



November 2016

# NAVY SHIP MAINTENANCE

## Action Needed to Maximize New Contracting Strategy's Potential Benefits

Accessible Version

# GAO Highlights

Highlights of [GAO-17-54](#), a report to congressional committees

## Why GAO Did This Study

The Navy has over 150 non-nuclear surface ships that it repairs, maintains, and modernizes using privately owned shipyards. The Navy concluded in 2010 that readiness of the surface ship force was below acceptable levels. This, in addition to the concerns of leadership about cost and schedule growth, led to a revised readiness strategy and, in 2015, introduction of a new contracting strategy for ship repair, referred to as MAC-MO.

House Report 114-102 accompanying the fiscal year 2016 National Defense Authorization Act included a provision for GAO to review the Navy's implementation of the MAC-MO strategy. This report assesses (1) the potential benefits of the MAC-MO contracting strategy, (2) process changes the Navy has made to address any challenges and to capitalize on anticipated benefits, and (3) how the strategy will potentially affect the Navy's ship repair industrial base.

GAO analyzed the Navy's acquisition planning documentation, lessons learned, and contracts. GAO interviewed Navy officials and visited regional maintenance centers in Norfolk, Va.; San Diego, Calif.; and Mayport, Fla. GAO also interviewed previous and prospective Navy ship maintenance contractors.

## What GAO Recommends

GAO recommends the Navy assign responsibility to a single entity to systematically assess implementation of the MAC-MO strategy. DOD agreed with GAO's recommended action and plans to report biennially on strategy implementation.

View [GAO-17-54](#). For more information, contact Michele Mackin at (202) 512-4841 or [mackinm@gao.gov](mailto:mackinm@gao.gov).

November 2016

## NAVY SHIP MAINTENANCE

### Action Needed to Maximize New Contracting Strategy's Potential Benefits

## What GAO Found

The Navy's Multiple Award Contract, Multi Order (MAC-MO) contracting strategy for ship repair offers a number of potential benefits compared to the former Multi Ship, Multi-Option (MSMO) contracting strategy, including increased competition. A key difference is that the MAC-MO strategy intends to control costs through the use of firm-fixed price contracts and the use of third-party planners, which could be cost-effective if the planner produces clearly defined work specifications for the repair contractor to price and execute. Prior to implementation of the new strategy, the Navy conducted market research and pilot-tested attributes of the strategy with pilot maintenance periods for a number of ships.

The Navy recognized several lessons learned from its pilot maintenance periods and has made subsequent process changes to address key lessons and support MAC-MO. These include a longer time frame for the planning process for finalizing work requirements (see figure). According to the Navy, this additional time is needed to promote stable requirements and, therefore, pricing.

#### Changes to Planning Milestones for Maintenance Periods under the Navy's New Strategy

Original milestones (in days)



Proposed milestones (in days)



Source: GAO analysis of Navy documentation. | [GAO-17-54](#)

The Navy is assessing outcomes of individual maintenance periods; however, it lacks a systematic process involving the fleet- and shore-based maintenance communities to assess overall implementation of MAC-MO. This is inconsistent with federal standards for internal control, which state that management should evaluate its response to risks and evaluate progress made toward program objectives. Not ensuring progress is systematically assessed—particularly in light of the many stakeholders involved—could undermine the Navy's ability to obtain the improved outcomes it seeks with the MAC-MO strategy.

The MAC-MO strategy will increase competition opportunities and set aside work for small businesses, but it is too soon to determine how these changes will impact the ship repair industrial base. Industry viewpoints GAO collected on MAC-MO varied both by shipyard location and contractor size. However, former MSMO contract holders reported that the uncertainty associated with the need to continually compete for work could result in decisions to reduce their workforce and facilities. Small businesses GAO spoke with have in the past mostly performed work as subcontractors to MSMO contract holders, but many expressed interest in competing as prime contractors under MAC-MO.

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**Abbreviations**

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CG	Cruisers
CNO	Chief of Naval Operations
CNRM	Commander, Navy Regional Maintenance Center
DASN AP	Deputy Assistant Secretary of the Navy for Acquisition and Procurement
DDG	Destroyers
FAR	Federal Acquisition Regulation
IDIQ	Indefinite Delivery Indefinite Quantity
MAC-MO	Multiple Award Contract-Multi Order
MARMC	Mid-Atlantic Regional Maintenance Center
MSMO	Multi-Ship, Multi-Option
MSRA	Master Ship Repair Agreement
NAVSEA	Naval Sea Systems Command
OFRP	Optimized Fleet Response Plan
RMC	Regional Maintenance Center
SEA 21	Deputy Commander for Surface Warfare
SERMC	Southeast Regional Maintenance Center
SURFMEPP	Surface Maintenance Engineering Planning Program
SWRMC	Southwest Regional Maintenance Center

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November 21, 2016

Congressional Committees

In support of its mission to maintain combat-ready forces, the Navy acquires, fields, and sustains a large fleet, which currently includes over 150 non-nuclear surface ships.<sup>1</sup> The Navy relies on these ships to be ready to operate when needed and to meet their expected service lives. To accomplish these objectives, the Navy contracts for ship repair, maintenance, and modernization through scheduled periods, called availabilities, during which the ship is temporarily unavailable for operations. The Navy concluded in 2010 that the material readiness of the surface ship force was well below acceptable levels to preserve ships to their full service lives, finding that deferrals of scheduled maintenance and reductions in the amount of time allowed for completing major repairs contributed to persisting deficiencies. These deferrals and reductions also had not remedied the longstanding problem of cost and schedule growth in ship maintenance availabilities. The Navy has since taken steps to improve the readiness of its non-nuclear surface combatant and amphibious warfare ships, including introducing a revised operational schedule intended to provide, among other things, for the predictable scheduling of tasks for ship maintenance, known as the Optimized Fleet Response Plan (OFRP).<sup>2</sup>

In 2015, the Navy transitioned to a different contract strategy for the maintenance and modernization of surface ships, which it expects to support the goals of the OFRP and alleviate cost and schedule growth incurred during availabilities. This new strategy is called Multiple Award Contract-Multi Order (MAC-MO). As opposed to the prior strategy, which used cost-reimbursement contracts and was only competed among ship repair contractors every 5 years, MAC-MO will use firm-fixed-price contracts, a third-party contractor to identify and plan the work, and increased competition, among other things. The MAC-MO strategy will cover maintenance needs for six classes of surface combatant and

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<sup>1</sup>Our focus for this review is on non-nuclear surface ships, which the Navy repairs, maintains, and modernizes under contracts with private industry.

<sup>2</sup>We recently reported on aspects of OFRP. See GAO, *Navy's Optimized Fleet Response Plan*, [GAO-16-466R](#) (Washington, D.C.: May 2, 2016).

amphibious assault ships, which the Navy estimates will cost about \$6.5 billion to maintain from fiscal year 2016 through fiscal year 2020.<sup>3</sup>

House Report 114-102 accompanying the fiscal year 2016 National Defense Authorization Act included a provision for us to review the Navy's implementation of the MAC-MO contracting strategy. This report assesses (1) the potential benefits of the MAC-MO contracting strategy, (2) process changes the Navy has taken to address any challenges and to capitalize on anticipated benefits, and (3) how the strategy will potentially affect the Navy's ship repair industrial base.

To assess the potential benefits of the MAC-MO strategy, we analyzed the Navy's acquisition planning documentation, compared conditions under which cost-reimbursement contracts and firm-fixed-price contracts are appropriate, and interviewed senior contracting officials and contractors with experience conducting maintenance availabilities. To determine how the previous Multi-Ship, Multi-Option (MSMO) and current MAC-MO strategies differ in terms of contract pricing, planning the work, and structuring the competition among ship repair yards, we analyzed the contents of MAC-MO acquisition planning documentation, and reviewed related Federal Acquisition Regulation (FAR) provisions and MSMO contracts. To assess process changes the Navy has taken to address challenges and to capitalize on intended benefits of the MAC-MO strategy, we analyzed documentation on lessons learned from the availabilities used to pilot the MAC-MO strategy and actions the Navy took in response, such as were identified in staffing and training plans, and proposals for revised planning milestones. For these two objectives, we also interviewed Navy officials responsible for planning, administering, and funding the ship repair contracts, including the offices of the Deputy Commander for Surface Warfare (SEA 21); Commander, Naval Surface Force, Atlantic; Commander, Naval Surface Force, Pacific; Commander, Navy Regional Maintenance Center; the Mid-Atlantic Regional Maintenance Center (MARMC) in Norfolk, Virginia; the Southwest Regional Maintenance Center (SWRMC) in San Diego, California; and the Southeast Regional Maintenance Center (SERMC) in Mayport, Florida. These are the three maintenance centers where the Navy is implementing the new contracting strategy. To understand how the new

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<sup>3</sup>The MAC-MO strategy includes Amphibious Dock Landing (LSD) ships, Amphibious Transport Dock (LPD) ships, Landing Helicopter Deck (LHD) ships, Landing Helicopter Assault (LHA) ships, Arleigh Burke class Guided Missile Destroyers (DDG), and Guided Missile Cruisers (CG).



strategy might affect the Navy's industrial base for ship repair, we used a data collection instrument and a semi-structured interview to collect viewpoints and a description of existing facilities from 14 selected contractors serving the Navy homeports of Norfolk, Virginia; Mayport, Florida; and San Diego, California. The contractors included former MSMO contract holders and additional contractors the Navy identified as potential competitors for MAC-MO contracts in its market research, including small businesses. In addition, we obtained information from the Navy on the number and scheduling of future availabilities for each of these three home ports. See appendix I for more information about our scope and methodology.

We conducted this performance audit from September 2015 to November 2016 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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## Background

Several Navy organizations share responsibilities for scheduling, planning, budgeting, overseeing, and setting policy for the repair, maintenance, and modernization of non-nuclear surface ships:

- The **Secretary of the Navy**, as directed by the Secretary of Defense, is responsible for conducting, and has the authority under Title 10 of the United States Code to conduct, all the affairs of the Department of the Navy, including overseeing the repair of naval ships.
- The **Chief of Naval Operations** is the senior military officer of the Department of the Navy and is responsible to the Secretary of the Navy for the command, utilization of resources, and operating efficiency of the operating forces of the Navy and of the Navy shore activities assigned by the Secretary.
- **U.S. Pacific Fleet and U.S. Fleet Forces Command** develop budgets for the operations and maintenance of ships, while also setting requirements for overall fleet readiness.
- **Commander, Naval Surface Force, U.S. Atlantic Fleet and Commander, Naval Surface Force, U.S. Pacific Fleet**—the Navy's surface type commanders—have specific responsibilities for

maintaining, training, and ensuring the readiness of their assigned surface ships.<sup>4</sup> In addition, the type commanders have a significant role in scheduling repair planning activities, funding availability work, and coordinating the management and supervision of that work.

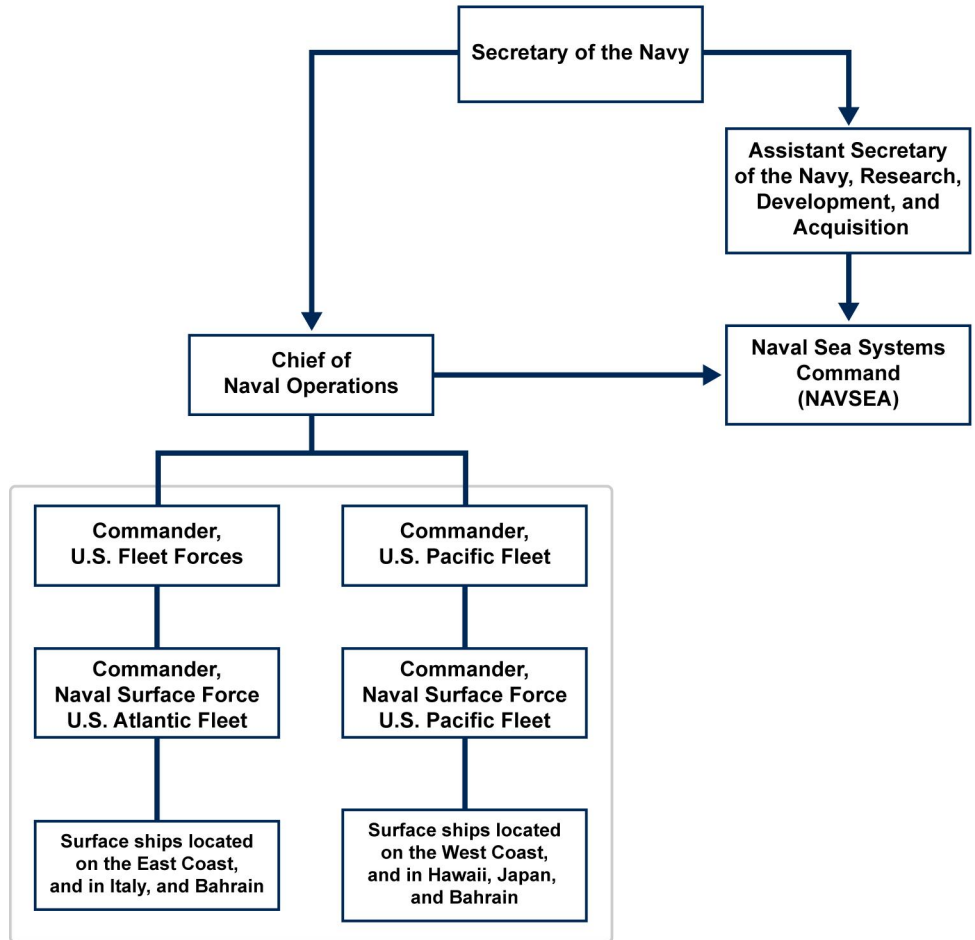
- The **Assistant Secretary of the Navy for Research, Development and Acquisition** serves as the Navy Acquisition Executive and has authority, responsibility, and accountability for all acquisition functions and programs, including surface ship repair, maintenance, and modernization. The Assistant Secretary also represents the Department of the Navy to the Under Secretary of Defense for Acquisition, Technology and Logistics and to Congress on all matters relating to acquisition policy and programs.
- **Naval Sea Systems Command (NAVSEA)** is charged with maintaining ships to meet fleet requirements, while doing so within defined cost and schedule parameters. NAVSEA has the further responsibility of establishing and enforcing technical authority in combat system design and operation. These technical standards ensure systems are engineered effectively, and that they operate safely and reliably.

Figure 1 shows how these operating forces and shore-based entities are organized within the Navy.

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<sup>4</sup>All ships are organized into categories by type of ship. Normally, the type command controls the ship during its primary and intermediate training cycles and then it moves under the operational control of a fleet commander.

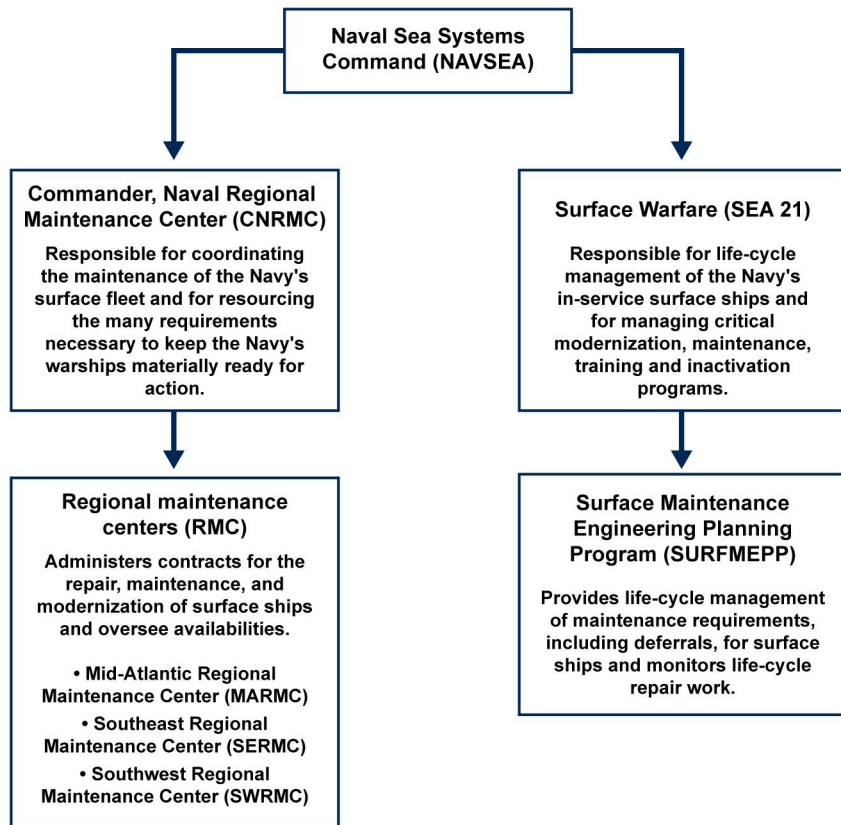
**Figure 1: Navy Operating Forces and Shore Establishment Responsible for Non-Nuclear Surface Ship Repair, Maintenance, and Modernization**



Source: GAO analysis of Navy data. | GAO-17-54

Within NAVSEA, several organizations provide headquarters-based and on-site, local support for surface ship availabilities. Functions these offices perform include contract administration, program management, and planning for future availabilities informed by the historical maintenance needs of Navy ships. Figure 2 highlights the various NAVSEA offices that participate in surface ship availabilities and their responsibilities.

