2021 *"Whites Papers Pitch"* Surface Prep & Coatings Panel

August 5, 2020

Virtual Meeting #3

Program Update

Surface Preparation and Coatings Panel Project Idea Presentation Meeting

August 5th, 2020

Virtual

Time Eastern	Time Pacific	Presentation	Speaker
11:00	**8:00**	**Convene Meeting/ Meeting Logistics**	
11:00	8:00	Welcome to OUR Virtual Space and NSRP Program Update	Arcino "Q" Quiero, Jr. NSRP SP&C Panel Chair Ryan Schneider, NSRP / ATI
11:15	8:15	NAVSEA 05, Technical Authority Directed Update to the FY-22 Standard Item 009-32	Mark Ingle, TWH, NAVSEA 05P2 Howard Castle, NAVSEA 05P2
11:30	8:30	SP&C Panel "White Papers" Proposals Presentation (i.e. nine proposals at 10 minutes per project)	Submitted Proposals Leads
1:00	10:00	"For the Good of the Panel", Wrap Up, & Path Forward	Arcino "Q" Quiero, Jr., Chair Robert Cloutier, Vice Chair

NSRP Mission

The mission of the National Shipbuilding Research Program 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 & development, and leverage best practices in shipbuilding and ship repair.

NSRP Collaboration

Anti-Trust Rules

- Regarding your company's and/or your competitor's **product & services**:
  - Do not discuss current or future prices.
  - Do not discuss any increase or decrease in price.
  - Do not discuss pricing procedures.
  - Do not discuss standardizing or stabilizing prices.
  - Do not discuss controlling sales or allocating markets for any product.
  - Do not discuss future design or marketing strategies.

