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THE SENATE ARMED SERVICES COMMITTEE

STATEMENT OF

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BEFORE THE

SENATE ARMED SERVICES COMMITTEE

SUBCOMMITTEE ON SEAPOWER AND

SUBCOMMITTEE ON READINESS AND MANAGEMENT SUPPORT

ON

SHIP AND SUBMARINE MAINTENANCE

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Chairman Perdue, Chairman Sullivan, Ranking Member Hirono, Ranking Member Kaine, and distinguished members of the Subcommittees, thank you for the opportunity to testify on the Department of the Navy's ship and submarine depot maintenance. The Department recognizes the need to deliver lethal ships and submarines to the combatant commanders on time, and is approaching ship and submarine maintenance with a sense of urgency.

The Navy faces high-tempo operations, budget pressures, and a fragile industrial base that has resulted in a maintenance backlog and reduced readiness of Navy ships. In the 1980s, the Navy had nearly 600 ships in the Fleet and kept roughly 100 – or 17 percent – deployed at any one time. Today, our Battle Force stands at 290 ships, of which 81 – or 28 percent of the Fleet – are at sea, increasing readiness challenges. Though our warships are more capable and more mechanically reliable than those of previous generations, maintenance and sustainment are critical to ensure that those Fleet assets remain ready to deploy.

Having a stable and predictable budget is crucial to the Navy's ability to execute contracts and maintenance actions required to keep our Navy in the fight. Beginning Fiscal Year (FY) 2020 under a continuing resolution (CR) introduces uncertainty, as the Navy attempts to execute work planned for the current year with funding based on last year's budget. The Navy has already had to postpone two availabilities planned for the first quarter of FY 2020 - USS Bainbridge (DDG 96) and USS Gonzalez (DDG 66). Delaying these planned activities has drastic downstream impacts – injecting instability in the industrial base and creating large cost impacts and inefficiencies that can extend beyond the duration of the uncertainty. In most hearings we are asked what Congress can do to support our efforts – the answer is simple, support and pass the President's Budget on time.

### INCREASING ACCOUNTABILITY

Recent on-time performance trends in both the public and private sectors are improving; however, challenges remain. To address these challenges, the Navy has undertaken a multipronged approach focused on increasing accountability and improving productivity in both public and private shipyards. In our public yards, we are growing the capacity of the shipyards to meet the workload demand, improving the training and productivity of the workforce, and making the needed investments in our shipyards to ensure they can support our growing needs. In the private shipyards, we have focused on improving the completeness, accuracy, and timeliness of planning; working with the Fleet to adjust maintenance schedules to level load the ports, revising acquisition strategies to improve stability and predictability, and streamlining Navy inspection points to improve efficiencies.

The Navy is preparing the second Long-Range Plan for Maintenance and Modernization of Naval Vessels to forecast maintenance workloads for all in-service ship classes over the next 30 years. This plan complements the Navy's Annual Long-Range Plan for Construction of Naval Vessels and establishes the framework to effectively sustain our investments in today's fleet. The intent is to build a culture of continuous evaluation of the industrial base capacity and capability and provide the industrial base with stable and predictable workloads. This will better

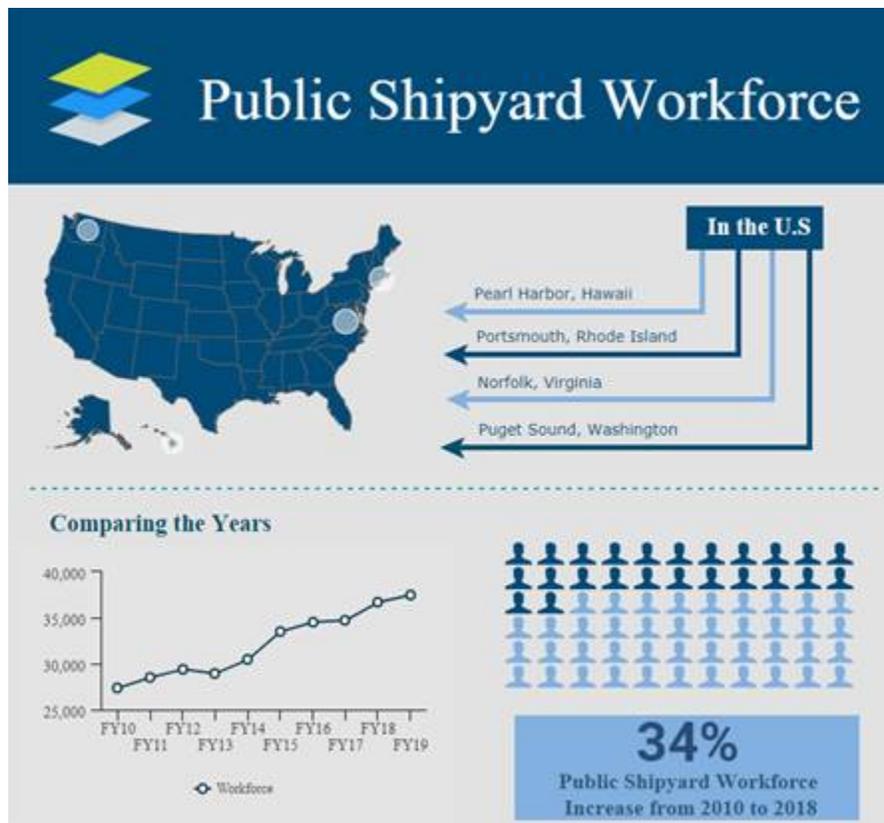
enable the Department to support the shipbuilding plan, and adapt to any surge demand if necessary.

