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Subject: Defense Infrastructure: Ability of Ship Maintenance Industrial Base to Support a Nuclear Aircraft Carrier at Naval Station Mayport

Since established as a naval base in December 1942, Naval Station Mayport, Florida,[1] as grown to become the third largest naval fleet concentration area in the United States and the second largest on the East Coast. During this time, the base has served as the home port for multiple types of Navy surface ships—reaching a peak of over 30 ships including two conventional carriers in 1987. The most recent conventionally powered carrier to be homeported there—the USS *John F. Kennedy*—was decommissioned in 2007. Prior to the USS *John F. Kennedy*'s retirement, the Department of Defense's (DOD) 2001 Quadrennial Defense Review called for the Navy to provide more warfighting assets more quickly to multiple locations, and, to meet this requirement, the Navy made a preliminary decision to homeport additional surface ships at Mayport. The Navy subsequently prepared an environmental impact statement to evaluate a broad range of strategic home port and dispersal options for Atlantic Fleet surface ships in Mayport and on January 14, 2009, issued its decision to pursue an option that would include the first-time homeporting of a nuclear-powered aircraft carrier at Mayport. The Navy's decision was reviewed as part of the 2010 Quadrennial Defense Review, which in its report supported the Navy's decision to homeport a nuclear-powered aircraft carrier in Mayport, indicating that homeporting an East Coast carrier in Mayport would contribute to mitigating the risk of a terrorist attack, accident, or natural disaster occurring in Norfolk, Virginia, where currently all of the nuclear-powered aircraft carriers on the East Coast are homeported.[2]

In House Report 111-491, accompanying a proposed bill for the Fiscal Year 2011 National Defense Authorization Act (H.R. 5136), the House Committee on Armed

[1] Naval Station Mayport is located in northeast Florida, on the Atlantic Coast, near Jacksonville. It is roughly 469 nautical miles south-southwest of Norfolk.

[2] In our report examining the military services' processes for making basing decisions for force structure within the United States, we provide information about the approach used by the Navy in making its decision to homeport a nuclear-powered carrier at Mayport, Florida. See GAO, *Defense Infrastructure: Opportunities Exist to Improve the Navy's Basing Decision Process and DOD Oversight*, GAO-10-482 (Washington, D.C.: May 11, 2010).

Services directed the Secretary of the Navy to report by December 15, 2010, to the congressional defense committees on

- the ability of the private ship maintenance industrial base[3] in northeast Florida to support nuclear-powered aircraft carrier maintenance requirements;
- the likely costs to the Navy that could result from establishing such maintenance capabilities within the local industrial base; and
- the impacts on cost and workforce scheduling that could result if the Navy must provide the maintenance workforce from another nuclear-powered aircraft carrier home-port location.[4]

The Navy issued its report to the congressional defense committees on December 29, 2010.[5] In the same House report, the committee also directed GAO to assess and report on the Secretary of the Navy's report within 90 days of receiving the Navy's report and to conduct an assessment of aspects of the local ship maintenance industrial base and determine to what extent the homeporting of a carrier at Mayport would affect carrier maintenance costs. In response to the House report, our objectives were to determine to what extent (1) the private ship repair firms in northeast Florida can meet the maintenance requirements of a nuclear-powered aircraft carrier and (2) the Navy's December 2010 report addresses the provisions directed by House Report 111-491. The House report also directed us to assess how the construction of maintenance facilities for a nuclear-powered aircraft carrier at Naval Station Mayport will affect maintenance costs for the carrier, including recurring and nonrecurring costs over a 10-year budget window. In March 2011, we issued a report providing our independent cost estimate of the full life-cycle costs of establishing a nuclear aircraft carrier home port at Mayport, a report that includes our response to this objective.[6] We have included a summary of that report, including the total recurring and nonrecurring costs over a 10-year budget period, in enclosure I.

Scope and Methodology

To determine the extent to which the private ship repair firms in northeast Florida can meet the maintenance requirements of a nuclear-powered aircraft carrier, we analyzed Navy workload data to determine the impact of the Navy's proposed ship

[3] For the purpose of this report we define the ship maintenance industrial base as the private ship repair firms, including the smaller firms and temporary labor with which they work, that support Navy ship repair, maintenance, and modernization requirements in northeast Florida. As such, throughout this report we use private ship repair firms when referring to the private ship maintenance industrial base, except when specifically referring to language in the committee report.

[4] *See* H.R. Rep. No. 111-491, at 260-261 (2010).

[5] Department of the Navy, *Report to Congress on Northeast Florida Private Ship Maintenance Industrial Base* (Washington, D.C.: Dec. 29, 2010).

[6] GAO, *Defense Infrastructure: Navy Can Improve the Quality of Its Cost Estimate to Homeport an Aircraft Carrier at Naval Station Mayport*, GAO-11-309 (Washington, D.C.: Mar. 3, 2011). GAO-11-309 was developed in response to direction from the committee to submit a report containing an independent estimate of the total direct and indirect costs to be incurred by the federal government in homeporting a nuclear carrier at Mayport. *See* H.R. Rep. No. 111-491, at 507.

decommissioning and homeporting plans at Naval Station Mayport and reviewed historical evidence on the ability of the private ship repair firms to meet Navy nuclear-carrier maintenance requirements. We also reviewed various Navy documents related to the maintenance and workload requirements of nuclear-powered aircraft carriers, including the Office of the Chief of Naval Operations Instruction 4700.7L on the Maintenance Policy for United States Navy Ships; the Office of the Chief of Naval Operations Notice 4700 on the Representative Intervals, Durations, and Repair Mandays[7] for Depot Level Maintenance Availabilities of U.S. Navy Ships; and the CVN 68 Aircraft Carrier Class Maintenance Plan[8]. We also interviewed Navy officials to determine private-sector nuclear aircraft carrier maintenance requirements. We did not include in our review the work performed on the carrier's nuclear propulsion plant and its associated systems by the public shipyard workforce[9] as that work is not supported by private ship repair firms.[10] To further evaluate the Navy's maintenance requirements and the infrastructure needed to support nuclear-powered aircraft carriers, we interviewed officials and visited facilities at Norfolk Naval Shipyard, Virginia, and Naval Air Station North Island, California. During our visits, we discussed the infrastructure upgrades made at these locations to berth and homeport nuclear-powered aircraft carriers. We interviewed Navy officials and visited facilities at Naval Station Mayport, Florida, to determine the extent of the upgrades planned at the station to support homeporting of a nuclear-powered aircraft carrier. We met with representatives from private sector ship repair firms in northeast Florida, such as BAE Systems Southeast Shipyards Jacksonville, Earl Industries, North Florida Shipyards, Inc., and others to discuss their capabilities and capacities to support the maintenance requirements of a nuclear-powered aircraft carrier and the possible impacts of decommissioning the frigates on the private firms' business operations. We also met with regional ship repair trade associations in Norfolk, Virginia, and Mayport, Florida, and the national private ship repair trade association in Washington, D.C., to discuss any potential impacts resulting from a nuclear aircraft carrier move to Mayport on the private ship repair industry.