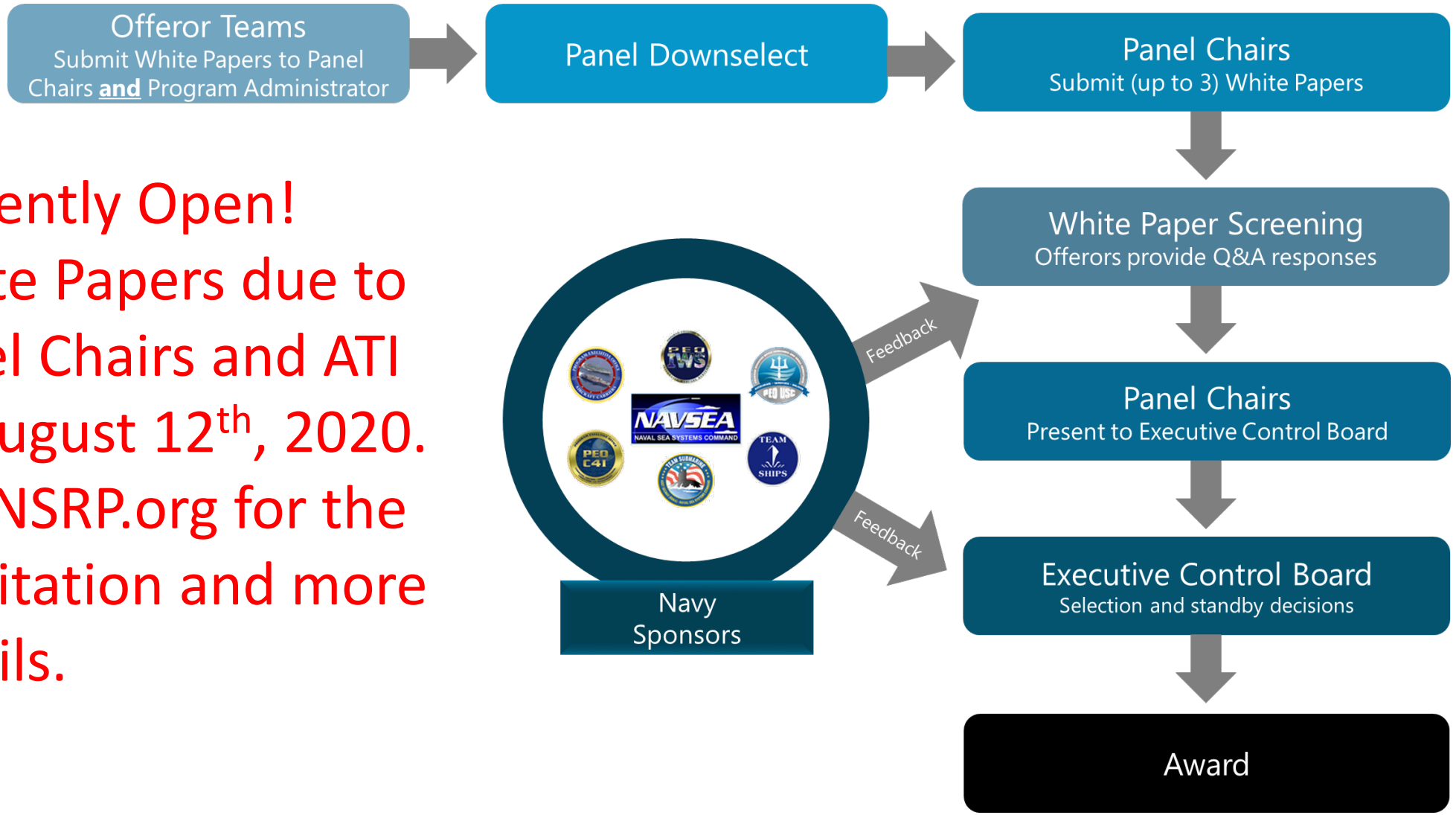
Anti-Trust Rules

- Regarding your company's and/or your competitors' selection of their **supplier companies**:
  - Do not discuss refusing to deal with a company because of its pricing or distribution practices.
  - Do not discuss strategies or plans to award business to remove business from a specific company.

- Regarding your company's and/or competitors' **trade secrets**:
  - Do not discuss trade secrets or confidential information of your company or any other participant.

Panel Project Proposal Process

Currently Open!
White Papers due to Panel Chairs and ATI by August 12th, 2020.
See NSRP.org for the solicitation and more details.



Panel Project Requirements

- Official requirements can be found in the Panel Project Solicitation and the Panel Project Guide Vol 1 located at https://www.nsrp.org/resource-library/:
- Deadline for Offerors to submit white papers to Panel Chairs ***and*** ATI is 12:00 p.m. (noon) ET on **August 12, 2020**.
- Deadline for Panel Chairs to submit top three white papers and any joint panel papers to ATI is 12:00 p.m. (noon) ET on **September 9, 2020.** Panel Chairs shall submit white paper(s), using the White Paper Submission Module.
- Deadline for Offerors whose white paper is one of the panel's top three to submit to ATI the Supporting Cost Data Table, required by the Panel Project Guide Vol 1 – Offerors Rev. T, is **September 9, 2020**.
- **NOTE: White paper submitters are reminded that each Panel Chair will have interim due dates to accommodate their panel's down-select process prior to submission to ATI. Please regularly check the NSRP website for those dates.**
- *Any questions can be directed to Ryan Schneider (ryan.schneider@ati.org) or Sarah H. Swain (sarah.swain@ati.org).*

Panel Project Requirements

- NSRP Executive Control Board member shipyards and panel members (as defined by individual panel membership by-laws) may submit white papers.
- No more than $150K in program-funded costs (Note: Fee or profit is not allowed)
- No more than 12 months in duration
- At least one member shipyard should be a project participant – ***multiple shipyard participation is strongly encouraged.*** An endorsement email for each participating member shipyard, specifically, an email from that yard's NSRP Shipyard Delegate (NSD) must be attached. These endorsement pages do not count toward the three page limit.
- If a Government organization will participate in the project, provide the name and contact information for the government point of contact who agreed to participate. If there is any issue with obtaining this information, offerors should contact the NAVSEA NSRP Program Engineer, Mr. Howard Franklin, at howard.l.franklin@navy.mil or (202) 781-2171 for early coordination.

Panel Project Requirements

- Offerors shall submit white papers directly to the appropriate Panel Chair and ATI (nsrp@ati.org).
- Any proposed prime contractor shall ensure all subcontractors will agree to the terms and conditions of NSRP's standard Base Task Order Agreement prior to submission of a white paper.

