May 2017, we reported that reduced crew sizes contributed to maintenance being deferred and increased maintenance costs, and Navy officials and ships' crews we spoke to in Japan and Bahrain stated that ships there continue to experience manning shortages.[42] For example, from September 2018 through February 2019, nearly 30 personnel from Bahrain-based Navy organizations were temporarily assigned to ships based in Bahrain to fill manning shortages, according to Navy officials and information, including for maintenance-specific positions.

According to maintenance officials overseas and in the United States, other factors also can add to the complexity of maintenance planning and contribute to delays including the length of time it takes to obtain spare parts overseas, availability of obsolete parts, and other challenges associated with maintaining aging ships, such as the MCMs and PCs, which are at or beyond their original service lives.

[41]NAVSEA and overseas maintenance officials attributed turnover at overseas maintenance centers and other staffing challenges to a number of U.S. government policies that pertain to overseas personnel. NAVSEA officials said that while the Navy faces shortages of critical skills and experience Navy-wide, overseas locations are particularly affected by such policies. For example, DOD Instruction 1400.25, Vol. 1230 limits the length of time U.S. civilians may be employed overseas, and NAVSEA officials stated that other policies limiting financial allowances for employees moving or living overseas may be disincentives for employment there. Department of Defense Instruction 1400.25, Vol. 1230, *DOD Civilian Personnel Management System: Employment in Foreign Areas and Employee Return Rights* (July 26, 2012). We did not analyze the extent to which these policies affect the ship maintenance workforce overseas, but our past work has reviewed certain overseas allowance and relocation policies, as well as other personnel shortages. For more information on our past work, see our Related GAO Products page.

[42]GAO, *Navy Force Structure: Actions Needed to Ensure Proper Size and Composition of Ship Crews*, GAO-17-413 (Washington, D.C.: May 18, 2017).

The Navy Collects Information on Overseas Maintenance at Individual Homeports, but Its Analysis of Factors Contributing to the Delays Is Limited

The Navy uses a number of mechanisms to monitor the planning and execution of individual maintenance periods to track progress and mitigate possible risks. According to Navy documentation and officials, these mechanisms include:

- **Individual homeports identify technical reasons for delays on individual maintenance periods.** Maintenance centers overseas and in the United States monitor the planning and progress of individual maintenance periods. SRF-JRMC officials in Yokosuka, Japan, monitor ongoing and recently completed maintenance periods and may identify technical causes for ship delays. For example, new work was identified on the main reduction gear of the USS *Barry* that was not in the planned work package and led to delays, according to officials. Additionally, Commander, Naval Surface Squadron Five in Bahrain tracks instances of growth and new work during the depot-level maintenance periods for the PCs and MCMs based there, including tracking the specific number of delayed days attributed to certain issues.
- **NAVSEA conducts regular meetings to report status of upcoming and ongoing maintenance.** NAVSEA collects information on and monitors the progress of individual maintenance periods, including at overseas homeports, through a variety of regular meetings and briefings. For example, NAVSEA 04 and CNRMC each conduct biweekly meetings with their respective maintenance centers to monitor advanced planning of upcoming maintenance periods and the progress of ongoing maintenance periods for the ships under their responsibilities, according to officials. Information shared during these briefings can include tracking whether certain planning milestones are met and identifying risks to the on-time completion of individual ships' maintenance periods. This information is then compiled into monthly briefings to the NAVSEA commander providing a snapshot of upcoming and ongoing maintenance periods and seeking approval for adjustments, according to officials.
- **Collecting and sharing lessons learned throughout the planning process.** According to the Navy's maintenance manual and related guidance, the collection and sharing of lessons learned from individual maintenance periods is to be part of certain planning milestones, including to inform the maintenance schedule and work estimates. For example, CNRMC Instruction 4790.4B directs that maintenance completion conferences with relevant stakeholders are to provide a detailed review of the maintenance period, including lessons learned that can be used to plan future maintenance periods, such as to

revise specific work items. According to CNRMC and NAVSEA 04 officials, lessons learned are collected at the end of each maintenance period and can be shared with other project teams. The *Joint Fleet Maintenance Manual* also states that while the lessons learned process is owned by the type commanders—for surface ships, these are Commander, Naval Surface Force, U.S. Pacific Fleet for ships in Japan and the western United States, or Commander, Naval Surface Force, U.S. Atlantic Fleet, for ships in Spain, Bahrain, and the eastern United States—the lessons learned process is part of the Surface Team One structure. However, Surface Team One officials noted that each of the milestones that include them is led by other Navy organizations, and its role in the lessons learned process is managed by a part-time contracted position.

- **CNRMC tracks overall days of maintenance delay by fiscal year.** CNRMC tracks and monitors the overall number of days individual ship maintenance periods are delayed and can perform analysis of overall delays, such as the number of days experienced by ship class and fiscal year. Additionally, CNRMC analysis has also identified specific ships that experience the longest delays, though it did not regularly include maintenance periods in Japan until 2018, according to officials.
- **CNRMC tracks costs associated with growth and new work for individual maintenance periods.** CNRMC tracks the costs associated with growth and new work discovered during maintenance periods by the regional maintenance centers it manages, including at overseas detachments in Bahrain and Spain. The costs that are tracked do not include information on any related delays, however, and do not include these costs for the ships in Japan.
- **Other recent Navy efforts have begun to examine issues related to delays.** According to Navy officials, several Navy entities are beginning efforts to improve the execution of surface ship maintenance. For example, in fiscal year 2019 the Navy began a broad effort to improve Navy surface ship, submarine, and aviation readiness, as well as public shipyards. This effort, called Performance to Plan, designates Commander, Naval Surface Forces, and Commander, NAVSEA, to improve performance of ship maintenance in private and public shipyards. According to Navy officials, the effort to improve surface ship maintenance consists of a pilot program examining how to better execute maintenance periods for destroyers, improve forecasts of maintenance period duration and assessments of ship condition, planning for growth and new work, and adherence to planning milestones. However, officials said this effort is still in the

early stage and does not specifically assess maintenance delays for ships based overseas. NAVSEA's SURFMEPP and Surface Team One also have recently begun related efforts. For example, SURFMEPP officials said they recently began an effort to examine and correct causes of growth and new work by analyzing changes to contracts or work items that result in more than $100,000 of additional cost. However, while officials said in July 2019 that this effort has been underway for about 9 months, they could not provide additional information on how it relates to delays. According to NAVSEA officials that co-chair Surface Team One, it has begun an effort to improve how adherence to key planning milestones is tracked across surface ship maintenance periods. To support this effort, in October 2018 the Navy updated the *Joint Fleet Maintenance Manual* to include additional requirements for meeting maintenance milestones and to document any changes, including reasons for those changes.[43] However, according to officials, these efforts are in their early stages, and the Navy has not used the information to analyze maintenance delays for overseas ships.

Although a number of different Navy entities conduct a variety of activities through which information on maintenance delays is collected and analyzed, these efforts are limited as the existing analysis is not comprehensive and systematic in nature. Specifically, the Navy has not positioned itself well to address the factors contributing to the maintenance delays because it has not (1) designated an individual entity responsible for conducting a single, comprehensive systematic analysis of overseas surface ship maintenance delays; and (2) developed a plan based on that analysis to address these delays.

First, this is in part because the responsibilities for managing surface ship maintenance overseas is shared among NAVSEA 21, CNRMC, and NAVSEA 04, which use somewhat different processes for their work, according to officials. For example, NAVSEA 04 has responsibility for the maintenance of aircraft carriers and submarines at naval shipyards, while CNRMC focuses on surface ships. In addition, until SRF-JRMC was brought under control of NAVSEA in October 2018, CNRMC was not regularly including maintenance periods in Japan as part of its tracking and monitoring of days of maintenance delay. According to officials, an operating instruction to align roles, responsibilities, and processes for surface ship maintenance in Japan between CNRMC and NAVSEA 04 is

[43]Commander, U.S. Fleet Forces Command Instruction 4790.3, *Joint Fleet Maintenance Manual* (Oct. 5, 2018) (incorporating revision C, change 7).

being developed, but as of September 2019, this instruction had not yet been finalized. Further, CNRMC and NAVSEA 04 officials pointed to NAVSEA 21 or Surface Team One as more appropriate entities to conduct a comprehensive systematic analysis of ship maintenance delays given their broad, enterprise-wide roles for managing and improving surface ship maintenance.

Surface Team One officials said that it could be an appropriate entity to conduct such analysis, and according to its charter, one of the entity's purposes is to measure performance of the planning and execution of surface ship maintenance periods and to manage and improve schedule, cost, and quality. However, officials said they have not conducted such a systematic analysis of maintenance period performance or developed a comprehensive plan to address them, in part due to inconsistent organizational leadership and personnel turnover. According to officials, since its founding in 2009, Surface Team One has been re-chartered twice and is in the process of further reorganizing under a fourth version of its charter. Part of the reason for this reorganization, according to officials, is to resource and structure Surface Team One to conduct more systematic, enterprise-wide analyses of issues affecting surface ship maintenance, for which they hope to develop a plan by the end of 2019. However, officials said these efforts did not specifically include analysis of maintenance delays for ships based overseas. Additionally, while Navy officials said that Performance to Plan efforts could help inform overseas maintenance delays, this effort is in the early stages of a pilot effort looking only at destroyer maintenance, and does not specifically analyze maintenance delays for ships based overseas.

Second, as a result of there being no single, comprehensive analysis of overseas surface ship maintenance delays, there is no plan for the Navy to improve the timeliness of its maintenance in a holistic way. Instead, individual organizations and maintenance centers have identified improvements for individual ships' maintenance or have undertaken efforts to address certain contributing factors to delays. While these efforts are important, given the interrelated challenges related to maintenance across the Navy, and that the Navy is dependent upon synchronized and timely maintenance to provide ships for operations to meet national security needs, the Navy would benefit from a plan of action that was comprehensive in nature.