[7] Although the Navy uses the industrial term manday when referring to aircraft carrier maintenance, for purposes of this report we use the term work day. Both refer to the industrial unit of production equal to the work one person can produce in a day.

[8] Office of the Chief of Naval Operations Instruction 4700.7L, *Maintenance Policy for United States Navy Ships* (May 25, 2010); Office of the Chief of Naval Operations Notice 4700, *Representative Intervals, Durations, and Repair Mandays for Depot Level Maintenance Availabilities of U.S. Navy Ships* (Nov. 8, 2010); Naval Sea Systems Command, *CVN 68 Class Aircraft Carrier Class Maintenance Plan* (Revision 3, Dec. 2009).

[9] The Navy's four public shipyards—Norfolk Naval Shipyard in Virginia, Pearl Harbor Naval Shipyard in Hawaii, Portsmouth Naval Shipyard in Maine, and Puget Sound Naval Shipyard in Washington—provide the organic capability to perform ship repair maintenance and modernization, and complement the private sector's capability for conventional surface ship maintenance.

[10] House Report 111-491 directed GAO to assess the potential readiness and cost impacts to the nuclear propulsion depot maintenance workforce. *See* H.R. Rep. No. 111-491, at 254. Our report on this subject was issued to congressional defense committees on March 3, 2011 (GAO-11-275R).

To determine the extent to which the Navy's report addresses the provisions directed by House Report 111-491, we reviewed the Navy's report and assessed whether the Navy provided clear and complete responses and the necessary information as directed by the House report. As part of our assessment, we obtained and analyzed documents used by the Navy to develop its responses. In addition, we compared the Navy's responses to information and data we collected during our own independent review of the capability of the private ship repair firms in northeast Florida to support the maintenance requirements of a nuclear-powered aircraft carrier and the costs associated with homeporting a carrier at Naval Station Mayport. Where appropriate, we assessed the extent to which the Navy's report addressed the provisions as directed by the House report and discussed those areas that we believed were not fully addressed with officials responsible for the development of the Navy's report.

We conducted this performance audit from July 2010 to March 2011, 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.

Summary

Private ship repair firms in northeast Florida will likely be able to support the maintenance requirements of a nuclear aircraft carrier if one is homeported at Naval Station Mayport in 2019 as the Navy plans. Of the 20 surface ships currently homeported at Mayport, the Navy plans to decommission 12 guided-missile frigates between 2011 and 2015. According to the Navy, the total depot maintenance workload at Mayport has averaged 225,000 work days per year over the last several years. The Navy estimates that the decommissioning of the frigates will reduce this average workload by about 135,200 work days after all of the frigates have been decommissioned in 2015—a potential decrease of 60 percent if no other work is allocated to Mayport. According to private ship repair firm representatives, this decrease in workload will likely result in the loss of some jobs for ship repair firms in northeast Florida, but the Navy expects the private ship repair firms to be able to support a nuclear-powered aircraft carrier in 2019 for five key reasons.

- The Navy has implemented mitigation measures to offset the decreased workload, such as transferring the maintenance of three barges from Norfolk Naval Shipyard to Mayport. These measures will likely not fully offset the decreased workload, but the Navy has stated it is continuing to explore other mitigation options, such as the homeporting of some littoral combat ships.[11] Additionally, the Navy expects the proposed homeporting of a nuclear aircraft carrier at Mayport in 2019 to further increase the workload at Mayport by an average of 28,800 work days per year.

[11] The littoral combat ship is a new class of warship meant to facilitate U.S. Navy access to and operations in the littorals, which are waters close to shore. The Navy plans to build a total of 55 littoral combat ships.

- The northeast Florida area is home to three master ship repair firms certified by the Navy to have the capabilities and capacities to support the maintenance requirements of U.S. Navy surface ships, including aircraft carriers. Each of these firms has significant production and administrative facilities either on or near Naval Station Mayport, and officials from these firms told us they will maintain their presence in northeast Florida. Additionally, these private ship repair officials told us they have options by which they can adjust to fluctuations in workload. For example, two of the firms have ship repair personnel at other Navy homeports that could be used to supplement the firms' workforces at Mayport during workload increases or used to transfer personnel during workload decreases. Similarly, there is a large transient, temporary ship repair workforce that can be used to supplement each of the ship repair firm's full-time workforce as needed. Because of these options, private ship repair firm officials told us that although they are concerned over the projected decrease in workload, workload fluctuations are common in the ship repair industry and their firms would be able to withstand any lulls in workload at Mayport and that it would not impact their ability to support a nuclear carrier beginning in 2019.
- The tasks required of the private ship repair firms to support a nuclear carrier are the same as those performed on conventional carriers in the past and the other types of ships currently homeported at Mayport.
- Private ship repair firms in northeast Florida have previously demonstrated the ability to support carrier maintenance. In fact, the largest aircraft carrier availability ever performed outside of a public shipyard was completed on the USS *John F. Kennedy* in Mayport in 2003.
- Finally, according to the Navy, the contracting strategy used with the private ship repair firms provides the firms with early visibility into the Navy's maintenance planning, thus allowing the firms to appropriately size their workforces in anticipation of future workload.

The Navy's December 2010 report on the ability of private ship repair firms in northeast Florida to support nuclear-powered aircraft carrier maintenance requirements at Naval Station Mayport generally addressed the three provisions as directed in House Report 111-491, but we found that the Navy could have provided clearer and more complete responses in its report by including additional information that could help provide Congress with a better understanding of its conclusions regarding the sufficiency of the capabilities and capacities of ship repair firms near or around Naval Station Mayport to support the maintenance requirements of a nuclear-powered aircraft carrier.

- First, regarding the ability of the private ship repair firms to support a carrier, the Navy discussed the capabilities of the various firms, but the report did not fully provide information on the maintenance requirements of a nuclear-powered carrier and how that work would be allocated to the private sector. Including such information would have provided additional support for the Navy's conclusion that the various firms have sufficient capabilities to support a nuclear carrier. Also, the report did not fully address the impact of the

decreasing Navy ship workload on the various private ship repair firms and whether this decrease would affect their ability to meet the maintenance requirements of a nuclear aircraft carrier.