Panel Universal By-laws

- At minimum, panel voting membership will include all of the member shipyards.
- Each organization gets only ONE vote. If an organization has a qualified voting member in a NSRP leadership position (Panel Chair, Panel Vice Chair, or Major Initiative Team Leader) the organization will have an additional vote (not to exceed two votes).
- Except for member shipyards, organizations must meet panel membership requirements, as defined in the individual panel by-laws, to propose a panel project or vote in panel voting activities.

NAVAL SEA SYSTEMS COMMAND
What's New in NAVSEA Coatings?

NSRP SPC Panel Meeting

Via Conference Call

August 2020

Mr. Mark Ingle, P.E.
SEA 05P2
(202) 781-3665
mark.w.ingle@navy.mil

Emergent Issue
FY-22 Update to Standard Item 009-32

- **Published FY-21, Change 2, Standard Item 009-32 on 6 Mar 2020 that includes thirty technical and editorial changes.**

- **SEA 05V, HII-NNS, SRF-JRMC, and public raised questions about editorial issues and inconsistencies in FY-21, Change 2, Standard Item 009-32.**

- **SEA 05P2 plans Technical Authority update to create an FY-22 Standard Item 009-32 that will be coordinated with NAVSEA and CNRMC.**

  - **No SSRAC meeting, so public comment inherently limited.**

  - **Circulate electronically within NAVSEA with concurrence from SEA 04X, SEA 05DB, SEA 05PB, SEA 05UB, and SEA 05VB.**

  - **SEA 05P2 to provide FY-22 update package, via SEA 05D5 SERMC Field representative, to RMC CHENGs for chop.**

  - **Goal is to provide signed, final document update package to CNRMC by 15 Sep 2020 for publication in Fall 2020.**

Timely update process acceptable because there will be no major policy or requirements changes.

Emergent Issue
Specific FY-22 Updates to Standard Item 009-32

1. **CREATE REQUIREMENTS FOR PCMS TILE INSTALLATION ON ALUMINUM SUBSTRATES.**
   Current: PCMS tile citations from Table 5 do not mention substrate material.
   Proposed: Move the current Table 5, Lines 21 – 26 to appear after Table 2, Line 44.
   Add new Lines in Aluminum Surfaces section of Table 2 for PCMS installation that cite SSPC-SP 11 and SSPC-SP 17.

2. **CITE CORRECT COLORS FOR ALUMINUM TOPCOATS.**
   Current: Table 2 Line 45a, Columns F and G cite use of dark gray on mast, stack, and vertical surfaces.
   Proposed: Require mast, stack, and vertical surfaces in Table 2, Line 45a to be coated with haze gray polysiloxane coatings.

3. **CLARIFY PARAGRAPH 3.7 REGARDING UNCOATED TANKS.**
   Current: The paragraph 3.7 table of Critical Coated Areas includes Note (65) that exempts ship's fuel tanks from coating requirement.
   Proposed: Remove Note (65) from the paragraph 3.7 table to avoid confusion about whether or not uncoated tanks are Critical Coated Areas.

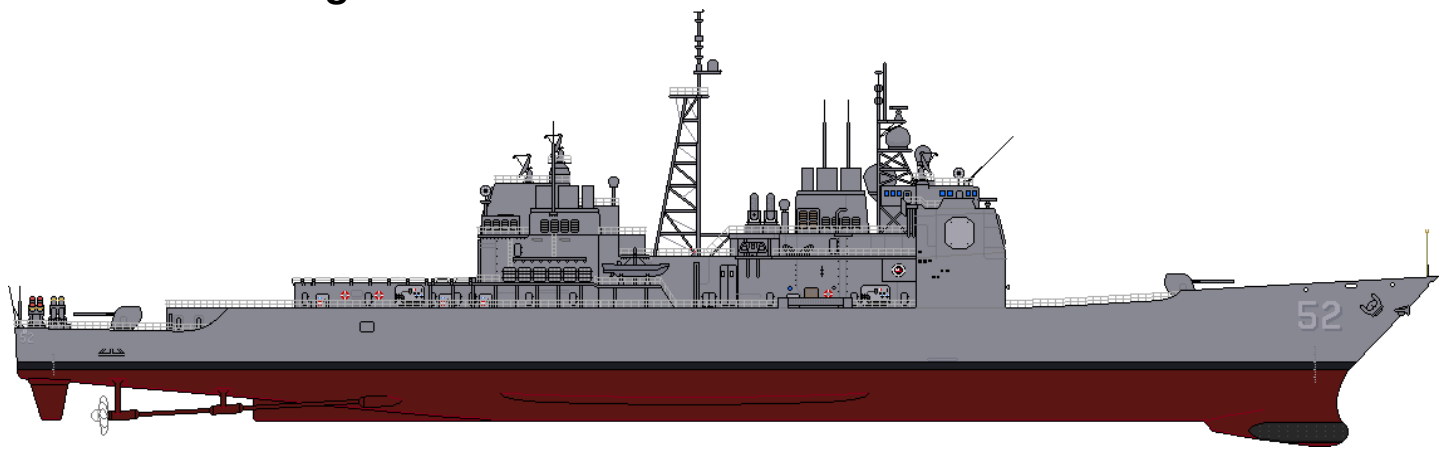
Updates address concerns raised by SRF-JRMC, SEA 05V, and SUPSHIP HII-NNS.