**Figure 2: NAVSEA Offices Responsible for Surface Ship Repair, Maintenance, and Modernization**



Source: GAO analysis of Navy data. | GAO-17-54

The level of complexity of ship repair, maintenance, and modernization can affect the length of a maintenance availability—which can range from a few weeks to more than 6 months—and informs whether the work will be competed among contractors only in the ship's homeport or competed among all ship repair yards on the East or West Coast. The types of availabilities include the following:

- **Chief of Naval Operations (CNO) availabilities** are scheduled to accomplish industrial maintenance and modernization. Industrial maintenance requires complex industrial processes to perform restorative work on a ship, for example, involving structural, mechanical, and electrical repairs. Modernization requirements include changes that either add new capability or improve the reliability of existing systems. For example, the Navy is currently in

process of modernizing cruisers and destroyers to upgrade their combat systems. CNO availabilities can last 6 months or longer and are normally scheduled every 2 to 3 years throughout a ship's service life. To inform the work scope for a CNO availability, Navy officials or contractor representatives typically perform one or more "ship checks" to assess the material condition of the ship in advance of the availability.

- **Continuous Maintenance availabilities** are for routine maintenance work, for example, repainting parts of a ship or repairing the nonskid surfaces on a flight deck. These availabilities are normally 2 to 6 weeks in duration and typically scheduled once per non-deployed quarter during a period when the ship will be in port.
- **Emergent Maintenance availabilities** are for work of an urgent nature when the risk of prolonged disruption to a ship's operations makes higher payments for repair acceptable. These availabilities are only completed on an as-needed basis in order to keep a ship operating. For example, in 2015, staff at one regional maintenance center discovered a propeller blade was loose during a contractor's routine cleaning of an underwater hull of an amphibious ship and immediately arranged for the repairs.

In support of its mission to ensure surface ships are mission-ready and able to achieve their expected service life, NAVSEA's Surface Maintenance Engineering Planning Program (SURFMEPP) has developed a series of products used to support long-term maintenance for ships, focusing on capturing the technical requirements for a class of ships. For example, maintenance plans for a class of ships could identify a need for equipment overhauls, propulsion shaft replacements, and corrosion protection. To identify requirements for a specific ship, SURFMEPP coordinates the development of a "baseline availability work package" with the relevant type commander. This package represents the NAVSEA-mandated technical requirements to ensure a ship reaches its expected service life and meets its operational commitments and is tailored specifically to each ship. Planners then use these requirements as a basis for developing detailed work specifications that direct the ship repair contractor how to perform the work. SURFMEPP also manages the Master Specification Catalog, which is a module within the Navy Maintenance Database that contains information and specifications needed by planners to develop the work specifications for the repair or modernization of a specific surface ship. This catalog is the repository of all work item instructions used to execute contracted depot-level maintenance. Use of the catalog is intended to promote standardization

and planning products that reduce costs and increase quality of contracted work.

In September 2012, we assessed a Navy readiness strategy, known as the Fleet Response Plan, aimed at improving the readiness of Navy surface combatant and amphibious warfare ships.<sup>5</sup> Our report recognized the Navy had taken steps to alleviate the consequences of deferred maintenance—such as reduced readiness and increased costs once repairs were made—by establishing SURFMEPP and the Commander, Naval Regional Maintenance Center (CNRMC) in 2010 to oversee the operations of the regional maintenance centers. However, we found the Navy had not assessed certain risks to implementation of the strategy, such as staffing shortages at SURFMEPP and CNRMC. We recommended that the Navy develop a comprehensive assessment of the risks the Navy faces in implementing its readiness strategy and develop alternatives to mitigate risks. However, in responding to our recommended actions, the Navy did not agree that a comprehensive assessment of risks was necessary or desirable—stating its view that existing assessment processes were sufficient—and did not take action.

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## Private Ship Repair Contractors and Facilities

The Navy contracts with private shipyards and other firms for the repair, maintenance, and modernization of non-nuclear surface ships. These contractors comprise what is referred to as the ship repair industrial base.<sup>6</sup> The extent of facilities required by a contractor to perform a maintenance availability varies by the complexity of the maintenance requirements. Contractors' facilities might include shipyards with piers, drydocks, cranes, and separate facilities for pipe-fitting and valve repair. Certain repairs, such as inspecting or repairing the ship's hull, or removing marine growth from the hull, might require placing a ship in a drydock. Figure 3 shows a drydock and crane.

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<sup>5</sup>GAO, *Military Readiness: Navy Needs to Assess Risks to Its Strategy to Improve Ship Readiness*, [GAO-12-887](#) (Washington, D.C.: Sept. 21, 2012).

<sup>6</sup>Although the Navy operates several government-owned shipyards, those shipyards are used to support the repair, maintenance, and modernization of nuclear powered ships, such as submarines and aircraft carriers.

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**Figure 3: Floating Drydock and Crane Used for Repair of Amphibious Assault Ships**



Drydock

Source: BAE Systems. | GAO-17-54

To support the execution of complex maintenance availabilities, the Navy has established a certification process to ensure that contractors are qualified to conduct the work. NAVSEA will grant a “Master Ship Repair Agreement” after certifying a ship repair firm’s capability and capacity to perform all aspects of shipboard work. To obtain this level of certification—the highest the Navy grants for ship repair—the firm must meet certain standards, including having the management, organization, production, and facilities to perform a complex repair. Certified firms must also be capable of subcontracting for elements beyond their capability or capacity, while ensuring that they have adequate oversight of the subcontracted effort.

A June 1995 ship depot policy issued by the Secretary of the Navy requires that, whenever possible, ship repair and maintenance work of 6 months or less be performed by shipyards at or near the ship’s home port to improve the crew’s quality of life by reducing their time away from home.<sup>7</sup> If the estimate is more than 6 months, the Navy expands the

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<sup>7</sup>The policy implemented 10 U.S.C. § 7299a.

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solicitation to include additional ship repair companies operating on the relevant U.S. coast.<sup>8</sup>

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## History of Navy Contracting, Planning, and Scheduling Approaches for Ship Repair

Over the years, the Navy has used different contracting strategies with the private sector to support the repairs and modernization for surface ships.

- **Pre-MSMO (before 2004):** According to Navy contracting officials, prior to the implementation of the MSMO contracting strategy that has been in place until recently, the Navy generally used firm-fixed-price contracts to contract for the maintenance and modernization of surface ships and used its own planning workforce to draft work specifications. A firm-fixed-price contract provides for a price that is not subject to any adjustment on the basis of the contractor's cost experience in performing the contract. This contract type places maximum risk and full responsibility for all costs—and resulting profit or loss—on the contractor. It therefore provides maximum incentive for the contractor to control costs.<sup>9</sup> In 1982, we reported on deficiencies with the Navy's implementation of this contracting strategy for ship repairs.<sup>10</sup>
- **MSMO (2004 to present):** The Navy has used the MSMO strategy, which features the use of cost-reimbursement contracts, to contract for ship maintenance work with the private sector. Cost-reimbursement contracts provide for the payment of allowable incurred costs, to the extent prescribed in the contract. Under a cost-reimbursement contract, the government does not contract for the performance of a specified amount of work for a predetermined price, but instead agrees to pay the contractor's reasonable costs of performance regardless of whether the work is completed.<sup>11</sup> In addition, as part of the MSMO strategy, the contractor responsible for executing the work develops the specifications to which the work was performed. While the Navy initially identified several benefits with the

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<sup>8</sup>We discussed this issue in GAO, *Navy Ship Maintenance: Allocation of Ship Maintenance Work in the Norfolk, Virginia Area*, [GAO/NSIAD-99-54](#) (Washington, D.C.: Feb. 24, 1999).

<sup>9</sup>FAR § 16.202-1.

<sup>10</sup>GAO, *Actions Needed to Reduce Schedule Slippages and Cost Growth on Contracts for Navy Ship Overhauls*, [PLRD-82-29](#) (Washington, D.C.: Mar. 17, 1982).

<sup>11</sup>FAR § 16.301-1.



MSMO strategy, including contractor assistance with developing the work package specifications, Navy leadership determined that the business case for the strategy had deteriorated as ship availabilities were incurring excessive cost and schedule growth.

- **MAC-MO (2015 to present):** In 2015, the Navy began transitioning to the use of its newest contracting strategy for ship maintenance—MAC-MO—which relies on (1) cost-reimbursement type contracts with a third-party planner (i.e., a contractor other than the contractor performing the actual repair work) to develop work specifications and (2) firm-fixed-price contracts with ship repair contractors to execute availabilities. In addition, the MAC-MO contracting strategy features the use of indefinite delivery/indefinite quantity (IDIQ) contracts for ship repair contractors. IDIQ contracts do not specify exact times for delivery of supplies or services at contract award; those are established via task orders during contract performance. The use of multiple award, IDIQ contracts (contract awards to more than one contractor) and orders is consistent with Department of Defense Better Buying Power initiatives aimed at increasing competition.

Shortly preceding implementation of the MAC-MO strategy, in November 2014 the Navy began implementing OFRP—a revision of its earlier Fleet Response Plan outlining fleet training, maintenance, deployment, and sustainment schedules. As we found in a May 2016 report, to meet heavy operational demands over the past decade, the Navy has increased ship deployment lengths and has reduced or deferred ship maintenance, reducing the predictability of ship deployments.<sup>12</sup> In addition, we found that public and private shipyards involved in Navy ship maintenance face a number of challenges in completing maintenance on time, including unanticipated work requirements, workforce inexperience, and workload fluctuations. The OFRP is intended to prioritize maintenance by developing a predictable schedule that allows sufficient time to accomplish needed maintenance tasks and ensure that platforms meet their expected service lives.

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<sup>12</sup>[GAO-16-466R](#).

## Market Research and Piloting Helped Inform Roll-out of MAC-MO Strategy, Which Offers Potential Benefits Compared to MSMO

Our analysis of the key attributes of the MAC-MO contracting strategy versus its MSMO predecessor indicates that the new strategy offers significant potential benefits, key among them being the ability to control contract costs through the use of firm-fixed-price contracts. The Navy has taken several proactive steps, including market research and piloting, which provided insights ahead of the strategy’s implementation. Because MAC-MO is in the early stages of implementation, though, it is too soon to assess the extent to which the new strategy will achieve its objectives.

## The MAC-MO Strategy Reflects Potential Benefits to Government as Compared to MSMO Strategy

The Navy’s objectives for the MAC-MO contracting strategy are to:

- maximize competition for surface combatants and amphibious ships
- improve cost control, quality of workmanship, and schedule adherence, and
- maintain an appropriate level of flexibility and responsiveness to the fleet.

The MAC-MO contracting strategy differs from the previous MSMO strategy in four significant ways, as shown in table 1.

**Table 1: Key Differences between the MAC-MO and MSMO Strategies for Ship Maintenance Availability Execution**

Strategy attributes	Multi-Ship, Multi-Option (MSMO)	Multiple Award Contract-Multi Order (MAC-MO)
Contract pricing and incentives	<p><b>Cost-reimbursement</b> contracts provide for payment of incurred costs. They are appropriate when the agency cannot define requirements or accurately estimate costs.</p> <p>MSMO contracts provided for award and incentive fees with award fees based on the government’s judgmental evaluation of contract performance.</p>	<p><b>Firm-fixed-price</b> contracts set firm prices for supplies or services. They are appropriate when specifications for the service provided are reasonably definite and costs can be estimated.</p> <p>Firm-fixed-price contracts provide maximum incentive for the contractor to control costs, but allow for the use of award fee or delivery incentives.</p>
Planning responsibilities	<p><b>Contractor executing the availability also plans the work</b> specifications under the terms of the cost-reimbursement MSMO contract.</p> <p>No separate competition for planning the availability, since one contractor both plans and executes the work.</p> <p>Contract uses both incentive and award fees, with award fees based on government’s judgmental evaluation of contractor performance in planning work specifications.</p>	<p><b>Naval Sea Systems Command (NAVSEA) contracts with a third-party firm to provide advance planning services.</b> The third-party firm is then ineligible to compete for executing the availability.</p> <p>NAVSEA competes cost-reimbursement contracts for third-party advance planning. The performance period is 5 years, assuming all the options are exercised.</p> <p>NAVSEA uses cost-reimbursement contracts with incentive fees based on pre-established formulas, which predominantly relate to the accuracy of the submitted specifications.</p>

Ship repair contract options and ordering	<p><b>Single contract</b> is awarded for multiple availabilities for ship repair, modernization, and continuous and emergent maintenance for an entire ship class or group of ship classes within their homeport.</p> <p>According to NAVSEA, MSMO contracts were awarded with options for up to five years based on “notional” work packages for each ship. The notional work packages consisted of individual work items, the costs of which would vary with the type of scheduled availability.</p>	<p><b>Multiple indefinite delivery-indefinite quantity (IDIQ) contracts</b> are awarded for a class of ships within their respective homeports, but NAVSEA may also award single contracts for emergent work and for CNO availabilities longer than 6 months.</p> <p>IDIQ contracts are awarded for ordering periods of up to 5 years, comprised of a base year and four option periods of 12 months each. Orders under the contracts will be completed and awarded based on actual work specifications.</p>
Competition opportunities for ship repairs	<p>Single competition for a ship class or a group of ship classes, which could have separate competitions for work needing drydocks. NAVSEA issued contract modifications to authorize each availability.</p> <p>According to NAVSEA, MSMO contracts did not include any work set aside for small businesses to serve as prime contractors. However, NAVSEA required prime contractors to subcontract 40 percent of the work to small businesses.</p> <p>According to NAVSEA, it executed few, if any, coast-wide competitions for Chief of Naval Operations (CNO) availabilities longer than 6 months.</p>	<p>Competition for multiple award IDIQ contracts for a class of ships, with separate competitions for complex and noncomplex work. NAVSEA plans to compete orders for each availability.<sup>a</sup></p> <p>NAVSEA intends to set aside “noncomplex” work for small businesses to serve as prime contractors. NAVSEA requires prime contractors to set aside about 20 percent of their work to subcontractors.</p> <p>NAVSEA plans to promote the use of coast wide competition for CNO availabilities longer than 6 months to provide for additional competition opportunities.</p>

Source: GAO analysis of the Federal Acquisition Regulation, NAVSEA documents, and interviews. | GAO-17-54

<sup>a</sup>NAVSEA generally considers non-complex work to include continuous maintenance availabilities and emergent maintenance availabilities less than 6 months, provided that the availability does not include work on shipboard critical systems.

The attributes of MAC-MO offer significant benefits as compared to MSMO. The increase in competition opportunities that MAC-MO offers has the potential to help save the taxpayer money, improve contractor performance, and promote accountability for results.<sup>13</sup> MAC-MO contract structures also offer benefits as compared to MSMO. Under MAC-MO’s firm-fixed-price contracts for executing availabilities, prices do not change based on contractor performance, even if the contractor underbids to win the contract. For MAC-MO’s third-party planning contracts, NAVSEA determined that those should be cost-reimbursement type contracts, but that incentives were appropriate to motivate contractor performance. The contracts will feature two types of incentives, incentive fees and award terms. The incentive fees will allow the contractor to earn profit based on the accuracy of its work specifications, adherence to schedule, or both. The award term plan allows the contractor to earn additional option years, exercisable at the government’s discretion, if the government decides the

<sup>13</sup>We discuss the importance of competition in GAO, *Federal Contracting: Noncompetitive Contracts Based on Urgency Need Additional Oversight*, [GAO-14-304](#) (Washington, D.C.: Mar. 26, 2014).