- Second, regarding the costs to establish additional ship repair maintenance capabilities in northeast Florida, the Navy's report discussed the types of maintenance work performed by the various ship repair firms and concluded that no additional costs would be incurred as the various firms already have the required capabilities, however, the report does not provide the full context to the reader to support the report's conclusion. Specifically, the report did not explain the differences between propulsion plant and related systems and nonpropulsion plant maintenance work. Nor did it explain the Navy's use of public shipyard employees to accomplish the propulsion plant maintenance and private ship repair firms to accomplish nonpropulsion plant maintenance or describe the capabilities needed to accomplish those tasks. Including the differences between propulsion plant and nonpropulsion plant maintenance and the Navy's strategy to accomplish this work would have further explained the Navy's conclusion that the private ship repair firms already have the capabilities to support the nonpropulsion maintenance requirements of a nuclear aircraft carrier and that there would not be any need for additional capabilities within the local industrial base.
- Third, regarding impacts on costs and workforce scheduling, the Navy reported on the maintenance workload associated with a nuclear aircraft carrier and the potential cost to the Navy if the public shipyards needed to perform 10 percent more of the work than anticipated, but the report did not fully discuss the Navy's workforce-shaping procedures and the One Shipyard concept, which helps ensure that the required number of workers and skill sets are available when needed to meet current and planned maintenance requirements.[12] This information would have provided the reader with better context to understand the Navy's potential workforce-scheduling strategies and any impacts that could result if the Navy must provide the maintenance workforce from another home-port location than Mayport. Although the responses in the Navy's report could have been clearer and more complete, the additional information lacking in the report is available in other sources including two other recent Navy reports previously issued to Congress or the congressional defense committees—one on the assessment of the U.S. ship repair industrial base[13] and the other on homeporting alternatives for

[12] Under the Naval Sea Systems Command's One Shipyard concept, the naval shipyards adjust the overall ship repair workload and mobilize the workforce across the all naval and private shipyards as needed to meet the Navy's maintenance needs for its ships and help stabilize the workload.

[13] Office of the Chief of Naval Operations, *Assessment of Ship Repair Industrial Base* (Washington, D.C.: June 2007). This report provided information on private ship repair firms geographically located in port areas throughout the continental United States, in Hawaii, and in Guam that are certified capable to perform work on U.S. Navy ships.

Mayport,[14] as well as in this report and other reports we have recently issued on the Mayport carrier homeporting proposal.

We are not making any recommendations in this correspondence. After reviewing a draft of this product, DOD officials said that the department had no comments.

Background

Nuclear-Powered Aircraft Carrier Maintenance

The U.S. Navy currently maintains 11 nuclear aircraft carriers—5 homeported on the West Coast of the United States, 5 on the East Coast of the United States, and 1 in Yokosuka, Japan. Of the West Coast carriers, three are homeported in San Diego, California; one in Bremerton, Washington; and one in Everett, Washington. All five of the East Coast carriers are homeported in Norfolk, Virginia. As some of the most technologically advanced ships in the world, nuclear aircraft carriers require continuous and regularly scheduled maintenance to keep them ready to meet mission requirements. The Navy identifies three levels of aircraft carrier maintenance:

- Organizational—The ship's crew performs as-needed, routine tasks such as replacing minor parts, lubricating machinery, and preventive inspections.
- Intermediate—Navy and civilian personnel from designated facilities use specialized skills to conduct more extensive work on a schedule of periodic cycles.
- Depot—Personnel at public and private shipyards perform maintenance that requires skills, facilities, or capacities normally beyond those of the organizational and intermediate levels, including ship overhauls, alterations, refits, restorations, and nuclear refueling.

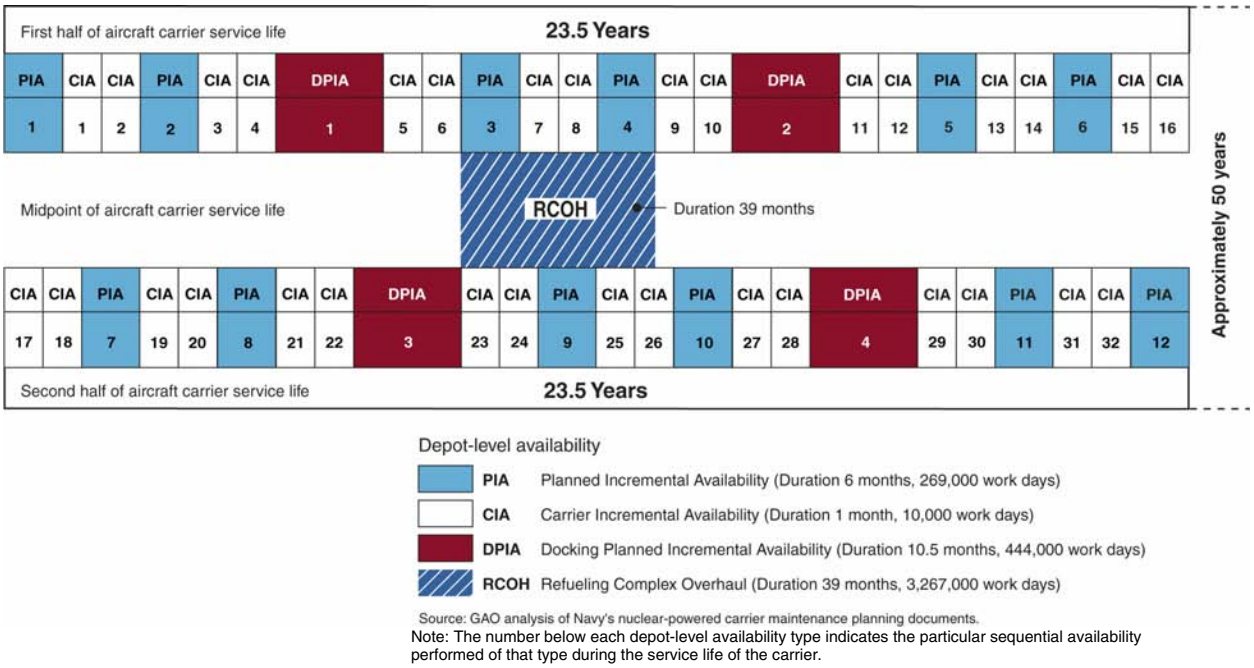
Depot-level maintenance periods, also known as availabilities, require the most resources and personnel of the three levels of nuclear aircraft carrier maintenance. There are four types of depot-level availabilities:

- carrier incremental availabilities lasting approximately 1 month each and performed twice in every 32-month operating cycle;
- planned incremental availabilities lasting approximately 6 months each and performed once in a 32-month operating cycle unless a docking planned incremental availability is scheduled;
- docking planned incremental availabilities lasting about 10.5 months each and performed after two consecutive cycles when planned incremental availabilities were performed; and
- refueling complex overhaul lasting about 39 months and performed once near the mid-life of the carrier, at around 23 years of the carrier's service life.

[14] Department of the Navy, *Report to Congress on Naval Station Mayport, Florida, Homeporting Alternatives* (Washington, D.C.: Dec. 28, 2010).

Over its expected 50-year service life, a nuclear carrier will undergo a total of 32 carrier incremental availabilities, 12 planned incremental availabilities, 4 docking planned incremental availabilities and one refueling complex overhaul as shown in figure 1.