Emergent Issue
Specific FY-22 Updates to Standard Item 009-32

4. CLARIFY THAT EMBARKED BOATS ARE TO USE GRAY ANTIFOULING.

Current: Paragraph 3.1.22 requires embarked boats and craft to meet camouflage requirements, but Table 1, Line 19 invokes black coatings.

Proposed: Modify Table 1, Line 19 to require last coat of antifouling to be "gray" or as approved by the Supervisor. Note that tradename "gray" antifouling was removed from Standard Item 009-32 in 2010.



5. COMBINE LINES FOR TECHNICALLY SIMILAR CONDENSATION CONTROL COATINGS.

Current: Table 5 Lines 3 and Line 5 both call out coatings that absorb moisture.

Proposed: Combine Table 5, Lines 3 and 5 into one line.

Updates address concerns raised by maintenance community without major policy changes.

Emergent Issue
Specific FY-22 Updates to Standard Item 009-32

6. CLARIFY TERMS IN NOTE (10A).
   Current: Note (10A) currently uses the term "qualified" that is not applicable to the cited MIL-DTL-24607 coatings because the specification is a “First Article” document with no QPL.
   Proposed: Remove the term “qualified” from Note (10A).

7. CLARIFY REQUIREMENTS FOR PREPARING WOOD SURFACES.
   Current: Table 2, Line 69 directs sanding without defining a sandpaper grit size.
   Proposed: Add Note (71) to Table 2, Line 69 in Column A to tell the workers to use 80- 120 grit sandpaper to prepare wood surfaces.

8. CLARIFY REQUIREMENTS FOR SINGLE PACK POLYSILOXANE SYSTEM PRIMERS. Current: Table 2, Line 1 requires two coats of solvent-based epoxy primer at 4 – 8 mils DFT, one stripe coat, and then one coat of either:
   Composition 1 (i.e., single pack polysiloxane) at 2 – 3 mils DFT
   - or –
   Composition 2 (i.e., two pack polysiloxane) at 5 – 8 mils DFT.
   Proposed: Create new Table 2, Line 1 that deletes the second coat of solvent-based epoxy under the Composition 2 (i.e., two pack polysiloxane) at 5 – 8 mils DFT, and a new Line 1a that retains the two coats of primer under the Composition 1 (i.e., single pack polysiloxane) at 2 – 3 mils DFT.

9. EDITORIAL.
   Current: Table 6, Line 1, Column B has a double comma between “TYPE IV" and "4 - 6 MILS".
   Proposed: Remove double comma.

Updates address concerns raised by NAVSEA and public without major policy changes.

Emergent Issue
Specific FY-22 Updates to Standard Item 009-32

- **SEEKING COMMMENTS ON NEW REQUIREMENTS FOR INTERIOR NONSKID.**

  Current: Requirements for interior nonskid surfaces on ramps and vehicle decks are unclear in Table 2.

  Proposed: Create new lines in Table 2 for interior vehicle ramps and deck nonskids that would invoke the MIL-PRF-24667, Type I and Type V flight deck nonskid requirements for LHA, LHD, LSD, and LPD, but would also invoke a new Note (XX) that states:

  "Nonskid on vehicle ramps must be rolled perpendicular to main axis of the ramp. Welds must not be cross-rolled on vehicle ramps."