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contractor generally performed satisfactorily regarding quality, cost, and schedule.

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## The Navy Used Market Research and Pilot Ship Availabilities to Inform MAC-MO Implementation

Prior to finalizing the MAC-MO acquisition plan in April 2015, NAVSEA conducted market research to identify how the proposed strategy could promote competition for the award of contracts for third-party planners and for the execution of maintenance availabilities. Market research—the process used to collect and analyze data about capabilities in the market that could satisfy an agency’s needs—is a critical step in the acquisition process, informing key decisions about how best to acquire goods and services.<sup>14</sup> The FAR requires, among other things, that market research be used to promote and provide for full and open competition, and as part of the acquisition planning process, that contract requirements be structured to facilitate competition by and among small business concerns.<sup>15</sup>

NAVSEA contracting staff used a variety of market research techniques to inform their analyses, such as holding industry days and publishing requests for information on [www.FedBizOpps.gov](http://www.FedBizOpps.gov) to gauge industry interest in competing for MAC-MO contracts.<sup>16</sup> As a result of the analyses, NAVSEA:

- identified potential competition for the execution of complex maintenance availabilities for the six ship classes included in the strategy within the three homeports (Mayport, Florida; Norfolk, Virginia; and San Diego, California) and the East and West Coast-wide competitions, as well as for the third-party planning contracts.<sup>17</sup>

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<sup>14</sup>GAO, *Market Research: Better Documentation Needed to Inform Future Procurements at Selected Agencies*, [GAO-15-8](#) (Washington, D.C.: Oct. 9, 2014).

<sup>15</sup>FAR § 7.102(a)(2). The FAR also directs that the results of market research are to be used to determine if sources capable of satisfying the agency’s requirements exist. FAR § 10.001(a)(3)(i).

<sup>16</sup>Federal Business Opportunities, commonly referred to as FedBizOpps, is a web-based government portal which allows all potential vendors to consider federal procurement opportunities.

<sup>17</sup>Federal regulations require agencies to perform acquisition planning activities, including market research for all acquisitions to ensure the government meets its needs in the most effective, economical, and timely manner possible. FAR § 7.102. See GAO, *Acquisition Planning: Opportunities to Build Strong Foundations for Better Services Contracts*, [GAO-11-672](#) (Washington, D.C.: Aug. 9, 2011).

- determined that two or more capable small businesses existed to justify setting aside noncomplex work to small businesses in the homeports of Norfolk and San Diego, but not Mayport or the coast-wide competitions.
- made an initial determination that the use of a single award IDIQ, planned for the repair of destroyers, was feasible. However, according to NAVSEA officials, the Navy subsequently decided not to pursue this contracting approach on the basis of two factors. First, single award IDIQs would have required potential contractors to pre-price availabilities years into the future, which industry cited as highly problematic. In addition, NAVSEA found that the use of single award IDIQs would likely undermine its negotiating position with respect to individual modernizations.

In addition, in 2014 NAVSEA used San Diego-based pilot availabilities for five ships to test the MAC-MO strategy, and assembled lessons learned. These availabilities, which SWRMC oversaw in San Diego, California, ranged in level of complexity. The Navy also considered lessons learned from earlier maintenance availabilities, particularly the USS Porter in 2013, for which NAVSEA awarded a firm-fixed-price contract for maintenance and collision damage repairs. A mixed maintenance team composed of personnel from SERMC and MARMC provided oversight over the planning and execution of this availability in Norfolk, Virginia. Table 2 identifies the MAC-MO attributes demonstrated during these pilot availabilities.

**Table 2: Multiple Award Contract, Multi-Order Attributes Demonstrated by the 2014 San Diego Pilot Ship Maintenance Availabilities**

	Attribute of the Proposed Strategy Demonstrated								
	Contract Pricing		Planning		Ordering		Competition		
	Firm-fixed price	Regional Maintenance Center writes requests for contract changes <sup>a</sup>	Third-party planner	Regional Maintenance Center verifies plans	Single Contract	Multi-Award IDIQ	Home-port	Coast wide	Small business set aside
<b>San Diego Pilot Ships</b>									
USS <i>William P. Lawrence</i>	YES	YES	YES	YES	NO	YES	YES	NO	NO
USS <i>Bunker Hill</i>	YES	YES	YES	YES	NO	YES	YES	NO	NO
USS <i>Spruance</i>	YES	YES	YES	YES	NO	YES	YES	NO	NO
USS <i>Mobile Bay</i>	YES	YES	YES	YES	NO	YES	YES	NO	NO
USS <i>Cape St. George</i>	YES	YES	YES	YES	NO	YES	YES	NO	NO

Source: GAO analysis of NAVSEA contract data and interviews. | GAO-17-54

<sup>a</sup>A request for contract change is a formal process between the government and contractor for modifying a contract for which a final price had been previously agreed to and can expand the scope of work on a contract

While the pilot ships provided the Navy useful information, the Navy did not test all aspects of the MAC-MO strategy. For example, the pilot was limited to maintenance, modernization, and repair of DDG 51 and CG 47 class ships in San Diego, California. In addition, the cost of the more complex pilot availabilities—the destroyers USS William P. Lawrence and USS Spruance—was relatively low compared to more typical costs for surface combatants, suggesting that the scope of work was much less than a typical CNO availability. Our analysis showed that these availabilities cost about \$4.2 million and \$3.7 million, respectively, whereas CNRMC data from 2011 to 2014 shows the average cost of a CNO availability for a destroyer to have been about \$17 million and a cruiser about \$32 million. In responding to our analysis, SWRMC contracting staff said that the type of work conducted in the pilot availabilities was typical of other drydocking availabilities and was ideal because it was small enough to identify potential problems with the proposed strategy without risking significant schedule delays and cost overruns.

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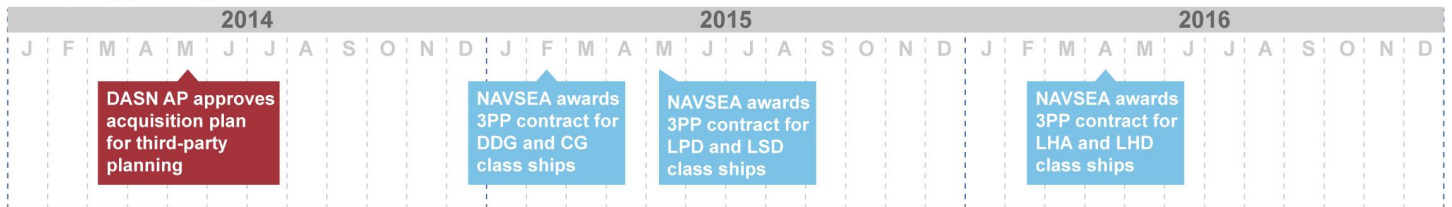
## Implementation of the MAC-MO Strategy Is Underway

NAVSEA began implementing the MAC-MO strategy following the Deputy Assistant Secretary of the Navy for Acquisition and Procurement's approval in May 2014 and April 2015, respectively, of acquisition strategies for acquiring third-party planning services and for execution of the ship availabilities. In February 2015, NAVSEA awarded the first of three third-party planning contracts to QED Systems, Inc. and, in February 2016, NAVSEA awarded the first of the two multiple award IDIQ contracts specifically for complex availabilities in Norfolk, Virginia.

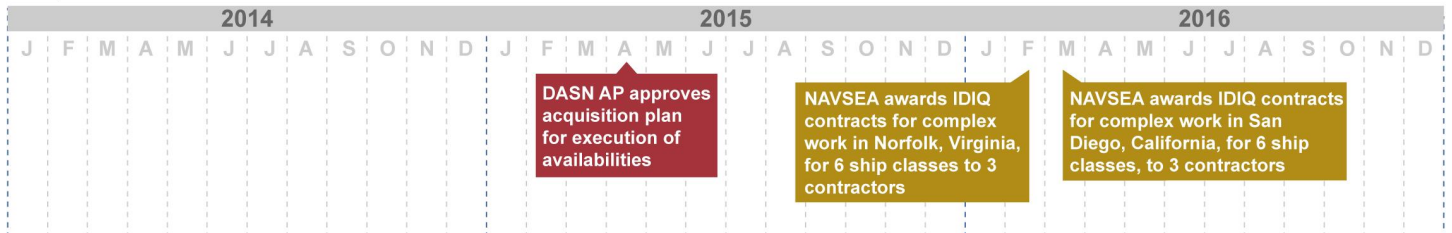
To provide a bridge between when the MSMO contracts ended and the award of the MAC-MO contracts, NAVSEA awarded a series of single contracts for the execution of mostly destroyer availabilities, including one that was competed along the East Coast. NAVSEA refers to these as "gap ships." Nine contract competitions to date have taken place for gap ships homeported in Norfolk, Virginia, and an additional availability was competed along the East Coast. According to NAVSEA officials, they do not anticipate requiring gap ship awards for any ships homeported in San Diego, California or Mayport, Florida. Figure 4 shows the timeline for these gap ship contract awards and other awards related to the MAC-MO strategy.

**Figure 4: Timeline of Initial Awards to Support the MAC-MO Strategy for Ship Maintenance Availabilities**

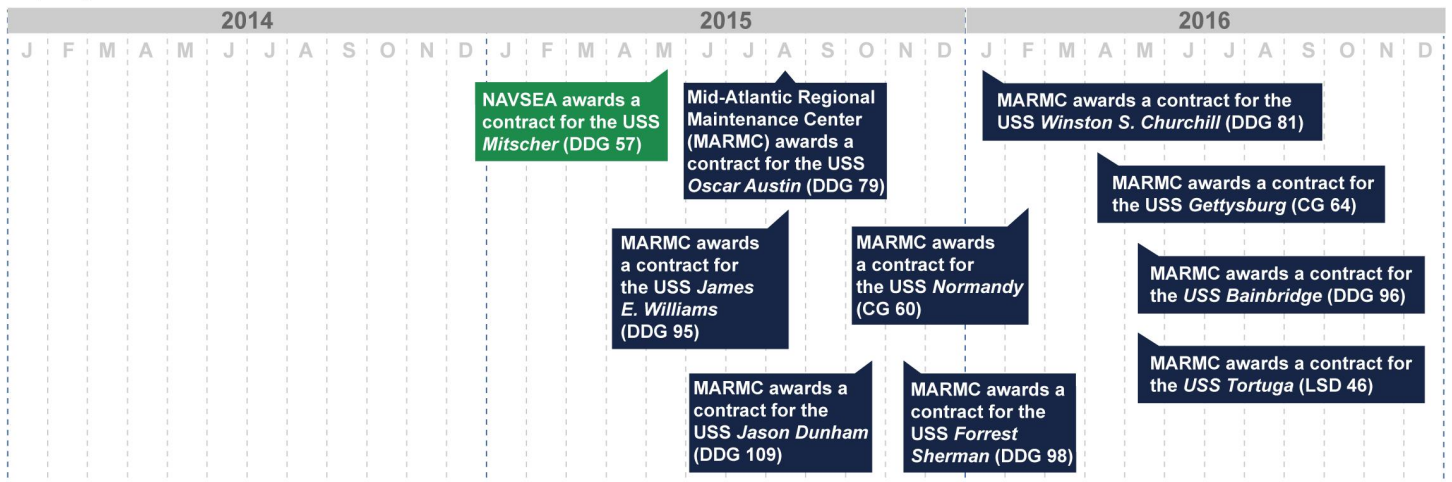
**Third-party planning events**



**Multiple Award Contract-Multi-Order events**



**Gap ship contract awards**



<ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #c00000; margin-right: 5px;"></span> Acquisition plan signed</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #00a0e3; margin-right: 5px;"></span> Third-party planner contract award</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #c08000; margin-right: 5px;"></span> IDIQ contract award for ships</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #002060; margin-right: 5px;"></span> Contract award for gap ship availability</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #008040; margin-right: 5px;"></span> Contract award for gap ship availability, coast wide bid</li> </ul>	<ul style="list-style-type: none"> <li>3PP = Third-party planning</li> <li>DASN AP = Deputy Assistant Secretary of the Navy, Acquisition and Procurement</li> <li>NAVSEA = Naval Sea Systems Command</li> <li>IDIQ = Indefinite delivery, indefinite quantity</li> </ul>	<ul style="list-style-type: none"> <li>DDG = Destroyers</li> <li>CG = Cruisers</li> <li>LHA = Landing Helicopter Assault</li> <li>LHD = Landing Helicopter Deck</li> <li>LPD = Landing Platform Dock</li> <li>LSD = Dock Landing Ships</li> </ul>
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Source: GAO analysis of Navy documentation. | GAO-17-54



By April 2016, the Navy had awarded all three of the third-party advance planning contracts—all to QED Systems, Inc. While the Navy anticipated competition, it reported that only the Landing Helicopter Assault/Landing Helicopter Deck class third-party advance planning solicitation received multiple offers. As a result, one firm is currently responsible for planning specifications for all of the MAC-MO availabilities. According to Navy staff we interviewed, QED Systems had prior experience drafting work specifications for ship availabilities as a subcontractor for MSMO ship repair contractors. As of August 2016, QED Systems had developed specifications for the Norfolk gap ships USS Normandy and USS Gettysburg and was in the process of planning additional availabilities.

NAVSEA has awarded multiple award IDIQ contracts for the execution of complex availabilities in Norfolk and San Diego, and reported MARMC and SWRMC have issued their first orders. In addition, as of August 2016, SERMC had solicited, with the intent to award multiple IDIQ contracts, for the execution of availabilities in Mayport, Florida. MARMC and SWRMC have posted draft solicitations for the award of IDIQs to small business contractors in their respective ports.

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## Additional Action Needed to Address Potential Challenges to Implementation of the MAC-MO Contract Strategy

The Navy has taken steps to mitigate potential challenges as it moves forward with the MAC-MO contracting strategy, primarily by responding to 11 key lessons learned from its pilot availabilities. As of August 2016, the Navy has taken actions that partially address 8 and fully address 3 of those lessons learned. A persistent theme across several of the lessons learned is the need for sufficient staffing within the regional maintenance centers (RMC)—a deficiency that has existed for years, according to NAVSEA officials. In addition, the lessons learned highlight the importance of stabilizing requirements prior to solicitation of firm-fixed-price contracts—a cornerstone of the MAC-MO approach. The Navy has developed new milestones that aim to do so; however, its discipline in performing to these milestones remains largely untested, and it has historically experienced challenges in this area. In addition, although individual RMCs are assessing the outcomes of individual ship availabilities under MAC-MO, many different maintenance community stakeholders are involved and the Navy lacks a coordinated process to evaluate whether implementation of the new strategy is progressing as planned.

The Navy Has Made Progress Addressing Potential Challenges in Implementing MAC-MO

Based on our analysis of Navy documentation and interviews with NAVSEA officials, we identified 11 key lessons learned stemming from the pilot maintenance availabilities. All but one of these lessons learned focused on the need to mitigate potential challenges associated with MAC-MO’s envisioned use of firm-fixed-price contracts and third-party planners. We considered lessons learned to be key if (1) NAVSEA staff documented them as lessons learned and (2) NAVSEA officials knowledgeable with the pilot ship experiences identified them as significant.<sup>18</sup> According to our analysis, the Navy has made progress towards addressing the lessons learned, fully addressing 3 and partially addressing the remaining 8.

Table 3 highlights these lessons learned, Navy actions related to them, and our assessment of the Navy’s actions.

**Table 3: Status of Actions to Address Key Lessons Learned During Multiple Award Contract-Multi-Order (MAC-MO) Pilot Ship Maintenance Availabilities**

Strategy attribute	Related lesson learned regarding potential challenge to implementation	Action taken	GAO assessment
Use of firm-fixed-price contracts	Need for stakeholders, such as the type commanders and modernization sponsors, to establish work requirements early to provide the third-party planner adequate time to produce accurate specifications	Naval Sea Systems Command (NAVSEA) proposed revised milestones to help ensure the requirements are established on a schedule that supports third-party planner needs.	Actions taken partially address the lesson learned ●
	Need for strategies to reduce the impact of changes to work requirements after contract award to prevent schedule delays	NAVSEA plans use of mechanisms, (such as formally reserving funds and using contract options) to fund additional work surfacing after contract award, to reduce the need to negotiate contract changes.	Actions taken partially address the lesson learned ●
	Need for additional regional maintenance center (RMC) staff for execution of the contract as staff assume additional responsibilities, such as drafting requests for contract changes, formerly done by Multi-Ship, Multi-Option (MSMO) contractors	RMCs have required and received funding approval for additional staff to fulfill needs that existed before implementation of the MAC-MO strategy and while there have been intermittent delays, hiring at RMCs is in progress.	Actions taken partially address the lesson learned ●
	Need for additional RMC staff training as they take on new responsibilities for oversight of the firm-fixed-price contracts	Commander, Navy Regional Maintenance Center (CNRMC) has enhanced the content of required course work and introduced new courses related to firm-fixed-price contracts.	Actions taken partially address the lesson learned ●

<sup>18</sup>See appendix I for more information about our methodology.