Finally, the Department has established a Deputy Assistant Secretary of the Navy (DASN) for Sustainment to improve our ability to plan, program, budget and execute the Navy's sustainment mission. DASN Sustainment will have oversight of sustainment funding across the DON and will oversee and manage Navy and Marine Corps sustainment and life-cycle management policies. This will allow the Department to improve and align the complex drivers of maintenance and modernization completion – that in turn will increase our output to the Fleet.

## PUBLIC SHIPYARDS

In the four public shipyards, the Navy is focused on several key lines of effort: growing the capacity of the shipyards to match the workload demand; improving the training of the workforce; improving the productivity of the workforce through innovation and improvements to our business processes in both planning and execution; and making needed investments in our shipyards to ensure a 21<sup>st</sup> century shipyard to match our 21<sup>st</sup> century workforce.

The Navy's four public shipyards have seen over a 25 percent increase in their planned workload since 2010. To match the growth, the Navy has increased the size of our public shipyard workforce by more than 9,000 people, from 27,368 employees in 2010 (measured in End-Strength) to 36,696 employees in 2018.



This growth was achieved approximately one year ahead of schedule and is enabling us to stop the growth in the backlog of work and begin working off that backlog earlier than planned. However, the rapid growth of the workforce has resulted in a less experienced workforce where 50 percent have less than five years of experience. To get new hires trained more efficiently, the shipyards have transformed how they train their new employees through learning centers that use both virtual learning tools and hands-on work. The Navy has carried that innovative concept to the waterfront by developing “safe-to-fail” areas where artisans can experiment with new and innovative techniques to improve throughput or save time during an availability. The net result of these learning centers is that the shipyards have cut the time to create a productive worker from the time they are hired by more than 50 percent over the past four years. Additionally, the Navy is working to create efficiencies in workforce training by standardizing and reducing regional variability in processes across the public shipyards. Developing Navy-wide procedures in areas such as welding will enable authorized welders to work in different locations without the need to be requalified.

To improve productivity, the Navy is testing innovative processes to reduce the time and cost of maintenance availabilities. New technologies such as cold spray and hull crawling robots have the potential to produce significant results. Cold spray is a technology in which metal powders are accelerated at high speeds and sprayed through a nozzle, impacting and mechanically bonding to a surface. This produces high performance coatings that can extend the life of legacy weapon and hull mechanical systems, and reduces the time to accomplish valve repair from 10 months at a vendor site to three days. Cold spray is currently in use at three of our naval shipyards and will be delivered to a fourth in FY 2020. Hull crawling robots are able to carry a variety of test equipment to conduct hull inspections, non-destructive testing and biofouling removal. This obviates the need for scaffolding or lifting equipment and is estimated to reduce dry docking periods by up to two weeks while improving worker safety. Hull crawlers have been ordered for each maintenance activity with an anticipated delivery of tooling suites in March 2020. The innovation project team at Portsmouth Naval Shipyard accomplished a complete 3D imaging of a submarine, USS Cheyenne (SSN 773). This 3D imaging will be used to plan and execute maintenance, reducing cost and schedule by limiting the need for travel, excessive interference removal and lost material.

