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STATEMENT OF

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BEFORE THE

SUBCOMMITTEE ON READINESS

OF THE

HOUSE ARMED SERVICES COMMITTEE

ON

# ORGANIC INDUSTRIAL BASE ISSUES

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Mr. Chairman, Ranking Member Lamborn, and distinguished members of the Subcommittee, thank you for the opportunity to testify on the Department of the Navy's Organic Industrial Base. The Navy's organic industrial base is critical to completing required maintenance and modernization on the ships, submarines, and aircraft the combatant commanders require to execute their missions. The Department approaches maintenance with a sense of urgency knowing our forward deployed warfighting assets are critical to dissuading aggression and responding to hostile actions and natural disasters.

Naval Aviation Fleet Readiness Centers

For the first quarter of FY2021, the continuing resolution presented challenges to producing aircraft, engines, and components at our Fleet Readiness Centers (FRCs). As inductions catch up and workload planning finalizes, the anticipated recovery of most production schedules will occur in the 3rd Quarter. For the Department of the Navy's aviation supply chain, of which the Fleet Readiness Centers provide the foundation, timely and predictable budgets would greatly improve efficiency of operations and allow optimization of available resources. Each year that begins without an approved budget puts fleet readiness at risk and requires workarounds that sub optimize workload planning and resource allocation.

Commander, Fleet Readiness Centers (COMFRC) is a Naval Air Systems Command (NAVAIR) Echelon III command that oversees three depots, ten intermediate level maintenance centers and 25 detachments providing Maintenance, Repair and Overhaul (MRO) of Navy and Marine Corps aircraft, engines, components and support equipment, as well as logistics and engineering support to Navy and Marine Corps squadrons throughout the world. Our highly skilled workforce spans six countries and territories: Japan; Guam; Korea; Malaysia; Bahrain; and Djibouti, and 13 states: Washington; California; Florida; North Carolina; Virginia; Maryland; Texas; Hawaii; Nevada; New Jersey; South Carolina; Arizona; Louisiana; and the District of Columbia. COMFRC comprises approximately 12,000 civilians, 6,000 Sailors and Marines, and 2,500 contractors. The government civilians include 7,900 artisans; 2,200 engineers; 900 logisticians; and 1,000 business personnel.

Focused efforts toward readiness recovery, including investment in spares and in-service engineering and logistics, began in FY18 and began to yield improvements in FY19. Incorporation of commercial best practices and maintenance reforms further accelerated readiness improvements and allowed achievement of SECDEF direction to meet 80% Mission Capability for front-line tactical jet aircraft. Other platforms saw similar improvements by the end of FY19 and throughout FY20. Fleet Readiness Center reforms were integral to readiness recovery and include incorporation of commercial

best practices, as well as redistribution of engineering and business operations expertise as part of Naval Air Systems Command restructuring. The repair process, including supply chain and engineering support, is now fully transparent, driving accountability in these support functions. Transformational planning and execution improvements in heavy depot performance, beginning with the Super Hornet, were initiated across all type/model/series by the end of calendar year 2020. Planned Maintenance Interval (PMI) lines; depot level component production; and intermediate level (I-level) expeditious repairs (EXREPS) have all exhibited improved performance

In FY 20, the Fleet Readiness Centers (FRCs) experienced personnel and material shortfalls in 3rd Quarter as a result of COVID-19 protections and impacts at material suppliers. These impacts were fully mitigated by the end of FY20, and the FRCs met, or exceeded, FY20 production schedules and budget targets for aircraft, engines and components. Since July of 2020, all FRC lines have consistently remained "Green, with no restrictions to production." Numerous mitigation measures were established to protect the health of our on-site FRC employees. The below details apply.

a) Strategies were developed to minimize exposure to COVID-19 by:
    a. eliminating overlap between shifts,
    b. minimizing contact between shops,
    c. reducing product team interactions, and
    d. rebalancing workforce through adjusted shifts for social distancing.
b) Travel is limited by site/local installation and requires Flag/SES approval for all official, government-funded travel.
c) Preventative measures were widely deployed (PPE, cleaning supplies, sanitizing supplies/services, Plexiglas barriers, and workforce social distancing/mitigation plans).
d) Surveillance testing and temperature taking prior to entering buildings were established.