Standards for Internal Control in the Federal Government state that management should assign responsibility to achieve objectives and remediate deficiencies; compare actual performance against planned

performance; and evaluate deficiencies on both an individual basis and in the aggregate.[44] Further, OMB Circular No. A-123, *Management's Responsibility for Enterprise Risk Management and Internal Control,* emphasizes that when developing corrective actions, agencies should perform a root-cause analysis of the deficiency and ensure that subsequent strategies and plans address the root of the problem and not just the symptoms.[45] Additionally, our past work on results-oriented management cites a number of key practices that can strengthen the use of performance information for process improvements. These practices include aligning agency-wide goals and measures, and building analytic capacity to use the information. Our past work has further shown this information should then be incorporated into improvement plans that include identifying analytically based goals; results-oriented metrics to measure progress; required resources, risks, and stakeholders to achieve those goals; and regularly reporting on progress.[46]

While several different Navy entities have a variety of efforts underway related to issues associated with ship maintenance delays, without designating an entity to conduct a comprehensive, systematic analysis to identify and understand the underlying causes maintenance periods grow beyond planned schedules, the Navy risks continuing to underestimate maintenance needs and the time and resources required to address them. Further, without conducting such an analysis to understand the underlying, interrelated causes of these delays, and incorporating this analysis into a comprehensive results-oriented plan to address them, the Navy cannot effectively target corrective actions to improve timely completion of ship maintenance to ensure ships are available for the critical training crews need and operations to support U.S. military and national security goals.

[44]GAO-14-704G.

[45]OMB Circular A-123 (July 15, 2016).

[46]GAO-19-242; GAO, *Managing For Results, Data-Driven Performance Reviews Show Promise But Agencies Should Explore How to Involve Other Relevant Agencies*, GAO-13-228 (Washington, D.C.: Feb. 27, 2013); GAO, *Government Performance: Strategies for Building a Results-Oriented and Collaborative Culture in the Federal Government*, GAO-09-1011T (Washington, D.C.: Sept. 24, 2009).

Navy Has Not Assessed and Mitigated Risks That Challenges Pose to Implementing Its New Maintenance Approach or Included Overseas Maintenance in Its Plans to Grow Fleet

The Navy is in the process of updating the maintenance approach for cruisers, destroyers, and amphibious ships based in Japan, but it has not assessed and mitigated risks that several challenges may pose to its successful implementation. Additionally, the Navy has not included assessments of overseas maintenance requirements in its long-range plans to support fleet growth to 355 ships.

The Navy Has Developed a New Maintenance Approach for Surface Ships in Japan Based on the Approach Used in Spain

The Navy has developed a new maintenance approach for the cruisers and destroyers in Yokosuka and the amphibious ships in Sasebo based on the approach developed for destroyers in Spain. Specifically, the Navy developed a new maintenance approach for the four destroyers it began to deploy to Rota, Spain, in 2014 and 2015 that includes generally shorter, but more frequent, maintenance periods. According to maintenance center and other Navy officials, the Navy developed this approach to avoid conducting dry-dock maintenance overseas so that the Navy could maximize the time the ships were available for operations.

According to officials, the Navy tailored this approach to the specific ships, mission, and maintenance resources available in Rota. For example, the four destroyers in Rota conduct patrols two ships at a time with predictable patrol schedules. With such specific operational and maintenance schedules officials said there is little margin for changes, and adjustments or delays could affect the ships' operational availability to support their ballistic missile defense mission. Under this approach, the Navy completed the majority of its maintenance on these four ships during fiscal years 2014 through 2018 on time—with only 20 total days of maintenance delay, equating to a relatively low overall delay rate of 2.2 percent.

Navy officials said that the new maintenance approach in Rota has been successful because the Navy:

- selected four ships with a high degree of commonality; for example, the ships were of similar age, systems, and equipment configuration, which helped facilitate planning for and conducting maintenance;
- ensured the ships received all needed maintenance and modernization before being sent to Spain, and arrived from the United States in good condition, which reduced the likelihood that they would require unexpected maintenance while overseas;
- designed the maintenance center and its staffing around the maintenance approach for the four destroyers; and
- coordinated with the contractor in Spain to ensure it had sufficient workforce and resources, including capacity to surge resources if additional work is discovered so that it can be completed on time.

Based on the performance of the maintenance approach for destroyers in Spain, officials stated that the Navy began to develop a similar approach in 2016 for its ships in Japan. NAVSEA officials identified that shorter, more frequent maintenance could help ensure that its ships based in Japan received the maintenance they need, while also meeting their high operational demands. The Navy finalized a new maintenance approach for cruisers and destroyers in Yokosuka in December 2018, and was in the process of finalizing the maintenance concept for the amphibious ships in Sasebo, according to NAVSEA officials in June 2019. For example, like in Spain, the Navy has adjusted the schedules for the planned periods in Yokosuka to be shorter, but more frequent. Planning documents show that under the new approach for the destroyers in Yokosuka, the Navy plans to provide them with eight maintenance periods over approximately 8 years overseas before rotating the ships back to the United States. Previously, the Navy planned for destroyers in Japan to receive eight maintenance periods over an estimated span of over 16 years overseas under the prior approach. Under the new approach, the surface ships in Japan are expected to receive all required maintenance, including completing most or all backlogged maintenance according to officials, in the United States before relocating the ships to Japan. Additionally, while officials expect ships in Yokosuka to receive some dry-dock maintenance during their rotation overseas, the amphibious ships in Sasebo generally will not—similar to the arrangement for destroyers in Spain. As a result, the new maintenance approach expects that ships in Sasebo will accrue maintenance backlogs that must be resolved upon return to the United States.

Several Challenges Pose Risks to Successful Implementation of New Maintenance Approaches Overseas

The Navy has decided to apply its new maintenance approach for cruisers, destroyers, and amphibious ships in Japan and in 2018 began initial implementation on certain ships already based there, but a number of challenges may pose risks to successful implementation of the strategy. Based on information from planning documents and officials, successful implementation relies on several planning assumptions that may be optimistic when compared to actual experience maintaining surface ships overseas and in the United States. Specifically, the new approach in Japan assumes that:

- Ships will receive robust, deep maintenance and modernization in the U.S. and meet their life-cycle health requirements prior to overseas assignment.[47]
- Ships will receive and complete planned maintenance on time while overseas to maximize operational availability.
- Ships will rotate back to receive full maintenance in the United States after no longer than 9 years of overseas assignment.

However, Navy officials and our analysis identified several challenges: (1) U.S. industrial base maintenance capacity limitations, (2) maintenance delays in the United States and overseas, (3) the ability of the overseas contractor industrial base to support future workload in Japan, and (4) differences in the operating environments between Spain and Japan. These challenges, which are discussed below in more detail, could pose risks to the successful implementation of the new maintenance approach.

U.S. industrial base maintenance capacity limitations. Implementing the new maintenance approach in Japan assumes that the ships identified for deployment will receive all required maintenance and modernization in the United States prior to being based overseas. However, the Navy has been challenged to do this in the past due to limited domestic maintenance capacity. For example, the Navy deferred maintenance assessments of the condition of the USS *Barry* and USS *Milius* that were to take place in the United States before moving the ships to Japan. As a result, Navy officials said these assessments had to be done in Japan. Additionally, upon arriving in Japan in November 2017, the USS *Barry* had to begin immediate unscheduled maintenance to

[47]The Navy measures the technical health and material condition of its surface ships to determine if they have met certain maintenance requirements and other measures, such as if dry-docking maintenance requirements have been met.

correct various issues, and as of our visit in February 2019, was still undergoing maintenance.[48] According to U.S. Pacific Fleet and maintenance center officials, in fiscal year 2014 the USS *Curtis Wilbur* received modernization in Japan due to lack of capacity in the United States.

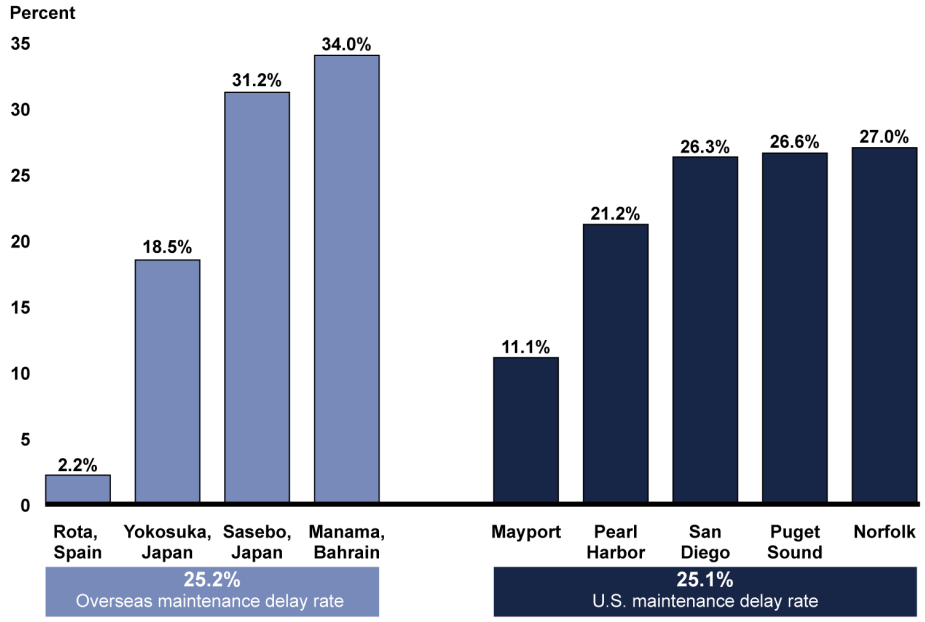
Further, Navy planning documents identified U.S. commercial dry-dock capacity shortfalls that may hinder the Navy's ability to support the future maintenance workload in the United States. For example, the Navy's *Long-Range Plan for the Maintenance and Modernization of Naval Vessels for Fiscal Year 2020* identified limited U.S. dry-dock capacity in the United States as posing a significant challenge to maintenance of U.S.-homeported ships and that this situation reduces the margin for schedule changes. According to the Navy's analysis, demand for surface ship maintenance in the United States will exceed available maintenance resources for fiscal years 2019 through 2026. During this time, the Navy will be rotating ships based in the United States to exchange with those currently based in Japan and Spain. Navy officials said the capacity shortfall in the United States negatively affects ship condition and maintenance of ships sent to Japan. However, the Navy's analysis does not account for the need to perform deep maintenance and modernization on ships in the United States before and after sending them to overseas homeports, as required by the new maintenance approach for ships bound for Japan, as well as Spain.