Figure 1: Depot-level Availability Maintenance Schedule of a Nuclear-Powered Aircraft Carrier over Its Expected 50-Year Service Life



Source: GAO analysis of Navy's nuclear-powered carrier maintenance planning documents.
Note: The number below each depot-level availability type indicates the particular sequential availability performed of that type during the service life of the carrier.

The Navy's maintenance policy for ships indicates that scheduled private sector carrier and planned incremental availabilities shall normally be performed in the ship's homeport area.[15] However, as Naval Station Mayport does not have dry docking capability for nuclear-powered aircraft carriers, a carrier homeported there would have to travel to Norfolk Naval Shipyard or Northrop Grumman Shipbuilding Newport News to undergo docking planned incremental availabilities and the one-time mid-life refueling complex overhaul, respectively.

Nonpropulsion Plant Maintenance and Propulsion Plant Maintenance

The maintenance work conducted during these depot-level availabilities is separated between nonpropulsion plant work and propulsion plant work. Nonpropulsion plant work consists of maintenance work on systems outside of the propulsion plant, or nuclear reactors and related systems, of an aircraft carrier. This type of work—sometimes called "topside work"—is almost entirely performed by the private sector. Types of nonpropulsion plant work performed by the private sector include

- flight deck and hangar deck resurfacing;

[15] Office of the Chief of Naval Operations Instruction 4700.7L, *Maintenance Policy for United States Navy Ships*.

- cabin repairs and upgrades—including deck resurfacing, restroom repairs and upgrades, and berthing compartment repairs and upgrades;
- aircraft and weapons elevators repairs and upgrades;
- hull and structural corrosion control, preservation, and repairs;
- steam system repairs and modifications—including piping repair and replacement, and valve repair and replacement;
- electrical distribution system repairs and modifications—including circuit breakers and generators; and
- ventilation system cleaning, preservation, corrosion control, and repairs to ducting, valves, and motors.

Propulsion plant work, on the other hand, consists of maintenance and repairs related to the carrier's nuclear reactors and associated systems that are largely performed in a controlled environment. This type of work is primarily performed by public shipyard personnel. Public shipyard personnel can also perform the nonpropulsion plant work performed by the private sector if needed. In order to support the required propulsion plant work, additional facilities will need to be constructed at Naval Station Mayport, including a controlled industrial facility that is used for the inspection, modification, and repair of radiologically controlled equipment and components. During the carrier and planned incremental availabilities, public shipyard personnel (most likely from Norfolk Naval Shipyard) will travel to Naval Station Mayport to perform the propulsion plant-related work. The propulsion plant maintenance strategy for Mayport is based on the model that has been used for nuclear carriers homeported at North Island Naval Air Station, San Diego, where public shipyard personnel (normally from Puget Sound Naval Shipyard) travel to North Island to perform this work during carrier and planned incremental availabilities.

Private Ship Repair Firms in Northeast Florida Will Likely Be Able to Support the Maintenance Requirements of a Nuclear Aircraft Carrier

Private ship repair firms in northeast Florida will likely be able to support the maintenance requirements of a nuclear aircraft carrier if one is homeported at Naval Station Mayport in 2019 as the Navy plans. Of the 20 surface ships currently homeported at Mayport, the Navy plans to decommission 12 guided-missile frigates between 2011 and 2015. The Navy estimates that these decommissionings could reduce the total maintenance workload by about 60 percent if no other work is allocated to Mayport and, as a result, has implemented some mitigation measures to help offset the decreased workload and is considering others. Additionally, the Navy expects the proposed homeporting of a nuclear aircraft carrier at Mayport in 2019 to further increase the workload at Mayport by an average of 28,800 work days per year. In the near term, although the decreased workload from the frigates' retirements may result in the loss of some ship repair jobs, the decrease is not expected to affect the ship repair firms' ability to support a carrier. All of the firms have demonstrated the

capability and capacity to work on naval ships, including performing large-scoped conventional aircraft carrier availabilities and have options available to increase capacity during workload surges, such as utilizing temporary workers and overtime for full-time workers. Additionally, private ship repair officials told us that although they are concerned over the projected decrease in workload, workload fluctuations are common in the ship repair industry and their firms would be able to withstand any lulls in workload at Mayport, and that any workload decreases would not impact their ability to support a nuclear carrier at Mayport.

Decommissioning of Guided-Missile Frigates Will Reduce Maintenance Workload at Mayport, but Navy Has Implemented Mitigation Measures and Is Considering Others

The planned decommissioning of the guided-missile frigates currently at Mayport will reduce the total maintenance workload at Mayport, but the Navy has implemented several mitigation measures and is actively exploring others. Of the 20 surface ships currently homeported at Mayport, the Navy plans to decommission 12 guided-missile frigates between 2011 and 2015. According to the Navy, the total depot maintenance workload at Mayport has averaged 225,000 work days per year over the past several years. The Navy estimates that the decommissioning of the frigates will reduce the total annual workload by about 135,200 work days after all the frigates have been decommissioned in 2015—a potential decrease of 60 percent if no other maintenance work is allocated to Mayport. Table 1 shows the planned decommissioning schedule for the guided-missile frigates at Naval Station Mayport.

Table 1: Navy's Schedule for Decommissioning Guided-Missile Frigates Homeported at Naval Station Mayport, as of December 2010

Hull number	Ship name	Fiscal year to be decommissioned
FFG 39	USS *Doyle*	2011
FFG 28	USS *Boone*	2012
FFG 29	USS *Stephen W. Groves*	2012
FFG 32	USS *John L. Hall*	2012
FFG 36	USS *Underwood*	2013
FFG 42	USS *Klakring*	2013
FFG 40	USS *Halyburton*	2014
FFG 45	USS *De Wert*	2014
FFG 49	USS *Robert G. Bradley*	2014
FFG 50	USS *Taylor*	2015
FFG 56	USS *Simpson*	2015
FFG 58	USS *Samuel B. Roberts*	2015

Source: Navy.

In response to the potential workload reductions, the Navy has implemented some mitigation measures that will help offset the decreased workload in the near term and is exploring other options. For example, according to Navy officials, the Navy has made changes to the scope of maintenance work for cruisers and destroyers homeported at Mayport to allocate more work to the private sector. Additionally, the Navy has reallocated some of the maintenance work slated to be performed by sailors at Mayport to the private sector. The Navy also has transferred the maintenance work for three living barges—which are used as living quarters by ship personnel while they are conducting maintenance—from Norfolk Naval Shipyard to Mayport. According to the Navy, these measures will not fully offset the workload lost from the decommissioning of the frigates, but will provide some workload stability through 2016. Additionally, the Navy is considering other near-term options, such as the foreign military sale of the 12 frigates scheduled to be decommissioned at Mayport between 2011 and 2015. Navy officials told us that the sale of frigates through the Foreign Military Sales program could add a significant level of workload for the private ship repair firms when the ships are refurbished and outfitted to the foreign government's specifications. The private sector workload could remain relatively constant through fiscal year 2016 if all the frigate refurbishments occur in northeast Florida, according to the Navy.