	Need to revisit the use of contractor incentives in a firm-fixed-price environment because penalties for not completing the contract as agreed, known as liquidated damages, were not seen as an effective tool	NAVSEA reports working on finding the most effective incentive structure, and RMC program managers would decide if an incentive were needed.	Actions taken partially address the lesson learned ○
Use of third-party planners	Need for incentives for third-party planners for improving Surface Maintenance Engineering Planning Program (SURFMEPP) planning products for future use and producing quality work specifications	NAVSEA includes monetary incentives in the third-party planning contract tied to updating technical data and accurate work specifications for the duration of the contract.	Actions taken fully address the lesson learned ●
	Need for third-party planners to check the condition of the ship (“ship check”) to minimize growth work	NAVSEA includes a requirement in the third-party planning contract to conduct ship checks	Actions taken fully address the lesson learned ●
	Need for third-party planners to have better access to the Navy Maintenance Database to more easily develop work specifications.	SURFMEPP has taken steps to improve the third-party planner’s access to the database, although gaps remain because of safeguards needed to protect proprietary information.	Actions taken partially address the lesson learned ○
	At MARMC and SWRMC, based on staff reporting, need for additional staff to administer the third-party planner contract and review specifications produced by the third-party planner	These RMCs reported they are shifting staff from other duties to perform these responsibilities and restructuring their planning divisions to support the strategy.	Actions taken partially address the lesson learned ○
	At MARMC and SWRMC, need for stronger staff capabilities to review the accuracy of third-party planning specifications	CNRMC is sponsoring training and created new courses to train staff on the specification review process.	Actions taken partially address the lesson learned ○
	Use of IDIQ contracts	Need for new arrangements to order and store advance materials, as MSMO contracts were generally for 5 years and contractors could store such materials.	NAVSEA included a contract requirement for the third-party planner to order and store these materials.
Separate competitions for noncomplex and complex work	N/A <sup>a</sup>	N/A <sup>a</sup>	N/A <sup>a</sup>

Legend: ● = Actions taken fully address the lesson learned; ○ = Actions taken partially address the lesson learned; ○ = No actions yet taken or actions taken did not address the lesson learned.

Source: GAO analysis of Navy data and documentation. | GAO-17-54

<sup>a</sup>The Navy did not test this attribute during the pilot availabilities.

The documented need to hire additional staff applied to two attributes—use of firm-fixed-price contracts and use of third-party planners. This issue also surfaced in interviews we conducted at two of the three MAC-MO implementing RMCs—MARMC and SWRMC. MARMC staff we interviewed reported they did not have the staff needed to implement

MAC-MO, and SWRMC leaders reported that the San Diego pilot availabilities validated the importance of them moving forward with hiring to approved staffing levels in areas such as specification review.

However, firm-fixed-price contracts—such as exist under MAC-MO—generally should require fewer government resources to administer than the cost-reimbursement contracts of the MSMO strategy. For instance, the use of a cost-reimbursement contract requires the contracting officer to determine before the award the contractor’s accounting system is adequate, to perform surveillance during execution to ensure the contractor is exercising effective cost controls, and to employ audits to ensure only allowable costs are being paid. None of these measures is necessary for firm-fixed-price contracts, under which the contractor must perform the specified work regardless of incurred expenses.

In response to our question on why additional staff were needed to support the MAC-MO strategy, a senior CNRMC official commented that the current need for additional staffing at MARMC and SWRMC was not a result of the change in contracting strategy to MAC-MO, but rather indicative of persistent staffing shortages that existed under the MSMO strategy. For example, the officials said that although RMC staff reported the need to hire qualified contracting specialists to support the MAC-MO strategy, shortages in this position existed under MSMO because the demands of the job produced high turnover. In 2014, several years after the establishment of the RMCs, U.S. Fleet Forces Command commissioned a study that assessed RMC manning requirements. CNRMC officials stated that this study served as justification for requesting approximately 300 additional staff across the RMCs beginning in fiscal year 2017. However, a senior CNRMC official cited budget constraints within U.S. Fleet Forces Command, which approves RMC budgets, as a limiting factor on how rapidly the RMCs could overcome existing staffing shortfalls. Nonetheless, a CNRMC official stated that MAC-MO might alleviate shortfalls, although it could be years before the impacts are realized.

In addition, Navy officials stated that they plan to continuously assess and incorporate lessons learned throughout implementation of the MAC-MO strategy. According to CNRMC officials, one recent example of this learning occurred during the execution of the gap ship availabilities in Norfolk, which identified a need to train contracting staff on how to obtain funding for contract changes when funding for the original contract had been obligated in the prior fiscal year. Since this process was never needed to fund changes to MSMO cost-reimbursement contracts,

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MARMC staff were unfamiliar with the process.<sup>19</sup> In addition, RMC officials identified a variety of lessons learned after the third-party planning contractor completed its first set of work specifications for the USS Normandy, a gap ship availability. RMC officials reported that although the third-party planner met almost all of the planning milestones, the experiences during the planning process underscored the importance of RMC staff meeting frequently with the planner to discuss and answer questions and review specifications and outcomes of ship checks.

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**Transition to the MAC-MO Strategy Requires Stakeholders to Stabilize Requirements Early to Support Development of Accurate Specifications**

Unstable work requirements have historically posed risks to the Navy's maintenance and readiness goals and hold significant implications for the MAC-MO contracting strategy. Without stable requirements, the third-party planner cannot develop work specifications that reflect the full scope of work needed to be done. In our May 2016 report on OFRP, we found that from 2011 to 2014, on average, surface combatants experienced a 34 percent increase in unanticipated growth in maintenance requirements, resulting in average annual cost growths of \$164.8 million. Officials primarily attribute the unanticipated growth and new work to estimating difficulties and high operational tempo, among other reasons.<sup>20</sup> Increases in growth and new work also have consequences for the length of a maintenance availability as RMC staff and contractors need to negotiate contract changes and agree on costs. For example, the Navy reported that from May to October 2015, the median time to process and complete negotiations for new work for surface combatants was 18 days, exceeding the Navy's standard of 5 days.

The MAC-MO San Diego pilot availabilities identified the need for NAVSEA to provide sufficient time to finalize work requirements (known as package lock) before the third-party planner develops the work specifications that accompany the solicitation. Accordingly, in 2015,

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<sup>19</sup>Department of the Navy, Office of the Assistant Secretary of the Navy, (Financial Management and Comptroller), *Financial Management Policy Manual, 2015*. Expired funds may generally be used for obligation adjustments, commonly referred to as upward obligation adjustments, resulting from within scope contract changes, as well as out of scope changes or other new obligations for which legal authority exists to use expired funds.

<sup>20</sup>The Navy defines growth as any additional work that is identified or authorized after contract definitization that is related to a work item included in the original contract. Alternatively, the Navy defines new work as any additional work that is identified or authorized after contract definitization that is not related to a work item included in the original contract definitization.

NAVSEA proposed revised planning milestones for CNO availabilities, which lengthened the amount of time between the start of the planning process and the start of maintenance availability from 360 days (which was the MSMO standard) to 540 days. Although key stakeholder roles remain the same under the new MAC-MO milestones, NAVSEA's move to lock the work package earlier to allow time for solicitation of the contract has implications for stakeholders who develop modernization and maintenance requirements, as well as stakeholders who verify the accuracy of the work specifications prepared by the third-party planner. For example, the requirements must be locked 175 days, rather than 90 days, before the start of an availability.

According to NAVSEA officials, the Navy has not yet formally approved and implemented the revised MAC-MO milestones. NAVSEA officials reported currently using the revised milestones for its firm-fixed-price contracts as it wants to see how they work before formally approving them. See figure 5 for a comparison of the planning milestones for a CNO availability under MSMO and MAC-MO.

**Figure 5: Comparison (in days) of Planning Milestones for Work Package Development in a Chief of Naval Operations Availability (>\$5 million and <\$20 million) under the MSMO and MAC-MO Strategies**

Milestones for multi-ship, multi-option (MSMO) cost reimbursement contracts (in days)



Milestones proposed for multiple-award contract, multi-order (MAC-MO) firm fixed price contracts (in days)



Source: GAO analysis of Navy documentation. | GAO-17-54

Note: Under MSMO, the Navy did not solicit proposals for individual availabilities. Consequently, the MAC-MO RFP release and award events are not correspondent to any MSMO milestones.

Senior NAVSEA, type command, RMC, and SURFMEPP officials agreed that development of fully-defined and timely work requirements is needed to support the planning process, but senior RMC officials as well as NAVSEA officials expressed concerns related to the occasionally conflicting goals of the fleet and the maintenance community. As officials explained, the fleet would prefer to wait as late as possible to define the requirements, as for example, ship systems continue to operate—and can thus break—up to the point that a ship enters an availability. Alternatively, the maintenance community prefers to lock requirements early in order to award the contract and support the solicitation of the availability. One senior NAVSEA program official commented that defining requirements later in the planning process was possible under the MSMO contracting strategy because the contract holder was responsible for repairing and maintaining the same ship year after year and could more easily accommodate changes in the scope of work to be completed. According to Navy officials, under MSMO, the contractor could even be tasked with writing requests for contract changes, which was the common practice at MARMC, but not SERMC or SWRMC. Alternatively, under MAC-MO, RMC staff exclusively are expected to develop these requests.

Several NAVSEA officials, including RMC officials, and a type command official commented that the use of firm-fixed-price contracts under MAC-MO will force earlier definition of requirements, which necessitates the Navy becoming more disciplined in its planning processes. Further, one RMC contracting official, experienced with the use of firm-fixed-price contracting, commented that one of the biggest challenges to MAC-MO will be making sure stakeholders responsible for developing the requirements are collectively meeting each of the milestones for locking the requirements. Consistently, Navy officials at the various commands we interviewed acknowledged the importance of achieving accurate work specifications for a maintenance availability, as inaccurate work specifications could result in contract modifications, leading to schedule delays and cost growth and thus contravening the goals of MAC-MO.

Several senior Navy officials expressed hope about the MAC-MO strategy's likelihood of success because they said the nature of firm-fixed-price contracts would make the tradeoffs between adding additional work after the start of an availability and adhering to the schedule more apparent, adding discipline to the process. A CNRMC official commented that adding additional work under the MSMO contracting strategy was relatively easy because the type commands and the modernization teams could go straight to the contractor and ask for more work to be done, and the contractors were willing to have new work added. In contrast, under the MAC-MO strategy adding work will be more time-consuming yet transparent because the cost of additional work will need to be negotiated before the work commences. Further, one senior acquisition planning official added that even if the need for new and growth work was identified after the contract was awarded, the government has the option of performing the work later at a subsequent availability provided the additional work is not related to the core functionality of the ship or a safety issue.

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### The Navy Lacks a Systematic Process for Evaluating MAC-MO Implementation and Progress

The Navy has processes in place for evaluating the contract performance of its individual surface ship availabilities, including metrics that measure schedule delays, cost growth, and contract changes associated with growth and new work. This evaluation process, which is centered in the RMCs, has largely carried over from the previous MSMO strategy, although under MAC-MO's firm-fixed-price contracts, it will not include award fee evaluation board reviews of the availability contractor. In addition, while the CNRMC collectively analyzes the metrics, it is not responsible for determining whether the strategy itself is achieving its objectives.



Apart from these availability-specific evaluations, the Navy does not have a systematic process in place to evaluate the extent to which the MAC-MO strategy is meeting its overall objectives and whether risks to its success, such as timely completion of work requirements under the proposed milestones and shortfalls in RMC staffing, have been cooperatively addressed and mitigated by stakeholders within the Navy maintenance community. According to federal standards for internal control, management should design control activities to respond to risks and evaluate if objectives are being met, which involves leadership-level reviews of performance and establishment of performance measures.<sup>21</sup> As we have previously reported, risk assessment can provide a foundation for effective program management because it provides reasonable assurance that such risks are being minimized.<sup>22</sup>

As noted above, the Navy faces some challenges to successfully implementing MAC-MO. Greater discipline is required to plan and execute ship availabilities using firm-fixed-price contracts and third-party planners, requiring greater coordination among stakeholders in the fleet and NAVSEA to identify potential risks to the strategy. Achieving stable requirements and specifications requires extensive coordination within the type commands, across NAVSEA offices, and with the third-party planner—an approach the Navy has only demonstrated to a limited extent to date, primarily through its San Diego pilot availabilities. Further, as experiences with the Norfolk gap ships suggest, the Navy is likely to identify additional lessons learned. Without effective coordination across myriad stakeholders within the Navy’s maintenance communities who together are responsible for scheduling, planning, budgeting, overseeing, and setting policy for surface ship availabilities, there is the risk that MAC-MO will not be implemented as envisioned and the potential benefits may not be fully realized.

The Navy already recognizes the importance of establishing forums where issues of cross-cutting interest to the fleet and maintenance communities can be addressed. In June 2016, the Navy chartered a committee to identify and address maintenance and modernization requirements for surface ships. This committee, known as the Surface and Expeditionary Warfare Maintenance and Modernization Committee,

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<sup>21</sup>GAO, *Standards for Internal Control in the Federal Government*, [GAO-14-704G](#) (Washington, D.C.: Sept. 10, 2014).

<sup>22</sup>[GAO-12-887](#).

includes stakeholders from the fleet and shore-based maintenance communities. As stated in the Navy instruction establishing the committee, this coordination is best accomplished through a standing group of knowledgeable and accountable representatives who actively participate in the development and assessment of maintenance and modernization requirements and resourcing solutions.<sup>23</sup> In addition, as SWRMC recommended as part of its lessons learned from the San Diego pilot availabilities, a committee known as Surface Team 1 could have the potential to track the successful aspects of MAC-MO's implementation and develop metrics to evaluate its performance. The Navy has tasked Surface Team 1, a previously existing committee, whose representatives also include members of the fleet and shore-based maintenance communities, with responsibilities for setting and developing surface ship maintenance and modernization priorities, but has not tasked it with assessing MAC-MO's implementation.

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## MAC-MO Strategy Will Increase Competition Opportunities, but It Is Too Soon to Assess Other Effects on the Ship Repair Industrial Base

NAVSEA designed the MAC-MO contracting strategy to increase the number of competition opportunities for the maintenance and modernization of surface ships. This goal is achieved through a competitive ordering process for individual availabilities, expansion of the base of potential prime contractors to include small businesses, and greater use of coast-wide—rather than just homeport-specific—solicitations. Aside from these increased competitions, it is too soon to tell what other effects MAC-MO may have on the ship repair industrial base. Navy MSMO contractors in the MAC-MO homeports of Mayport, Florida; Norfolk, Virginia; and San Diego, California stated they have begun taking steps to reduce overhead costs to position them to operate efficiently within a firm-fixed-price contracting environment. Contractor representatives report these steps include reduced investments in training and facilities. The effect of these steps, however, depends in part on factors unrelated to MAC-MO—most notably, the Navy's ability to provide consistent and stable workloads within these ports. In contrast, non-MSMO contract holders, including small businesses, did not share these concerns since they were accustomed to working in a firm-fixed-price contract environment and maintained less extensive facilities. All of the contractors we interviewed intend to compete for MAC-MO contracts, and

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<sup>23</sup>OPNAVINST 4700.40 N9 15 June 2016. The instruction authorizing this committee is applicable to all surface and expeditionary ship maintenance and modernization requirements with the exception of nuclear-powered surface ships.

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several cited potential changes needed to their workforces to prepare for an environment of increased competition under MAC-MO.

