Strategic Investment Plan

NATIONAL SHIPBUILDING RESEARCH PROGRAM™
Taking Shipbuilding and Repair to the Next Level

MISSION

- Employ a unique collaborative framework to research, develop, mature, and implement industry-relevant shipbuilding and sustainment technologies and processes, improving efficiency across the U.S. shipyard industrial base and meeting future demand.

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1. RECORD OF CHANGES

Previous historical changes to the Strategic Investment Plan are identified in the NSRP Organization and Operations Manual.

Version	Date	Sections	Description

Change 5	November 30, 2010	All	• The original plan was divided into two documents:
			  ○ Concise and focused Strategic Investment Plan
			  ○ Program Organization and Operations Manual

Change 6	March 14, 2013	2, 3, 6, 6.1, 7, 7.1-7.4	• Inclusion of new program sponsors
			• Inclusion of new Ship Warfare Systems Integration Panel
			• Updated R&D interest areas
			• Administrative updates, including
			  ○ Expanded Executive Summary
			  ○ Updated graphics
			  ○ Updates to date references

Change 7	June, 2016	6, 6.1, 7, 7.1-7.4	• Updated Strategic Priorities to Strategic Objectives
			• Updated Major Focus Areas and added definitions for each area
			• Moved Areas of Concentration from Major Focus Areas and included these in each Major Initiative
			• Administrative updates, including
			  ○ Updated graphics
			  ○ Updates to date references
			  ○ Updated NSRP Branding

Change 8	February, 2019	All	• Administrative updates, including
			  ○ Inclusion of new program sponsors
			  ○ Updated graphics
			  ○ Updates to date references
			• Updated NSRP Branding

Change 9	February, 2020	All	• Updated Plan

Change 10	February 2022	All	• Administrative update to:
			  ○ Reformat document from four Major Initiatives to three major Initiatives to reflect program reorganization
			  ○ Add Sustainment Working Group
			  ○ Update ECB-approved revised NSRP Mission Statement

2. INTRODUCTION

The National Shipbuilding Research Program's mission is to employ a unique collaborative framework to research, develop, mature, and implement industry-relevant shipbuilding and sustainment technologies and processes, improving efficiency across the U.S. shipyard industrial base and meeting future demand. The NSRP's Government impact is primarily on U. S. Navy ships, but the program is also intended to benefit other Federal Government organizations such as the U.S. Coast Guard (USCG), National Oceanic and Atmospheric Administration (NOAA), Maritime Administration (MARAD), Military Sealift Command (MSC), and Army Corps of Engineers (ACoE). The NSRP considers unmanned and optionally manned vessels to be types of ships fully within the mission scope. The NSRP's mission equally includes reducing the total ownership costs of and delivering capability improvements to U. S.-flag commercial ships

The NSRP is designed to benefit the entire U.S. shipbuilding and ship repair industry. This Strategic Investment Plan (SIP) describes the NSRP's investment strategy for accomplishing its mission over a three – five year period. The SIP is supplemented with an annual Technology Investment Plan (TIP) that provides more detail and describes more specific areas of interest. Both are approved by the NSRP's industry Executive Control Board (ECB) with Government input.

3. OVERVIEW

The NSRP team reviewed a wide range of national, Navy, and Naval Sea Systems Command strategies and plans (see Section 10, Bibliography) to determine the NSRP's role within the higher level strategies. The NSRP's role is to support the Nation's plan to increase its maritime capability by increasing the overall number of vessels, improving the combat capability of military vessels, increasing the operational availability of all vessels, and improving the ability to rapidly upgrade mission systems, all while reducing the total ownership costs of these vessels. The NSRP mission statement (located on the cover page) was updated in February 2022 to reflect the Program's commitment to achieving these goals and to strategically align the program to the three major phases of the ship/mission system lifecycle (Design, build, sustain).

The NSRP will support the national strategy by collaborating with other government organizations, other shipyards, industry and academia to research and develop process and technology improvements for ship acquisition and sustainment. The strategic objectives that promote the NSRP mission consist of funding projects that affect total ownership cost as follows:

- Insertion of relevant technologies that reduce design, acquisition, testing or delivered ship operations and sustainment (maintenance/repair/conversion) costs
- Development of improved processes that reduce design, acquisition, testing or delivered ship operations and sustainment (maintenance/repair/conversion) costs

Under the leadership of the industry ECB, this collaborative effort operates under the framework of Major Initiative areas, which are further divided into nine Panels. In 2021, the ECB met with Navy representatives to investigate how the NSRP could support both the current and strategic needs of the U. S. fleet.

