INTEGRATION OF INSULATED BUS PIPE (IBP) INTO WARSHIP DESIGNS TO SUPPORT SHIPBOARD DISTRIBUTION OF HIGH-POWER ENERGY

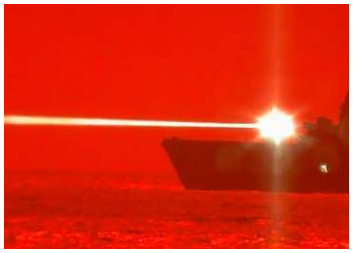
TECHNOLOGY

Insulated Bus Pipe (IBP), Modular Power Distribution for Shipboard High-Power Applications

RDT&E,N PROGRAM ELEMENT (PE):

PE 0603573N / Advanced Surface Machinery Sys – Project 2471 / Integrated Power System (IPS). DDG(X) Power & Propulsion Risk Mitigation & Demo

Recommended Language: Conduct development and preparation of Insulated Bus Pipe (IBP) providing for tool-free connections and scaled manufacturing for warfighter capabilities.



Directed Energy Shipboard Applications Enabled by Insulated Bus Pipe Power Distribution Technology

NEXT STEPS:

- Move from low-rate initial production (LRIP)to full scale manufacturing
- Full power testing at and above intended mission load profile
- Parallel effort into Coaxial Insulated Bus Pipe (CIBP) components and system integration development
- Qualification program with Program Office

ACCOMPLISHMENTS

- Delivered draft military performance specification working with NAVSEA
- Risk reduction testing for shipboard use and qualification
- Designed, developed, and manufactured 1st ever coaxial insulated bus pipe
- Tested at high-power and for medium weight shock and vibration
- Low-rate initial production in Windsor, CA

BARRIERS TO ADOPTION AND PURPOSE OF REQUESTED FUNDING:

Current Challenge	Addressed Though Funding
Complete performance validation:	Enable for testing, modeling, and performance
Breadth of product catalog:	Engineering design to meet warfighter needs
Scaled production:	Building local manufacturing capability
Clear value demonstration:	Perform representative testing and deployment

CURRENT TRL: 5 – Specific components validation in ManTech and SBIRs, ready for system application and proceeding to TRL 6

WARFIGHTER NEED

- IBP is an enabling technology to integrate future Navy combat systems, e.g. high energy lasers
- Reduces installation labor cost and construction schedule risk while providing low and medium voltage power distribution capability.
- Support the distribution of high-power energy to new and emerging, power-hungry weapons, sensor and propulsion systems.

> *"Laser power is not the issue – it's the form factor, it's the **engineering of the power** to get the density of that in a shipboard design, that's the challenge."*
>
> *"I don't think a one-megawatt laser is beyond what should be on that battleship."*
>
> Adm. Daryl Caudle
> U.S. Navy's Chief of Naval Operations

TECHNOLOGY DESCRIPTION & BENEFIT

- **>20% labor cost savings** by installing modular IBP in pre-outfitting and eliminating critical path cable pulling late in ship construction
- **Tight bend radius** for complex routing capability in contrast to cable
- **Magnetic Signature Reduction** dependent upon rating and type
- **Boltless connections** along modular distribution to minimize life cycle maintenance

TECHNOLOGY POINT OF CONTACT

Patrick Lewis, Hepburn and Sons LLC, Director of Technology Development
Phone: (412) 527-2619 Email: patrick.lewis@hepburnandsons.com

GOVERNMENT POINTS OF CONTACT

Neal White, Acting DASN Ships
Phone: (703) 697-1710 Email: neal.r.white12.civ@us.navy.mil

Nathan Spivey, ONR Program Officer Code 331
Phone: (215) 266-6096 Email: nathan.n.spivey.civ@us.navy.mil

POTENTIAL CUSTOMER(S)

- Surface Ship Program Offices
- Submarine Program Offices
- Shipyards
- Data Centers
- Electrical Utilities

OTHER BENEFITS IN THE NATIONAL INTEREST

- Grid Resilience
- Bring Back Manufacturing Jobs to US
- Enabling high-power technologies



Modular Sections of Insulated Bus Pipe, Boltless Connections

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