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### MAC-MO Strategy Expands Competition Opportunities in Three Ways

The MAC-MO strategy expands competition opportunities in three key ways:

- holders of IDIQ multiple award contracts will compete for orders for each availability,
- noncomplex availabilities are set aside for small businesses, and
- coast-wide competitions will enable contractors not located in the ship's homeport to compete for the maintenance availability.

NAVSEA officials told us they expect increased competition to reduce the overall cost of ship availabilities, although it is too soon to determine if the Navy will realize these benefits. Details follow on each aspect of planned competition.

### IDIQ Multiple Award Contracts Facilitate Competition for Each Availability

Under the MAC-MO strategy, more opportunities for contractors to compete for work will exist because the multiple award contract structure allows the Navy to compete orders for each individual availability among the pool of IDIQ awardees. This represents a departure from the MSMO strategy because under MSMO, a single contract is awarded to one contractor to execute availabilities for a class of ship over a 5-year period. Under MSMO two contracts could be awarded for a class of ships—one for maintenance availabilities that required a drydock facility (docker contract) and one for those that did not (non-docker contract).

To illustrate the number of IDIQ orders that could potentially be competed under the MAC-MO strategy, we analyzed DDG 51-class destroyer availabilities completed in Norfolk between fiscal years 2010 and 2014. The Navy executed these maintenance availabilities under two different MSMO contracts—a docker contract and a non-docker contract. We performed this analysis because under the MAC-MO strategy, individual availabilities—which were previously covered by a single MSMO contract—could now be competed as individual orders among the pool of IDIQ awardees. As shown in table 4, our analysis indicates that over a 5-year period, the Navy could have realized over 350 competitive orders for

the destroyer availabilities it completed in Norfolk, had a MAC-MO IDIQ contract with associated competition opportunities been in place.<sup>24</sup>

**Table 4: GAO Analysis of Destroyer Availabilities in Norfolk, Virginia, Fiscal Years 2010-2014**

Type of Contract	Number of Potential Competitions under Multiple Award Contract-Multi Order Strategy					
	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2010-FY 2014
Non-Docker	31	41	38	39	47	196
Docker	23	35	32	30	36	156
<b>Totals</b>	<b>54</b>	<b>76</b>	<b>70</b>	<b>69</b>	<b>83</b>	<b>352</b>

Source: GAO analysis of Navy data. | GAO-17-54

In addition, NAVSEA officials told us they plan to broaden the pool of potential competitors for IDIQ complex and noncomplex awards by setting up rolling admissions for additional proposals, meaning that qualified contractors can apply to become a part of the pool of IDIQ awardees beyond the initial IDIQ solicitation period. They plan to release a solicitation for rolling admissions in San Diego and Norfolk in early fiscal year 2017.<sup>25</sup> The purpose of the rolling admission is to expand the contractor base for modernization of surface combatants and amphibious ships. A representative from one small business, which did not hold a MSMO contract, told us it would consider applying for an IDIQ award for complex availabilities once the MAC-MO strategy is fully implemented because of the flexibility offered by rolling admissions.

**Noncomplex Availabilities Competed Among Small Businesses**

The MAC-MO strategy broadens the pool of prime contractors qualified to compete for work in Norfolk, Virginia and San Diego, California by setting aside noncomplex availabilities in those locations for small businesses.<sup>26</sup> Small businesses told us that historically they were more likely to work as

<sup>24</sup>However, a MARMC official told us that the majority of these availabilities are considered to be complex work, so would not be considered small business set asides under the MAC-MO strategy.

<sup>25</sup>In June 2016, NAVSEA released the pre-solicitation for rolling admission for complex continuous maintenance, emergent maintenance, and CNO availabilities for work in Norfolk, Virginia and San Diego, California.

<sup>26</sup>As part of its market research analysis, consistent with FAR requirements to structure contracts to facilitate small business participation, NAVSEA determined the potential existed for small businesses to compete in two of the homeport markets—Norfolk and San Diego—as prime contractors for IDIQs structured to cover noncomplex work but not the third—Mayport. In Mayport, NAVSEA determined there were not enough existing small businesses to warrant a small business set aside for non-complex work.

subcontractors to MSMO contract holders, offering specialized services such as electrical work, sometimes under a teaming agreement with the prime contractor.<sup>27</sup>

Under MAC-MO, small businesses are not required to hold a Master Ship Repair Agreement (MSRA) certification in order to compete for noncomplex availabilities. In March 2016, a NAVSEA official briefed contractors that, alternatively, small businesses competing for noncomplex contracts would be required to have “MSRA-like” capabilities and capacity to successfully compete for the contract.<sup>28</sup> The term “MSRA-like” means that small businesses will be required to have similar management and quality processes to that required of a certified MSRA holder, and the capability to successfully complete typical work requirements associated with continuous maintenance availabilities. As of September 2016, NAVSEA had not awarded any IDIQ contracts for noncomplex availabilities, so it is too soon to tell how NAVSEA will adjudicate this process.

Small business representatives we interviewed consistently expressed interest in performing as prime contractors under MAC-MO. Representatives of all seven small businesses we interviewed stated that they plan to compete as prime contractors for noncomplex availabilities—even in Mayport, Florida, where the Navy plans to compete noncomplex availabilities among both small and large businesses. Some small business representatives noted they were likely to continue to act as subcontractors for complex availabilities. Representatives from small businesses identified a variety of factors they would consider on whether to compete for complex availabilities. For example, three small businesses told us it would depend on the nature of the work in a given availability, and more specifically, the facility requirements set forth in the solicitation. Further, 4 of the 7 small businesses we interviewed told us they do not own their own piers or have the dredged water space alongside the piers to berth ships. These businesses told us they typically

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<sup>27</sup>FAR § 9.601. A teaming arrangement refers to an agreement between two or more companies to form a partnership or joint venture to act as a prime contractor or in which a potential prime contractor agrees with one or more companies to have them act as subcontractor on a particular contract or program.

<sup>28</sup>Naval Sea Systems Command Instruction 4280.2C, Master Agreement for Repair and Alteration of Vessels; Master Ship Repair Agreement (MSRA) and Agreement for Boat Repair (ABR) (Nov. 27, 1996). A CNRMC official advised us that the Navy is in the process of revising the MSRA certification program to update information on contractors.

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rely on the Navy's facilities or those of large contractors to berth the ship so that they can conduct work on the ship. NAVSEA officials told us that it is not their intent for small businesses to perform work at facilities owned by large contractors and that, in general, the Navy will provide pier space for completion of noncomplex availabilities.

Increased Use of Coast Wide Competitions

Navy policy requires that, whenever possible, ship repair and maintenance work of 6 months or less be performed by shipyards at or near the ship's homeport to improve the crew's quality of life by reducing their time away from home.<sup>29</sup> Although NAVSEA officials told us they solicited few if any coast-wide availabilities under MSMO, as part of the transition to the MAC-MO strategy, NAVSEA has already competed several availabilities coast-wide and plans to compete nine additional maintenance availabilities along the East and West Coasts from 2017 to 2019. Accordingly, any contractor on either coast with access to a pier and drydock will be able to compete for these availabilities. For example, shipyards in Charleston, South Carolina and Pascagoula, Mississippi would be allowed to compete for East Coast solicitations. NAVSEA officials told us they intend to evaluate the total cost of moving a ship out of its homeport—including fuel and transportation—before making an award for availabilities competed coast-wide, as moving ships from their homeport can be expensive and offset potential savings from the competition.

The Navy's plan to compete nine coast-wide availabilities represents a significant increase over those competed under MSMO, where, according to NAVSEA officials, RMCs competed few if any coast-wide availabilities. Under the statute in effect since 1986 and Navy policy dating back to 1995, if the work will take 6 months or less and there is adequate competition available among firms able to perform the work at the homeport of the vessel, then the contract solicitation must be limited to only homeport firms.<sup>30</sup> Contract solicitations for work taking longer than 6 months generally must be competed coast-wide. According to NAVSEA officials, under MSMO, the availabilities were planned to be shorter than 6 months.

Navy officials offered various reasons as to why availabilities under MSMO were planned to be completed in less than 6 months. Because

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<sup>29</sup>This policy was established in June 1995, in accordance with 10 U.S.C. § 7299a.

<sup>30</sup>10 U.S.C. § 7299a.

MSMO contracts typically provided for 5 years of planned availabilities for a ship class within a given homeport, NAVSEA officials told us estimates of availability durations regularly had to be made years before the actual work requirements were known. Nevertheless, by planning the availabilities to be less than 6 months, NAVSEA did not need to compete them coast-wide (as it would have under the 1986 statute) and move the ship out of its homeport. In one instance, though, we found a MSMO contract that included options to cover any instances of work anticipated to take longer than 6 months, such as extended modernization availabilities. Therefore, the period of performance of these availabilities would have exceeded the 6-month limitation if the options had been exercised. NAVSEA and RMC officials told us that, in general, RMC contracting staff have been opposed to moving a ship out of its homeport because of the potential negative effects on sailor morale and the anticipated costs of moving the ship.

NAVSEA officials reported taking two separate actions to clarify the homeport exception to coast-wide competitions. First, NAVSEA officials recognized that the Navy homeport policy does not use the term “work”, which is included in the current statute. Specifically, the homeport policy does not define the scope of work included in an availability or when measuring of that work (estimating the number of days needed to execute the availability) should take place. NAVSEA officials stated they are drafting a revision to the 1996 homeport policy and that this draft revision will define the term “work” as meaning “work for the overhaul, repair, or maintenance of a naval vessel”. Additionally, the Navy’s proposed policy revision will require that 540 days prior to the start of an availability, the Navy identify how work days will be measured for that availability. In addition, NAVSEA officials told us they are developing a legislative proposal to increase the 6-month exception to coast-wide competitions to allow for a longer period before they have to do a coast-wide competition because availabilities with modernization packages now regularly exceed 6 months, unlike in the past.

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### Multiple Factors Likely to Affect the Industrial Base as Contractors Respond to the MAC-MO Strategy

A variety of factors, including the Navy’s level of demand for maintenance and repair work at each of the three homeports in our review, will determine how the MAC-MO strategy might affect the industrial base, if at all. The possibility exists that some firms may choose to exit or enter the market, but it is too soon to tell how the MAC-MO contracting strategy might affect the industry’s capacity to meet the Navy’s long-term needs, especially since fluctuations in the Navy’s workload forecasts could also affect industrial base conditions within individual homeports.

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Navy Maintenance Workloads Drive Demand for Contractor Services

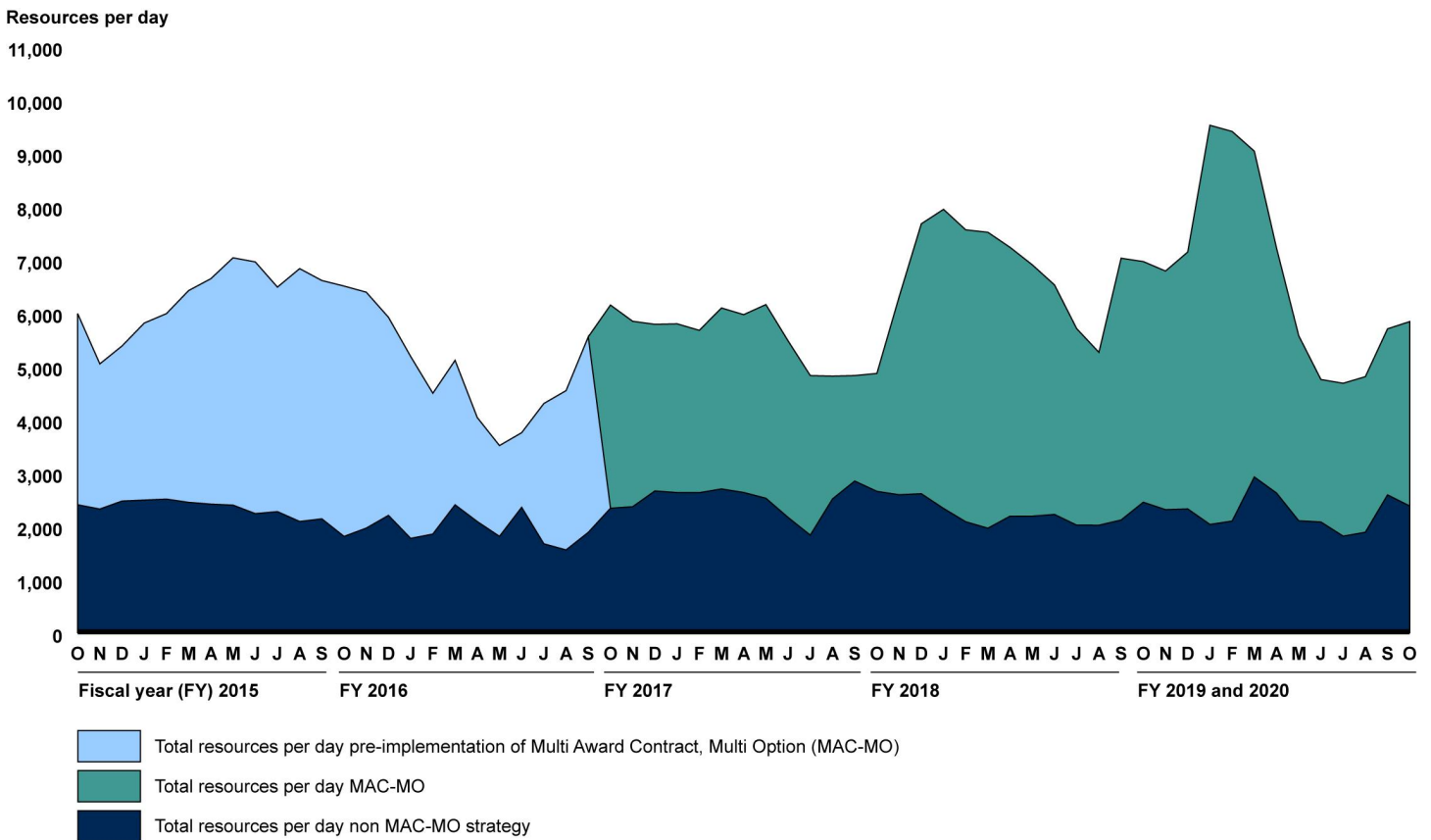
CNRMC officials told us they expect a predictable repair and maintenance workload in the homeports of Mayport, Florida; Norfolk, Virginia; and San Diego, California in future years, although this workload is cyclical in nature as it was under the MSMO strategy. Various factors, including the deployment of ships, can affect the demand for work in each of the homeports. For example, according to a Fleet Forces Command official, an upswing in workload for surface ships is expected in Norfolk as deployed ships move back into their homeport during fiscal year 2018. Similarly, the Navy plans to homeport newly constructed surface ships in San Diego, providing an upswing in future workload there as these new ships come in for maintenance and repairs. However, the Navy could make other decisions that could affect a homeport's industrial base, such as when the Navy relocated three amphibious ships from Norfolk, Virginia to Mayport, Florida in fiscal year 2014.<sup>31</sup> See figures 6, 7, and 8 for the Navy's recent historical and forecasted workload in these three ports.

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<sup>31</sup> [GAO-13-501](#).