The safety of the FRC workforce continues to be of utmost importance and COMFRC's Safety Management System (SMS) is based on a safety-first culture. COMFRC promotes continual improvement and emphasizes hazard prevention, program evaluation, employee involvement, training and industry standard certifications as necessary elements of MRO operations. Evidence of effectiveness is COMFRC's FY20 Total Case Incident Rate (TCIR) rate of 1.68 and Days Away, Restricted or Transferred (DART) Rate of 1.02; the lowest rates in COMFRC history. As a reference, for 2019 the Bureau of Labor Statistics reflects 2.4 TCIR and 1.5 DART rates as standards for the aircraft manufacturing industry. All of our FRCs have achieved SMS Gold Status, which is the command's measure of sustained safety program compliance. Our COMFRC Enterprise Safety and Compliance Team was selected for the SECNAV Emerging Safety Center of Excellence Award, FRCs

have received CNO Aviation and Ashore Awards seven years in a row, Depot-level FRCs have obtained registration in the International Organization of Standardization (ISO) 45001 and 14001, and FRC East has maintained Occupational Safety and Health Administration's Voluntary Protection Program Star status in its application areas; the first Naval Aviation command to do so.

Though our depot workforce size is slightly smaller since the end of FY19 with approximately 11,300 currently onboard, we continue to meet readiness requirements. COMFRC is targeting recruitment in critical skills like Nondestructive Testing, and specialized Mechanical and Engineering skill areas. The command continues to invest in the future through our National Apprenticeship Program with 270 apprentices currently onboard. Recruitment and retention challenges continue to exist in competitive markets. To address this, NAVAIR received approval from DoD in FY20 for two Special Salary Rate packages to increase pay for Aircraft Maintenance positions in both the Charleston, SC and San Diego, CA regions. To date, we have seen a slight increase in retention rates from FY20 to FY21. COMFRC also continues to invest in workforce development. Depot personnel participate in all NAVAIR leadership programs, notably in the recently launched Foundational Leadership Development Program. Over the next ten years, the command's Strategic Plan focuses on developing our people to meet the challenges of a transformed digitized workplace. We also look forward to leveraging existing partnerships with academia and developing new partnerships with industry and other services to develop new training plans for maintenance on technologically sophisticated next generation platforms.

In addition to workforce skills improvement, COMFRC continues to modernize and upgrade facilities and equipment through the Infrastructure Optimization Plan (IOP). Our Phase 1 report was submitted to Congress April 11, 2019, followed by an interim report submitted July 2, 2020. IOP Phase 2 is underway, further progressing optimization planning for our three heavy depots through comprehensive assessments of facilities, processes, and industrial equipment. All future reporting will be submitted through the FY20 NDAA Section 359 annual requirement. In all, $3.5B in infrastructure requirements over the next 10 years have been identified. Infrastructure associated with Military Construction (MILCON) will be informed by efforts associated with the Ship Infrastructure Optimization Program (SIOP).

We look forward to continuing to work with Congress to position the Fleet Readiness Centers to meet Naval Aviation maintenance and supply chain requirements.

## Naval Shipyards

In 2018, the United States Navy began an unprecedented effort to modernize its four naval shipyards, each of which is over a century old. The Shipyard Infrastructure Optimization Program, or

SIOP, is a 20-year effort that will deliver the shipyards the Navy needs to support its submarines and aircraft carriers for the foreseeable future. Through upgrading existing dry docks and building new ones; reimagining the physical layout of the shipyards, and replacing antiquated capital equipment with modern machines, SIOP is delivering efficient and modernized shipyards.

SIOP is the largest and most impactful effort the Navy has undertaken to improve shipyard performance, but it is not the only one. Over the past decade, the Navy has increased the size of its shipyard workforce by approximately one-quarter to help address the 25-percent increase in planned workload at the four shipyards. To train new employees more efficiently, the shipyards transformed their educational programs through the development of learning centers that utilize both virtual and hands-on learning. Over the past five years, these learning centers reduced the time required to train employees by more than 50 percent, enabling new workers to productively contribute to ship maintenance sooner.

The Navy carried the learning center philosophy to the waterfront by developing "safe-to-learn" training areas where artisans can hone their skills on new and innovative techniques to increase their proficiency and reduce the time it takes to accomplish the maintenance.

The Navy also revised its maintenance duration models to build more predictable and executable maintenance delivery schedules. The shipyards used enhanced analytic capabilities derived from analytics labs and tools to increase the efficacy of its maintenance planning and scheduling. Concurrently, the shipyards are modifying their maintenance planning, programming, budgeting and execution process in a way that accounts for these more precise work packages and the changing workforce demographics in the shipyards.