- **SEEKING COMMMENTS ON REPLACING ATTACHMENT E WITH NAVSEA DRAWING.**

- **SEEKING COMMMENTS ON NEW REQUIREMENTS FOR ANTIFOULING PRIMERS WITH EXTENDED OVERCOAT BEYOND "TOUCH TACKY."**

  Current: Paragraph 3.1.20 requires epoxy primer to be tacky when first coat of antifouling topcoat is applied.

  Proposed: New products allow extended overcoat period. Recommend Standard Item 009-32 limit overcoat to a maximum three day period from cure to overcoat to application of first coat of antifouling topcoat to minimize contamination risk.

Updates address concerns raised by NAVSEA and public without major policy changes.

NRSP SP&C Panel 2021 Project Proposals (8)

Project #	Prime / Lead	Title and Objective	NSRP Yards
1	**Elzly Technology**	**Heat Resistance of Type VII Class 5** Evaluate the use of MIL-23236 TYPE VII Class 5 to meet certain Class 19 requirements when applied over a Type VI coating. The use of such a system in well deck overhead spaces would improve production and reduce waste. Testing will be coordinated with NAVSEA to ensure their concerns are addressed by the project.	• HII-Ingalls Shipbuilding • Others TBD
2	**Elzly Technology**	**"Meet Spot" – Demonstration of a Crawling Robot in a Shipyard SPC Environment** A current project investigating surface prep and coating automation identified the ability to work in small, complex spaces as a critical obstacle to be overcome. The proposed project will begin with a fully developed robotic technology, determine mobility, and payload capabilities. The project will serve as the next step in developing automated SP&C related capabilities in complex shipboard spaces.	• HII-Ingalls Shipbuilding • Others TBD
3	**Elzly Technology**	**Visual Guide for Non-Ferrous & Stainless Steel Surface Preparation** The proposed guide would facilitate fair and consistent implementation of new requirements for preparation of non-ferrous metals and stainless steels. A guide will minimize rework and time spent adjudicating differences in interpretation of the specification.	• Others TBD
4	**Elzly Technology**	**QA Data Integration to Streamline Coating Application** Evaluate QA data from multiple shipyards to identify opportunities to streamline coating application, reduce costs, and increase quality. Leverage technology for data-driven decision making within the Coating Quality community.	• HII-Ingalls Shipbuilding • Others TBD
5	**HII-Ingalls Shipbuilding**	**Utilizing Ship Product Model Information for Corrosion Control and Coatings** Ship product models do not include information on corrosion control and specific coatings. The data that is pulled from the model is duplicated and modified in other programs and Excel. Develop processes to reduce the amount of manual input and handling of ship product model data for corrosion control and coatings applications.	• HII-Ingalls Shipbuilding • Others TBD
6	**HII-Ingalls Shipbuilding**	**Improved Methods for Corrosion Prevention when Bonding & Grounding Dissimilar Metals** Requirements and processes have been fully developed for corrosion prevention and bonding and grounding, however they conflict with each other. Current requirements sidestep the issue by giving precedence to bonding and grounding when necessary, resulting in inadequate corrosion protection and maintenance burdens for the shipyard and the Navy. Interact with NAVSEA to develop approved methods that cost effectively provide long-term corrosion protection meeting requirements.	• HII-Ingalls Shipbuilding • Others TBD
7	**HII-Newport News Shipbuilding**	**Corrosivity of Disinfection Materials upon Shipboard Metallic Materials** To assess how Shipbuilding metallic materials respond to common and novel disinfectants. • Corrosion / Embrittlement • Kill Efficacy	• HII-Newport News Shipbuilding • Others TBD
8	**Entry Point International**	**Temporary Protection of Shipboard Coatings and Finishes** Introduce new methodologies for temporary protection being deployed commercially in other shipyards in US, NATO, and Europe. To prevent delivery delays and cost overruns due to unforeseen rework of structural components and coating finishes. Evaluate cost and provide a working formula for shipbuilders that measures real cost of new approaches vs. legacy methods.	• HII-Ingalls • HII-NNS
9	**SurClean, Inc.**	**Establishing Laser Ablated Profile On Steel** 1. To establish process parameters for laser ablated profile on steel replacing grit blast operations in manufacturing & maintenance repair operations 2. Address concerns of thermal distortion "melting" using laser ablation 3. Socialize findings & set up PC Specifications	• HII-Ingalls • HII-NNS • Others TBD