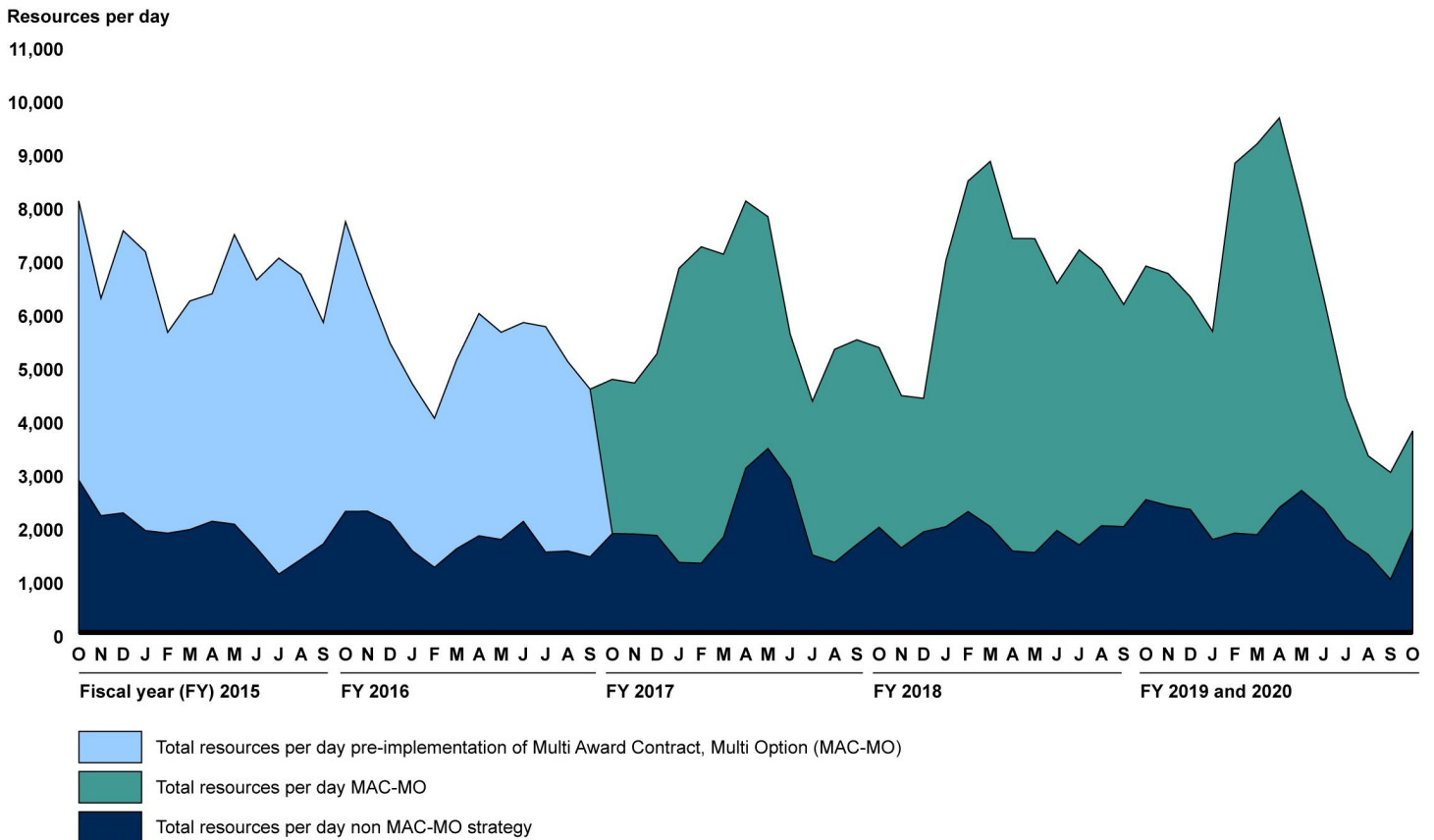
**Figure 6: Recent Historical and Forecasted Navy Maintenance Workload in Port of Norfolk, Virginia, fiscal years 2015-2020**



Source: Commander Navy Regional Maintenance Center. | GAO-17-54

Note: Resources per day is derived from the Navy's estimate of total mandays budgeted for each availability, which is then summarized to provide an estimated forecast of a port's entire workload. Total resources pre-implementation of the MAC-MO strategy includes contracts under the MSMO strategy, gap ship contracts, and anticipated MAC-MO contracts. Total resources per day non-MAC-MO strategy includes availabilities on aircraft carriers and other vessels which are not included in the MAC-MO strategy. This forecast does not include an estimate of the resources per day needed to execute anticipated coast-wide competed availabilities.

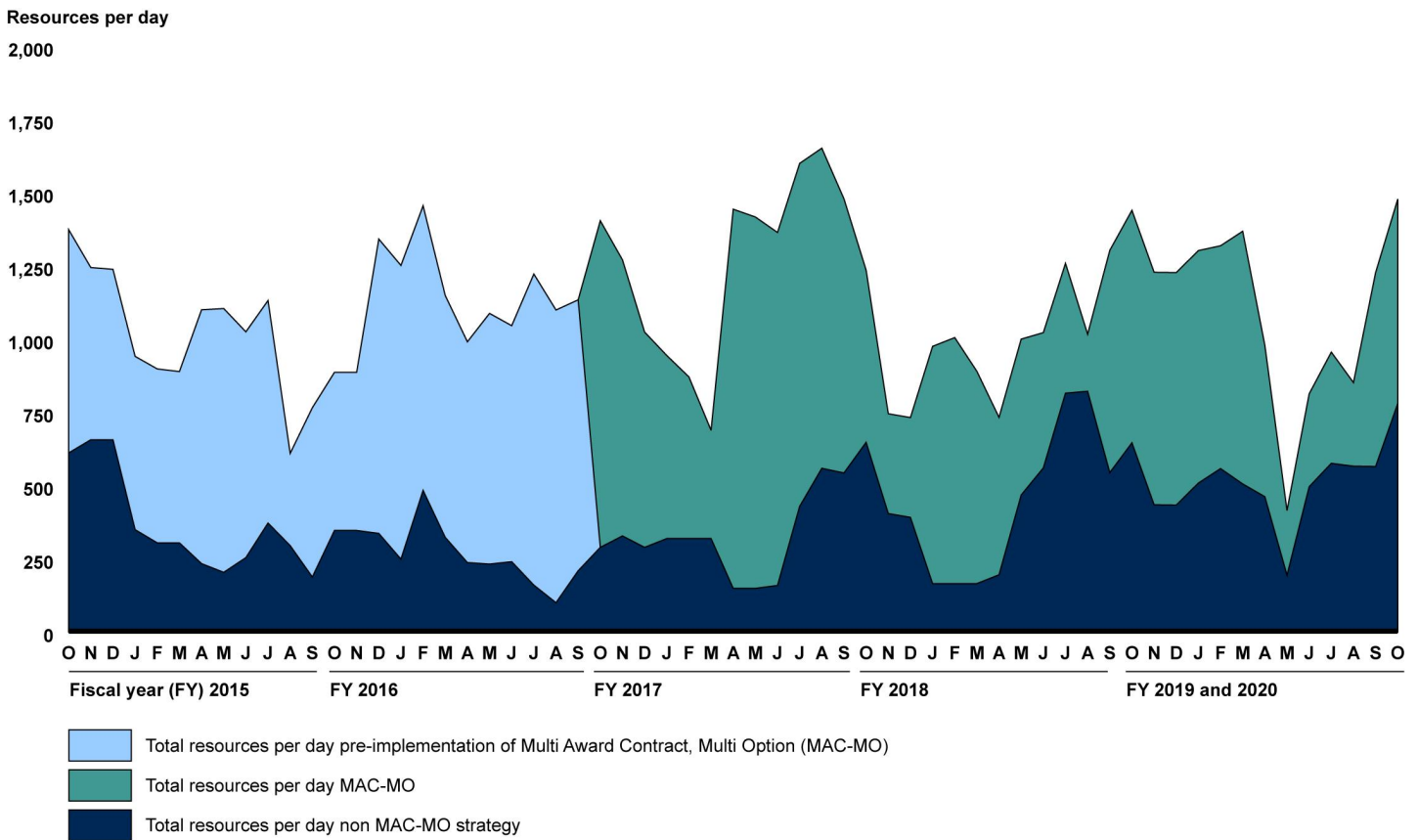
**Figure 7: Recent Historical and Forecasted Navy Maintenance Workload in Port of San Diego, California, fiscal years 2015-2020**



Source: Commander Navy Regional Maintenance Center. | GAO-17-54

Note: Resources per day is derived from the Navy's estimate of total mandays budgeted for each availability, which is then summarized to provide an estimated forecast of a port's entire workload. Total resources pre-implementation of the MAC-MO strategy includes contracts under the MSMO strategy, gap ship contracts, and anticipated MAC-MO contracts. Total resources per day non-MAC-MO strategy includes availabilities on air craft carriers and other vessels which are not included in the MAC-MO strategy. This forecast does not include an estimate of the resources per day needed to execute anticipated coast-wide competed availabilities.

**Figure 8: Recent Historical and Forecasted Navy Maintenance Workload in Port of Mayport, Florida, fiscal years 2015-2020**



Source: Commander Navy Regional Maintenance Center. | GAO-17-54

Note: Resources per day is derived from the Navy's estimate of total mandays budgeted for each availability, which is then summarized to provide an estimated forecast of a port's entire workload. Total resources pre-implementation of the MAC-MO strategy includes contracts under the MSMO strategy, gap ship contracts, and anticipated MAC-MO contracts. Total resources per day non-MAC-MO strategy includes availabilities on air craft carriers and other vessels which are not included in the MAC-MO strategy. This forecast does not include an estimate of the resources per day needed to execute anticipated coast-wide competed availabilities.

Generally, former MSMO contract holders we interviewed in Norfolk and San Diego expressed less concern about the transition from MSMO to MAC-MO than they did the Navy's ability to provide stable workloads in their ports, irrespective of contract type. In May 2016, we found that wide swings in port workload can have a negative effect on the private-sector industrial base, and various factors can affect those workloads.<sup>32</sup> Further,

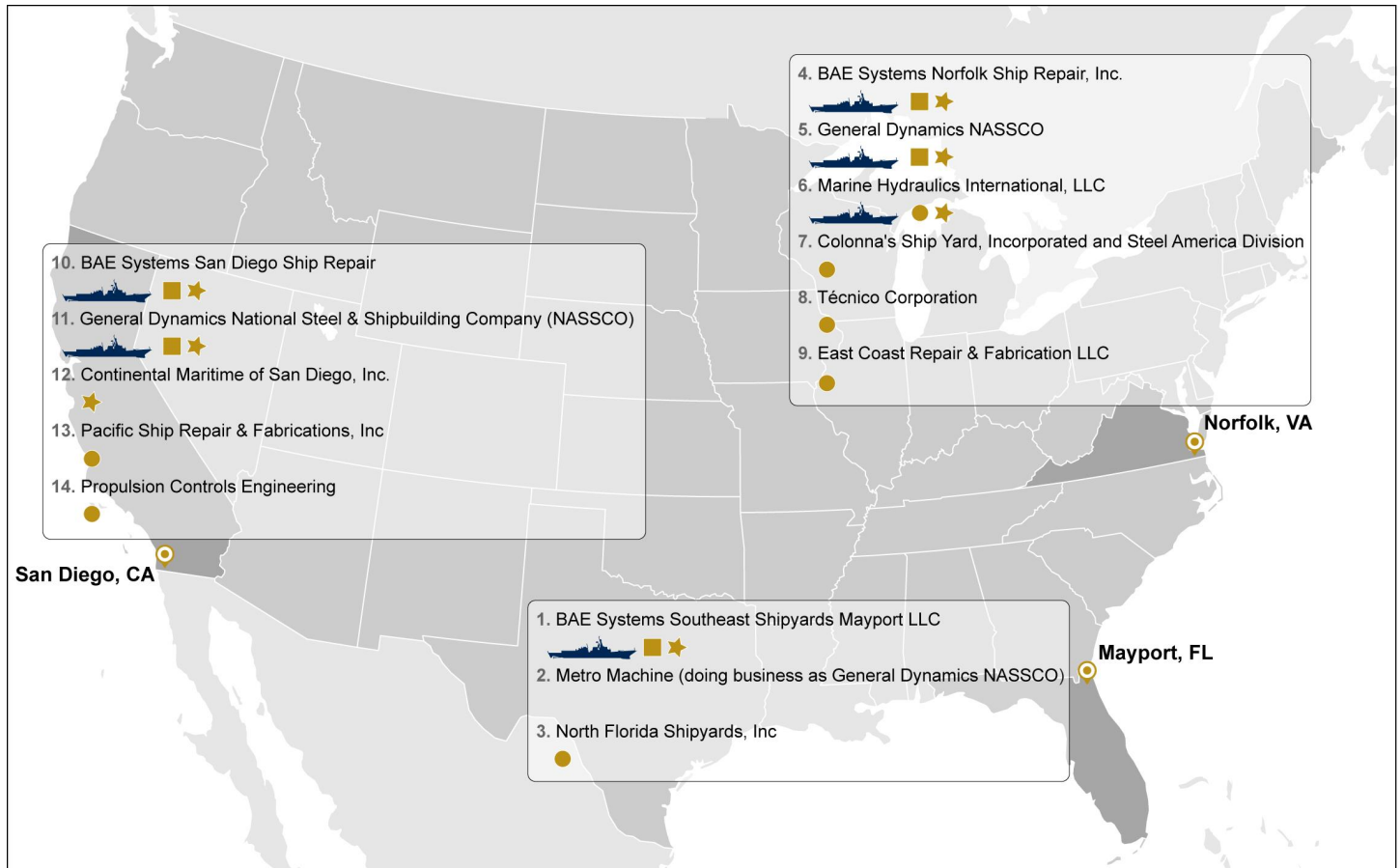
<sup>32</sup> [GAO-16-466R](#).





Navy documents show that OFRP will drive changes to the maintenance cycles for carrier and expeditionary strike groups and, in turn, cause significant fluctuations in port workloads, which could affect the industrial base's ability to hire and retain a skilled workforce. Navy officials stated that they have begun to take steps to ensure that ships that comprise a carrier or expeditionary strike group—including non-nuclear surface ships, such as destroyers, cruisers, and amphibious ships—stagger their maintenance start and stop timelines, which would alleviate, in part, the concerns that industry cited.

Availability of Industrial Base  
Facilities and Workforce

Former MSMO and non-MSMO contractors offered various views on the potential effects of the MAC-MO strategy on the industrial base, primarily related to the need for contractors to compete for orders after the award of the IDIQ multiple award contracts. In part, these views are shaped by the various types of facilities—such as drydocks and piers—that an individual contractor maintains. According to two former MSMO contractors, these facilities represent significant capital investments on the part of the contractor, which then relies on sustained Navy workloads to fund their maintenance. Figure 9 highlights the characteristics of selected contractors we interviewed across the three ports where the Navy is implementing the MAC-MO strategy.

**Figure 9: Characteristics of Selected Contractors in Each Port Where the Navy Is Implementing the Multiple Award Contract-Multi Order Strategy**



-  Multi-ship Multi Option (MSMO) contract holder
-  Small business
-  Naval Sea Systems Command (NAVSEA) certified drydock
-  Pier

Source: GAO analysis of Navy data. | GAO-17-54

Contractors we interviewed commented on potential challenges and changes they are making to prepare for the increase in competition opportunities under the MAC-MO fixed price approach.

- Five former MSMO contractors told us they are working to reduce their overhead costs in order to remain competitive in a firm-fixed-price environment. In general, under the 5-year MSMO cost-

reimbursable contract, they stated they had confidence that they would receive regular workload from the Navy for a given class of ships. This confidence underpinned investments they made in maintaining and upgrading their facilities and training their workforces. Under MAC-MO, which will require competition for every availability within a homeport, these contractors do not have similar confidence or visibility into future work. Consequently, three MSMO contract holders told us they are laying off staff and reducing training programs to remain competitive. These layoffs are in addition to ones in 2015 and 2016 reported by several Norfolk contractors and attributed to the decrease in workload in that port, which was unrelated to the MAC-MO strategy. Four MSMO contract holders also told us they are eliminating apprenticeship programs for workers. Further, one contractor told us that it may cease dredging the water surrounding its drydock to reduce its overhead costs, which would eliminate certain classes of ships being serviced in that port. Because the Navy only recently implemented MAC-MO, whether these reductions actually occur and, if so, their net effect on the industrial base's capability and capacity to respond to the Navy's maintenance needs remains indeterminate.

- Non-MSMO contractors told us that they are accustomed to working under firm-fixed-price contracts, having served as prime contractors for the Military Sealift Command, commercial companies, and small-scale NAVSEA availabilities. However, six of the non-MSMO contract holders we interviewed were small businesses with varying experience working as a prime contractor for the Navy. Representatives from one small business told us that the type of contract does not change the type of work to be completed. Representatives from four small businesses told us they are making changes to become more competitive under MAC-MO, such as realigning staff positions to reduce the company's overhead costs.
- Both former MSMO holders and non-MSMO holders rely on full-time and temporary laborers to conduct work on Navy availabilities. Three MSMO contract holders told us they have laid off skilled laborers in response to decreases in work and may have to rely on temporary laborers to complete certain availabilities. One contractor told us that it is harder to secure and incentivize temporary laborers to complete requested work on time. Contractors also have the option of hiring new, untrained laborers into their workforces, but these individuals require time to train and become proficient at their trades, which can reduce work efficiencies in the near-term. Two contractors also expressed concern about finding, training, and retaining qualified, skilled laborers when new contracts are secured under MAC-MO.