The Navy is also leveraging the recent successes of the Naval Sustainment System (NSS)–Aviation that has increased the mission capability rates of its F/A-18 E/F fleet by creating a NSS – Shipyards. Similar to NSS-Aviation, the NSS-Shipyards has brought in outside business process experts to improve productivity and identify areas for long-term improvement at Norfolk Naval Shipyard and Puget Sound Naval Shipyard. This includes a mobile passive Radio Frequency Identification (pRFID) system, which is similar to a GPS that tracks material throughout the shipyard. This creates a way for material targeting to record the distance items under maintenance travel. It will also eventually reduce costs by eliminating lost material and work hours associated with locating misplaced material. The Navy will expand that effort to all four public shipyards in FY 2020.

The Navy is now in its second year of the planned 20-year, \$21 billion Shipyard Infrastructure Optimization Program (SIOP) that will fully transform shipyards originally

designed and laid out to support building ships of sail and coal into 21<sup>st</sup> century shipyards dedicated to executing complex maintenance availabilities on the Navy's nuclear-powered aircraft carriers and submarines. Fully executed, SIOP will deliver required dry-dock repairs and upgrades to support both current and future classes of ships, optimize workflow within the shipyards through significant changes to their physical layout, and recapitalize obsolete capital equipment with modern machines that will dramatically increase productivity and safety.

The Government Accountability Office (GAO) has recently reviewed the SIOP plan and identified opportunities for the Navy to enhance reliability through improved cost estimating and better defining the roles and responsibilities of the shipyards. The Navy is taking steps to implement these recommendations, executing modeling and simulation efforts to inform area development plans at specific shipyards and provide a more complete cost estimate for executing SIOP. Additionally, the Navy will continue to refine the roles and responsibilities for all stakeholders to better execute projects at each of the four naval shipyards.

In two years the Navy has delivered or started a series of SIOP projects and begun the delivery of new capital equipment across the four shipyards:

For Pearl Harbor Naval Shipyard & Intermediate Maintenance Facility (PHNSY&IMF), the Navy has delivered 150-ton heavy lift transporters to support Virginia Class availabilities. More importantly, the Navy and its industry partner tracked every aspect of the recent USS Asheville (SSN 758) maintenance availability to build a "digital twin" of the shipyard. This dynamic virtual shipyard will enable the Navy to manipulate data and measure the impact of moving certain shops and workspaces to different areas within the existing footprint. Once the full capability is delivered in February 2020, the Navy will use this data to reimagine the shipyard to improve productivity, safety, and the quality of life of our shipyard personnel. PHNSY&IMF will also be the first shipyard to receive a Dry Dock Production Facility (DDPF) which, as currently envisioned, will enclose multiple dry docks and move much of the production work to the waterfront.

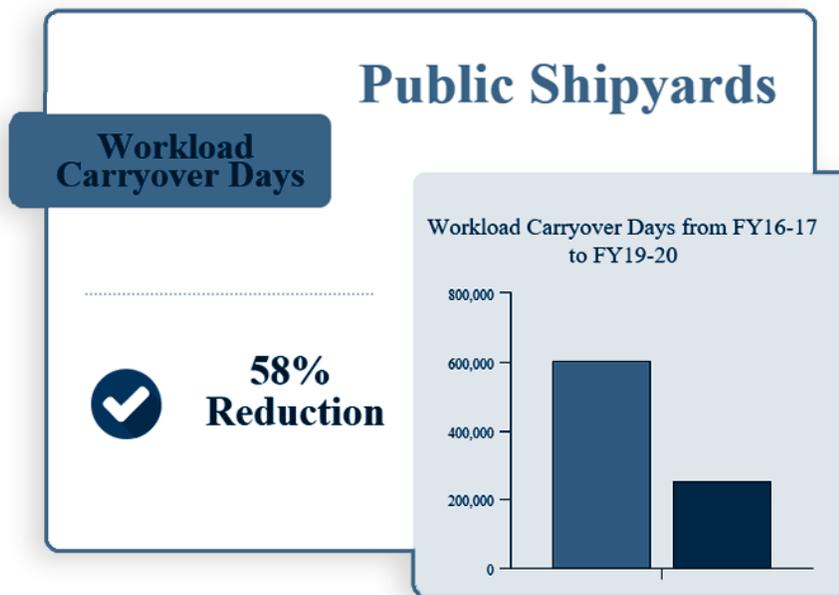
Puget Sound Naval Shipyard & Intermediate Maintenance Facility (PSNS&IMF) will be the second naval shipyard to have a digital twin built. To ensure the Navy properly understands the complex workflow, it will track both aircraft carrier and submarine availability. Work started on this effort on October 15, 2019 and final delivery is expected in fall 2020. PSNS&IMF received the first 55-ton mobile crane this year which will allow the shipyard to more effectively execute maintenance work.