Heat Resistance of Type VII Class 5

Panel: Surface Preparation & Coatings

PROJECT INFORMATION	OBJECTIVE
Prime/Lead: Elzly Technology Corporation **Team Members:** HII-Ingalls, other shipyards TBD **Duration:** 12 Months	Evaluate the use of MIL-23236 TYPE VII Class 5 to meet certain Class 19 requirements when applied over a Type VI coating. The use of such a system in well deck overhead spaces would improve production and reduce waste. Testing will be coordinated with NAVSEA to ensure their concerns are addressed by the project.
DELIVERABLES/BENEFITS/ROI	**FINANCIAL**
• Deliver guidance and data that allows use of Class 5 coatings for well deck overheads during ship production • Reduce fire hazard • Reduce material waste • Positively impact schedule • Improve finish (less discoloration)	**Program Funds:** $150K **Cost Share:** None 

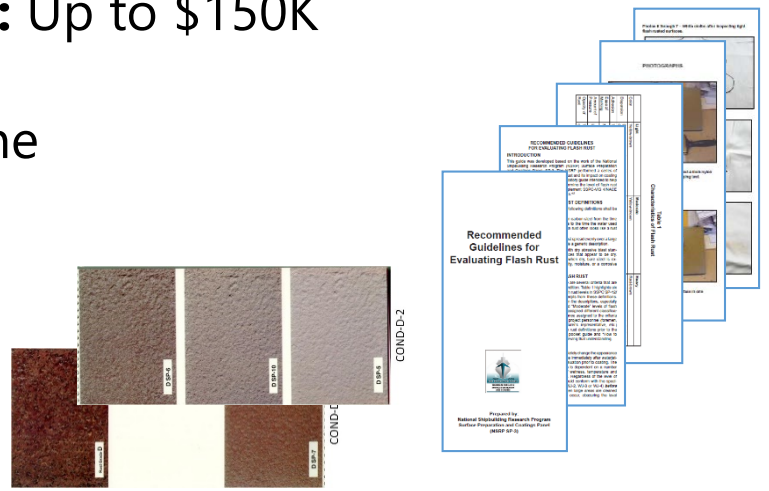
"Meet Spot – Demonstration of a Crawling Robot in a Shipyard SPC Environment

Panel: Surface Preparation & Coatings

PROJECT INFORMATION	OBJECTIVE
Prime/Lead: Elzly Technology Corporation **Team Members:** HII-Ingalls, other shipyards TBD **Duration:** 12 Months	A current project investigating surface prep and coating automation identified the ability to work in small, complex spaces as a critical obstacle to be overcome. The proposed project will begin with a fully developed robotic technology, determine mobility, and payload capabilities. The project will serve as the next step in developing automated SP&C related capabilities in complex shipboard spaces.
DELIVERABLES/BENEFITS/ROI	**FINANCIAL**
• Address a key challenge for automation that has been identified by the SPC panel • Determine if the technology is suitable for further development	**Program Funds:** $150K **Cost Share:** None 

Visual Guide for Non-Ferrous & Stainless Steel Surface Preparation

Panel: Surface Preparation & Coatings

PROJECT INFORMATION	OBJECTIVE
Prime/Lead: Elzly Technology Corporation **Team Members:** Other shipyards TBD **Duration:** 12 Months	The proposed guide would facilitate fair and consistent implementation of new requirements for preparation of non-ferrous metals and stainless steels. A guide will minimize rework and time spent adjudicating differences in interpretation of the specification.
DELIVERABLES/BENEFITS/ROI	**FINANCIAL**
• Develop a Visual Guide for Non-Ferrous Surface Preparation which can be used by shipyards and the Navy as a guide for interpreting the new standard • Provide copies of the guide to NSRP shipyards and Navy waterfront activities • Provide the guide to SSPC for publication as an NSRP document or adoption as an industry standard	**Program Funds:** Up to $150K **Cost Share:** None 