Maintenance delays in the United States and overseas. Maintenance delays at both U.S. and overseas homeports may also affect the Navy's implementation of its new maintenance approach. Successful implementation of the new approach depends in part on ships receiving all required maintenance on time prior to moving overseas, as well as receiving timely maintenance during their time based abroad. Our analysis of Navy surface ship maintenance periods that started in fiscal years 2014 through 2018 found that about 60 percent of maintenance periods in the United States ran 31 or more days beyond schedule. Additionally, our analysis shows that ships homeported at both U.S. and overseas locations experienced an average rate of delay of about 25

[48]As of the most recent data received from the Navy, as of April 2019, the USS *Barry* was expected to experience over 200 days of maintenance delay. The USS *Barry*'s maintenance period ended on June 11, 2019.

percent (see fig. 7).[49] Additionally, rates of delay in Sasebo, where the Navy plans to implement one of its new maintenance approaches, exceed 30 percent.

Figure 7: Navy Surface Ship Maintenance Delay Rates at Overseas and U.S. Locations, Fiscal Years 2014 through 2018



Source: GAO analysis of Navy data. | GAO-20-86

Note: We calculated maintenance delay rates as the percentage of the number of days maintenance was delayed divided by the total number of days maintenance was conducted at each location. We allocated the days of delay and the total number of days maintenance was conducted to the fiscal years in which they occurred.

According to Navy officials, the new maintenance approach for ships in Japan is intended to provide more frequent maintenance periods, in an effort to improve ship maintenance and to maximize ships' availability for operations. However, the approach also relies on most of these maintenance periods being shorter—and being completed on time. Given the Navy's history of persistent maintenance delays in Japan, this could be a challenge. Further, Navy officials said that maintenance delays experienced in the United States could also affect the maintenance that

[49]Our analysis examined the rate of maintenance delay—i.e., the rate at which each location experienced ship maintenance delays as a percentage of total maintenance—from fiscal years 2014 through 2018 at each U.S. and overseas location where surface ships are based.

ships bound for and returning from overseas homeports may receive, and pose a risk that maintenance will be deferred to overseas homeports.

Challenges with overseas contractor industrial base meeting future workload in Japan. Navy maintenance officials in Spain said that successful implementation of the new maintenance approach there relied on sufficient contractor capacity overseas, and that the Navy involved the contractor in the development of the maintenance approach to ensure they could implement it.

In contrast, Navy officials in Japan stated that current contractor capacity may not meet expected future workload. For example, Navy documentation shows that contractors performed almost two-thirds of ship maintenance in Sasebo in fiscal year 2018. Additionally, the documentation shows that maintenance planned for fiscal year 2020 is expected to increase beyond existing Navy and contractor capacity. Maintenance in Sasebo relies on a number of smaller contractors, and these contractors have experienced challenges planning for the unpredictable maintenance workload there, according to officials. Specifically, the amphibious ships based in Sasebo typically deploy as a group of three.[50] As a result, Navy officials said the workload in Sasebo can be uneven. When all three ships return to port, they require maintenance at the same time. The Navy found that contractors have difficulty planning for this uneven workload, among other issues, which can deter contractors from bidding on work. For example, in fiscal year 2015, the Navy found that they were unable to award over 25 percent of work planned for contractors in Sasebo because no contractor bid on the work. The Navy plans to add a fifth amphibious ship in Sasebo in fiscal year 2020, in part to provide a more stable workload there, according to officials. The Navy expects the additional ship will also result in a forecasted increase in overall maintenance workload there.

Navy officials also expressed concerns about the continuity of the existing industrial base in Yokosuka to be able to support future Navy needs. According to Navy documentation, in fiscal year 2018, about one-third of ship maintenance in Yokosuka was conducted by contractors, and, according to officials, the Navy relied on one main contractor to conduct much of this work. However, Navy maintenance center officials in Japan stated they have concerns about the continuity of the contractor to

[50]According to Navy officials, ships deploy in groups of three to meet the operational requirements of the embarked Marines.

support this workload. The Navy has begun efforts to consider conducting maintenance at contractor facilities outside the ships' homeports of Yokosuka and Sasebo. Specifically, the Navy has begun to consider using contractor facilities located outside the Yokosuka area, as far as 2 hours away from where the ships are currently based. For example, Navy officials told us that they conducted market research and outreach to potential contractors, and have awarded a small contract for a short continuous maintenance period to a new contractor about 30 minutes outside the Yokosuka area. However, maintenance and contracting officials stated these efforts face their own challenges. For example, conducting weeks or months of maintenance on a ship as far as 2 hours outside a ship's homeport—where crews and families live—could require additional travel, housing, and other costs. Additionally, maintenance and contracting officials in Yokosuka stated that the substantial regulatory, legal, and Navy requirements that private companies must adopt to contract with the U.S. government might serve as disincentives for prospective Japanese contractors, and developing these contractors will take time.

Differences in the operating environments in Japan and Spain. According to NAVSEA officials, the decision to apply the approach in Japan was based on its timely performance in Spain, but the ships, missions, and operating environment in Yokosuka and Sasebo differ substantially from the environment in Spain. For example:

- *Greater diversity and number of ships in Japan.* Navy officials told us that the four destroyers sent to Rota in 2014 and 2015 were specifically chosen with similar age, configuration, and condition, which made it easier to sustain the maintenance approach, since issues and lessons from one ship could be easily applied to the next. The ships in Japan in fiscal year 2019 consisted of a more diverse set of ships—eight destroyers and three cruisers in Yokosuka, and various classes of amphibious ships in Sasebo. According to officials, these ships are of different configurations and capabilities.
- *Greater workload and staffing challenges in Japan.* Navy officials have attributed the persistent maintenance delays experienced in Japan to insufficient U.S. maintenance prior to deployment, insufficient estimation of the maintenance work package, missed planning milestones, staffing challenges, and other causes, that are not currently being experienced in Rota.
- *Less predictability in operational tempo in Japan.* According to Navy officials in Rota, the four ships based there have the same mission,

regular and predictable patrol schedules, and do not go above Navy deployment limits. Additionally, officials said the patrol schedules allow for some additional maintenance to be conducted when ships are in port, if needed. As a result, Navy officials in Rota said that they are able to meet key maintenance planning milestones such as conducting ship checks and other assessments.

In Japan, however, Navy officials and operational commanders described operational tempo as more unpredictable, and that ships can be unavailable due to the operational demands of the varied missions with different timeframes for ships in Seventh Fleet's area of responsibility. For example, according to Seventh Fleet officials, the cruisers and destroyers in Yokosuka are expected to serve a number of different missions, including conducting patrols around Japan or Guam; providing ship presence in the East China Sea; or escorting the carrier as part of the strike group. Additionally, according to Navy officials, operational tempo in Japan continues to be high, and in 2015 we reported that to meet increasing demands overseas, the Navy has extended deployments and increased operational tempo.[51]

Standards for Internal Control in the Federal Government state that it is a key responsibility of management to analyze and respond to identified changes and related risks, and to monitor program effectiveness. These standards also note that changing conditions often result in new risks or changes to existing risks that need to be assessed.[52] Additionally, the April 2011 *DOD Product Support Business Case Analysis Guidebook* further states that each risk should be reviewed and assessed, and that effective mitigation plans may involve making tradeoffs in capabilities, schedule, and performance.[53]

However, NAVSEA officials said the Navy has not assessed the risks posed by these challenges to implementing its new maintenance approach in Japan. Instead, officials based the decision to implement the approach in Japan on the performance of the approach in Rota, Spain. Without a full assessment of the risks these challenges may pose to successful implementation of its new maintenance approach, and without identifying ways to mitigate any risks posed by these challenges, the

[51]GAO-15-329.

[52]GAO-14-704G.

[53]Department of Defense, *DOD Product Support Business Case Analysis Guidebook* (April 2011).

Navy cannot ensure its overseas homeported ships complete all required maintenance as planned in support of fleet readiness needs.

The Navy Plans to Grow Its Fleet but Has Not Included Overseas Ship Maintenance Requirements in Its Plans

The Navy's timeline for growing the fleet from 290 total ships (as of September 2019) to 355 ships shows that the largest increase will be in the number of surface ships. Specifically, the Navy plans to increase the number of surface ships in the fleet by a total of 48 ships in the next 15 years, or by 2034. However, the Navy's long-range plans to grow its fleet do not consider the maintenance these ships will require while based or traveling overseas. The *Navy's Report to Congress on the Annual Long-Range Plan for Maintenance and Modernization of Naval Vessels for Fiscal Year 2020,* which is intended to assess the maintenance and modernization requirements for the fleet as it grows, only assesses maintenance provided by private and public shipyards in the United States, not overseas.[54] It does not identify or assess the maintenance requirements needed overseas—including those provided by Navy facilities or the contractor industrial base. Moreover, it does not identify overseas requirements, such as any expected changes in the number of ships based there or growth in the number of ships visiting overseas locations from the United States. For example:

- As the number of ships in the overall fleet grows, NAVSEA officials said they expect the number of ships based overseas to grow proportionally, and the number of U.S.-based ships conducting operations and exercises overseas to increase, thereby increasing overseas maintenance requirements. However, the expected increase in the fleet and associated maintenance requirements for ships based and visiting overseas were not included in the recent long-range plans. For example, according to officials, the Navy plans to base an additional amphibious ship in Sasebo, Japan, by fiscal year 2020, and the Navy is examining a possible increase to the number of destroyers in Rota, Spain.[55] According to maintenance center officials in Rota, increasing the number of ships based in Rota would require additional planning to meet the Navy's needs, such as negotiating

[54]See Office of the Chief of Naval Operations, *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020* (Washington, D.C.: March 2019) and Naval Sea Systems Command, *Report to Congress on the Long-Range Plan for Maintenance and Modernization of Naval Vessels for Fiscal Year 2020* (Washington, D.C.)

[55]S. Rep. No. 116-48, at 280 (2019*).*

with the Government of Spain to request additional capacity, such as pier space, for such future requirements.