During the course of several meetings, the program determined that the current organization of Major Initiatives and Panels, as shown in Figure 1, did not fully align with the perspective and priorities held by the Navy. This led to internal meetings involving the ECB and its extended leadership to formulate a new structure that was more relevant and capable of delivering improvements to strategic areas within the life cycle of any ship, namely: Design, Build, Sustain.

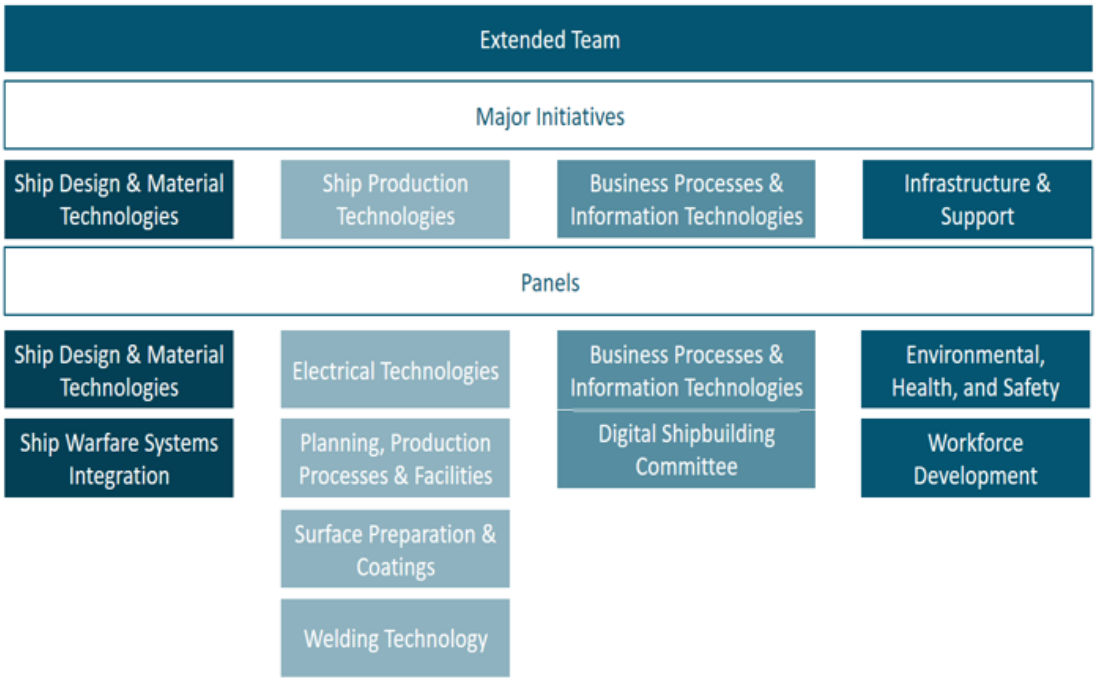

Figure 1. Original NSRP Structure

For this reason, the new Major Initiative architecture, as shown in Figure 2 on the next page, is comprised of three areas: Ship Design & Material Technologies (Design), Ship Production Technologies (Build), Infrastructure, Logistics, & Sustainment (Sustain). The new organizational structure of the Panels provides more targeted focus on topics that reinforce the overall mission of the NSRP, consolidating some panels where coverage was too thin to support the overall Major Initiative. To complete the areas covered, a new panel, Sustainment, was created to support improvements and innovation in the realm of fleet sustainment.

