Strategic Investment Plan

MISSION

- The mission of the National Shipbuilding Research Program (NSRP) is to reduce the total ownership cost and improve the capabilities of both United States Government and U. S.-flag commercial ships.
- The Program accomplishes this mission by providing a collaborative framework to manage, focus, develop, and share research and development and leverage best practices in shipbuilding and ship repair.



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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



2. INTRODUCTION

The National Shipbuilding Research Program's mission is to reduce the total ownership cost and improve the capabilities of both United States Government and U.S-flag commercial ships. NSRP achieves this mission by providing a collaborative framework to manage, focus, develop, and share research and development and leverage best practices in shipbuilding and ship repair. The total ownership cost includes all elements of the ship lifecycle including the costs of design, construction, maintenance and repair, technology refresh/insertion, operation and sustainment, and disposal. The NSRP's Government impact is primarily on U. S. Navy ships, but the program is also intended to benefit other 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 the 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 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 four Major Initiative areas that are further divided into nine Panels and one committee, as shown in Figure (1). The NSRP program structure is further defined in the NSRP Organization and Operations Manual.



Figure 1. Major Initiatives and Panels



The NSRP will also collaborate with industry, other Navy, and other federal organizations to most efficiently accomplish its mission by leveraging other programs' work and minimizing duplication. Some of these other programs are shown in Figure (2).





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.

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>U. S. Navy Strategic Documents</u> web site at for latest versions of many of these documents. NSRP participants should consider these



documents, especially as they formulate potential responses to the annual NSRP Research Announcement (RA) and Panel Project (PP) solicitations.

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

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 within 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.



6. TECHNOLOGY INVESTMENT PLAN

NSRP conducts an annual workshop to develop a more tactical Technology Investment Plan or 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 both the annual NSRP Research Announcement (RA) and Panel Project (PP) 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



NSRP has 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. The nine NSRP panels each align to one of the 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 Major Initiative consists of two panels: the Ship Design and Material Technologies (SDMT) Panel and the Ship Warfare Systems Integration (SWSI) 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.

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 (Al/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



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. 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 BUSINESS PROCESSES AND INFORMATION TECHNOLOGIES

7.3.1 DEFINITION

The Business Processes and Information Technologies Major Initiative 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. This Major Initiative is executed through the Business Technologies Panel, which includes the Digital Shipbuilding Committee.

7.3.2 SUB-INITIATIVES

- 1. Digital Shipbuilding
- 2. Cybersecurity Compliance, Solutions, Education & Awareness
- 3. Information Management
- 4. Emerging Technologies & Business Processes



7.4 INFRASTRUCTURE AND SUPPORT

7.4.1 DEFINITION

Infrastructure and Support is a Major Initiative area focused on functions that support all direct shipbuilding and sustainment processes. The Major Initiative consists of two panels:

- Environmental, Health, and Safety (EH&S)
 - The EH&S panel's mission is to research, develop, and sustain current and emerging environmental, health and safety issues to promote and improve health and safety, wellness, and environmental stewardship of shipyards. The panel provides an open and interactive forum for technology transfer and broad industry interaction in support of the NSRP mission to reduce the total cost of ship construction and repair.
- Workforce Development
 - The Workforce Development panel's mission is to reduce the cost of shipbuilding through effective projects centered on training and development, human resources, change management and technology transfer. It ensures that all NSRP panel projects include consideration of issues regarding human capital as part of project implementation.

7.4.2 SUB-INITIATIVES

- 1. Attract new workers to our industry through an effective workforce development pipeline
- 2. Standardize and publicize a pathway for craft skills development
- 3. Retain and improve a competent and motivated workforce
- 4. Improve the effectiveness and reduce the training time for knowledge capture and training transfer
- 5. Eliminate workplace injuries and improve shipbuilder well-being
- 6. Ensure environmental compliance excellence



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 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.

BAE SYSTEMS SHIP REPAIR

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

Ву:	Tom Perrine	By:	 Alex Romanczuk
Title:		Title:	
Date:		Date:	
CONF		FINIC	
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Ву:	René Leonard	By:	Jim Morse
By: Title:	René Leonard	By: Title:	Jim Morse
By: Title: Date:	René Leonard	By: Title: Date:	Jim Morse



AUSTAL USA

APPROVALS AND ENDORSEMENT (CONTINUED)

GENE	RAL DYNAMICS – BATH IRON W	ORKS GENERAL DYNAMICS – ELECTRIC BO
By:		Ву:
-	Chris Waaler	Matt Olander
Title:		Title:
Date:		Date:
GENE	RAL DYNAMICS – NASSCO	HII - INGALLS SHIPBUILDNG
By:		Ву:
-	Tim Glinatsis	Mike Duthu
Title:		Title:
Date:		Date:
HII - I	NEWPORT NEWS SHIPBUILDING	VIGOR MARINE
Ву:	Don Hamadyk	By: Richard McCreary
Title:		Title:
Date:		Date:
VT Н/	ALTER MARINE	ENDORSEMENT (NAVSEA NSRP PROGRAM –SEA 06)
By:		<u>By:</u>
-	Buck Younger	Erik Oller
Title:		Title: <u>Program Manager</u>
Date:		Date:



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America				
Quadrennial Defense Review	Department of Defense (DoD)			
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Integrated Navy Force Structure Assessment	Secretary of the Navy (SECNAV)			
Assistant Secretary of the Navy for Research,				
Development, and Acquisition (ASN (RD&A))				
strategy and policy documents				
30-year Shipbuilding Plan				
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			
NAVSEA Strategic document(s) and Business	Naval Sea Systems Command (NAVSEA)			
Plans				
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for FYXX				
ONR Strategic document(s) and Business Plans	Office of Naval Research (ONR)			
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Program Executive Office Science and Technology	Program Executive Offices			
Plans				