- The Navy projects the number and type of ships based in Japan and Bahrain to change in the next few years. Specifically, the Navy plans to decommission the mine countermeasures (MCM) ships currently homeported in Japan and Bahrain by 2023 and replace them with littoral combat ships to perform the mine countermeasures missions. However, maintenance center officials in Bahrain stated that as of March 2019, plans for the overseas maintenance of littoral combat ships remained uncertain, even though officials expect the initial deployments of littoral combat ships to Bahrain to begin as early as 2020. Additionally, the Navy has not developed deployment timelines and overseas maintenance requirements for littoral combat ships in the Middle East and Western Pacific areas of operation, even though the USS *Montgomery* arrived in Singapore to begin its overseas rotational deployment in July 2019. According to Navy officials, the Navy expects long-term deployments of littoral combat ships to both areas of operation as the MCMs are decommissioned.
- Ships based in the United States also rely on voyage repair at overseas shipyards while conducting missions or patrols. For example, according to the Navy's annual report to Congress listing all repairs and maintenance performed on Navy ships, in fiscal year 2018, the maintenance center in Bahrain conducted voyage repairs for the USS *Monterey* and USS *Arleigh Burke*, both based in Norfolk, Virginia, and the USS *The Sullivans,* based in Mayport, Florida. Additionally, voyage repairs were conducted in Japan for visiting Navy ships and submarines based in Washington and Hawaii.[56]

Standards for Internal Control in the Federal Government state that it is a key responsibility of management to consider changes within the environment and other factors, and analyze and respond to identified changes and related risks through methods such as strategic planning and other assessments. These standards also note that conditions affecting the organization and its environment continually change, and management can anticipate and plan for significant changes by using a forward-looking process.[57]

NAVSEA officials said that when planning for future growth, they have focused on analyzing U.S. industrial base issues and potential mitigations

[56]10 U.S.C. § 8680.

[57]GAO-14-704G.

to increase capacity for U.S.-based ship maintenance as demand grows beyond existing dry docks and pier space. Officials said the Navy did not analyze overseas maintenance requirements or projected growth overseas to include in the long-range plan. According to NAVSEA officials, future iterations of long-term maintenance planning are to include analysis of the Navy's overseas maintenance capacity, which Navy officials said could begin in March 2020. As the Navy continues its long-term maintenance planning, it will be important for the Navy to conduct and include analysis of anticipated overseas maintenance requirements given that substantial growth of surface ships is expected through 2034—including destroyers and amphibious ships, two types of ships currently based overseas. Without analyzing maintenance needs and requirements for ships based overseas, including any projected growth or other force changes, in its long-range plans, the Navy cannot ensure it is sufficiently planning for the total needs—and resulting readiness and health—of the future fleet.

Conclusions

The Navy bases and maintains 38 surface ships—such as destroyers, cruisers, and amphibious ships, among others—at homeports outside of the United States. The 2018 National Defense Strategy has prioritized military readiness, which depends in part on ships completing maintenance on time, to ensure that the United States is positioned to respond to events quickly all over the world. Ship maintenance is a complex process involving numerous Navy and private industry stakeholders that devote substantial time and effort to ensure that ships receive the maintenance they need. Yet we have previously reported on the persistent delays and other challenges the Navy faces in completing maintenance on time both for ships in the United States and overseas. While a number of entities in the Navy have different efforts underway to examine individual ship maintenance issues, a comprehensive, systematic understanding of the underlying and interrelated causes for these delays is essential to implementing corrective actions to ensure these strategically based ships are able and ready for operations when needed.

The Navy has also taken steps to adjust its maintenance strategies to improve ship maintenance while balancing the high operational demands for ships based in Japan. Additionally, the Navy has begun planning to grow the fleet, but the expected increase in the fleet and associated maintenance requirements for ships based and visiting overseas were not included in the recent long-range plans. Also, the Navy's plans to implement updated maintenance strategies overseas, as well as to grow

the total fleet, were developed without accounting for risks that challenges may pose to these strategies, as well as analysis of the necessary overseas maintenance requirements to sustain the Navy's strategically important ships homeported or visiting overseas locations. Ensuring the Navy's maintenance plans and capacity for the total fleet align with its plans for substantial future fleet growth will enhance the Navy's ability to conduct timely maintenance of its overseas surface fleet, which, in turn, is essential to the Navy achieving its strategic goals.

Recommendations

We are making a total of five recommendations to DOD.

The Secretary of the Navy should assign responsibility to an entity to conduct a single, comprehensive systematic analysis of overseas surface ship maintenance delays. (Recommendation 1)

The Secretary of the Navy should ensure the designated entity conducts a comprehensive, systematic analysis to identify the underlying, interrelated causes of overseas surface ship maintenance delays. (Recommendation 2)

The Secretary of the Navy should use the results of the analysis to develop a plan to address surface ship maintenance delays overseas. Such a plan should incorporate results-oriented elements, including analytically based goals, identification of risks to achieving those goals, identification of required resources and stakeholders, metrics to measure progress, and regular reporting on progress. (Recommendation 3)

The Secretary of the Navy should ensure that Naval Sea Systems Command assesses and mitigates risks posed by any challenges, such as persistent delays and capacity limitations, to successful implementation of its new maintenance approach in Japan. (Recommendation 4)

The Secretary of the Navy should ensure that Naval Sea Systems Command conducts analysis to include overseas maintenance requirements as part of its long-term maintenance plan to support the planned growth and readiness of the fleet. (Recommendation 5)

Agency Comments

We provided a draft of this report to DOD for review and comment. In written comments provided by the Navy (reproduced in appendix VII), DOD concurred with our recommendations. The Navy also provided technical comments, which we incorporated as appropriate.

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

If you or your staff have questions about this report, please contact me at maurerd@gao.gov or (202) 512-9627. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix VIII.

Diana Maurer
Director, Defense Capabilities and Management

List of Committees

The Honorable James M. Inhofe
Chairman
The Honorable Jack Reed
Ranking Member
Committee on Armed Services
United States Senate

The Honorable Richard Shelby
Chairman
The Honorable Richard Durbin
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Chairman
The Honorable Mac Thornberry
Ranking Member
Committee on Armed Services
House of Representatives

The Honorable Pete Visclosky
Chairman
The Honorable Ken Calvert
Ranking Member
Subcommittee on Defense
Committee on Appropriations
House of Representatives

Appendix I: Objectives, Scope, and Methodology

This report (1) describes existing maintenance capacity and approaches the Navy uses for surface ships based overseas, (2) assesses the extent to which the Navy completed maintenance periods as scheduled in fiscal years 2014 through 2018 and analyzes factors contributing to any delays, and (3) evaluates the extent to which the Navy has assessed any challenges facing future overseas ship maintenance efforts.

The scope of this review includes the regularly scheduled depot-level maintenance of surface ships based overseas, the maintenance of which is generally the responsibility of Naval Sea Systems Command (NAVSEA). These ships comprised 38 of the 40 ships based overseas during the time period we analyzed, and consisted of the following ship classes: guided-missile cruisers (CG 47 class), guided-missile destroyers (DDG 51 class), mine countermeasures ships (MCM 1 class), patrol coastal ships (PC 1 class), amphibious assault ships (LHD 1 class), amphibious transport dock ships (LPD 17 class), dock landing ships (LSD 41 class), and an amphibious command ship (LCC 19 class).[1] These ships were based overseas at homeports located in Japan, Spain, and Bahrain as of the end of fiscal year 2018.

For objective one, to describe existing capacity and maintenance approaches the Navy uses for the regularly scheduled depot-level maintenance periods for the 38 surface ships based overseas during the time of our review, we reviewed Navy documents and information on the Navy's overseas maintenance centers' physical capacity and authorized workforce, local contractor industrial base and capacity, and other Navy organizations and commands responsible for planning, managing, and overseeing the maintenance of these ships. To examine physical capacity, we analyzed Navy information on U.S. and contractor facilities and equipment such as dry docks and information on future planning or improvements. We reviewed NAVSEA information and data on ship maintenance periods, as well as information and documentation on historic and forecasted workloads at each homeport, including the

[1]We did not evaluate the maintenance of the single aircraft carrier in Japan or the command ship based in Italy since the maintenance and related data for those ships is managed under different processes, but we reviewed documents and discussed these ships with cognizant officials to include in our report for context, as appropriate. As of September 2019, the Navy assigned an additional amphibious assault ship to Sasebo, Japan. Additionally, the Navy announced another LPD is to be moved to Sasebo by fiscal year 2020 according to Navy officials. Our review did not include the two additional ships since they were not based overseas during the time period we analyzed. We also did not include support ships operated by Military Sealift Command.

number and type of ships that have received maintenance at those shipyards. We also reviewed Navy maintenance plans and guidance that document Navy maintenance approaches and organizations at overseas homeports.[2] We conducted site visits to three overseas homeports—Yokosuka and Sasebo, Japan, and Manama, Bahrain—where the Navy bases a majority of the surface ships overseas. We observed the physical capacity and operations of the maintenance centers and shipyards there, as well as the Forward Deployed Regional Maintenance Center (FDRMC) headquarters in Naples, Italy. We interviewed cognizant officials at Navy commands, numbered fleets, and maintenance centers, including officials at all the overseas maintenance centers responsible for ships based overseas: the U.S. Naval Ship Repair Facility and Japan Regional Maintenance Center (SRF-JRMC) in Yokosuka, Japan, and its detachment in Sasebo, and the FDRMC headquarters in Naples, Italy, as well as its two detachments—in Rota, Spain, and Manama, Bahrain.

For objective two, to assess the extent to which maintenance schedules are completed as planned, we analyzed Navy data on regularly scheduled, depot-level maintenance periods for surface ships—including those maintained at overseas homeports and in the United States. NAVSEA collects and manages data on these maintenance periods—known as Chief of Naval Operations maintenance availabilities—for surface ships, submarines, and aircraft carriers. We obtained the data on surface ship depot-level maintenance periods used by NAVSEA's Surface Maintenance Engineering Planning Program and the Commander, Navy Regional Maintenance Center (SURFMEPP).[3] We used Navy data to identify depot-level maintenance periods conducted at each homeport starting in fiscal years 2014 through 2018 and to assess the extent to which maintenance schedules for ships based overseas were executed

[2]For example, Commander, U.S. Fleet Forces Command Instruction 4790.3, *Joint Fleet Maintenance Manual* (Oct. 5, 2018) (incorporating revision C, change 7). In October 2019, the *Joint Fleet Maintenance Manual* was updated to incorporate revision D. The *Joint Fleet Maintenance Manual* incorporating revision C, change 7 was in use at the time the documentation we reviewed in our audit was created. We also reviewed Navy maintenance plans and guidance that document Navy maintenance approaches and organizations at overseas homeports.

