

# ORGANIC LED (OLED), LOW VOLTAGE SHIPYARD LIGHTING TESTING AND DEMONSTRATION – PANEL PROJECT



Electrical Technologies Panel Project Meeting – May 2020

# Problem Statement

- Reduce shipbuilding costs related to installation of lighting -- eliminate bonding and grounding
  - 2018 Panel Project – Feasibility of Low-Voltage DC Shipboard Lighting <https://www.nsrp.org/project/low-voltage-shipboard-lighting-feasibility-study/>
  - Page 8: *OLED lighting is an alternative to LED/solid-state light (SSL) sources that use organic materials as the light source. An OLED source emits light across the entire surface area, producing high quality illumination. The thermals of OLED devices are more easily managed (compared to SSL), allowing new concepts for fixture designs. OLED is a newer technology and the performance is currently lagging that of SSL; however industry is working aggressively to develop this technology. The technology has the potential to greatly reduce weight and increase options for interior lighting systems.* Appendix A provides additional information on OLED technology and feasibility for low voltage shipboard applications.
  - Page 10: *Given that the intent of this study is to determine feasibility of the low voltage approach, system design and layout would be recommended for follow on activity.*

# Panel Project Status

- ATI award to OLEDWorks 31 March 2020
- Sub Contracts Executed w/ Shipyards
  - GD BIW
  - Hii Pascagoula
- Sub-Contract under negotiation
  - Acuity Brands
- Kick-off Meeting
  - Pending sub k w/ Acuity
    - Schedule Risk to be assessed / addressed at Kick-off

# Panel Project SOW - Goals & Objectives

**Project Goals and Objectives:** This project is proposed as logical follow-on to previous 2018 Panel Project cited. Additional work is needed to refine shipboard configuration, optimize size & weight to maximize inherent advantages of OLED technology.

Specifically:

- Develop and demonstrate installation mounting techniques / options during ship construction
- Design robust fixture platform and test to required shock and vibration standards
- Quantify savings / cost avoidance associated w/ eliminating bonding and grounding
- Demonstrate light distribution / delivery characteristics of OLED including integration of red & amber panels into general illumination white fixture
- Model and quantify platform level space and weight reductions in terms of cubic feet (ft<sup>3</sup>) and tons over current standard general lighting. Include flexible OLEDs in the analysis.
- Demonstrate both standard OLEDs and higher lumen OLED options currently in development

# Panel Project SOW - Tasks

## TASKS

- Task 1: Develop Fixture & Demonstrate and Mounting Techniques
  - Task 1.1: Refine requirements for mounting, maintenance and space illumination
  - Task 1.2: Design options for fixture; light modeling of space
  - Task 1.3: Fixture fabrication
  - Task 1.4: Installation demonstration in mock or real space
- Task 2: Fixture robustness testing – shock and vibration
- Task 3: Demonstrate light distribution including white, amber and red lights
- Task 4: Quantify savings / cost avoidance, Total Cost of Ownership
  - Task 4.1: Installation and maintenance costs
  - Task 4.2: Space and weight savings
- Task 5: Define solutions for improvement
- Task 6: Summary and Recommendations

# Panel Project SOW - Partners

- **Acuity Brands** – Luminaire Manufacturing Partner
  - Current supplier to DoD facilities
  - Leading global supplier
- **Huntington Ingalls Industries**, Pascagoula
  - Shipyard stakeholder
  - Mounting / installation consulting
  - Environmental (Shock) Testing
  - Demonstration
  - Metrics support
- **General Dynamics, Bath Iron Works**
  - Shipyard stakeholder
  - Mounting / installation consulting
  - Demonstration in mock space - explore leverage opps
  - Metrics support
- **NAVSEA / NSWC PD (NAVSSSES)**
  - NAVSEA Technical Authority

# Panel Project SOW - Deliverables

DELIVERABLE SCHEDULE			
#	Deliverable	Team Member(s)	Due Date
1	Requirements Defined	OLEDWorks (Boroson); Acuity Brands (Wang, Schwade); Bath Iron Works, Huntington Ingalls	June 30, 2020
2	Fixture design approved including mounting specifics	Acuity Brands (Wang, Schwade) lead on design; OLEDWorks (Boroson); Bath Iron Works, Huntington Ingalls	June 30, 2020
5	Quarterly Project Status Report 2	OLEDWorks (Boroson)	September 30, 2020
6	Installation in mock or real space; installation procedures documented	Bath Iron Works, Huntington Ingalls	October 30, 2020
7	Shock and vibration testing	Bath Iron Works, Huntington Ingalls	October 30, 2020
8	Photometrics measurements and modeling report; select shipboard spaces	Acuity Brands (Wang, Schwade), BIW, HII	November 30, 2020
9	Quarterly Project Status Report 3	OLEDWorks (Boroson)	December 31, 2020
10	Total Cost of Ownership Report	OLEDWorks (Boroson); Acuity Brands (Wang, Schwade); Bath Iron Works, Huntington Ingalls	January 29, 2021
11	Performance Analysis and Recommendation Report	OLEDWorks (Boroson); Acuity Brands (Wang, Schwade); Bath Iron Works, Huntington Ingalls	February 26, 2021
12	Final Report	OLEDWorks (Boroson)	March 30, 2021

Potential Schedule Risk – due to sub k process

# Project Contacts

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