

Power Panel & Breaker Commonality

GENERAL DYNAMICS Bath Iron Works

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11/08/17 San Diego, CA



DISTRIBUTION STATEMENT A: Approved for Public Release

Agenda

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- Summary
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Project Mission Statement

 Identify Where Opportunities Exist with Consolidating Power Panels and Circuit Breakers to Reduce the Number of Variants and Push Commonality into Ship Designs





Refer to Title Page for Distribution Statement

Project Summary

- Mission:
 - Many Variants of Power Panels & Breakers
 - Many Different Applications
 - Multiple Ship Programs
- Objectives:



- Identify Existing Opportunities for Consolidation
- Reduce the Number of Variants and Breaker Panel Combinations
- Drive **Commonality** into Ship Designs



Project Tasks

- Create Power Panel and Breaker Master List 100% Complete
- Research & Determine Requirements 100% Complete
- Research Applicable Products 100% Complete
- Determine Product Opportunity 100% Complete
- Breaker Shock & Vibration Testing Procedure 100% Complete
- Design, Build, & Test Demonstrator 50% Complete
- Generate Report and Presentation 20% Complete





Project Schedule

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Overview From Previous Update

- Breaker and panel master lists are developed
- Opportunities exist for standardization and commonality based on technical characteristics
 - Some attribute comparison has been completed and reported, but some more assessment will occur
- Based on current product availability and not having a specific baseline for comparison purposes, decision is to pursue testing of COTS style breakers and panels
 - This aligns with original project plan



Commercial Demonstrator

- Demonstrator will be a
 - Six circuit panel
 - Hold various sizes of FDC style breakers, representing good all around option to consider for many applications
 - Will be hard mounted to test fixture for light weight shock testing per Mil-Std-901E
- Reviewed option for shock mounting, but this would extend the scope and require many other considerations for program introduction (couple examples follow)
 - Shock loops for cables
 - Different structural arrangements for shock mount interface
 - Increased space consumption



More About Testing

- Testing a panel that *might* serve several applications creates a baseline; it is not expected to meet all testing requirements, but
 - Failure assessment can be used to determine where requirements were not met and ideas generated regarding how to meet requirements: cost and type of modifications required
 - What options exist to use straight COTS products (i.e., shock mounting)
 - What benefits might be earned from using COTS products
 - If a hybrid product is needed, how do costs and benefits compare
 - What is likelihood of necessary manufacturer support being available
- It is likely COTS product lines offer more flexible options (especially along the lines of performance related requirements)
- Not aware that this type of testing has been done recently; data and assessment can be used for other baseline uses



Path Forward

- Conduct testing of the panel and breakers
- Conduct post test evaluation
- Generate options for breaker consolidation based on
 - Opportunities that may exist with COTS families of breakers and panels (comparing to MIL-STD requirements)
 - Determinations of longer term opportunities for panel standardization based on breaker standardization
- Develop cost benefit analysis
- Generate a report of findings and recommendations





Power Panel & Breaker Commonality

NSRP ETP



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