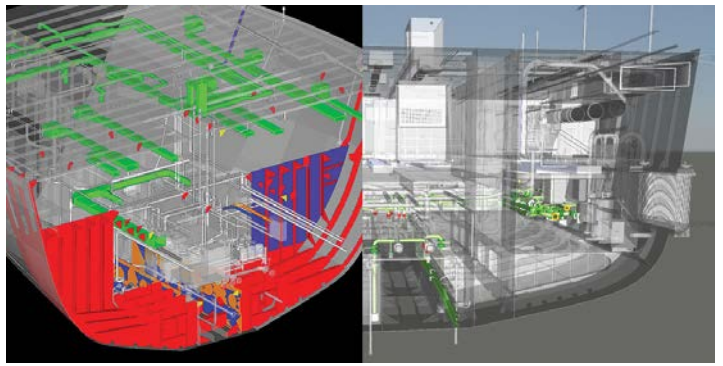
QA Data Integration to Streamline Coating Application

Panel: Surface Preparation & Coatings

PROJECT INFORMATION	OBJECTIVE
Prime/Lead: Elzly Technology Corporation **Team Members:** HII-Ingalls, other shipyards TBD **Duration:** 12 Months	Evaluate QA data from multiple shipyards to identify opportunities to streamline coating application, reduce costs, and increase quality. Leverage technology for data-driven decision making within the Coating Quality community.
DELIVERABLES/BENEFITS/ROI	**FINANCIAL**
• Deliver guidance and data that could support changes to Navy practices such as: o Changing checkpoints from G to V, I o Optimizing the number of distinct QA packages required o Taking advantage of calculated parameters in the approval process o Inform rewrite of 009-32 Appendices	**Program Funds:** Up to $150K **Cost Share:** None 

Utilizing Ship Product Model Information for Corrosion Control and Coatings

Panel: Surface Preparation & Coatings

PROJECT INFORMATION	OBJECTIVE
Prime/Lead: HII-Ingalls Shipbuilding **Team Members:** Other shipyards TBD **Duration:** 12 Months	Ship product models do not include information on corrosion control and specific coatings. The data that is pulled from the model is duplicated and modified in other programs and Excel. Develop processes to reduce the amount of manual input and handling of ship product model data for corrosion control and coatings applications.
DELIVERABLES/BENEFITS/ROI	**FINANCIAL**
• Improved quality of coverage area assessments for coatings applications • Reduced rework due to incorrect and missed corrosion control applications	**Program Funds:** Up to $150K **Cost Share:** None 

Improved Methods for Corrosion Prevention when Bonding & Grounding Dissimilar Metals

Panel: Surface Preparation & Coatings

PROJECT INFORMATION

Prime/Lead: HII-Ingalls Shipbuilding

Team Members: Other shipyards TBD

Duration: 12 Months

OBJECTIVE

Requirements and processes have been fully developed for corrosion prevention and bonding and grounding, however they conflict with each other. Current requirements sidestep the issue by giving precedence to bonding and grounding when necessary, resulting in inadequate corrosion protection and maintenance burdens for the shipyard and the Navy. Interact with NAVSEA to develop approved methods that cost effectively provide long-term corrosion protection meeting requirements.

DELIVERABLES/BENEFITS/ROI

- Defined processes with NAVSEA TWH input on corrosion prevention, bonding, and grounding of electrolytically dissimilar metals
- Establish universal process for Class B bonds on dissimilar metal joints
- Decrease shipbuilding cost due to installation and rework reduction

FINANCIAL

Program Funds: Up to $150K

Cost Share:
None

Contacting Metals	Aluminium alloy	Calcium plate	Zinc plate	Carbon and alloy steels	Lead	Tin coating	Copper and alloys	Nickel and alloys	Titanium and alloys	Chromium plate	Corrosion resisting steel	Magnesium alloys
Aluminium alloy												
Calcium plate												
Zinc plate												
Carbon and alloy steels												
Lead												
Tin coating												
Copper and alloys												
Nickel and alloys												
Titanium and alloys												
Chromium plate												
Corrosion resisting steel												
Magnesium alloys												

Green areas indicate dissimilar metal contact

Corrosivity of Disinfection Materials upon Shipboard Metallic Materials

Panel: Surface Preparation & Coatings

PROJECT INFORMATION	OBJECTIVE
Prime/Lead: HII-Newport News Shipbuilding **Team Members:** Sandia National Laboratory **Duration:** 12 Months	To assess how Shipbuilding metallic materials respond to common and novel disinfectants. • Corrosion / Embrittlement • Kill Efficacy
DELIVERABLES/BENEFITS/ROI	**FINANCIAL**
Deliverables: • Guidance on safe / proper use of disinfectant material • Identification of material-disinfectant combinations to avoid **Benefits:** • Reduce unintentional corrosion • Maximize disinfectant performance	**Program Funds:** Up to $149,853 **Cost Share:** None **EROM:** Formal pricing comes from NNS Contracts/Pricing organization.