Portsmouth Naval Shipyard (PNSY) replaced an obsolete and maintenance-intensive lathe with a computer operated Horizontal Turning Center. The center will improve productivity at PNSY and reduces the maintenance burden on our workforce. Work has also begun on Dry Dock #1 in preparation for refueling selected Los Angeles Class submarines. Efforts include building a super flood basin and P1074 which will be dedicated to the Los Angeles Class Service Life Extension. Work on PNSY's digital twin is scheduled to begin in 2020.

Norfolk Naval Shipyard (NNSY) has seen a number of military construction efforts begin or deliver in the past year. On June 14, 2019, the renovated Waterfront Operations Support Facility (Building 1735) located near Pier 3 re-opened. This two-story structure houses 15 shop spaces

and allows for work to be executed near to the ships, reducing travel time and increasing efficiency. On July 1, 2019, the Navy broke ground on a new Production Training Facility which will host most of the training classes and shops for the entire shipyard. Further, the Navy is in negotiations to award a contract to build a new defueling and inactivation complex that will replace a 25-year old facility. The new M-140 Complex will alleviate frequently required repair work and support the increase in submarine inactivations planned for the 2020s. The Navy also awarded a contract for a horizontal boring mill for NNSY's Navy Foundry and Propeller Center in Philadelphia, PA, to support Columbia Class and Virginia Class propulsor manufacturing. NNSY took possession of a Bridge Mill which replaces two obsolete and less effective machines to support aircraft carrier and submarine shaft, rudder, and fairwater plane work. The Navy plans to begin NNSY's digital twin effort in early 2020.

The net result of all these integrated efforts is that the Navy is seeing positive results across the naval shipyard enterprise. This includes completing nine of the last ten CVN availabilities on time or early including the recent early delivery of USS Nimitz (CVN 68), the Navy's oldest combat ship, from a docking availability at Puget Sound Naval Shipyard. The four naval shipyards have reduced the amount of workload carryover from one fiscal year to the next by nearly two-thirds between FY 2017 and FY 2020, from a total of 603,400 work days carried over between FY 2016 and FY 2017 to a projected 287,500 work days between FY 2019 and FY 2020. Additionally, the Navy has reduced delayed maintenance by half, from 1,734 total days delayed in FY 2018 to 894 total days in FY 2019.



This has resulted in three aircraft carriers and one submarine delivered on time or early, along with the majority of our current maintenance availabilities scheduled on time or earlier as well. Currently, 13 submarines and two aircraft carriers are undergoing CNO-level maintenance at the four public shipyards. Of those, eight submarines and both aircraft carriers are on track to deliver on time.

## PRIVATE SHIPYARDS

Similarly, the Navy is focusing on several lines of effort in private sector maintenance. This includes improvements in planning, improvements in forecasting availability durations, working with the fleet to adjust maintenance schedules to level load the ports, and acquisition strategies that are designed to improve the long term stability and predictability of private sector surface ship maintenance planning and execution – a key ask of our private sector industry partners. There are 45 CNO surface ship availabilities in execution at private shipyards across the country, and over 100 ships in planning.

Successful execution of complex ship maintenance and modernization availabilities requires solid planning. Accurate assessment of the ship's maintenance needs, early identification of the scope of modernization, and timely procurement of Long Lead Time Material are all key tenets of solid planning. The Navy is accelerating its planning milestones to drive earlier identification of availability scope, ordering material earlier and soliciting contracts earlier - ultimately leading to earlier contract awards. The migration to earlier milestones is enabled by improvements in the Navy's ability to use maintenance data coupled with engineering analysis to determine lifecycle maintenance requirements and accurately estimate the scope of future repairs. Navy's goal is to award all contracts 120 days prior to the start of an availability (vice 60 days), which gives industry double the time they previously had to develop planning products and buy materials. This initiative was informed by industry's feedback, and has proven successful. The first ship in this pilot program, USS Shoup (DDG 86), undocked 10 days early from BAE Systems' Pride of California dry dock in San Diego.



USS Shoup's (DDG 86) early undocking from BAE Systems' Pride of California drydock on August 28, 2019.

