





SIBC Supplier Seminars

Additive Manufacturing & Other New Technology Tuesday February 25, 2025

MIB Advanced Manufacturing Approach



Additive Manufacturing (AM)

Operationalize Additive Manufacturing (AM) as a viable manufacturing process.

Industry 4.0 (I4.0)

Adoption of advanced automation and robotic technologies into the workforce, supply chain, and shipyard infrastructures.

Non-Destructive Testing (NDT)

Integrate advanced NDT techniques into traditional NDT spaces; Develop NDT requirements for AM; Enhance training and certification opportunities and timelines.

Industrial Base Acceleration (IBA)

Accelerate the evaluation, acquisition, deployment, and sustainment of mature technologies at scale across Industry, Organic Facilities, and Warfighters.

Digital Transformation (DT)

Make advanced manufacturing equipment and associated data Visible, Accessible, Understandable, Linked, Trustworthy, Interoperable, and Secure (VAULTIS); leverage existing digital infrastructure and develop ecosystem elements when necessary.



For general MIB questions please contact mib-inbox@us.navy.mil

NEWPORT NEWS Shipbuilding A Division of Hi



Additive Manufacturing





Motivation for Additive Manufacturing





- Achieving delivery of "1+2" is challenging the submarine industry
- Material availability has continued to be a factor in construction/delivery delays
- AM enables an alternate manufacturing solution to solve unique problems
- AM provides a reduction in manufacturing time by up to >75% compared to castings



Strategy: Scale Additive Manufacturing via Interchangeability





The focus in 2025 is on manual transition & defining the framework for interchangeability



GENERAL DYNAMICS Electric Boat

Technical Baseline is Set for Manual Transitions



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- Interim Material Requirements Specification see table for details
- Interim Weldability Requirements PPD 802-8999910 Issued 10-4-24

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NDT Inspection Method & Criteria Guidance Letter 9074 Ser 05Z/223 dtd 5/8/24

Shock Analysis

Shock will be done on part by part basis, until material characterization testing is complete, ECD-8/31/25

Material Process Combinations (MPC)	AM PPDs	AM EB Specs*	Legacy Spec.
CuNi LPBF	802-8979761 2-29-24	EB-6542A 6-4-24	ASTM B369
CuNi WA-DED	802-8979760 2-29-24	EB-6541A 6-4-24	ASTM B369
MIL-100S WA-DED	802-8979757 7-24-24	N/A	Cast HY-80 (NAVSEA TP-300)
316L LPBF	802-8979758 2-29-24	EB-6572A 9-24-24	ASTM A351 (and many others)
316L WA-DED	MOD DED-316LSi-1 12-19-22		ASTM A351 (and many others)
NAB WA-DED	802-8979762 2-29-24	EB-6551A 6-4-24	ASTM B148
Alloy 625 LPBF	TBD		MIL-C-24615A
Alloy 625 WA-DED	MOD DED-Alloy 625-1 2-21-24		MIL-C-24615A
Titanium WA-DED	802-8979759 2-29-24		ASMTB367

*EB will issue EB Specification as needed based on parts selected for Manual Transitions

Material Plan to Interchangeability

Ivia	te	rial Maturity S	tatus	5 – Ja	n 202	25	Major Issue :	On Hold Action
Program Phase		Major Tasks	DED MIL-100S	DED NAB	DED CuNi	LPBF CuNi	LPBF 316L	DED CP Ti 2
	1.	Perform Literature Review	Q4 FY22	Q2 FY23	Q2 FY23	Q4 FY23	Q4 FY23	Q2 FY24
Planning	2.	Develop Program Plan (including test details and POAM)	Q4 FY23	Q1 FY24	Q1 FY24	Q3 FY24	Q1 FY24	Q4 FY24
R&D	3.	Execute parameter optimization, shielding gas studies, heat treatment studies, etc	Q1 FY25	Q1 FY25	Q1 FY25	Q1 FY25	Q1 FY25	Q3 FY25
T&E	4.	Execute Material Property Screening Studies, Anisotropy Evaluation, Fail-Fast Testing, NDT, etc	Q3 FY24	Q4 FY24	Q4 FY24	Q3 FY25	Q1 FY25	Q3 FY25
	5.	Develop AM Material Procurement Spec	Q4 FY24	Q2 FY24	Q2 FY24	Q2 FY24	Q2 FY24	Q2 FY24
	6.	Qualify AM Material Supplier	Q1 FY25	Q3 FY25	Q2 FY25	Q4 FY25	Q4 FY25	Q3 FY26
Cert	7.	Perform Material Certification Testing (e.g., fatigue, fracture, corrosion, and industrial fabricability)	Q3 FY25	Q3 FY25	Q4 FY25	Q2 FY26	Q1 FY26	Q4 FY26
	8.	NAVSEA Approval of Certification Test Data	Q4 FY25	Q3 FY25	Q4 FY25	Q3 FY26	Q2 FY26	Q1 FY27

All major requirements have been issued in order to support manual transitions

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Purchase Order Prior To Interchangeability

- Shipbuilders will continue to procure traditional product forms in conjunction with new purchase orders for AM parts with the intent to install
- Shipbuilder desire to maintain current procurement methods to the extent possible (i.e. if the part is procure by 1st tier, then the AM would be procured by a 1st tier)

Purchase Orders After Interchangeability

- Shipbuilder will provide the suppliers the option to procure either the traditional fabricated method or AM part equivalent
- Shipbuilder desire to maintain current procurement methods to the extent possible (i.e. if the part is procure by 1st tier, then the AM would be procured by a 1st tier)

Shipbuilders anticipate increasing annual volume of manual transitions until 2026; interchangeability will provide a step change in scale





Dashboard Roll-Up					
Print Houses On-boarded	12				
Print Houses In-Process	3				
STAVs completed	6				
Projects in Execution	11 (but not seed funding just AM)				
RFQs Issued	43 RFQs sent				
POs Issued	5				
Projects in Execution	20				
Potential Projects Identified	25				

Onboarding to PO placement



Additive Manufacturing/ NNS/ Seed Funding Project



Activate supply base for AM by aligning first tier OEMs with AM service suppliers.