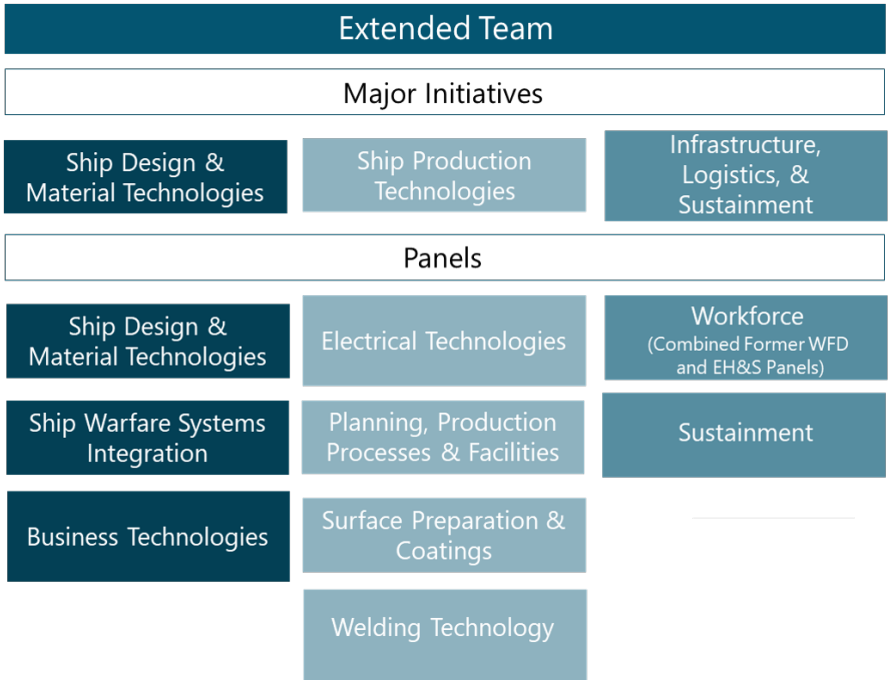

Figure 2. New Major Initiatives and Panels Structure[1]

Since the Sustainment Panel is a new component within the overall architecture, an informal Working Group is developing the panel's mission and other foundational matters. The program intends to elect Panel Officers during Calendar Year 2022 and, hence, the details will be addressed within future publications.

Augmenting this structure, the NSRP also collaborates with industry, other Navy, and other federal organizations to most efficiently accomplish its mission by leveraging other programs' work and minimizing duplication.

4. PROGRAM POLICY INFLUENCES

Since the U. S. Navy is the principal government sponsor and currently the largest beneficiary of NSRP activities, the priorities of the Department of Defense (DoD) and Department of the Navy (DoN) influence this industry-led R&D program. It is difficult to keep this SIP aligned with higher-level DoD and DoN strategic and policy documents, as these strategies and policies are influenced by changing worldwide geo-political events, changes in the U.S. federal Executive Branch from the President, to the Cabinet, the Navy Department, and subordinate reporting commands like NAVSEA, other federal Executive Branch agencies, and Congress.

[1] The new structure was adopted in October 2021.

Rather, this Strategic Investment Plan references these overarching documents in the Bibliography at the end of this document. All parties interested in NSRP should consult the U.S. Navy Strategic Library website for the latest versions of many of these documents[2]. NSRP participants should review the content within these documents, especially as they formulate potential responses to the annual NSRP Research Announcement (RA), Panel Project (PP), and Rapid Adoption Project (RAP) solicitations.

5. STRATEGIC ENVIRONMENT

For this update of the SIP, the emphasis of each Major Initiative and its associated Panels is to review and streamline their specific areas of interest for a 3-5 year time frame. Over this 3-5 year horizon, the following enduring themes should be present:

- The United States will find itself in a renewed great power competition with potential adversaries.
- The Navy plans to increase the fleet size very significantly over the next two decades. There is a general acknowledgement that the Navy will not be able to solely build itself to its fleet size objective.
- The Navy will need to extend ship service lives and reduce the time that ships are in maintenance and unavailable for fleet operations.
- Unmanned and autonomous vessels will play an increasing role in fleet operations.
- There has been a perceived general decline in availability of current and future shipbuilding and ship repair talent, concurrent with potentially increasing workforce demand required to achieve a larger Navy fleet.
- The industrial base needed to support a dominant Navy fleet, the fleets of other federal agencies, and the commercial fleet of the United States continues to erode. The supplier base of the major shipbuilding and ship repair shipyards is, in many cases, "one deep". Any effort to sustain and increase the number of qualified and willing vendors to supply the fleet is an imperative.
- The industrial base must consider total ship cost when looking for reducing production or design cost for current or future platforms. In the past, the industry has focused on technology stove pipes without looking at the platform as a whole. Going forward, investment decisions should consider total platform benefit not just individual technology areas.

[2] As the other federal agencies with operational fleets become more involved in NSRP, their equivalent strategic documents will be added to the Bibliography.

6. TECHNOLOGY INVESTMENT PLAN

NSRP conducts an annual workshop to develop a shorter-term, more-focused, and tactical Technology Investment Plan (TIP). The workshop participants include the NSRP's ECB and Extended Team, the NAVSEA NSRP Program Manager, and other government stakeholders. The TIP provides the more specific, annual, combined industry and government R&D priorities for the program. All R&D priorities in the TIP should clearly align with one or more requirements from the SIP, without being so generic as to apply to any emphasis area in the SIP. The annual TIP is approved by the ECB, after comment from the government.