Although the foreign military sale of the frigates would help address the decreased workload through fiscal year 2016, there is still uncertainty about the workload after 2016. As a result, the Navy is also considering longer-term solutions, such as homeporting some of the littoral combat ships at Mayport. Currently, no specific ships have been identified and no timeline for delivery has been determined, but the Navy is considering homeporting some of the ships at Mayport beginning in fiscal year 2016. Although the maintenance workload associated with these ships is still under development, the Navy has stated that it would need to homeport 12 littoral combat ships to fully mitigate the workload lost from the frigates. Additionally, the homeporting of a carrier at Mayport in 2019 would further address the decreased workload, as the Navy estimates that the homeporting would increase the workload at Mayport by an average of 28,800 work days per year.

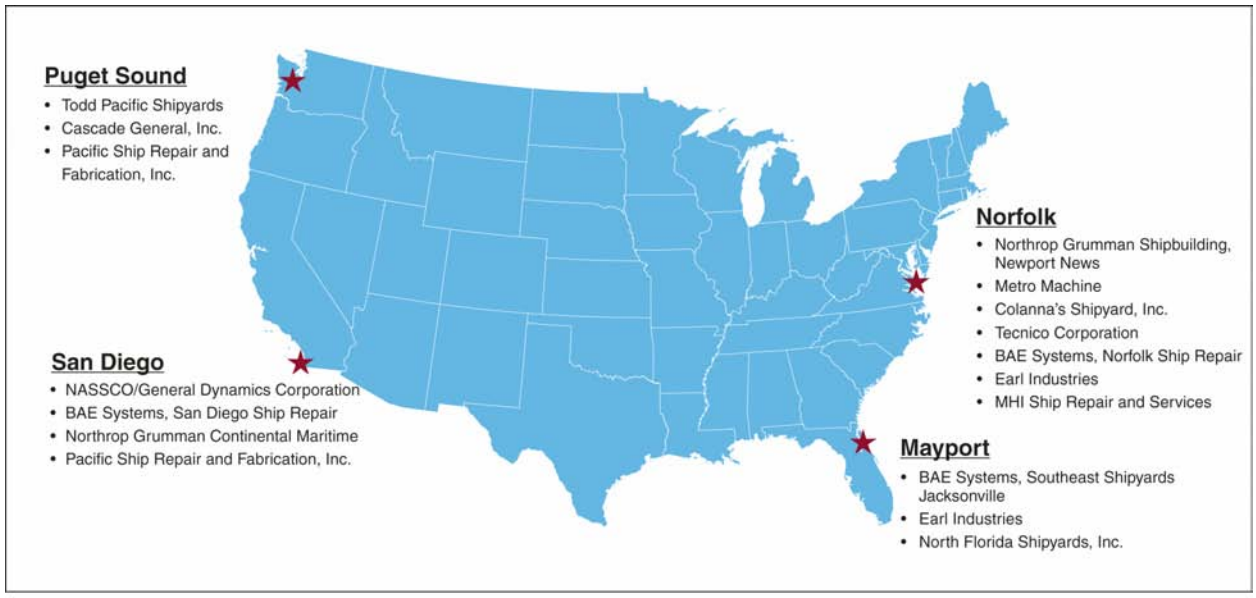
Northeast Florida Area Includes Three Master Ship Repair Firms with Demonstrated Capabilities and Capacity to Provide Carrier Maintenance

The northeast Florida area is home to three master repair firms certified by the Navy to have the capabilities and capacity to support the maintenance requirements of U.S. Navy surface ships, including aircraft carriers. The Navy grants the master ship repair certification following an evaluation of a ship repair firm's capability and capacity to perform all aspects of shipboard work and is the highest level of certification by the Navy to perform ship repair work. To obtain this level of certification, the firm must meet certain criteria, including

- have the management, organization, production, and facilities capabilities to perform an entire complex repair and alteration package on a frigate guided-missile class selected restricted availability[16] or larger ship;
- perform 55 percent of the availability using the firm's own facilities and its own workforce; and
- possess or have committed access to a pier with the requisite support and technical services available to accommodate a guided-missile class frigate.[17]

BAE Systems Southeast Shipyards Jacksonville, Earl Industries, and North Florida Shipyards, Inc., have this certification in the northeast Florida area. This is comparable to the number of certified master ship repair firms located in the Puget Sound, Washington and San Diego, California areas, where nuclear aircraft carriers are also homeported. Figure 2 shows the locations of firms the Navy identified as certified master ship repair firms at Navy home ports in Puget Sound, Washington; San Diego, California; Norfolk, Virginia; and Mayport, Florida.

Figure 2: Master Ship Repair Firms at Selected Navy Home Ports



Source: Navy.

[16] Selected restricted availabilities are short labor-intensive maintenance availabilities, assigned to ships in certain maintenance programs with characteristics such as reduced manning, limited organizational-level maintenance, and operational tempos that limit ship's availability for regular depot-level maintenance periods, designed to sustain a high level of readiness and increase the ship's availability for required operations.

[17] *See* 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). *See also* Department of the Navy, *Report to Congress on Northeast Florida Private Ship Maintenance Industrial Base* (Washington, D.C.: Dec. 29, 2010).

All three of the master ship repair firms have significant production and administrative facilities either on or near Naval Station Mayport. In addition, officials from these firms told us that their firms have sufficient facility resources and personnel capabilities to support a nuclear aircraft carrier and that their firms have options by which they can adjust to decreases in workload or increase capacity during workload surges. For example, both BAE Systems and Earl Industries have personnel at other locations that could be brought to Mayport to support increased workload or Mayport personnel could be transferred to these other locations if there is a decrease in the workload at Mayport. In addition, these firms can use overtime to help meet maintenance requirements during workload peaks and can hire additional employees or issue contracts for temporary labor to meet maintenance surges. For example, private ship repair officials told us that there is a robust temporary ship repair workforce that can be used by all private ship repair firms to supplement their full-time workforce when needed. Because of these options, private ship repair officials told us that although they are concerned over the projected decrease in workload, workload fluctuations are common in the ship repair industry and their firms would be able to withstand any lulls in workload and that any workload fluctuations would not impact their ability to support a carrier if one is homeported at Mayport. Enclosure II includes further discussion of the capabilities and capacity of each of the three master ship repair firms in northeast Florida.