The Navy is seeing some initial positive results due to these initiatives. Portsmouth Naval Shipyard (PNSY) undocked the USS California (SSN 781) ahead of schedule and completed its follow-on steaming program milestone five days early. Norfolk Naval Shipyard's (NNSY) Off-Yard Carrier Group completed three successful on-time maintenance availabilities, performing repairs on many vital systems, which allowed USS Dwight D. Eisenhower (CVN 69) to deploy on time. Puget Sound Naval Shipyard and Intermediate Maintenance Facility (PSNS & IMF) executed maintenance efforts on four carriers simultaneously and successfully completed all on time. The Pearl Harbor Naval Shipyard & Intermediate Maintenance Facility (PHNSY & IMF) workforce completed all planned maintenance and modernization work on USS Missouri (SSN 780) five days early, representing the first time any shipyard has completed two consecutive Virginia-class extended dry-docking selected restricted availabilities ahead of schedule.

At the enterprise-level, the public shipyards reduced days of maintenance delays by more than 80 percent, going from 1,528 total days of delay in Fiscal Year 2019 to 304 total days of delay in Fiscal Year 2020. Thus far in Fiscal Year 2021, the Navy has maintained its schedule and, unlike previous years, has yet to shift work from this fiscal year into the next fiscal year.

Successful implementation of SIOP builds upon these previous efforts and will ensure the four shipyards are ready and able to support all of the Navy's submarines and aircraft carriers for generations to come. Now in its third year, SIOP is a planned 20-year, $21 billion comprehensive program that will transform shipyards originally designed and configured to support building ships of sail and coal into 21st 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.

SIOP has three phases. Phase I completed with the establishment of a dedicated SIOP program office within NAVSEA, with blended staff from CNIC and NAVFAC to facilitate integration and communications. Phase II, which is currently underway, focuses on executing the enhanced industrial engineering analysis and the modeling and simulation of industrial processes at the naval shipyards. The Navy is building dynamic "digital twins" for the public shipyards that can be manipulated to move work functions and entire buildings to different locations within the shipyards and measure the impact to throughput and efficiency. The digital twins will allow the Navy to build Area Development Plans (ADPs) that will guide infrastructure modifications within the shipyard to enhance productivity. Concurrently, SIOP is executing dry dock, facility restoration and modernization, and capital-equipment investments during the development of the ADPs that support dry-dock availabilities and the long-term optimization program.

Phase III will prioritize, develop, and execute projects identified during Phase II. Phase III will see the most of the Military Construction (MILCON) and larger efforts.

PHNSY & IMF is the first shipyard to complete its digital twin. To build the virtual representation of the shipyard, the Navy and its industry partner tracked every aspect of the recent USS Asheville (SSN 758) maintenance availability. The resulting "virtual shipyard" enables 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, the Navy will use this data to reimagine the shipyard to improve productivity, safety, and the quality of life for our shipyard personnel.

Although most of the MILCON will occur during Phase III, the Navy is moving forward on a number of efforts. At PHNSY & IMF, Dry Dock 3 is incapable of supporting Virginia Class submarines, so the Navy is moving forward on building a new dry dock that can service all variants of Virginia-Class submarines. To support this effort, the Navy awarded an Environmental Impact Statement (EIS) support contract in September 2019 and issued an EIS Notice of Intent (NOI) in September 2020. These will be followed by an EIS Record of Decision (ROD) in September 2022. The Navy is also working toward a Nationwide Programmatic Agreement (NPA) to address historic preservation and protecting cultural resources.

PSNS&IMF will be the second naval shipyard to have a digital twin built. As PSNS&IMF maintains both submarines and aircraft carrier, its digital twin will be more complex as it will track both types of availabilities. Digital twin work began in October 2019 and final delivery is expected in May 2021. An on-going major MILCON project at PSNS&IMF includes modernization effort for both Dry Dock 4 and Pier 3. Awarded in June 2020, this project modernizes the Dry Dock 4 electrical distribution systems that serve nuclear ship electrical shore power and industrial power and encloses Dry Dock 4 utility service galleries to prevent seawater flooding during docking operations. The project also modernizes Pier 3 electrical distribution system that serves nuclear ship electrical shore and industrial power. Navy recently awarded a $48M contract for a 175-Ton Portal Crane to be delivered to PSNS&IMF in May of 2025.

Work on PNSY's digital twin is currently underway and the Navy expects delivery of the final product in June 2021. A major on-going initiative at PNSY involves ensuring the shipyard is ready to start refueling Improved Los Angeles Class attack submarines – specifically building a super-flood basin to support the docking and undocking of submarines and capital equipment upgrades to replace an obsolete and maintenance-intensive lathe with a computer operated Horizontal Turning Center. The center will improve productivity at PNSY and reduce the maintenance burden on its workforce.

Further, the Navy awarded a contract in May 2020 for a Nuclear Railcar Secure Holding Area that will be used as a staging, inspection, and holding area for rail cars. Rail cars must be secured when they are staged for use and before shipping with security systems and access controls. PNSY will take delivery of a 60-Ton Portal Crane in March 2021, which will assist with waterfront operations.