[3]This regularly scheduled depot-level maintenance is referred to by the Navy as Chief of Naval Operations (CNO) maintenance availabilities, but for the purposes of this report we refer to them as maintenance periods. We have used NAVSEA's data on CNO availabilities in a number of past reports, including GAO, *Military Readiness: Progress and Challenges in Implementing the Navy's Optimized Fleet Response Plan*, GAO-16-466R (Washington, D.C.: May 2, 2016) and *Navy and Marine Corps: Rebuilding Ship, Submarine, and Aviation Readiness Will Require Time and Sustained Management Attention*, GAO-19-225T (Washington, D.C.: Dec. 12, 2018).

as planned from fiscal year 2014 through 2018, and the delays experienced.

To assess the reliability of this data, we interviewed cognizant NAVSEA officials to understand system operating procedures, organizational roles and responsibilities, and any data limitations. NAVSEA provided information based on our questions regarding data reliability, including an overview of the data, data-collection processes and procedures, data quality controls, and overall perceptions of data quality. NAVSEA also provided documentation of how the systems are structured and what written procedures are in place to help ensure that the appropriate information is collected and properly categorized. We interviewed officials from SURFMEPP and CNRMC to obtain further clarification on data reliability, discuss how the data were collected and reported, and explain how we planned to use the data. Some of these data were used in prior reports, and their reliability had previously been assessed. In addition, we also assessed the reliability of the data by checking: (1) for missing data entries, (2) for duplicate records, and (3) to ensure the data was formatted consistently. We determined that the data were sufficiently reliable for the purposes of summarizing surface ship maintenance periods and related information at homeports both overseas and in the United States, including reporting on the duration of maintenance periods and the number of days of maintenance delays.[4]

Because maintenance periods may cross over one or more fiscal years, to be able to report on days ships spent in maintenance periods from fiscal years 2014 through 2018, we analyzed data on maintenance periods that began in fiscal years 2012 through 2018 for all surface ships included in the data, including those based at overseas and U.S.

[4]Two maintenance periods that began in 2018 were included in the data provided by NAVSEA but excluded from our analysis of the data. First, a maintenance period for the USS *Fitzgerald* in fiscal year 2018 was excluded from our analysis because it was precipitated by emergency maintenance due to a collision rather than a planned maintenance period, as confirmed by Navy officials. Second, a 2018 maintenance period for the USS *Milius* was also excluded because the data did not contain planned duration information, so we had no basis to calculate delays. Navy officials in Japan told us the USS *Milius* arrived in Japan with unexpected structural damage, and was immediately placed into an unplanned maintenance period.

homeports.[5] Specifically, we used the dates of the planned and actual durations of the maintenance periods in our data set to determine the total number of days ships spent in maintenance in fiscal years 2014 through 2018 and by how many days the maintenance periods were extended beyond their planned number of days—which the Navy refers to "days of maintenance delay."[6] To determine the total number of days ships spent in maintenance in each fiscal year, we allocated the number of days spent in maintenance periods according to the fiscal year in which the maintenance days occurred.[7] After we calculated the number of days each maintenance period went beyond the planned duration, we allocated these days of maintenance delay to the fiscal years in which they occurred. To compare ship maintenance delays experienced at different homeports while accounting for the varying workload at each, we calculated days of maintenance delay as a percentage of the total

[5]We included ships homeported in the United States to provide context and comparison between ships homeported overseas and in the United States. We used available NAVSEA data on maintenance periods beginning in fiscal years 2012 and 2013 to provide a more comprehensive basis from which to calculate total maintenance days and days of maintenance delay, as some maintenance periods begun in one year can extend to the next year and beyond. We recognize that there could be some small undercount of maintenance days and days of maintenance delay in 2014 if there were maintenance periods that started in 2011 or earlier but continued into 2014. However, using the approach we took provides the most comprehensive set of data for fiscal year 2014 based on available NAVSEA data. Additionally, the NAVSEA data also included Navy's projected completion dates for some of the maintenance periods that would take place in fiscal year 2018 and we kept these maintenance periods in the data set so that the data for fiscal year 2018 would be as comprehensive as possible. Finally, the Navy did not begin to homeport ships in Rota, Spain, until 2014, so no maintenance was conducted on ships prior to this time.

[6]The Navy typically allocates days of maintenance delay to the year the maintenance period started, but for some of our analyses in this report we are allocating days of maintenance and delay by the fiscal year in which it occurred so as to better be able to compare delay rates across locations and fiscal years.

[7]Planned schedule duration dates are documented in letters the Navy issues about a month before maintenance begins, and actual dates are verified about 100 days after maintenance is completed, according to NAVSEA officials and documentation. Additionally, officials stated that the data on actual duration and projected delays for maintenance in progress are updated monthly. Officials also noted that maintenance periods are not fully reported until about 100 days after completion of maintenance, so information may change until that point. As a result, our October 2018 data may not include all delays actually experienced by ships whose maintenance was not completely reported by the time we received the data in October 2018, such as for maintenance periods begun in fiscal years 2017 or 2018 but expected to continue into fiscal year 2019. However, according to Navy officials the data they provided to us in October 2018 was the best available data at the time, and it included projections they had made as of October 2018 for future completion dates.

number of days ships spent in maintenance periods each location, which resulted in a rate of delay that we could compare across homeports. In addition, we analyzed the number of maintenance periods that were completed on or ahead of time or were completed later than planned, and we examined these maintenance durations by the fiscal year in which the maintenance periods started.

We interviewed officials to understand the reasons they identified for delays. We reviewed the actions the Navy has taken to identify, evaluate, and resolve these delays, including information in Navy policies, guidance, and documentation on the planning, management, and oversight of overseas ship maintenance. This information included the *Joint Fleet Maintenance Manual* and related Navy instructions, documents establishing maintenance requirements.[8] We also reviewed Navy guidance and documentation on the planning and execution of maintenance for ships based overseas and in the United States, including documentation such as status briefings, planning documents, and lessons learned information identifying certain reasons for maintenance delays of individual maintenance periods.[9] We interviewed cognizant Navy officials responsible for planning, managing, and conducting oversight for surface ship maintenance in the United States and overseas to understand how they produce and use this information to improve maintenance planning and execution. We compared this information to standards for planning, scheduling, and monitoring events to correct deficiencies and identify process improvements, including *Standards for Internal Control in the Federal Government*, which includes principles pertaining to oversight responsibility, evaluating issues, and remediating deficiencies; our *Schedule Assessment Guide;* and OMB Circular No. A-123, *Management's Responsibility for Enterprise Risk Management and Internal Control,* which includes guidance on conducting a root-cause

[8]Commander, U.S. Fleet Forces Command Instruction 4790.3, *Joint Fleet Maintenance Manual* (Oct. 5, 2018) (incorporating revision C, change 7); Office of the Chief of Naval Operations Instruction 4700.7M, *Maintenance Policy for Navy Ships* (May 8, 2019); Commander, Navy Regional Maintenance Center Instruction 4970.4B, *Integrated Project Team Development (IPTD) Program* (Sept. 24, 2015); and Naval Sea Systems Command Instruction 4701.1, *Surface Ship Chief of Naval Operations Availability Duration Analysis* (Mar. 27, 2017).

[9]Commander, U.S. Fleet Forces Command Instruction 4790.3, *Joint Fleet Maintenance Manual* (Oct. 5, 2018) (incorporating revision C, change 7).

analysis when developing corrective actions.[10] We also compared this information with our past work identifying best practices for results-oriented performance management and planning.[11]

For objective three, to assess the extent to which the Navy has assessed and mitigated challenges that may affect overseas ship maintenance efforts, including new maintenance approaches and future maintenance requirements as the Navy seeks to grow the fleet, we analyzed Navy documentation, NAVSEA data, and available information documenting challenges that affect maintenance overseas, as well in the United States. We also analyzed Navy efforts to address these challenges, as well as Navy plans for future fleet growth and maintenance workload, including the long-range plans for shipbuilding and maintenance as the Navy seeks to grow its fleet, as well as other studies and analyses pertaining to these plans.[12] We interviewed cognizant Navy officials who plan, execute, and oversee overseas shipyards and maintenance, as well as operational commanders, to obtain their perspectives on issues and challenges associated with execution of ship maintenance. We compared this information to government standards for planning and monitoring events to assess changes in risk, correct deficiencies, and identify process improvements, including *Standards for Internal Control in the Federal*

[10]GAO, *Standards for Internal Control in the Federal Government*, GAO-14-704G (Washington, D.C.: September 2014); *GAO Schedule Assessment Guide: Best Practices for Project Schedules*, GAO-16-89G (Washington, D.C.: December 2015); and Office of Management and Budget Circular A-123, *Management's Responsibility for Enterprise Risk Management and Internal Control* (July 15, 2016).

[11]GAO, *Military Depots: Actions Needed to Improve Poor Conditions of Facilities and Equipment that Affect Maintenance Timeliness and Efficiency,* GAO-19-242 (Washington, D.C.: Apr. 29, 2019); *Managing For Results: Data-Driven Performance Reviews Show Promise But Agencies Should Explore How to Involve Other Relevant Agencies*, GAO-13-228 (Washington, D.C.: Feb. 27, 2013); and *Government Performance: Strategies for Building a Results-Oriented and Collaborative Culture in the Federal Government*, GAO-09-1011T (Washington, D.C.: Sept. 24, 2009).

[12]See Office of the Chief of Naval Operations, *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020* (Washington, D.C.: March 2019) and *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2019* (Washington, D.C.: February 2018); Naval Sea Systems Command, *Report to Congress on the Long-Range Plan for Maintenance and Modernization of Naval Vessels for Fiscal Year 2020* (Washington, D.C.).