- Seed Funding Objectives
 - Identify good AM candidate parts with the help of NNS SCM, suppliers, and engineering
 - Partner to convert conventional parts to AM Shipbuilders, OEM Suppliers, AM COE, and AM Service Suppliers
 - Place POs for any effort within the AM value stream machining, printing, qualification, and testing
 - Create the roadmap for any supplier to manufacture production parts using AM
 - Current status
 - 12 New AM Service Suppliers on-boarded
 - 45 projects identified to-date, 25 in planning, and 20 in varying stages of execution

2025 Goals to support 20-30 unique AM projects with existing supply base

- Challenges
 - Part identification we need help from the supply base

GENERAL DYNAMICS 2/25/2025 pg. 9 Electric Boat AM feasibility studies - are these parts good candidates, size, material, design layout





Navy Additive Manufacturing Center of Excellence Unique Opportunities for Suppliers

- Establishing end-to-end AM production capability (Danville, VA); Navy dedicated assets
- Collection of a variety of additive manufacturing capabilities; consortium of industry leaders and academia
- Mission: Scale AM industrial capacity in the SIB for serial production
 - Vendor Onboarding and Training:
 - Streamline NAVSEA AM qualification activities for AM vendors and OEMs. To date EB and NNS have on boarded 10 AM Suppliers in collaboration with COE
 - Workforce training
 - Develop "print-ready" AM data packages for parts to reduce market barriers for entry
 - Support standardization of Navy AM processes
 - Resolve tech issues & troubleshoot at component/process level

Website: <u>https://navydigitalsea.com/</u> Email: <u>AMCOE@austalusa.com</u>





Other Opportunities for Additive Manufacturing



<u>CVN Opportunities</u>: Leverage low risk applications to de-risk & advance AM

- NNS as a qualified AM supplier, has the following CVN focus:
 - Target low-risk applications in order to accelerate deployment
 - Continued targeting of higher risk opportunities
 - Application opportunities include (but are not limited to): fittings, casting alternatives, valve bodies, structural components, weldments, etc.
 - AM deployment for CVNs will promote future supplier readiness through low-risk part production
 - NNS contact information provided on following slide

In-Service Opportunities Across Navy:

Maritime Sustainment Technology and Innovation Consortium (MSTIC) is an Other Transaction Agreement/Authority" (OTA)

- Consortium based model allows government and industry to communicate more openly, from requirement generation to the proposal stage
- Targeted Materials/AM Process are aligned with Material Maturity Efforts
- Website: MSTIC (<u>https://www.mstic.org/</u>) Contact: Drazen Hadzialic (<u>drazen.hadzialic.civ@us.navy.mil</u>)





Industry 4.0 & Non-Destructive Test





Cobots – The Shared Workplace – Welding & Cutting



Cutting and Welding Cobots:

Realized Benefits:

Improved first time quality. 20% reduction in labor hours on impacted joints as compared to manual welding. Improved schedule based on quality and cost. Improved safety due to ergonomic benefits.

Robotic Welding Requirements:

Realized Benefit:

- Decreased barrier to entry by 70%, implementation and scaling of robotic welding equipment
- Electric Boat Specification updated, issued to supply base

EB Briefed the supply base during a Lunch and Learn Session on January 22nd and 23rd on Appendix R requirements.





Use your Resources. Website: https://gdeb.com/suppliers/12_weld_ndt/



2025 Q2

2025 2Q

suppliers

Initial CR (welds)

requirement bulletin to

Issue Final Report Train Staff

2025 Q2

Bulletin to suppliers on requirements 2025 Q2

2025 3Q Final CR (welds)

requirement

suppliers with IT

2025 3Q

energy cast)

bulletin to

file transfer

solution

IT file transfer solution implemented

2026

Supplier

EB submit for approval (low

NAVSEA approval &

Implementation

(low energy cast)



Digitized Film

Inspection or archive involving film and a scanner



EB has established dedicated resources to staff these projects

Computed Radiography

A volumetric test inspection involving an *imaging plate*





Suppliers will have CR and DF requirements 3Q25

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2024 Q3 Testing in

Progress

2024 Q3

NAVSEA TP271 Req.

Published (welds)



Take Action-Advance Manufacturing



- Begin dialogue with your Navy representative today
- We encourage you to reach out to your Sourcing POC
- If you have projects that are "Ready Now", send your ideas into our Team and we will help you determine next steps Get the Shipbuilders involved early
- The Shipbuilder teams will ensure that your ideas are properly vetted and a solid two-way communication plan is shared with you

Area	ЕВ	NNS	МІВ
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Questions?