NNSY's digital twin modeling and simulation is underway with an expected delivery of the final product in September 2021. NNSY has seen a number of Military Construction (MILCON) efforts begin or deliver in the past years. In September 2020, the Navy awarded a contract for the Dry Dock Flood-Protection Improvements. These improvements enclose the waterfront area around Dry Docks 1, 2, 3, and 4 with a continuous, all-inclusive flood-protection system. In June 2019, NNSY reopened its

renovated Waterfront Operations Support Facility (Building 1735). This two-story structure houses 15 shop spaces and allows work to be executed near the ships, reducing travel time and increasing efficiency. In July 2019, the Navy broke ground on a new Production Training Facility that will house most of the training classes and shops for the entire shipyard. NNSY also completed installation of a Bridge Mill, which replaces two obsolete and less effective machines to support aircraft carrier and submarine shaft, rudder, and fairwater plane work, and a new computer-controlled hydraulic ram designed to punch precise holes in steel. In October 2020, NNSY received new Emergency Diesel Generators that provide power to submarines in dry dock. Owning these generators instead of renting them will save the Navy $4.8M over a 10-year period.

The Navy also awarded a contract for a horizontal boring mill for NNSY's Naval Foundry and Propeller Center in Philadelphia, PA, to support Columbia-Class (SSBN) and Virginia-Class (SSN) propulsor manufacturing.

NAVSEA is continually working to deliver innovative processes and technologies to the shipyards. Recent examples include:

- Cold Spray: Cold spray is a process in which metal powders are accelerated at high speeds and sprayed through a nozzle so that it mechanically bonds to a surface. This produces high performance coatings that can extend the life of legacy weapon and hull mechanical systems. The Navy has demonstrated that it can save significant time and cost utilizing cold spray, in some cases restoring valves in three days when previously we required ten months due to having to ship the component to vendor sites for refurbishment. To date, fourteen components have been repaired and installed on various availabilities, proving this is a viable technology.
- 3-D Ship Scanning: PNSY accomplished the first ever complete 3-D imaging scan of a submarine, USS Cheyenne (SSN 773), in preparation for its upcoming Engineered Refueling Overhaul (ERO). The scan consists of 40 billion precision measurements and more than 18,000 high-resolution images, replacing in-person ship checks. Using the scan data, the shipyard was able to eliminate the need for a temporary cooling system that would have otherwise been prepared in advance of her arrival at the shipyard, saving approximately $250,000 and approximately 200 labor-hours aboard Cheyenne. Due to the success of this effort, the Navy intends to mainstream 3-D scanning this year in order to save time and cost.
- Additive Manufacturing (AM): Also known as 3-D printing, AM has seen rapid growth at the shipyards due to extensive Navy investment and has had direct impact on maintenance availabilities. For example, to support recent work on USS Dwight D. Eisenhower (CVN

69), the innovation team at NNSY designed, developed and manufactured a tool used to precisely measure waterborne bearing widths, which expedited installation jobs, helping to ensure IKE could deploy on time.

- ROVs: PSNS & IMF developed a robotic solution to safely and effectively clean the turbine generator condensers aboard USS Nimitz (CVN 68) and USS Abraham Lincoln (CVN 72), reclassifying the maintenance required on both ships from a major to a minor availability. The shipyard also deployed a remote operated vehicle (ROV) on Abraham Lincoln to accomplish inspections of a fresh water high interest tank, which saved nine days of schedule and approximately 1,700 work days. The shipyard innovation enterprise is taking this ROV technology and expanding it for submarine applications.

In addition to undertaking innovation initiatives to increase shipyard productive capacity, the Navy is implementing an overarching public shipyard improvement plan. Supporting this plan is the Shipyard Performance to Plan (P2P) effort, a data analytic effort to measure shipyard performance in areas that drive outcome. P2P is used to identify under-performing areas and identify levers that could be exploited to improve execution of ship maintenance.

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 NSS – Shipyards. The Navy is partnering with a global management consulting firm, to develop a holistic plan that implements commercial best practices at the shipyards to achieve on-time delivery of all future availabilities. Naval Sustainment System – Shipyards (NSS-SY), in coordination with the P2P effort, will identify under-performing areas or processes and then target specific improvement opportunities with the goal of increasing throughput and recovering readiness and reducing maintenance costs.

In an era of great power competition, delivering combat-ready submarines and aircraft carriers is critical to ensuring our national defense. NAVSEA, and the entire Navy, is laser focused on improving our on-time performance through the use of innovative technologies, procedures, and holistic improvements programs such as SIOP. Combined, these efforts will allow the four naval shipyards to serve the Fleet of the 21st Century and continue to serve our Nation for decades to come.