Government and *DOD Product Support Business Case Analysis Guidebook.*[13]

For all three objectives, we interviewed officials and obtained information from the following entities:

- Office of the Chief of Naval Operations
- Assistant Secretary of the Navy for Research, Development, and Acquisition
- U.S. Fleet Forces Command
- U.S. Pacific Fleet
- Commander, Naval Surface Force, Pacific
  - Commander, Naval Surface Group, Western Pacific
- Commander, Naval Surface Force, Atlantic
  - Commander, Naval Surface Squadron Five
- U.S. Fifth Fleet
- U.S. Sixth Fleet
- U.S. Seventh Fleet
- USS *Shiloh*, USS *Barry*, USS *Pioneer*, USS *Germantown*, USS *Tempest*, and USS *Devastator*
- Afloat Training Group Western Pacific
- Naval Sea Systems Command
  - Logistics, Maintenance, and Industrial Operations (NAVSEA 04)
  - Deputy Commander for Ship Maintenance and Modernization (NAVSEA 21)
  - Commander, Navy Regional Maintenance Center (CNRMC)
  - Surface Maintenance Engineering Planning Program (SURFMEPP)
  - U.S. Naval Ship Repair Facility and Japan Regional Maintenance Center (Yokosuka, Japan, and detachment in Sasebo, Japan)

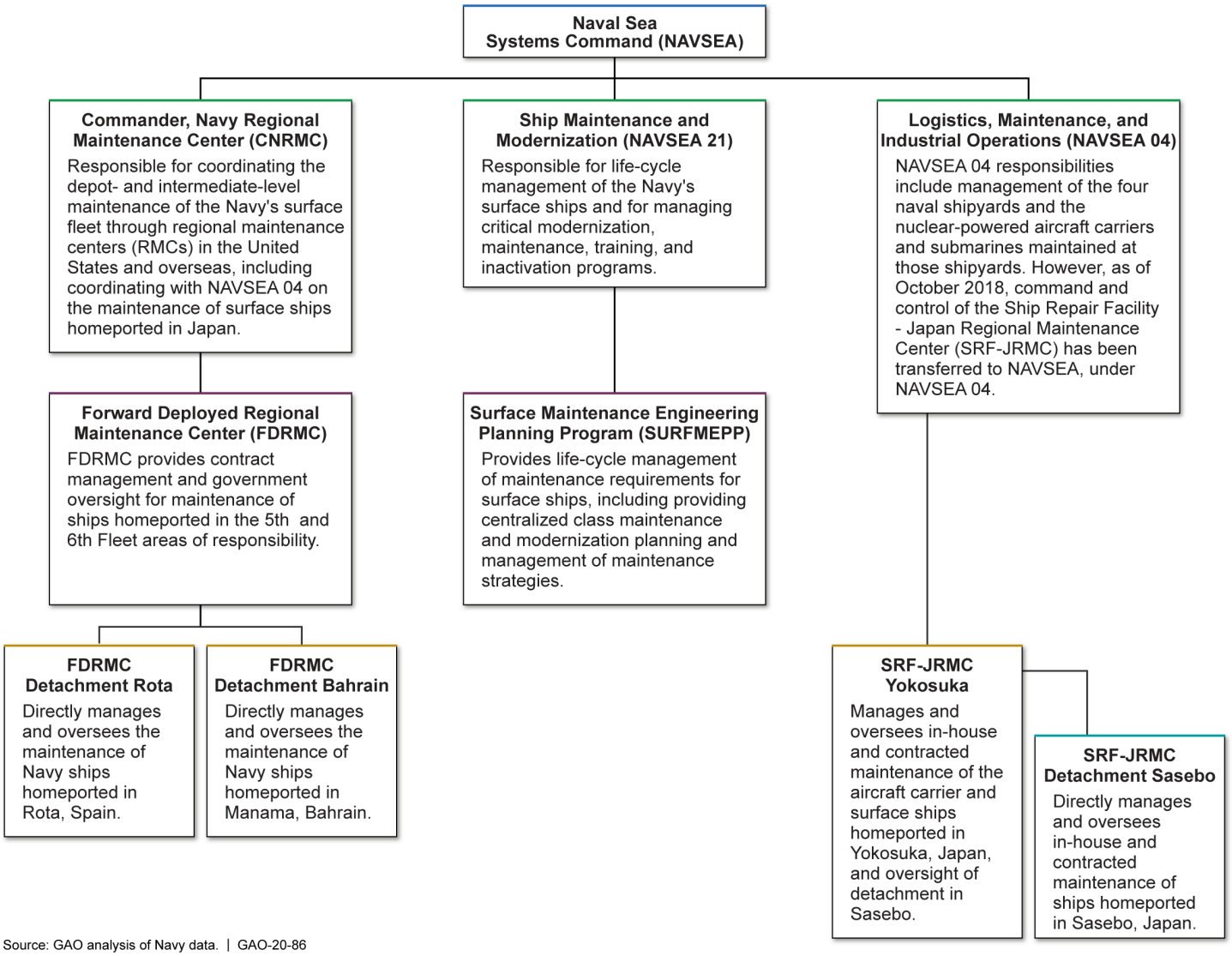
[13]GAO-14-704G; Department of Defense, *DOD Product Support Business Case Analysis Guidebook* (2011). For example, *Standards for Internal Control in the Federal Government* include principles pertaining to management's responsibilities to identify, analyze, respond to, and plan for changes and risks to achieving objectives.

  - Forward Deployed Regional Maintenance Center in Naples, Italy, and its detachments in Rota, Spain, and Manama, Bahrain
  - Carrier Planning Activity
  - Surface Team One
- Naval Supply Systems Command Fleet Logistics Centers in Yokosuka, Japan, and Manama, Bahrain
- U.S. Naval Forces Central Command
- U.S. Naval Forces Europe-Africa
- Human Resources Office for Commander Navy Region Europe, Africa, Southwest Asia (CNREURAFSWA)
- Military Sealift Command
- Naval Inspector General

We conducted this performance audit from August 2018 to February 2020 in accordance with generally accepted government auditing standards. Those standards require 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 II: Naval Sea Systems Command (NAVSEA) Organizations with Responsibility for Surface Ship Maintenance Overseas

Figure 8: Naval Sea Systems Command (NAVSEA) Directorates and Commands Responsible for Surface Ship Maintenance Overseas



Source: GAO analysis of Navy data. | GAO-20-86

Note: NAVSEA also operates five regional maintenance centers and four public naval shipyards in the United States. The regional maintenance centers responsible for surface-ship maintenance include Mid-Atlantic Regional Maintenance Center (Norfolk, VA); Southeast Regional Maintenance Center (Mayport, FL); Southwest Regional Maintenance Center (San Diego, CA); and two incorporated into two of the public naval shipyards—Northwest Regional Maintenance Center (Puget Sound, WA) and the Hawaii Regional Maintenance Center (Pearl Harbor, HI). The four public naval shipyards are: Puget Sound Naval Shipyard and Intermediate Maintenance Facility (Bremerton, WA); Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility (Pearl Harbor, HI); Norfolk Naval Shipyard (Portsmouth, VA); Portsmouth Naval Shipyard (Kittery, ME).

U.S. Naval Ship Repair Facility and Japan Regional Maintenance Center

Yokosuka, Japan

History and Mission

The Ship Repair Facility and Japan Regional Maintenance Center (SRF-JRMC) was originally created in 1947 as the Ship Repair Department, and in 1951 became the Ship Repair Facility. In 2004 it became the combined SRF-JRMC. Headquartered in Yokosuka, SRF-JRMC provides oversight and support to its detachment in Sasebo and is responsible for the maintenance for ships based in Yokosuka. SRF-JRMC also provides technical assistance and voyage repairs for Navy ships visiting Japan.

Unique Issues

In addition to maintaining the surface ships based in Yokosuka, an important part of SRF-JRMC's role is to support the aircraft carrier based there—the only one based outside the United States. SRF-JRMC operates as both a Navy shipyard, conducting maintenance through its large Japanese workforce, and a regional maintenance center with U.S. Navy and civilian workforce that plans and manages contractor-provided work. SRF-JRMC directly conducted about two-thirds of the workload in fiscal year 2018, including the aircraft carrier, with the rest by private companies.

Performance

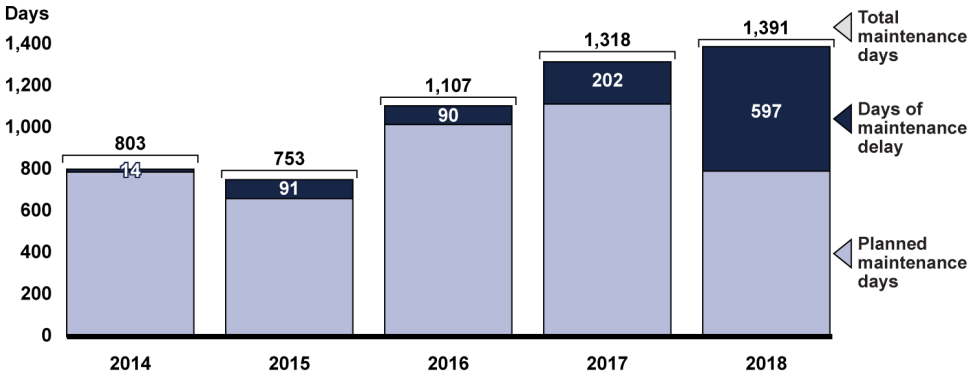
Surface ships based in Yokosuka experienced 597 days of maintenance delay in fiscal year 2018. Of the 22 maintenance periods started during fiscal years 2014 through 2018, the Navy completed 15 later than planned including 9 completed 31 or more days late.

U.S. Navy Surface Ship Maintenance Snapshot

Surface Ships Maintained in Yokosuka as of Fiscal Year 2018
8 Guided-missile destroyers (DDG)
3 Guided-missile cruisers (CG)
1 Amphibious command ship (LCC)

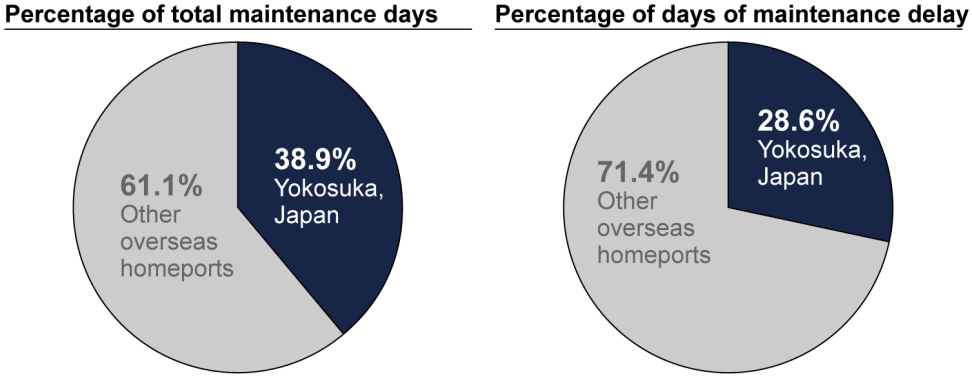
Fiscal Year 2018 Authorized SRF-JRMC Workforce
U.S. Civilians: 272
U.S. Navy: 108
Japanese nationals: 2,341 (paid for by the Government of Japan)
Note: These numbers represent approved full-time equivalent civilian and authorized military positions not numbers of personnel, according to Navy documentation.