Work Performed by Private Ship Repair Firms to Support a Nuclear-Powered Aircraft Carrier Is the Same as That Performed on Other Types of Ships

The ship repair tasks required of the northeast Florida private ship repair firms to support a nuclear-powered aircraft carrier are the same as those tasks performed on conventional carriers in the past and other types of ships. For example, the work performed by northeast Florida ship repair firms on nonnuclear surface ships would be consistent with similar hull, structural, preservation, and other nonpropulsion work that would be performed on a nuclear aircraft carrier. Thus, the type of work that the private sector is performing now on the cruisers, destroyers, and frigates currently stationed at Mayport will be the same type of work they would perform on a nuclear-powered carrier if one were homeported there. Specifically, the depot-level maintenance work conducted on nuclear-powered carriers is separated between propulsion plant and nonpropulsion plant work. Propulsion plant work includes maintenance activities related to the carrier's nuclear reactors and related systems and is almost entirely performed by the public shipyard personnel. The private sector performs a majority of the nonpropulsion plant work which includes such tasks as tank cleaning and repairs, preservation and painting of the hull, flight deck gear maintenance and repair, and steel structural repairs—basic tasks the private sector performs regardless of the type of ship.

Private Ship Repair Firms in Northeast Florida Have Supported Aircraft Carriers in the Past

The various ship repair firms in northeast Florida have demonstrated the ability to support the maintenance requirements of multiple types of ships in the past, including performing all of the workload on conventional aircraft carrier availabilities. Until 2007, Naval Station Mayport was the homeport to at least one conventional aircraft carrier and multiple types of other surface ships. Private ship repair officials told us that during this time their firms were able to provide all the necessary maintenance capabilities and capacity to support these ships. In fact, according to the Navy, the largest aircraft carrier availability ever performed outside of a public shipyard was completed on the USS *John F. Kennedy* in Mayport in 2003 and included more than 360,000 work days completed by the private sector. According to our analysis, this is about five times the amount of work that will be completed by private ship repair firms on a nuclear carrier at Mayport during a planned incremental availability. According to the Navy's 2010 Mayport ship maintenance industrial base report, the Navy estimates that if a nuclear carrier is homeported at Mayport, private ship repair firms will be required to complete an average of approximately 28,800 work days of ship repair work per year. This is considerably less than the average annual work days performed by the private sector on the USS *John F. Kennedy* during fiscal years 1998 through 2007, when the private sector performed almost all of the conventional carrier repair work, as shown by table 2.

Table 2: Historical Workload on USS *John F. Kennedy*, Fiscal Years 1998-2007

Fiscal year	Total work days
1998	69,226
1999	53,077
2000	94,759
2001	30,762
2002	30,077
2003	366,083
2004	21,290
2005	11,607
2006	2,442
2007	28,164
Average work days per year	**70,749**

Source: Navy
Notes: The large decrease in total work days starting in 2005 represents the fact that the Navy started to defer maintenance on the USS *John F. Kennedy* as it was slated to be decommissioned. The work days for 2007 represents work days performed through May 31, 2007.

Navy Designed Its Contracting Strategy to Help Firms Plan for and Conduct Ship Repair Work

According to Navy officials, the Navy designed its contracting strategy for nuclear aircraft carrier maintenance to help private ship repair firms plan for decreases and increases in workload. Navy officials stated that at each home port, the Navy awards a multiyear, multiship, multioption contract to a prime contractor to perform the maintenance on all the ships of a particular class. For example, according to the Navy, Earl Industries is currently responsible for performing with its own workforce and subcontracting with other firms the private-sector maintenance for all the carriers in Norfolk, Virginia. The Navy asserts that this type of contracting strategy

- establishes a long-term relationship between the Navy and prime contractor;
- provides the prime contractor early visibility into the Navy's carrier maintenance planning, thus allowing the contractor to appropriately size its workforce in anticipation of future workload;
- facilitates the scheduling of work, resulting in contractor efficiencies and cost savings;
- reduces the time spent on contracting private sector work;
- provides a quick response to emergent work; and
- provides an easy contracting vehicle for ship repair firms to perform deferred maintenance every time ships are in homeport, regardless of the duration of their visit.

Moreover, according to Navy officials, within its multiyear, multiship, multioption contracts, the Navy promotes partnerships between the prime contractor and other ship repair firms actually performing the scheduled maintenance work through teaming agreements. According to industry representatives, teaming agreements are used by the prime contractor to share work with other ship repair firms in northeast Florida. Generally, teaming agreements include arrangements in which a potential prime contractor agrees with other companies to have them act as its subcontractors under a specified government contract. In addition, private ship repair officials told us the teaming agreement allows the prime contractor to easily draw upon the resources of subcontractors during increased workload periods and spreads the workload around to different firms to help maintain the capabilities of the all the ship repair firms. According to the Navy, this contracting strategy is currently used for private sector repairs on all nuclear aircraft carriers, and the Navy has indicated it plans to implement this strategy for the proposed carrier homeporting at Mayport, including the use of teaming agreements.

The Navy's Report Generally Addressed the Provisions Directed in the House Report, but Additional Information Could Help to Clarify Its Responses

The Navy's December 2010 report on the northeast Florida private ship maintenance industrial base[18] generally met the reporting direction, including the three provisions outlined in House Report 111-491, which accompanied a proposed bill for the Fiscal Year 2011 National Defense Authorization Act (H.R. 5136). The Navy, however, could have provided clearer and more complete responses in its report by including additional information that could help provide Congress with a better understanding of its conclusions regarding the sufficiency of the capabilities and capacities of ship repair firms near or around Naval Station Mayport to support the maintenance requirements of a nuclear-powered aircraft carrier. Table 3 provides our evaluation of the Navy's responses to the three provisions listed in the House report as provided in its December 2010 report.

[18] For the purpose of this report we define the ship maintenance industrial base as the private ship repair firms, including the smaller firms and temporary labor with which they work, that support Navy ship repair, maintenance, and modernization requirements in northeast Florida. As such, throughout this report we use private ship repair firms when referring to the private ship maintenance industrial base, except when specifically referring to language in the committee report.

Table 3: Our Evaluation of the Navy's December 2010 Report Responses to the Congressional Defense Committees on the Northeast Florida Private Ship Maintenance Industrial Base

House Report 111-491 provision	Navy's response and information that would help clarify the response

The ability of the private ship maintenance industrial base in northeast Florida to support nuclear-powered aircraft carrier maintenance requirements.	• The Navy's report discussed the capabilities of the various private ship repair firms in northeast Florida and listed some of the types of work that the firms can perform.
	• We found the report did not fully provide information on the
	  ○ maintenance requirements of a nuclear-powered aircraft carrier and how that maintenance work would be allocated to the private sector;
	  ○ impact of the decreasing Navy ship workload on the private ship repair firms and whether this decrease would affect their ability to meet the maintenance requirements of a nuclear aircraft carrier.
	• Including such information on the carrier's maintenance requirements and the impact of the decreasing workload would have provided additional support for the Navy's conclusion regarding the sufficiency of the various northeast Florida firms to support a nuclear aircraft carrier.