The Navy understands the importance of workload stability to a healthy and efficient industrial base. The method of contracting that workload is evolving from a complete one ship availability at a time strategy that did not provide long term workload predictability to a strategy that groups ship availabilities both horizontally and vertically to provide longer term predictability to incentive industry to grow the needed capacity. Vertical groupings for ships with similar start dates will include multiple overlapping availabilities within a single solicitation. The Navy awarded the first three-ship vertical grouping contract in February 2019 for USS Arleigh Burke (DDG 51), USS Bulkeley (DDG 84) and USS Gunston Hall (LSD 44). Horizontal groupings for ship availabilities occurring in a series will include multiple sequential availabilities within a single solicitation. The first horizontal grouping contract was awarded on September 25, 2019 for USS Chosin (CG 65) and USS Cape St. George (CG 71) to Vigor Marine, LLC, providing stability in the workload in the Pacific Northwest. Based on industry feedback on ways to improve, the Navy also recently awarded a double docking availability for the USS Stethem (DDG 63) and USS Decatur (DDG 73). By awarding multiple availabilities, industry gets a backlog of work that creates confidence in hiring and retaining a skilled workforce and investment in infrastructure.



Double docking of USS Decatur (DDG 73) and USS Stethem (DDG 63) in BAE Systems - Ship Repair's dry dock.

Informed by strong dialogue with the ship repair industrial base, the Navy has implemented multiple initiatives that are improving performance in contract execution. Initiatives include utilizing pre-priced changes to eliminate previously-required approvals for small dollar changes, which typically account for 70 percent of growth work schedule delays. The approval cycle time was reduced to two days as compared to the historical average of 31 days. The Navy and industry also worked together to implement an initiative to right-size quality assurance checkpoints, reducing the number by 50 percent by eliminating overlapping or duplicative

requirements. The Navy has worked to become more proactive in availability planning by increasing directive maintenance strategies to improve the forecasting model for ship availability durations and port industrial capacity. All five of the FY 2019 availabilities that incorporated this model have delivered on time. With better estimates of projected availability durations and capacity to accomplish the work, the Navy has been able to reduce workload peaks and valleys at each port to create a more balanced and executable schedule for the industrial base. The net result has been a 21 percent improvement in the number of on-time deliveries for availabilities that completed in FY 2019 as compared to FY 2018.

The Navy is working with our industry partners to improve cost and schedule performance for submarine maintenance in the private sector. Cost overruns and delays in schedules on USS Helena (SSN 725) at Newport News Shipbuilding Huntington Ingalls Industries and USS Montpelier (SSN 765) at General Dynamics Electric Boat in FY 2019 have resulted in the deferred maintenance for USS Boise (SSN 764) and USS Columbus (SSN 762). The Navy will need to balance the workload across the public and private sectors to support future maintenance and modernization as well as ensuring new ship construction efforts are adequately supported.

The biggest risks to execution of this plan are continuing resolutions and lack of an on-time budget. Under a CR, the Navy has less cash available than requested which limits decision space for maintenance and operations. As a result, the Navy is forced to make hard decisions about what to fund and what to defer or cancel. Due to the first FY 2020 CR, the Navy delayed award of maintenance contracts for USS Gonzalez (DDG 66) and USS Bainbridge (DDG 96), creating instability in the industrial base. The Navy also has plans to award five additional ship maintenance contracts before December 20, 2019, which may be adversely impacted by the second CR. This uncertainty significantly undermines our efforts to provide greater stability and predictability to industry, and limits industry's ability to plan for future work by hiring workers, ordering materials, and investing in maintenance and infrastructure upgrades. The Shipbuilders Council of America recently highlighted the impacts of a long-term continuing resolution in a November 13, 2019, letter to the congressional defense committees. A survey conducted by the Council found that 94 percent of companies will have to stop hiring if the Department continues to operate under a CR. The impact will be felt even more strongly by small businesses, which may face a five to 50 percent workforce reduction and a 15 to 35 percent reduction in annual revenue according to the survey results. These effects will become more pronounced if the CR extends further into the year, significantly impacting planned work on both coasts.

## CONCLUSION

The Navy fully understands that the on-time delivery of ships and submarines out of maintenance availabilities is a national security imperative. The Department is taking a holistic approach to ensure both our public and private yards have the information, people, and equipment needed to maintain the world's greatest Navy. The Navy will continue to work with Congress and our industry partners to address our challenges and to efficiently maintain and modernize the Navy's growing fleet by growing the capacity and capability of the industrial base.