Figure 9: Total Days U.S. Navy Surface Ships Based in Yokosuka, Japan, Underwent Maintenance, Including Delays (Fiscal Years 2014 through 2018)



Source: GAO analysis of Navy data. | GAO-20-86

Figure 10: Percentage of Total Overseas Maintenance and Delays Experienced by Surface Ships Based in Yokosuka, Japan (Fiscal Years 2014 through 2018)



Source: GAO analysis of Navy data. | GAO-20-86
Note: The other overseas homeports are Sasebo, Japan; Rota, Spain; and Manama, Bahrain.

Future Considerations

In 2018, the Navy finalized a new maintenance approach for cruisers and destroyers based in Yokosuka. This approach relies on deep maintenance in the United States prior to ships moving to Japan, and increases the frequency of maintenance periods while ships are in Japan. The Navy has begun efforts to identify additional private companies to conduct ship maintenance to meet future planned workload, according to Navy officials.

U.S. Naval Ship Repair Facility and Japan Regional Maintenance Center Detachment

Sasebo, Japan

History and Mission

The Ship Repair Facility and Japan Regional Maintenance Center (SRF-JRMC) detachment in Sasebo was originally designated as the Sasebo Office to the Ship Repair Facility in Yokosuka in 1976, and made a detachment in 1984. The SRF-JRMC detachment is responsible for supporting the maintenance for the eight surface ships based in Sasebo, and can provide technical assistance and other maintenance to ships in and visiting Japan.

Unique Issues

During fiscal year 2018, local private companies conducted nearly two-thirds of ship maintenance in Sasebo. The SRF-JRMC detachment's Japanese workforce also provides depot-level maintenance. The operational requirements for the amphibious ships based in Sasebo are aligned with the missions of the U.S. Marines based in Okinawa, Japan. The patrol schedules typically involve three ships deploying and then returning to port for maintenance at the same time. As a result, the ship maintenance workload is not stable, according to Navy officials, which presents difficulties for local companies to plan for and support the workload.

Performance

Ships in Sasebo experienced 558 days of maintenance delay in fiscal year 2018. The Navy completed 13 of the 16 maintenance periods later than planned, with more than half of these 31 or more days late based on our analysis of maintenance started in fiscal years 2014 through 2018.

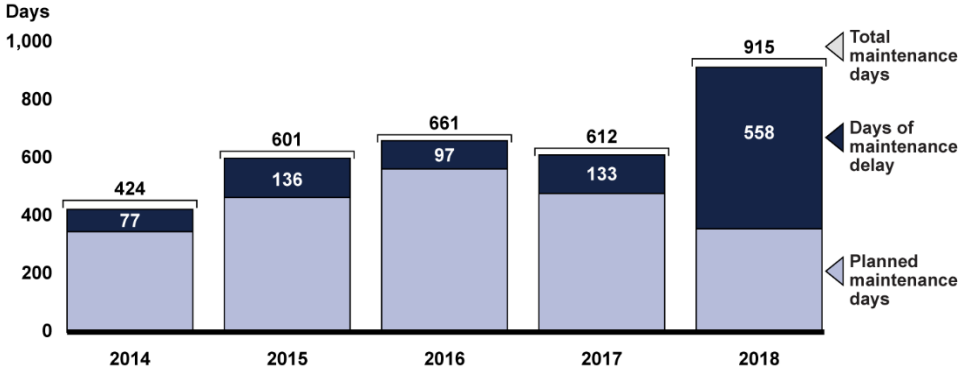
U.S. Navy Surface Ship Maintenance Snapshot

Surface Ships Maintained in Sasebo as of Fiscal Year 2018
1 Amphibious Assault Ship (LHD)
1 Amphibious Transport Dock (LPD)
2 Dock Landing Ships (LSD)
4 Mine Countermeasures Ships (MCM)

Fiscal Year 2018 Authorized SRF-JRMC Workforce
U.S. Civilians: 65
U.S. Navy: 40
Japanese nationals: 450 (paid for by the Government of Japan)

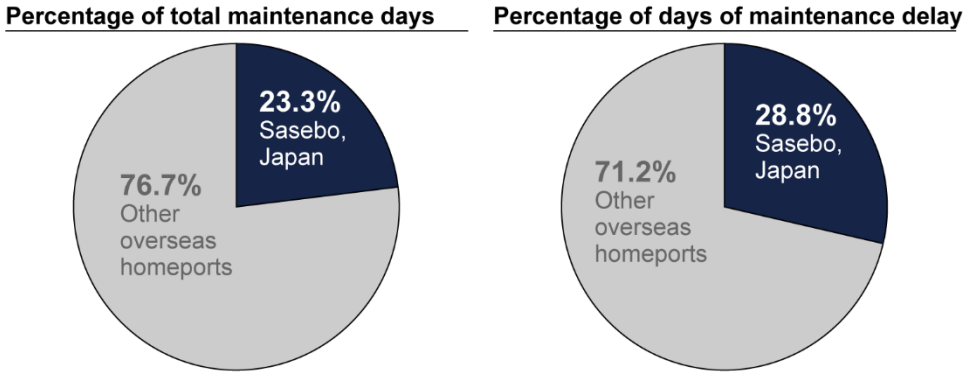
Note: These numbers represent approved full-time equivalent civilian and authorized military positions not numbers of personnel, according to Navy documentation.

Figure 11: Total Days U.S. Navy Surface Ships Based in Sasebo, Japan, Underwent Maintenance, Including Delays (Fiscal Years 2014 through 2018)



Source: GAO analysis of Navy data. | GAO-20-86

Figure 12: Percentage of Total Overseas Maintenance and Delays Experienced by Surface Ships Based in Sasebo, Japan (Fiscal Years 2014 through 2018)



Source: GAO analysis of Navy data. | GAO-20-86

Note: The other overseas homeports are Yokosuka, Japan; Rota, Spain; and Manama, Bahrain.

Future Considerations

Navy officials stated that the Navy is finalizing a new maintenance approach for amphibious ships in Sasebo, which increases the number of maintenance periods but relies on deep maintenance in the United States before and after deployment. The Navy plans to add a fifth amphibious ship in fiscal year 2020, and to decommission the MCMs by fiscal year 2023, but has not finalized plans for littoral combat ships intended to replace them, according to Navy officials.

Forward Deployed Regional Maintenance Center Detachment

Rota, Spain

History and Mission

The Navy established initial maintenance center operations in Rota in December 2013 to oversee maintenance of the four destroyers the Navy began to move to Spain in 2014. The Navy established the Forward Deployed Regional Maintenance Center (FDRMC) headquarters in Naples, Italy, in 2014, with detachments in Spain and Bahrain. FDRMC Detachment Rota is responsible for managing the maintenance of ships based there and providing technical assistance to U.S. Navy ships visiting U.S. Fifth and Sixth Fleet areas of operation and other duties.

Unique Issues

One state-owned Spanish company maintains all four ships in Rota, with management and oversight by the FDRMC detachment's U.S. Navy and civilian personnel. The maintenance approach and set of ships in Rota were designed around the specific ships' mission, according to officials. For example, the four ships based in Rota are similar age and configuration, serve the same mission, and have regular patrol schedules. The Navy decided not to conduct dry-dock maintenance in Rota to maximize the ships' availability for operations. As a result, Navy officials said ships must receive all dry-dock maintenance and modernization in the United States before and after rotating to Spain.

Performance

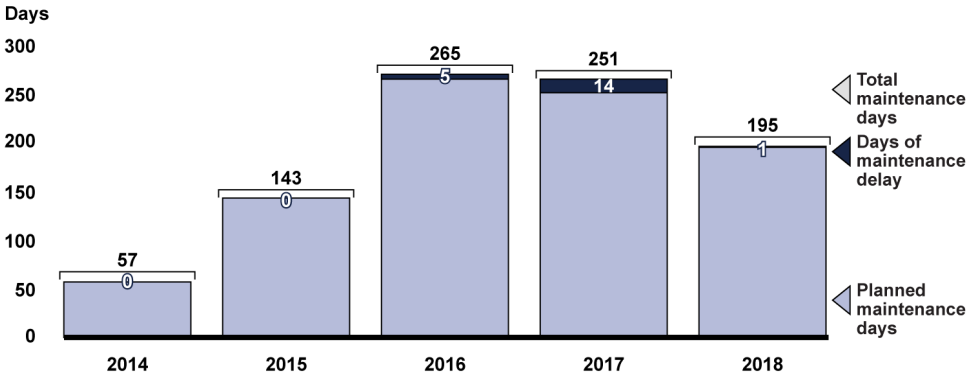
Ships based in Rota experienced 20 total days of delay during fiscal years 2014 through 2018, and the majority of maintenance periods started during this time were completed early or on time.

U.S. Navy Surface Ship Maintenance Snapshot

Surface Ships Maintained in Rota as of Fiscal Year 2018
4 Guided-missile destroyers (DDG)

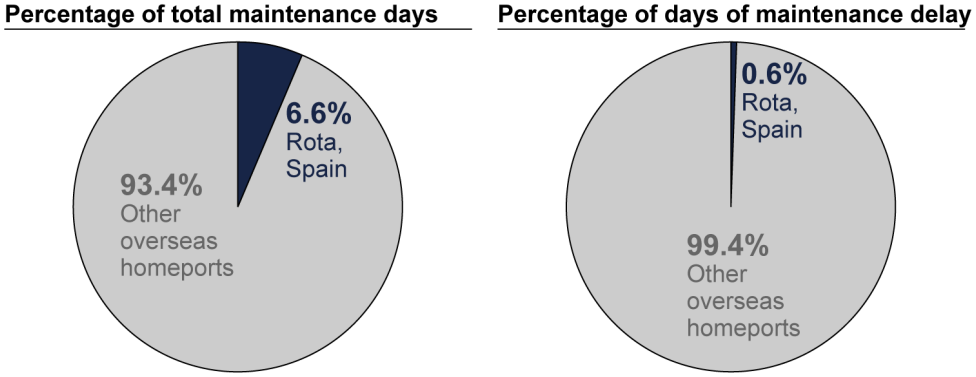
Fiscal Year 2018 Authorized FDRMC Workforce
U.S. Civilians: 73
U.S. Navy: 8
Note: These numbers represent approved full-time equivalent civilian and authorized military positions not numbers of personnel, according to Navy documentation.