The likely costs to the Navy that could result from establishing such maintenance capabilities within the local industrial base.	• The Navy's report concluded that there would not be any additional costs to the Navy associated with adding maintenance capabilities within the private-sector ship repair industrial base to support a nuclear aircraft carrier as the various firms already have the required capabilities. • We found the Navy did not fully explain how it reached its conclusion. Specifically, the report did not explain the differences between propulsion plant and related systems and nonpropulsion plant maintenance work, and the Navy's use of public shipyard employees to accomplish the propulsion plant maintenance and private ship repair firms to accomplish nonpropulsion requirements, or the capabilities needed to accomplish those tasks. • Including the differences between propulsion plant and nonpropulsion plant maintenance and the Navy's strategy to accomplish this work would have further explained the Navy's conclusion that the private ship repair firms already have the capabilities to support the nonpropulsion maintenance requirements of a nuclear aircraft carrier and that there would not be any need for additional capabilities within the local industrial base.
The impacts on costs and workforce scheduling that could result if the Navy must provide the maintenance workforce from another nuclear-powered aircraft carrier home-port location.	• The Navy's report discussed the maintenance workload associated with a nuclear aircraft carrier and the potential cost to the Navy if the public shipyards needed to perform 10 percent more of the work than anticipated, which would require these shipyards to send more workers to Mayport. • We found the report did not fully discuss the Navy's workforce-shaping procedures and the One Shipyard concept, which helps ensure that the required number of workers and skill sets are available when needed to meet current and planned maintenance requirements. Under the Naval Sea Systems Command's One Shipyard concept, the naval shipyards adjust the overall ship repair workload and mobilize the workforce across the all naval and private shipyards as needed to meet the Navy's maintenance needs for its

House Report 111-491 provision	Navy's response and information that would help clarify the response
	ships and help stabilize the workload. • This information would have provided the reader with better context to understand the Navy's potential workforce-scheduling strategies and any impacts that could result if the Navy must provide the maintenance workforce from another homeport location than Mayport.

Source: GAO analysis.

While the responses in the Navy's northeast Florida industrial base report could be clearer and more complete, the additional information lacking in the report is available in two other recent Navy reports previously issued to Congress or the congressional defense committees—one on the assessment of the U.S. ship repair industrial base,[19] and the other on homeporting alternatives for Mayport.[20] Additionally, this report and other reports we have recently issued on the Mayport carrier homeporting proposal also provide complementary information on nuclear carrier maintenance, homeporting costs, and other related areas not fully addressed in the Navy's report.[21] First, a 2007 Navy report to Congress on the assessment of the U.S. ship repair industrial base provides a discussion of the maintenance requirements of a nuclear-powered aircraft carrier and how that work is distributed to the private sector. Second, a 2010 Navy report to the congressional defense committees on homeporting alternatives for Mayport, issued at the same time as the northeast Florida private ship maintenance industrial base report, discusses the possible impacts of the expected decreasing workload at Naval Station Mayport on the northeast Florida private ship repair firms. Third, we provide a discussion of the differences between propulsion plant and related systems and nonpropulsion plant maintenance work and the related workforces in this report, as well as a recent report we issued on the nuclear carrier workforce plans for the Mayport carrier.[22] And lastly, the Navy's 2007 report and its current shipyard business plan that was provided to members of Congress in May 2010[23] provide information on the Navy's workforce-shaping procedures and the One Shipyard concept.

[19] Office of the Chief of Naval Operations, *Assessment of Ship Repair Industrial Base*. This report provided information on private ship repair firms geographically located in port areas throughout the continental United States, in Hawaii, and in Guam that are certified capable to perform work on U.S. Navy ships

[20] Department of the Navy, *Report to Congress on Naval Station Mayport, Florida, Homeporting Alternatives*.

[21] GAO, *Depot Maintenance: Navy Has Revised Its Estimated Workforce Cost for Basing an Aircraft Carrier at Mayport, Florida*, GAO-11-257R (Washington, D.C.: Mar. 3, 2011); GAO-11-309; and GAO-10-482.

[22] GAO-11-257R.

[23] Department of the Navy, 2010 *Naval Shipyard Business Plan* (Washington, D.C.: May 10, 2010).

We are not making any recommendations in this correspondence. After reviewing a draft of this product, DOD officials said that the department had no comments.

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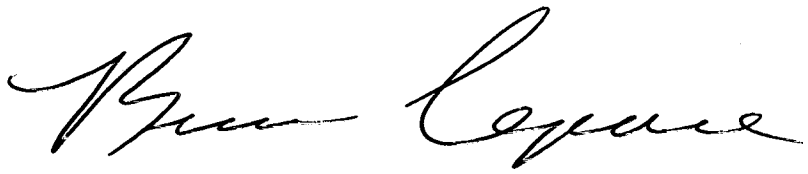
We are sending copies of this correspondence to the congressional defense committees. We are also sending copies to the Secretary of Defense; Secretary of the Navy; and Director, Office of Management and Budget. This correspondence will also be available at no charge on our Web site at http://www.gao.gov.

Should you or your staffs have any questions concerning this correspondence, please contact me at (202) 512-4523 or leporeb@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this correspondence. Key contributors to this correspondence are listed in enclosure III.



Brian J. Lepore
Director, Defense Capabilities
and Management

Enclosures – 3

List of Committees

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The Honorable Thad Cochran
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Committee on Armed Services
House of Representatives

The Honorable C.W. Bill Young
Chairman
The Honorable Norman D. Dicks
Ranking Member
Subcommittee on Defense
Committee on Appropriations
House of Representatives

Enclosure I: Summary of GAO's Independent Cost Estimate to Homeport a Nuclear Carrier at Naval Station Mayport

Our independent cost estimate of establishing a nuclear-powered aircraft carrier home port at Mayport suggests that over a 10-year budget window, recurring costs are expected to total between $90 million and $176 million ($9.0 million and $17.6 million per year), in base year 2010 dollars. For nonrecurring or one-time costs, our independent estimate suggests that the total one-time cost of homeporting a nuclear-powered aircraft carrier at Naval Station Mayport is expected to be between $258.7 million and $356.0 million, in base year 2010 dollars. Table 4 shows our estimated range for recurring costs for each cost element in our independent estimate. Specifically, the table shows our estimate range at an 80 percent confidence interval. The low value of the estimated range represents a 10 percent chance that the cost will be that amount or less, and the high value of the estimated range represents a 90 percent chance that the cost will be that amount or less.