The TIP is referenced in the annual NSRP Research Announcement (RA), Panel Project (PP) and Rapid Adoption Project (RAP) solicitations. Therefore, parties interested in applying for NSRP program funding during these solicitations should be familiar with the TIP, as it represents specific, short-term, research and development emphasis areas for the program.

7. MAJOR INITIATIVES

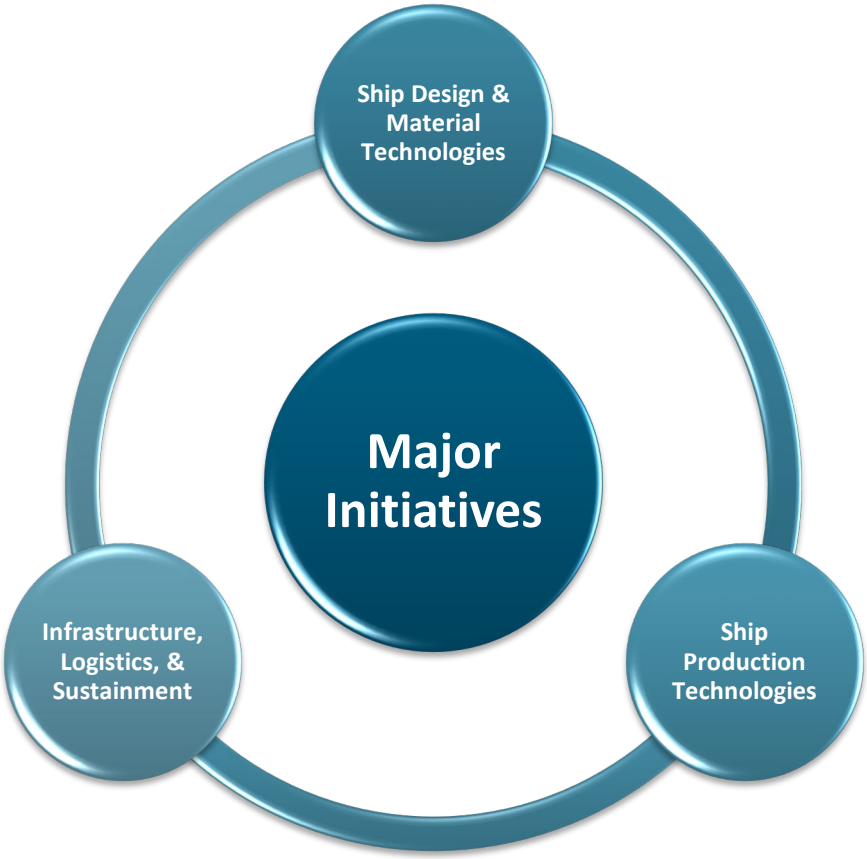

Figure 3 Revised Major Initiative Structure

NSRP had previously identified four overarching, integrally-connected Major Initiatives (MI) that tie the program's vision to proposed industry research and are derived from the basic organizational structure of a shipyard. The term "Major Initiative," as used in this document, constitutes operationally-aligned groups of functional topics. In 2021, the program reevaluated and streamlined its MIs from four to the three MIs shown in Figure 3 above. The nine NSRP panels each align to one of these Major Initiative areas. Each Major Initiative group has identified technology development and improvement areas (sub-initiatives). Each of these MIs will be discussed in greater detail in the following sub-sections.

7.1 SHIP DESIGN AND MATERIAL TECHNOLOGIES

7.1.1 DEFINITION

The Ship Design and Material Technologies (SDMT) Major Initiative covers the full spectrum of ships, systems and equipment for design, construction, and sustainment. The initiative investigates new materials, processes, technologies, commonality and standardization principles with the goal of adding value for future programs, reducing the cost of new designs, minimizing the cost of maintenance and repair and controlling the total ownership cost to the U.S. Government and the commercial sector. This MI also focuses on emerging technology research and the blending of process and technology to manage information and develop advanced solutions that support the full product lifecycle.

This Major Initiative consists of three panels: the Ship Design and Material Technologies (SDMT) Panel, the Ship Warfare Systems Integration (SWSI) Panel, and the Business Technologies (BT) Panel.