Figure 13: Total Days U.S. Navy Surface Ships Based in Rota, Spain, Underwent Maintenance, Including Delays (Fiscal Years 2014 through 2018)



Source: GAO analysis of Navy data. | GAO-20-86

Figure 14: Percentage of Total Overseas Maintenance and Delays Experienced by Surface Ships Based in Rota, Spain (Fiscal Years 2014 through 2018)



Source: GAO analysis of Navy data. | GAO-20-86
Note: The other overseas homeports are in Yokosuka and Sasebo, Japan, and Manama, Bahrain.

Future Considerations

The Navy plans to rotate the four current ships back to the United States beginning in 2020 through 2022. FDRMC officials said the next set of ships will not be as standardized as the first four. Additionally, the Senate Armed Services Committee has directed the Navy to assess the feasibility of increasing the number of guided-missile destroyers based in Rota from four to six. FDRMC officials said increasing the number of ships would require additional staff and physical infrastructure that would need to be negotiated with the Spanish government.

Forward Deployed Regional Maintenance Center Detachment

Manama, Bahrain

History and Mission

The Forward Deployed Regional Maintenance Center detachment in Bahrain (FDRMC Detachment Bahrain) was established in June 2014. FDRMC Detachment Bahrain manages the maintenance of ships based there, and can provide fleet technical assistance and coordinate voyage repairs for other ships in the U.S. Fifth Fleet area of operations including Military Sealift Command ships and visiting U.S. Navy ships. FDRMC Detachment Bahrain manages the maintenance for the most homeported ships of all overseas locations.

Unique Issues

The U.S. Navy faces staffing challenges in Bahrain that may contribute to maintenance delays, according to Navy officials. For example, officials from both FDRMC Detachment Bahrain and the Navy's Fleet Logistics Center, which manages the contracting process for ship maintenance there, face staffing shortfalls. Navy officials attributed staffing challenges to a number of factors, including Department of Defense limitations on the length of time U.S. civilians may be employed outside of the United States.

Performance

Ships based in Bahrain experienced 678 days of maintenance delay in fiscal year 2018. The Navy completed 19 of 22 maintenance periods later than planned. This included 13 periods completed 31 or more days late based on our analysis of Navy maintenance periods started during fiscal years 2014 through 2018.

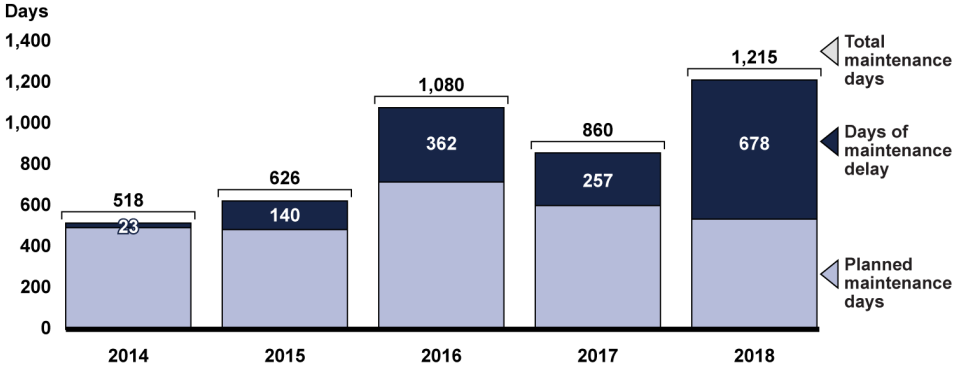
U.S. Navy Surface Ship Maintenance Snapshot

Surface Ships Maintained in Manama as of Fiscal Year 2018
10 Patrol Coastal Ships (PC)
4 Mine Countermeasures Ships (MCM)

Fiscal Year 2018 Authorized FDRMC Workforce
U.S. Civilians: 87
U.S. Navy: 29
Foreign nationals: 14

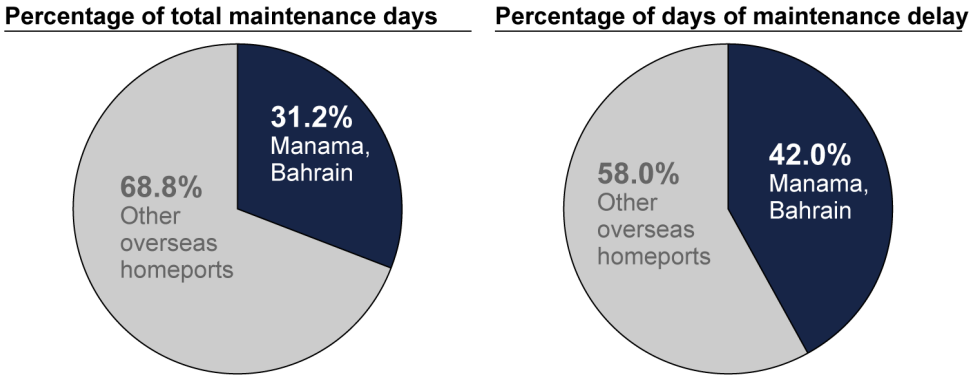
Note: These numbers represent approved full-time equivalent civilian and authorized military positions, not numbers of personnel, according to Navy documentation.

Figure 15: Total Days U.S. Navy Surface Ships Based in Manama, Bahrain, Underwent Maintenance, Including Delays (Fiscal Years 2014 through 2018)



Source: GAO analysis of Navy data. | GAO-20-86

Figure 16: Percentage of Total Overseas Maintenance and Delays Experienced by Surface Ships Based in Manama, Bahrain (Fiscal Years 2014 through 2018)



Source: GAO analysis of Navy data. | GAO-20-86
Note: The other overseas homeports are in Yokosuka and Sasebo, Japan, and Rota, Spain.

Future Considerations

Beginning in fiscal year 2020, the Navy will decommission U.S.-based MCMs to provide spare parts to MCMs overseas. The Navy plans to decommission the MCMs and PCs in Bahrain in fiscal years 2023 and 2026, respectively. The Navy plans to replace the MCM mission with littoral combat ships but has not finalized plans for their deployment or maintenance, according to Navy officials.

Appendix VII: Comments from the Department of Defense

THE ASSISTANT SECRETARY OF THE NAVY
(RESEARCH, DEVELOPMENT AND ACQUISITION)
1000 NAVY PENTAGON
WASHINGTON DC 20350-1000

FEB 0 3 2020

Ms. Diana Maurer
Director, Defense Capabilities Management
U.S. Government Accountability Office
441 G Street, NW
Washington DC 20548

Dear Ms. Maurer:

Attached is the Department of Defense (DoD) response and comments on the GAO Draft Report GAO-20-86SU, "NAVY SHIP MAINTENANCE: Actions Needed to Address Maintenance Delays for Surface Ships Based Overseas" dated December 5, 2019 (GAO Code 102943). The draft report is unclassified and cleared for open publication.

Sincerely,

James F. Geurts

Attachments:
As Stated

GAO DRAFT REPORT DATED DECEMBER 5, 2019
GAO-20-86SU (GAO CODE 102943)

"NAVY SHIP MAINTENANCE: ACTIONS NEEDED TO ADDRESS MAINTENANCE DELAYS FOR SURFACE SHIPS BASED OVERSEAS"

DEPARTMENT OF NAVY COMMENTS
TO THE GAO RECOMMENDATIONS

GAO recommends that the Secretary of Navy to complete the following action:

RECOMMENDATION 1: Assign responsibility to an entity to conduct a single, comprehensive systematic analysis of overseas surface ship maintenance delays.

DoD RESPONSE 1: Concur. Within the Naval Sea Systems Command (NAVSEA), Deputy Commander for Ship Maintenance and Modernization (SEA 21) will continue to be the entity conducting the analysis with input from all stakeholders, including the Fleet.

RECOMMENDATION 2: Ensure the designated entity conduct a comprehensive, systematic analysis to identify the underlying, interrelated causes of overseas surface ship maintenance delays.

DoD RESPONSE 2: Concur.

RECOMMENDATION 3: Use the results of the analysis to develop a plan to address surface ship maintenance delays overseas. Such a plan should incorporate results-oriented elements, including analytically based goals, identification of risks to achieving those goals, identification of required resources and stakeholders, metrics to measure progress, and regular reporting on progress.

DoD RESPONSE 3: Concur.

RECOMMENDATION 4: Ensure that the NAVSEA assesses and mitigates risks posed by any challenges, such as persistent delays and capacity limitations, to successful implementation of its new maintenance approach in Japan.

DoD RESPONSE 4: Concur.

RECOMMENDATION 5: Ensure that the NAVSEA conducts analysis to include overseas maintenance requirements as part of its long-term maintenance plan to support the planned growth and readiness of the fleet.

DoD RESPONSE 5: Concur. The 30 Year Long Range Maintenance and Modernization Plan is currently in draft for release in February 2020. The single comprehensive systemic analysis will be developed and incorporated into the next report.

Appendix VIII: GAO Contact and Staff Acknowledgments

GAO Contact

If you or your staff have questions about this report, please contact Diana Maurer at (202) 512-9627 or maurerd@gao.gov

Staff Acknowledgments

In addition the contact named above, the following staff members made key contributions to this report: Suzanne Wren (Assistant Director), Sally Williamson (Analyst in Charge), David Ballard, Martin De Alteriis, Alexandra Gonzalez, Amie Lesser, Shahrzad Nikoo, Carol Petersen, Clarice Ransom, Rachel Schultz, and Samuel Woo.

Related GAO Products

Navy Maintenance: Persistent and Substantial Ship and Submarine Maintenance Delays Hinder Efforts to Rebuild Readiness. GAO-20-257T. Washington, D.C.: December 4, 2019.

Naval Shipyards: Key Actions Remain to Improve Infrastructure to Better Support Navy Operations. GAO-20-64. Washington, D.C.: November 25, 2019.

Navy Readiness: Actions Needed to Evaluate the Effectiveness of Changes to Surface Warfare Officer Training. GAO-20-154. Washington, D.C.: November 14, 2019.

Military Depots: Actions Needed to Improve Poor Conditions of Facilities and Equipment that Affect Maintenance Timeliness and Efficiency. GAO-19-242. Washington, D.C.: April 29, 2019.

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DOD Depot Workforce: Services Need to Assess the Effectiveness of Their Initiatives to Maintain Critical Skills. GAO-19-51. Washington, D.C.: December 14, 2018.

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