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Maintaining Contractor Interest  
in Competing for Navy Work

Navy officials told us they anticipated certain workforce reductions within the private sector under the firm-fixed-price contract structure.

Representatives from all of the companies we interviewed told us they plan to compete for work under the MAC-MO strategy; for many, the Navy is their primary customer. For instance, former MSMO contract holders in Norfolk reported they rely on Navy work for at least 97 percent of their revenue. However, nine of the companies we interviewed across the three MAC-MO ports reported that they diversify their Navy workload with work from other government customers and commercial work, and three would consider competing for other work should they not have a Navy contract in hand. For example, in San Diego, one former MSMO contract holder reported less than 60 percent of their revenue coming from the Navy. In Mayport, one small business contractor reported more than 40 percent of its revenue coming from commercial and other government customers and signaled an intention to shift more resources into commercial work if it did not secure a MAC-MO contract.

Small businesses who are dependent on the Navy for work, and do not own drydocks or piers, told us they plan to aggressively compete for non-complex work. In addition, three of the four small businesses in Norfolk told us they depend on the Navy for more than 75 percent of their revenue. Three Norfolk small businesses told us they have relocated personnel to Mayport in order to compete for Navy availabilities there.

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## Conclusions

In developing its MAC-MO contracting strategy, the Navy has taken a thoughtful approach that builds on the promising results from its pilot availabilities by incorporating lessons learned, and establishing milestones that promote the timely definition of work requirements in availabilities. These steps reflect an upfront recognition on the part of the Navy that the practices and processes it employed to manage availabilities under cost-reimbursement, MSMO contracts would likely prove untenable under firm-fixed-price, MAC-MO contracts. However, the implementation process does not end there. Additional learning is likely to take place as the Navy orders ship maintenance availabilities under MAC-MO. New aspects of the strategy will be tested, as will the discipline of the Navy's fleet and shore-based maintenance communities to adhere to the MAC-MO milestones they have set. Further, the actions the ship repair industrial base takes to adapt to MAC-MO will become more evident, as will any potential implications. Harnessing new lessons learned, and ensuring key stakeholders are committed to their implementation, can position the MAC-MO strategy for success. The Navy has not put in place

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such a process for MAC-MO. Particularly in light of the large and complex nature of ship repair stakeholders in the Navy, not ensuring that progress is systematically assessed and that new lessons learned are incorporated in a timely manner could undermine the Navy's ability to obtain the improved cost, schedule, and quality outcomes it seeks under the new strategy. To realize MAC-MO's benefits, the Navy will need information to decide on how to make adjustments to the strategy. The existing committees—Surface Team 1 or the Surface and Expeditionary Warfare Maintenance and Modernization Committee—could provide a starting point.

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## Recommendation for Executive Action

In order to promote effective implementation of the MAC-MO contracting strategy, we recommend that the Secretary of Defense direct the Secretary of the Navy to complete the following action:

Assign responsibility to a single entity comprised of representatives from the fleet and shore-based maintenance communities, such as Surface Team 1, to perform systematic assessments of MAC-MO's implementation that include the following:

- Review of lessons learned and identification of changes to Navy processes, including staffing, needed to support the MAC-MO strategy,
- Evaluation of performance against anticipated cost, schedule, and quality objectives, as outlined in the MAC-MO acquisition strategy, and
- Input and recommendations from all Navy parties that participate in the scheduling, planning, budgeting, oversight, and policy development for the repair, maintenance, and modernization of non-nuclear surface ships.

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## Agency Comments

We provided a draft of this product to DOD for comment. In its written comments, reproduced in appendix II, DOD concurred with our recommendation on the need to provide systematic assessments of the MAC-MO strategy implementation. To address our recommendation, the Navy will identify criteria to be used to perform the assessment, identify appropriate stakeholders, identify which entity is best positioned to perform the assessment, and submit biennial reports beginning in December 2017 to the Director, Defense Procurement and Acquisition Policy in the Office of the Under Secretary of Defense for Acquisition, Technology and Logistics.



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

If you or your staff have any questions concerning this report, please contact me at (202) 512-4841 or by e-mail at [mackinm@gao.gov](mailto:mackinm@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report are listed in appendix III.

A handwritten signature in black ink that reads "Michele Mackin". The signature is written in a cursive, flowing style.

Michele Mackin  
Director, Acquisition and Sourcing Management

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*List of Committees*

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

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

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

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

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# Appendix I: Objectives, Scope, and Methodology

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In 2015, the Navy transitioned to the Multiple Award Contract-Multi Order (MAC-MO) contract strategy for the maintenance and modernization of surface ships. This report assesses (1) the potential benefits of the MAC-MO contracting strategy, (2) process changes the Navy has taken to address any challenges and to capitalize on anticipated benefits, and (3) how the strategy might affect the Navy's ship repair industrial base.

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## Potential Benefits of the MAC-MO Strategy

To assess the potential benefits of the MAC-MO strategy, we analyzed acquisition planning and contract documentation and interviewed senior Naval Sea Systems Command (NAVSEA) officials about the strategy, including staff from the Deputy Commander for Surface Warfare. To determine the key differences between the MAC-MO and the Multi-Ship, Multi-Option (MSMO) contracting strategies in contract pricing, planning the work, ordering, and structuring the competition among ship repair contractors, we analyzed NAVSEA's acquisition planning documentation for the MAC-MO strategy and reviewed contents of selected MSMO contracts the Navy identified as illustrative, most recent, or were still in a period of performance and MAC-MO contract documentation for third-party planning contract awards. We also considered applicable Federal Acquisition Regulation (FAR) provisions describing the conditions under which firm-fixed-price and cost-reimbursement contracts are appropriate. To identify the Navy's rationale on how to proceed with the new strategy, we analyzed acquisition planning documentation to understand how NAVSEA applied the results of its market research as prescribed by the FAR.<sup>1</sup> To further our understanding of NAVSEA's decision to proceed with the MAC-MO strategy, we examined the characteristics of ship availabilities used to pilot features of the strategy, for example, the use of firm-fixed-price contracts and use of indefinite delivery, indefinite quantity (IDIQ) contracts and interviewed Southwest Regional Maintenance Center (SWRMC) in San Diego, California, who administered the pilot contracts. We also interviewed senior NAVSEA officials, including the Commander, Navy Regional Maintenance Center (CNRMC) staff, and contractors with experience in executing ship availabilities, to obtain their perspectives on the strategy. To identify the progress the Navy had made as of September 2016 in implementing the MAC-MO strategy, including the "gap ship" contract awards, we interviewed and obtained information from the Mid-Atlantic Regional Maintenance Center (MARMC) staff in

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<sup>1</sup>FAR Part 10.

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Norfolk, Virginia and senior NAVSEA contracting staff, and analyzed supporting contract documentation.

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## Navy Process Changes

To assess process changes the Navy has made to address any challenges and to capitalize on anticipated benefits, we analyzed Navy documentation containing assessments of lessons learned from pilot maintenance availabilities used to test key features of the MAC-MO strategy. We identified a total of 18 lessons learned based on our assessment the Navy's documentation of the San Diego pilot and USS Porter maintenance availabilities. We categorized 11 of the lessons-learned as key because they were also identified as lessons-learned in one or more interviews with NAVSEA officials knowledgeable about the pilot ship experiences. We excluded 7 lessons that did not meet this additional criterion. We interviewed Navy officials responsible for availability funding and oversight, contract administration, and program management pertaining to the MAC-MO contracting strategy and pilot availabilities. These offices included the Deputy Commander for Surface Warfare; Commander, Naval Surface Force, Atlantic; Commander, Naval Surface Force, Pacific; CNRMC; MARMC in Norfolk, Virginia; SWRMC in San Diego, California; and the Southeast Regional Maintenance Center (SERMC) in Mayport, Florida. To assess the Navy's progress in taking actions to address potential challenges posed by the 11 key lessons learned, we evaluated Navy documents, including staffing and training plans for the contracting workforce across the RMCs, proposals for revised planning milestones, strategy and planning documents, and the contents of contracts for the third-party planner. We also interviewed Navy contracting, maintenance, and program management officials previously mentioned. To assess the extent to which the Navy has taken actions, we developed the following three-point scale:

- Not Met—The Navy has not taken any action to respond to identified lessons learned.
- Partially Met—The Navy has taken some action to respond to the identified lessons learned, but has not completed the action needed to address the identified risk.
- Met—The Navy has completed the action needed to address the identified lesson learned.

To identify roles and responsibilities for planning maintenance availabilities, we reviewed procedural documents to ascertain the lead offices that administer, plan and coordinate Navy availabilities, including

organizations that oversee repair and modernization efforts at private shipyards. In addition, as previously discussed, we interviewed officials responsible for planning and implementing the strategy. To describe the extent of maintenance overruns and their impact on the Navy, we used information from a previous GAO report that analyzed ship maintenance data from fiscal years 2011 to 2015, which included availabilities conducted before and after Optimized Fleet Response Plan implementation, to ascertain the extent to which maintenance availabilities for surface combatants had been completed on time.<sup>2</sup>

To identify the extent to which the Navy has made provisions to assess implementation of the strategy and if it is meeting its goals, we interviewed senior NAVSEA officials on whether performance metrics had been developed to assess the strategy and if an organization had been assigned responsibility. We used federal internal control standards to determine if the Navy appropriately defined objectives related to the contracting strategy; assessed its internal processes to identify risks related to the strategy, including the development of performance measures; and created strategies to mitigate those risks.

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## Ship Repair Industrial Base

To assess how the MAC-MO contracting strategy might affect the ship repair industrial base for surface ships, we examined the ways in which the strategy had the potential to increase competition opportunities and how the contractors within the industrial base might respond to these opportunities. To understand how IDIQ multiple award contracts and how setting aside noncomplex work to small businesses might promote competition, we identified how MAC-MO and MSMO contract provisions differed, as previously described, and also obtained the perspectives of NAVSEA officials and selected contractors.<sup>3</sup> To understand the potential of IDIQ multiple award contracts for increasing competition, we selected two contracts reflective of the work—DDG 51 class ships in the homeport of Norfolk, Virginia—that would be included under the MAC-MO strategy. To do so, we analyzed documentation listing the availabilities completed under two MSMO contracts—one contract requiring a drydock and one not requiring a drydock—to ensure we covered the range of availabilities that could be covered by a MAC-MO complex and

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<sup>2</sup>GAO, *Navy's Optimized Fleet Response Plan*, [GAO-16-466R](#) (Washington, D.C.: May 2, 2016.)

<sup>3</sup>The industrial base consists of private ship repair firms, including smaller firms

noncomplex contract. We analyzed the data for consistency and completeness, although we did not trace the data to the original contract documentation. Since the purpose of this analysis was to illustrate how the number of competitive opportunities contract awards could increase under an IDIQ contract for one class of ships, and the Navy's maintenance needs can change year by year, the results are not generalizable to other availabilities or future time periods. In addition, to understand how the Navy intends to promote the use of coast-wide competitions, we interviewed NAVSEA policy officials about the application of the Navy's June 1995 Ship Depot Maintenance Solicitation Policy and obtained data from CNRMC on the use of such competitions under MSMO.

To identify the Navy's projected workload for non-nuclear surface ships in the homeports of Mayport, Florida; Norfolk, Virginia, and San Diego, California, where the MAC-MO strategy will be implemented, we obtained data from CNRMC from fiscal years 2015 through the end of 2020.<sup>4</sup> The CNRMC estimated these trends based on an analysis of needed staffing resources, including data housed in the Navy Database Environment. Since the purpose of our analysis was to show the Navy's projections in anticipated port workload, we did not conduct our own assessment of the accuracy of this data. We excluded data on the coast-wide competitions from our analyses because these availabilities could be executed in ports other than the ship's homeport.

To obtain the perspective of contractors from the three homeports where the MAC-MO contracting strategy will be implemented, we conducted semi-structured interviews to obtain viewpoints from selected 14 contractors. We identified 30 contractors which (1) held MSMO contracts as prime contractors under the MSMO contracting strategy, (2) the Navy identified as potential competitors in the MAC-MO acquisition plan, and (3) the Navy identified as potential competitors in its market research documentation. From these 30 contractors, we selected 14 contractors that represented a mix of these categories. Specifically, the 14 contractors included 6 former MSMO contract holders and 8 non MSMO

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<sup>4</sup>The three ports where the MAC-MO strategy is planned to be implemented are Norfolk Virginia; San Diego, California; and Mayport, Florida. In Florida, firms may have facilities in Jacksonville, but conduct their work at the Naval Facilities in Mayport. One contractor we interviewed conducted work in San Diego, Puget Sound, and Everett, Washington. This contractor held a MSMO contract in Puget Sound. However, Puget Sound was outside the scope of our review so for purposes of this report we did not classify them as a MSMO contract holder.

contract holders, which comprised 7 small businesses and 7 large businesses. We used data provided by the Navy to verify if the selected contractors met the Navy's small business certification requirements. We conducted 10 semi-structured interviews in person and 4 by teleconference. The viewpoints of the 14 contractors are nongeneralizable to all contractors which conduct and perform work under Navy maintenance, repair, and modernization contracts.

Further, we used a data collection instrument to collect information from each of the selected 14 contractors on their facilities, workforce, and sources of revenue. For example, we gathered information on what types of facilities the contractor owned, such as a drydock or a pier, the number of the contractor's full-time staff, and the percentage of revenue from entities other than from the Navy. We verified that contractors did or did not have drydocks for 10 of the 14 contractors during our onsite contractor visits. We did not verify the number of full-time staff that the contractor employed or the contractor sources of revenue.

We conducted this performance audit from September 2015 to November 2016 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

# Appendix II: Comments from the Department of Defense



OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE  
3015 DEFENSE PENTAGON  
WASHINGTON, DC 20301-3015

ACQUISITION

OCT 26 2016

Ms. Michele Mackin  
Director  
Acquisition and Sourcing Management  
U.S. Government Accountability Office  
441 G Street, N.W.  
Washington, DC 20548

Dear Ms. Mackin:

This is the Department of Defense (DoD) response to the GAO Draft Report, GAO-17-54, 'NAVY SHIP MAINTENANCE: Action Needed to Maximize New Contracting Strategy's Potential Benefits' dated September 22, 2016 (GAO Code 100327). The Department acknowledges receipt of the draft report and notes that it contains a recommendation for DoD action as a result of your review.

The Department concurs with the recommendation in the draft report.

The Department appreciates the opportunity to comment on the draft report. For further questions concerning this report, please contact Dr. James Moreland, Deputy Director, Tactical Warfare Systems, Naval Warfare, at james.d.moreland18.civ@mail.mil or 703-614-3170.

Sincerely,

A handwritten signature in blue ink, appearing to read "James A. MacStravic", is positioned above the typed name.

James A. MacStravic  
Acting Principal Deputy Assistant Secretary of  
Defense for Acquisition  
Performing the Duties of the Assistant Secretary  
of Defense for Acquisition

Enclosure:  
As stated



GAO DRAFT REPORT DATED NOVEMBER, 2016  
GAO-17-54 (GAO CODE 100327)

“NAVY SHIP MAINTENANCE: ACTION NEEDED TO MAXIMIZE NEW  
CONTRACTING STRATEGY’S POTENTIAL BENEFITS”

DEPARTMENT OF DEFENSE COMMENTS  
TO THE GAO RECOMMENDATIONS

In order to promote effective implementation of the MAC-MO contracting strategy, we recommend that the Secretary of Defense direct the Secretary of the Navy to complete the following action:

**RECOMMENDATION 1:** Assign responsibility to a single entity comprised of representatives from the fleet and shore-based maintenance communities, such as Surface Team 1, to perform systematic assessments of MAC-MO’s implementation that include the following:

- Review of lessons learned and identification of changes to Navy processes, including staffing, needed to support the MAC-MO strategy,
- Evaluation of performance against anticipated cost, schedule, and quality objectives, as outlined in the MAC-MO acquisition strategy, and
- Input and recommendations from all Navy parties that participate in the scheduling, planning, budgeting, oversight, and policy development for the repair, maintenance, and modernization of non-nuclear surface ships.