- The SDMT Panel is focused on projects that provide increased capabilities and cost reduction initiatives across the complete spectrum of design processes (concept to detail) and the use of advanced materials to support the rapid and efficient development, construction, sustainment, and disposal of the next generation vessels.
- The SWSI Panel reduces the costs of integration and test for warfare and communication systems in ship construction and maintenance/modernization. The Panel facilitates communications among Government programs, warfare systems integrators, communication system integrators, ship designers, shipbuilders and other NSRP panels.
- The Business Technologies Panel focuses on emerging technology research and education and the blending of process and technology to manage information and develop advanced solutions that support the product lifecycle from concept to disposal.

7.1.2 SUB-INITIATIVES

1. Reduce time for development and qualification of emerging materials and manufacturing technologies
2. Develop and implement autonomous processes in design for construction
3. Develop materials, design and logistics processes that reduces sustainment/modernization costs and schedule
4. Develop advanced learning (AI/machine learning) and decision support tools focused on sustainment, ship availability, and design
5. Develop design guidance regarding unmanned or manned platforms for production, integration, sustainment, and operation
6. Identify and implement designs that create flexibility, modularity, and scalability across new or existing platforms
7. Research and leverage foreign, domestic and adjacent industries for design, materials and manufacturing technologies
8. Promote technologies that lead to affordable solutions for digital shipbuilding

9. Develop processes and technologies that create innovative approaches to cybersecurity compliance, solutions, education & awareness
10. Identify areas within information management that benefit the shipbuilder and our Navy customer
11. Emerging Technologies & Business Processes

7.2 SHIP PRODUCTION TECHNOLOGIES

7.2.1 DEFINITION

The Ship Production Technologies (SPT) Major Initiative addresses the fabrication, assembly, and testing phases of ship production, and the disassembly, repair/conversion, reassembly and testing phases of maintenance and modernization activities.

This Major Initiative consists of the following four panels: Electrical Technologies; Planning, Production Processes, and Facilities; Surface Preparation and Coatings; and Welding Technology. The SPT Major Initiative focuses on the following:

- Fabrication, assembly, and erection of all ship structures
- Outfitting processes (electrical, piping, sheet metal, etc.)
- Equipment installation and testing
- Surface preparation and coatings
- Welding/Joining/Non-Destructive Testing
- Support Services (planning, production control, accuracy control, etc.)
- Manufacturing Services (transportation and rigging, tool rooms, temporary ventilation/lighting, etc.)

7.2.2 SUB-INITIATIVES

1. Improving Manufacturing Processes
2. Increase use of Automation and Robotics
3. Increasing knowledge and proficiency of overall workforce
4. Development and Qualification of Emerging Technologies
5. Digitalization of Shipbuilding
6. Standards, Commonality and Modularity

7.3 INFRASTRUCTURE, LOGISTICS, AND SUSTAINMENT

7.3.1 DEFINITION

The Infrastructure, Logistics and Sustainment Major Initiative is focused on supporting all direct shipbuilding and sustainment processes. This includes developing a skilled workforce, and maintaining the well-being of shipbuilding and ship repair communities through compliance with environmental, health and safety requirements. It also includes logistics and sustainment processes associated with life cycle support of Navy, other Federal government agency, and commercial ships. The Major Initiative consists of a Panel and a Working Group as follows:

- Workforce

  The Workforce Panel reflects a recent merger of the Workforce Development Panel and the Environmental, Health and Safety Panel. As such, its mission includes the scope of each of the prior panels. It includes reducing the cost of shipbuilding and ship repair and adopting best practices through projects centered on improving the industry's workforce development ecosystem, maximizing training efficiency and effectiveness, and developing technologies to solve workforce challenges. It also includes researching, developing, and sustaining current and emerging environmental, health and safety issues to promote and improve health and safety, wellness, and environmental stewardship of industry communities.

- Sustainment Working Group

  The Sustainment Working Group has the mission of reducing the cost of ship logistics and sustainment activities, and increasing operational availability, with a focus on improved technologies, processes and procedures that realize greater efficiencies in lifecycle sustainment of Navy, other Federal government agency, and commercial ships. The Working Group should also research and evaluate opportunities for how the use of digital tools, new technology, and processes could decrease the time spent in a maintenance availability.