Temporary Protection of Shipboard Coatings and Finishes

Panel: Surface Preparation & Coatings

PROJECT INFORMATION	OBJECTIVE
Prime/Lead: Entry Point International, LLC **Team Members:** AFS Consultants, HII-Newport News Shipbuilding, HII-Ingalls Shipbuilding **Duration:** 12 Months	Introduce new methodologies for temporary protection being deployed commercially in other shipyards in US, NATO, and Europe. To prevent delivery delays and cost overruns due to unforeseen rework of structural components and coating finishes. Evaluate cost and provide a working formula for shipbuilders to use that measures real cost of new approaches vs. legacy methods.
DELIVERABLES/BENEFITS/ROI	**FINANCIAL**
• Prove actual cost benefit analysis of technologies used in commercial shipbuilding that can reduce direct cost of rework and impact readiness • Time study cost impacts of legacy vs. higher performing temporary protection • Measure labor of higher performing protection vs legacy materials. Look for reusability/ recyclable/ sustainable technologies vs. disposable materials. • Perform field mock ups of new technologies vs legacy approaches • Measure protection of non-skid vs. damage rework cost	**Program Funds:** Up to $150K **Cost Share:** None  

ESTABLISHING LASER ABLATED PROFILE ON STEEL

Panel: Surface Preparation & Coatings

PROJECT INFORMATION	OBJECTIVE
Prime/Lead: SurClean, Inc. **Team Members:** Huntington Ingalls Shipyard, Newport News, NUWC-Keyport invited, others who come forward **Duration:** 10 months from ARO	1. To establish process parameters for laser ablated profile on steel replacing grit blast operations in manufacturing & maintenance repair operations 2. Address concerns of thermal distortion "melting" using laser ablation 3. Socialize findings & set up PC Specifications
DELIVERABLES/BENEFITS/ROI	**FINANCIAL**

A published report to NSRP, NUWC, DON
• utilize the process parameters to receive NAVSEA approval for shipyard manufacturing & SSPC Spec
• ROI is reduced:
  • set-up time & less equipment requirements
  • man-hours & secondary processes
  • or zero hazardous waste = no certifications, inspections or documentation costs
  • air contaminants = *zero total containments & PPE for employees*
	Program Funds: $142,000 – 10 month duration
	Cost Share: None
	Industrial Collaboration partners with SurClean have provided consigned or low-cost leased lasers and other ancillary required equipment. This information will be documented in the report.

NSRP SP&C Panel "*White Papers*" 2021 Timeline

DATE	ACTION
✓ June 9, 2019	NSRP Panel Project Solicitation Issued
✓ July 8, 2020	SP&C Panel Chair "*White Papers*" Communication
✓ July 29, 2020	"*White Papers*" Quad Charts to SP&C Panel Chair
August 5, 2020	"*White Papers Pitch*" – SP&C Panel Virtual Meeting
August 12, 2020	Final "*White Papers*" Submitted to Panel Chair and ATI (nsrp@ati.org) – 12 PM EDT Deadline
August 14, 2020	Forward to Steering Committee for Scoring / Voting
August 21, 2020	Scoring by Steering Committee Back to Panel Chair
September 2, 2020	SP&C Pre-Recorded Update – During Virtual MegaRust
September 9, 2020	Panel Chair Forward SP&C Top 3 to ATI – 12 PM EDT Deadline
November 17-19, 2020	ECB Meeting / "*White Papers*" Proposals Scoring / NSRP Day at NAVSEA
Reference Material	Solicitation for Panel Projects
Reference Material	Panel Project Guide Volume 1 – Proposers


NATIONAL SHIPBUILDING
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