**DoD RESPONSE:** Concur. The Department concurs that there is a need to perform systematic assessments of the MAC-MO strategy implementation. Identifying and tracking the lessons learned from contracting execution will be crucial to the future success of the new acquisition strategy. The Navy will perform a study to identify the specific criteria to be assessed. This will also identify the appropriate stakeholders from across the surface ship maintenance enterprise. The Navy will then determine which entity is best positioned to perform the assessments of the MAC-MO strategy execution and to submit biennial reports covering the assessment to Director, Defense Procurement and Acquisition Policy (DPAP) in the Office of the Undersecretary of Defense for Acquisition, Technology, and Logistics. The first biennial assessment will be completed by December 31, 2017, and subsequent assessments will be completed every two years from that date. For reference purposes this item will be identified as GAO-17-54-01.

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# Appendix III: GAO Contact and Staff Acknowledgments

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## GAO Contact

Michele Mackin, (202) 512-4841 or [mackinm@gao.gov](mailto:mackinm@gao.gov)

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## Staff Acknowledgments

In addition to the contact named, Christopher R. Durbin, Assistant Director; Pedro A. Almoguera; Peter Anderson; Sonja Bensen; Jessica M. Berkholtz; Lorraine R. Ettaro; Kurt S. Gurka; Cale T. Jones; Charles T. Schartung; Leslie G. Stubbs; and Roxanna Sun made key contributions to this report.

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Katherine Siggerud, Managing Director, [siggerudk@gao.gov](mailto:siggerudk@gao.gov), (202) 512-4400,  
U.S. Government Accountability Office, 441 G Street NW, Room 7125,  
Washington, DC 20548

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## Public Affairs

Chuck Young, Managing Director, [youngc1@gao.gov](mailto:youngc1@gao.gov), (202) 512-4800  
U.S. Government Accountability Office, 441 G Street NW, Room 7149  
Washington, DC 20548

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## Strategic Planning and External Liaison

James-Christian Blockwood, Managing Director, [spel@gao.gov](mailto:spel@gao.gov), (202) 512-4707  
U.S. Government Accountability Office, 441 G Street NW, Room 7814,  
Washington, DC 20548

# Appendix IV: Accessible Data

**Data Table for Highlights Original Milestones (in days)**

Milestones for multi-ship, multi-option (MSMO) cost reimbursement contracts (in days)	
360	Planning commences
90	Work requirements finalized
89	Planning complete
0	Start of work
Milestones proposed for multiple-award contract, multi-order (MAC-MO) firm fixed price contracts (in days)	
540	Planning commences
175	Work requirements finalized
160	Planning complete
60	Award at 60 days
0	Start of work

**Data Table for Figure 1: Organizational Chart for Navy Operating Forces and Shore Establishment Responsible for Non-Nuclear Surface Ship Repair, Maintenance, and Modernization.**

Reporting Relationships not described. More information available upon request.

Secretary of the Navy	
Assistant Secretary of the Navy, Research, Development, and Acquisition	
Chief of Naval Operations	Naval Sea Systems Command (NAVSEA)
Commander, U.S. Fleet Forces	Commander, U.S. Pacific Fleet

Commander, Naval Surface Force U.S. Atlantic Fleet	Commander, Naval Surface Force U.S. Pacific Fleet
Surface ships located on the East Coast, and in Italy, and Bahrain	Surface ships located on the West Coast, and in Hawaii, Japan, and Bahrain

**Data Table for Figure 2: NAVSEA Offices Responsible for Surface Ship Repair, Maintenance, and Modernization**

Naval Sea Systems Command (NAVSEA)	
Commander, Naval Regional Maintenance Center (CNRMC) Responsible for coordinating the maintenance of the Navy's surface fleet and for resourcing the many requirements necessary to keep the Navy's warships materially ready for action.	Surface Warfare (SEA 21) Responsible for life-cycle management of the Navy's in-service surface ships and for managing critical modernization, maintenance, training and inactivation programs.
Regional maintenance centers (RMC) Administers contracts for the repair, maintenance, and modernization of surface ships and oversee availabilities.  <ul style="list-style-type: none"> <li>• Mid-Atlantic Regional Maintenance Center (MARMC)</li> <li>• Southeast Regional Maintenance Center (SERMC)</li> <li>• Southwest Regional Maintenance Center (SWRMC)</li> </ul>	Surface Maintenance Engineering Planning Program (SURFMEPP)  Provides life-cycle management of maintenance requirements, including deferrals, for surface ships and monitors life-cycle repair work.

**Data Table for Figure 4: Timeline of Initial Awards to Support the MAC-MO Strategy for Ship Maintenance Availabilities**

Third-party planning events		
May 2014	DASN AP approves acquisition plan for third-party planning	Acquisition plan signed
February 2015	NAVSEA awards 3PP contract for DDG and CG class ships	Third-party planner contract award

May 2015	NAVSEA awards 3PP contract for LPD and LSD class ships	Third-party planner contract award
April 2016	NAVSEA awards 3PP contract for LHA and LHD class ships	Third-party planner contract award
Multiple Award Contract-Multi-Order events		
April 2015	DASN AP approves acquisition plan for execution of availabilities	Acquisition plan signed
February 2016	NAVSEA awards IDIQ contracts for complex work in Norfolk, Virginia, for 6 ship classes, to 3 contractors	IDIQ contract award for ships
March 2015	NAVSEA awards IDIQ contracts for complex work in San Diego, California, for 6 ship classes, to 3 contractors	IDIQ contract award for ships
Gap ship contract awards		
May 2015	NAVSEA awards a contract for the USS Mitscher (DDG 57)	Contract award for gap ship availability, coast wide bid
August 2015	Mid-Atlantic Regional Maintenance Center (MARMC) awards a contract for the USS Oscar Austin (DDG 79)	Contract award for gap ship availability
August 2015	MARMC awards a contract for the USS James E. Williams (DDG 95)	Contract award for gap ship availability
October 2015	MARMC awards a contract for the USS Jason Dunham (DDG 109)	Contract award for gap ship availability

November 2015	MARMC awards a contract for the USS Forrest Sherman (DDG 98)	Contract award for gap ship availability
January 2016	MARMC awards a contract for the USS Winston S. Churchill (DDG 81)	Contract award for gap ship availability
February 2016	MARMC awards a contract for the USS Normandy (CG 60)	Contract award for gap ship availability
April 2016	MARMC awards a contract for the USS Gettysburg (CG 64)	Contract award for gap ship availability
May 2016	MARMC awards a contract for the USS Bainbridge (DDG 96)	Contract award for gap ship availability
May 2016	MARMC awards a contract for the USS Tortuga (LSD 46)	Contract award for gap ship availability

3PP = Third-party planning  
DASN AP = Deputy Assistant Secretary of the Navy, Acquisition and Procurement  
NAVSEA = Naval Sea Systems Command  
IDIQ = Indefinite delivery, indefinite quantity  
DDG = Destroyers  
CG = Cruisers  
LHA = Landing Helicopter Assault  
LHD = Landing Helicopter Deck  
LPD = Landing Platform Dock  
LSD = Dock Landing Ships

**Data Table for Figure 5: Comparison (in days) of Planning Milestones for Work Package Development in a Chief of Naval Operations Availability (>\$5 million and <\$20 million) under the MSMO and MAC-MO Strategies**

Milestones for multi-ship, multi-option (MSMO) cost reimbursement contracts (in days)	
360	Planning commences
120	Modernization requirements finalized
90	Work requirements finalized
89	Planning complete
0	Start of work

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Milestones proposed for multiple-award contract, multi-order (MAC-MO) firm fixed price contracts (in days)

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0	Planning commences
240	Modernization requirements finalized
175	Work requirements finalized
160	Planning complete
120	Request for Proposal (RFP) release
60	Award at 60 days
0	Start of work

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**Data Table for Figure 6: Recent Historical and Forecasted Navy Maintenance Workload in Port of Norfolk, Virginia, fiscal years 2015-2020**

Year	Month	Total resources per day non MAC-MO strategy	Total resources per day pre-implementation of Multi Award Contract, Multi Option (MAC-MO)	Total resources per day MAC-MO
Fiscal year 2015	October	2399.19	3587.53	0
	November	2318.76	2723.91	0
	December	2468.69	2910.09	0
	January	2487.01	3321.47	0
	February	2504.99	3480.58	0
	March	2444.2	3974.26	0
	April	2411.27	4229.44	0
	May	2392.22	4640.88	0
	June	2233.28	4722.56	0
	July	2270.17	4212.88	0
	August	2085.47	4744.34	0
Fiscal year 2016	September	2134.72	4472.2	0
	October	1804.94	4697.31	0
	November	1960.82	4426.78	0
	December	2199.67	3717.11	0

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	January	1768.16	3412.83	0
	February	1849.24	2642.54	0
	March	2398.23	2710.56	0
	April	2084.35	1951.46	0
	May	1806.07	1703.61	0
	June	2350.57	1400.93	0
	July	1666.01	2633.32	0
	August	1551.82	2989.07	0
	September	1880.49	3669.23	0
Fiscal year 2017	October	2334.1	0	3812.14
	November	2362.52	0	3479.42
	December	2658.05	0	3126.93
	January	2628	0	3166.24
	February	2625.53	0	3046.25
	March	2695.79	0	3395.89
	April	2629.46	0	3337.16
	May	2521.24	0	3634.01
	June	2161.01	0	3313.01
	July	1829	0	2994.02
	August	2508.01	0	2305.03
	September	2843.77	0	1979.83
Fiscal year 2018	October	2650.68	0	2212.5
	November	2586.98	0	3712.65
	December	2606.3	0	5064.53
	January	2330.68	0	5611.3
	February	2080	0	5477.78
	March	1958.92	0	5552.57
	April	2185.18	0	5043.07
	May	2184.84	0	4716.21
	June	2217.32	0	4306.71
	July	2016.06	0	3687.03
	August	2015.01	0	3243.68
	September	2113.07	0	4912.08
Fiscal year 2019	October	2446.67	0	4515.72
	November	2307.4	0	4477.05
	December	2321.06	0	4820.02
	January	2029.79	0	7490.32
	February	2092.56	0	7311.2

March	2919.78	0	6113.5
April	2619.19	0	4597.17
May	2098.39	0	3472.3
June	2075.57	0	2673.54
July	1810.13	0	2868.49
August	1882.65	0	2919.76
September	2583.97	0	3116.3
October	2376.15	0	3460.04

**Data Table for Figure 7: Recent Historical and Forecasted Navy Maintenance Workload in Port of San Diego, California, fiscal years 2015-2020 36**

Year	Month	Total resources per day non MAC-MO strategy	Total resources per day pre-implementation of Multi Award Contract, Multi Option (MAC-MO)	Total resources per day MAC-MO
Fiscal year 2015	October	2867.44	5223.34	0
	November	2199.71	4068.14	0
	December	2251.28	5281.3	0
	January	1921.47	5218.58	0
	February	1872.89	3758.39	0
	March	1940.8	4277.6	0
	April	2094.99	4258.47	0
	May	2040.17	5421.1	0
	June	1593.01	5019.95	0
	July	1104.88	5915.39	0
	August	1383.35	5330.87	0
	September	1670.1	4146.78	0
Fiscal year 2016	October	2281.4	5420.81	0
	November	2282.7	4224.82	0
	December	2080.75	3350.27	0
	January	1543.62	3126.61	0
	February	1232.34	2790.69	0
	March	1582.34	3537.13	0
	April	1823.19	4159.32	0
	May	1754.97	3877.59	0
	June	2092.85	3722.19	0
	July	1518.02	4219.94	0
	August	1539.13	3542.54	0

	September	1428.95	3139.12	0
Fiscal year 2017	October	1865.6	0	2886.08
	November	1856.86	0	2825.2
	December	1830.08	0	3395
	January	1325.39	0	5505.37
	February	1310.22	0	5922.57
	March	1799.73	0	5294.28
	April	3086.25	0	5002.74
	May	3456.53	0	4339.3
	June	2888.75	0	2710.12
	July	1464.55	0	2877.92
	August	1324.49	0	3989.88
	September	1661.44	0	3830.14
Fiscal year 2018	October	1983.07	0	3362.93
	November	1598.12	0	2849.52
	December	1898.12	0	2498
	January	1991.9	0	4977.97
	February	2276.1	0	6187.78
	March	1994.76	0	6836.65
	April	1540.34	0	5848.99
	May	1508.35	0	5877.53
	June	1922.59	0	4623.05
	July	1652.92	0	5521.32
	August	2011.83	0	4815.32
	September	1995.82	0	4158.03
Fiscal year 2019	October	2498.99	0	4373.13
	November	2389.06	0	4344.27
	December	2315.24	0	3980.19
	January	1755.05	0	3893.14
	February	1873.83	0	6923.53
	March	1843.66	0	7313.72
	April	2352.12	0	7293.42
	May	2671.75	0	5373.49
	June	2320.35	0	3958.31
	July	1754.9	0	2649.55
	August	1474.32	0	1845.53
	September	1008.72	0	2000.67
	October	1952.8	0	1834.43

**Data Table for Figure 8: Recent Historical and Forecasted Navy Maintenance Workload in Port of Mayport, Florida, fiscal years 2015-2020**

Year	Month	Total resources per day non MAC-MO strategy	Total resources per day pre-implementation of Multi Award Contract, Multi Option (MAC-MO)	Total resources per day MAC-MO
Fiscal year 2015	October	611.443	762.451	0
	November	656.518	588	0
	December	656.518	582	0
	January	349.443	591.74	0
	February	304.345	594	0
	March	304.345	585	0
	April	233.345	867.1	0
	May	203.702	900.852	0
	June	253.936	771	0
	July	371.936	760	0
	August	294.91	315	0
Fiscal year 2016	September	187.745	578	0
	October	346.745	540	0
	November	346.745	540	0
	December	336.745	1005	0
	January	248.765	1003	0
	February	483.586	972	0
	March	323.046	826	0
	April	237	754	0
	May	232	856	0
	June	240	806	0
	July	160	1062.37	0
Fiscal year 2017	August	100	999.533	0
	September	209	925.237	0
	October	289	0	1115.5
	November	328	0	942.845
	December	289	0	735.182
	January	319	0	625.281
	February	319	0	552.162
	March	319	0	369.772
April	149	0	1294.75	

	May	149	0	1268.21
	June	159	0	1205.33
	July	429	0	1171.28
	August	559	0	1093.17
	September	543.077	0	935.96
Fiscal year 2018	October	647.777	0	587.924
	November	404.462	0	340.826
	December	391.423	0	340.826
	January	165.346	0	809.999
	February	165.346	0	839.978
	March	165.346	0	724.792
	April	195.346	0	537.495
	May	467.707	0	532.485
	June	560.248	0	462.035
	July	815.531	0	443.298
	August	822.08	0	194.864
	September	544.238	0	759.044
Fiscal year 2019	October	646.03	0	793.96
	November	434.459	0	793.96
	December	433.445	0	793.96
	January	508.526	0	793.96
	February	557.954	0	760.985
	March	505.536	0	862.935
	April	462.081	0	516.811
	May	194.068	0	220.784
	June	496	0	317.25
	July	576	0	379.62
	August	566.302	0	285.401
	September	565.129	0	662.268
	"October	780.16	0	698.179

**Data Table for Figure 9: Characteristics of Selected Contractors in Each Port Where the Navy Is Implementing the Multiple Award Contract-Multi Order Strategy**

Location	Company	Multi-ship Multi Option (MSMO) contract holder	Small business	Naval Sea Systems Command (NAVSEA) certified drydock	Pier
Mayport, FL	1. BAE Systems Southeast Shipyards Mayport LLC	Yes	No	Yes	Yes
	2. Metro Machine (doing business as General Dynamics NASSCO)	No	No	No	No
	3. North Florida Shipyards, Inc	No	Yes	No	No
Norfolk, VA	4. BAE Systems Norfolk Ship Repair, Inc.	Yes	No	Yes	Yes
	5. General Dynamics NASSCO	Yes	No	Yes	Yes
	6. Marine Hydraulics International, LLC	Yes	Yes	Yes	Yes
	7. Colonna's Ship Yard, Incorporated and Steel America Division	No	No	No	No
	8. Técnico Corporation	No	No	No	No
	9. East Coast Repair & Fabrication LLC	No	No	No	No
San Diego, CA	10. BAE Systems San Diego Ship Repair	Yes	No	Yes	Yes
	11. General Dynamics National Steel & Shipbuilding Company (NASSCO)	Yes	No	Yes	Yes
	12. Continental Maritime of San Diego, Inc.	No	No	No	No
	13. Pacific Ship Repair & Fabrications, Inc	No	Yes	No	No
	14. Propulsion Controls Engineering	No	Yes	No	No