7.3.2 SUB-INITIATIVES

(NOTE: the IL&S Sub Initiatives are still under development)

1. Attract, retain and continually develop a competent and motivated workforce (pathway for craft skills development; workforce development pipeline)
2. Improve the effectiveness and reduce the training time for knowledge capture and training transfer
3. Eliminate workplace injuries and improve workforce well-being

4. Develop new and leverage existing technologies to enhance health, safety, and environmental factors and/or reduce costs associated with compliance
5. Incorporate sustainment in design
6. Develop new maintenance processes and procedures to support minimal time in availabilities
7. Incorporate advanced technologies to benefit sustainment or improve reliability
8. Develop and implement appropriate R&D supply chain issue projects
9. Develop and implement appropriate R&D information/data management projects

8. CONCLUSION

NSRP is committed to supporting the national strategy by providing a collaborative framework and performing research and development on shipbuilding and ship repair processes and technologies that will reduce the total ownership cost of United States Government and U. S.-flag commercial ships. The NSRP will collaborate with other organizations to execute the strategy described in this SIP to support the nation's plan to increase its maritime capability by increasing the overall number of vessels, increasing the combat capability of military vessels, increasing the operational availability of all vessels, and improving the ability to rapidly upgrade mission systems.

The strategic objectives that promote the NSRP mission consist of funding R&D projects that affect total ownership cost are as follows:

- Insertion of relevant technologies that reduce design, acquisition, testing or delivered ship operations and sustainment (maintenance/repair/conversion) costs
- Development of improved processes that reduce design, acquisition, testing or delivered ship operations and sustainment (maintenance/repair/conversion) costs

9. APPROVALS AND ENDORSEMENT

The U.S. shipbuilding and ship repair industry is committed to improving productivity and first-time quality to reduce the total ownership costs of the nation's defense and maritime capability. All stakeholders recognize that continuous improvement is the key to maintaining the industrial capacity and the shipbuilding and repair skills necessary in support of the United States' security. The collaborative framework of the NSRP will allow the industry to achieve this commitment. We are encouraged by and applaud the Navy's active engagement with the NSRP.

The NSRP is an important strategic component for the U.S. shipbuilding and repair industry to remain effective as suppliers to the U.S. Navy, other federal agencies with operational fleets, and the commercial sector. In 1998, the CEOs of NSRP member companies stated, "It is the consensus of the industry representatives endorsing this Plan that two vital ingredients are needed to make this happen. First, a cooperative team effort on the part of the government and industry, and second, a strong commitment to finance the development and implementation of needed improvements in processes, systems and technologies." That statement remains true today, and the commitment is evidenced by the participation, matching of funds, assignment of top personnel, and collaboration among competitors.

We support and approve the mission of the NSRP and the Strategic Investment Plan:

AUSTAL USA

By: _____
Tom Perrine

_____
Title

_____
Date

BAE SYSTEMS SHIP REPAIR

By: _____

_____
Title

_____
Date

FINCANTIERI MARINETTE MARINE

By: _____
Ross Kanzleiter

_____
Title

_____
Date

GENERAL DYNAMICS – BATH IRON WORKS

By: _____
Chris Waaler

_____
Title

_____
Date

9. APPROVALS AND ENDORSEMENT (Continued)

GENERAL DYNAMICS – ELECTRIC BOAT

By: _____
Emil Casciano

_____
Title

_____
Date

GENERAL DYNAMICS – NASSCO

By: _____
Tim Glinatsis

_____
Title

_____
Date

HII - INGALLS SHIPBUILDNG

By: _____
John Kooienga

_____
Title

_____
Date

HII - NEWPORT NEWS SHIPBUILDING

By: _____
Dave Bolcar

_____
Title

_____
Date

VIGOR MARINE

By: _____
TBD

_____
Title

_____
Date

VT HALTER MARINE

By: _____
Mike Duthu

_____
Title

_____
Date

ENDORSEMENT
(NAVSEA NSRP PROGRAM –SEA 05TN)

By: _____
Ben Canilang
Program Manager
Title

_____
Date

10.BIBLIOGRAPHY

Document	Originator
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Quadrennial Defense Review	Department of Defense (DoD)
CNO Strategic document(s) and Business Plans	Chief of Naval Operation (CNO)
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Assistant Secretary of the Navy for Research, Development, and Acquisition (ASN (RD&A)) strategy and policy documents	
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President's Budget FYXX Shipbuilding Plan (FYXX - FYXX+4)	
Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year XX	
DASN-Sustainment rollout and emphasis areas	Deputy Assistant Secretary of the Navy (DASN-Sustainment
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Program Executive Office Science and Technology Plans	Program Executive Offices