



Planning, Production Processes & Facilities  
Panel Meeting  
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# Additively Manufactured HY-80 for Incidental Tooling/Casting Replacement WhitePaper Proposal

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# AM HY-80 Tooling & Castings

## About the EWI Team

- **Fully Functional AM Facility in Buffalo, NY**
- **Every Metallic AM process recognized in ASTM D42**
- **Complete Metallurgical Facilities**

## The EWI Team

- **Rutuja Samant**
- **Ryan Hurley**



# AM HY-80 Tooling & Castings

## Why do this?

- **Why CASTINGS?**
- **One of the greatest potential areas for AM:**
  - **Castings!**
- **Why TOOLING?**
  - **We can do it NOW!**
- **Why HY-80?**
  - **Hy-80 castings are a problem!**
  - **Many classes of ships....**



# AM HY-80 Tooling & Castings

## Why do this?

### *What's wrong with castings?*

- HY80 casting lead times can be 2 years
- HY80 castings often have dimensional inaccuracies
- HY80 casting often have volumetric defects
  - These are detected at the shipyard
  - Worst possible time
- This project will provide needed data leading to
  - Ultimate Navy approval for AM to replace HY80 castings
  - *But can be applied to tooling right now!*



# AM HY-80 Tooling & Castings

***Do it Now?***

***Castings? – No Way! Not Now....***

***Tooling? – Resounding Yes!***

- Navy won't let us do castings now – but.....
- Incidental tooling is an area that can be implemented right now
- Immediate use is already happening –but...
  - Progress has mostly been non-metallic
- There is a need for metallic tooling
  - Also needed is legitimate procedures and controls
- Progress in this area can build a solid base for progress with castings



# AM HY-80 Tooling & Castings

Team Member	Area of Expertise	AM Experience
<b>Edison Welding Institute</b> <b>Buffalo</b>	<b>North America's leading authority on welding protocols, parameters &amp; requirements.</b>	<b>Partnership in ASTM Center of Excellence</b> <b>Research into all aspects of metallic AM</b>
<b>HII-Ingalls Shipbuilding</b>	<b>Experiencing the PAIN of long lead times and on-site repairs of dimensional and volumetric defects</b>	
<b>HII-Newport News Shipbuilding</b>	<b>Leader in exploration of shipyard AM to replace castings</b>	



# AM HY-80 Tooling & Castings

<b>Material</b>	<b>Addressed Challenges (Team has experience and solutions)</b>	<b>Key Remaining Project Challenge(s)</b>
<b>Powder</b>	Robust suite of applications for powder AM builds	Establishing ability of HY80 and HY80-type powders to meet or exceed casting requirements
<b>Wire</b>	Combined experience with NNS for other alloy builds using DED wire process	Maintaining HY80 properties while building the needed shape



# AM HY-80 Tooling & Castings

<b>Component</b>	<b>Addressed Challenges (Team has experience and solutions)</b>	<b>Key Remaining Project Challenge(s)</b>
<b>Tooling – the Tool</b>	Experience with a variety of other builds that were capable of meeting requirements	D
<b>Tooling – the Process</b>	State of the art process monitoring and data acquisition for certification and tech transfer.	Establishing the essential variables to provide constant quality of the build
<b>Tooling – Conformance</b>	Large library of weld parameters and weld requirements for many items built	Establishing a set of conformance tests to validate quality and fitness-for-purpose.





# AM HY-80 Tooling & Castings

## Other thoughts:

- 1
- 2
- 3
- 4
- 5



# AM HY-80 Tooling & Castings

*Questions?*





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