Table 4: GAO Estimated Range of Recurring Costs (in Base-Year 2010 Dollars)
(Dollars in millions)

Cost element	GAO's estimated low cost	GAO's estimated high cost
Permanently assigned labor for nuclear facilities	0.7	1.9
Base operating support	0.7	1.4
Facilities sustainment	0.7	1.2
Facilities restoration and modernization	2.2	3.3
Operations	0.5	1.4
Travel/per diem for public shipyard workers	4.8	12.2
Biennial maintenance dredging	0.1	0.2
Basic allowance for housing differential	- 5.5	- 4.4
Utilities	0.6	1.8
Permanent change of station	1.0	1.3
Private sector travel	0.1	1.2

Source: GAO analysis.

Notes: Base-year 2010 dollars have the effects of inflation removed. The low cost estimate is at the 10 percent confidence level and the high cost estimate is at the 90 percent confidence level. It is not statistically appropriate to add each of the individual confidence intervals to come up with an overall confidence interval. The range and estimate for the basic allowance for housing is negative because the housing allowance is less in the Jacksonville, Florida, metropolitan area than it is in Norfolk, Virginia. This means that the Navy saves money for this cost element.

Table 5 shows a comparison between our estimated range for each cost element in our independent estimate for one-time costs. Specifically, the table shows our estimated range at an 80 percent confidence interval. The low value of the estimate range represents a 10 percent chance that the cost will be that amount or less, and the high value of the estimated range represents a 90 percent chance that the cost will be that amount or less. For more information, see our recently issued report that

provides our independent estimate of the full life-cycle costs associated with the Navy's planned homeporting of a nuclear-powered aircraft carrier at Mayport.[24]

Table 5: GAO Estimated Range of One-Time Costs (in Base Year 2010 Dollars)
(Dollars in millions)

Cost element	GAO's estimated low cost	GAO's estimated high cost
Planning and design	15.0	22.9
Dredging	31.3	33.1
Construction		
Parking garage	21.9	53.3
Road improvements	9.5	24.3
Wharf F improvements	28.3	75.3
Controlled industrial facility	35.2	94.9
Ship maintenance support facilities	23.0	59.3
Initial equipment outfitting	24.5	64.4
Permanent change of station for crew	4.7	6.0

Source: GAO Analysis.

Notes: The low cost estimate is at the 10 percent confidence level and the high cost estimate is at the 90 percent confidence level. It is not statistically appropriate to add each of the individual confidence intervals to come up with an overall confidence interval. In addition to the road improvements on Naval Station Mayport, information provided by a Department of Transportation official indicates that the Jacksonville Transportation Authority, based on its study of traffic improvements to the intersection approaching the main gate outside of the naval station, has identified up to $8 million in improvements that are unfunded at this time. The official indicated that these improvements are potentially eligible for federal-aid funds.

[24] GAO, *Defense Infrastructure: Navy Can Improve the Quality of Its Cost Estimate to Homeport an Aircraft Carrier at Naval Station Mayport*, GAO-11-309 (Washington, D.C.: Mar. 3, 2011).

Enclosure II: Capabilities and Capacity of the Master Ship Repair Firms in Northeast Florida

The northeast Florida area has three master ship repair firms—BAE Systems Southeast Shipyards Jacksonville, Earl Industries, and North Florida Shipyards, Inc.—certified by the Navy as having the capabilities and capacity required to perform nonnuclear maintenance and modernization on all Navy ships. The following is a description of the capabilities and capacity of these master ship repair firms.

BAE Systems Southeast Shipyards Jacksonville

BAE Systems is the largest of the three master ship repair firms in northeast Florida. It has modern ship repair facilities located adjacent to Wharf F (where the proposed nuclear aircraft carrier will be docked during an availability) at Naval Station Mayport. These facilities are fully dedicated to supporting Navy vessels. BAE Systems also maintains an administrative facility at Naval Station Mayport to execute support functions such as solicitation, execution planning, and program management. The facilities at Naval Station Mayport include the following trade shops:

- pipe shop,
- welding shop,
- electric shop,
- rigging shop,
- paint shop,
- pump shop,
- sheet metal shop,
- insulation and lagging shop, and
- warehouse.

In addition to the facilities located at Naval Station Mayport, BAE Systems also has substantial capabilities at its private Jacksonville shipyard. The Jacksonville shipyard is just across the St. John's River from Naval Station Mayport, less than 5 miles by car. The facility performs both Navy and commercial work. Three Naval Sea Systems Command certified dry docks are located at this facility, including a 4,000-ton marine railway and a 13,500-ton dry dock capable of docking cruiser and destroyer class ships. The Jacksonville shipyard facilities and equipment are available to Naval Station Mayport if needed. BAE Systems employs approximately 800 full-time ship repair personnel at its Naval Station Mayport and Jacksonville repair facilities combined. Additionally, it employs approximately 1,300 full-time personnel in the Norfolk area who could potentially be used to augment its personnel in northeast Florida, if needed.

Earl Industries

Earl Industries' facilities at Naval Station Mayport were designed specifically to support Navy ship repair. The 2-acre compound occupied by Earl Industries, adjacent to Wharf F, includes a fully equipped machine shop, structural shop, electrical clean room, sheet metal shop, and pipe shop. Additionally, a fully equipped 30,000-square foot production building constructed in fiscal year 2007 is located 500 yards from the piers. According to Earl Industries' executives, this facility was designed to support aircraft carrier maintenance requirements; however, according to Earl officials, since the decommissioning of the USS *John F. Kennedy* in 2007, the building has not been utilized to its full capabilities. Earl Industries also maintains mobile, containerized tool rooms and shop facilities that are readily transportable to the wharf job site. Earl Industries also has a long-term lease on a 10,000-square foot warehouse and 2 more acres of temporary storage area a half of a mile outside the Naval Station's main gate. Earl Industries employs approximately 120 full-time ship repair personnel at its Naval Station Mayport location. In addition, it employs approximately 571 personnel in the Norfolk area, who could potentially be used to augment its personnel in northeast Florida, if needed.

North Florida Shipyards, Inc.

North Florida Shipyards has a 60,000-square foot facility located on 2.5 acres adjacent to Wharf F on Naval Station Mayport. This facility houses a fabrication shop, pipe shop, machine shop, electric shop, crane and rigging shop, paint shop, and material storage warehouse. In addition to the Mayport facility, North Florida Shipyards also has a commercial facility located at Commodore Point in Jacksonville, Florida. This facility has additional capabilities and equipment that are available to support Navy work being performed at Naval Station Mayport if needed. North Florida Shipyards employs approximately 235 full-time ship repair personnel at its Naval Station Mayport and Jacksonville locations combined. It does not have any personnel in the Norfolk area.

Enclosure III: GAO Contact and Staff Acknowledgments

GAO Contact

Brian J. Lepore, (202) 512-4523 or leporeb@gao.gov

Staff Acknowledgments

In addition to the contact named above, Mark J. Wielgoszynski, Assistant Director; Darnita Akers; Shawn Arbogast; Russell Bryan; Mary Jo LaCasse; Carol Petersen; Erik Wilkins-McKee; and Michael Shaughnessy made key contributions to this correspondence.

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