



# INSULATED BUS PIPE (IBP) SYSTEM

## Transforming Electrical Distribution on U.S. Navy Warships

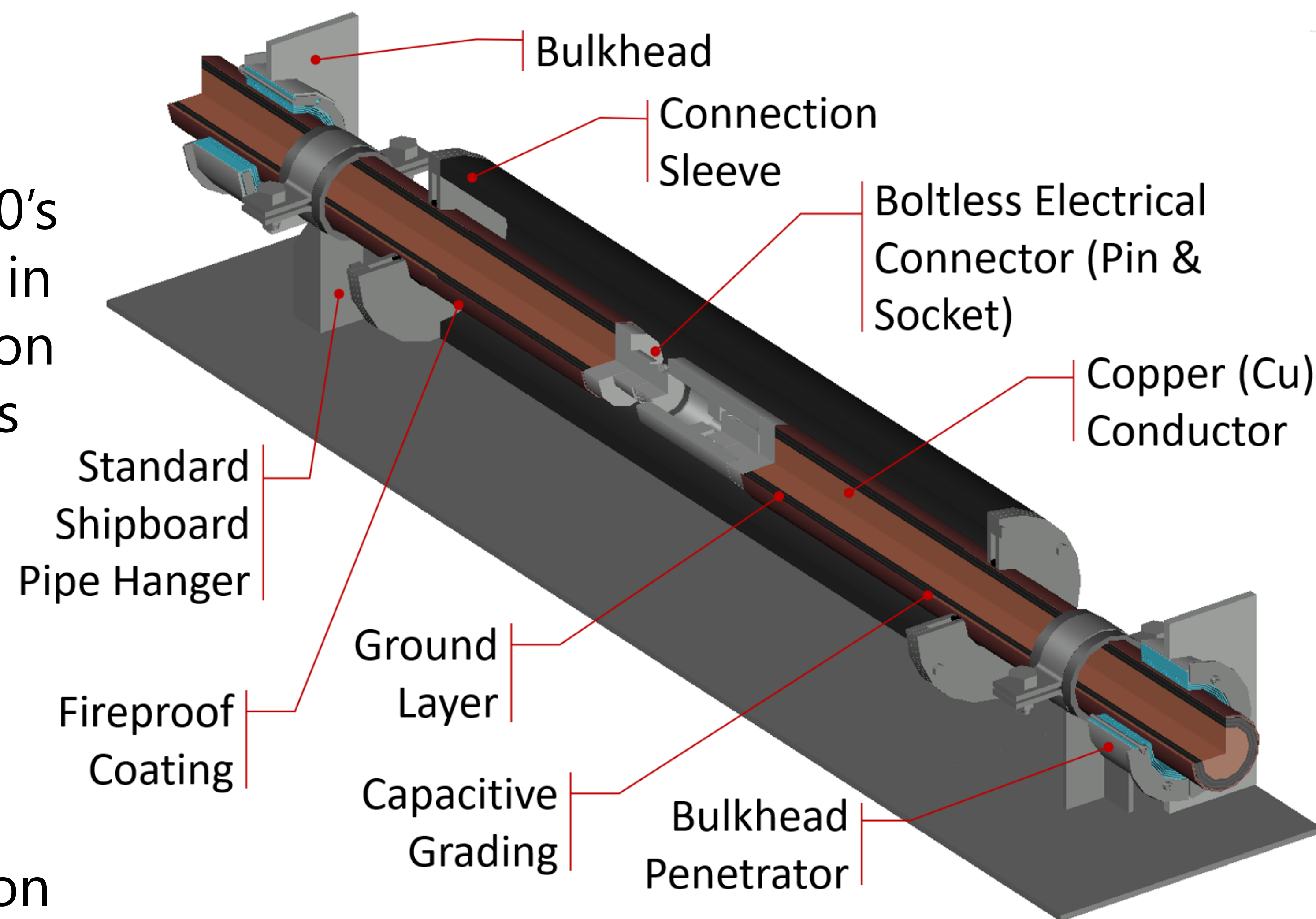
**Team:** Hepburn and Sons LLC | Stäubli | FSU CAPS | General Dynamics Bath Iron Works | AeroNav Labs | Roxtec | RSL Fiber | ABS | Others

### Problem

- Cables used since advent of electrical distribution in 1800's
- Primary advancements only in standardization and insulation
- Supplying high current loads requires numerous parallel cables for high amperage
- Bend radius can be over twelve times the overall diameter
- Cable installation does not support modular construction
- Cable repulls are costly and time-consuming. Must pull whole cable to repair.

### Solution

- Touch-safe power distribution
- Capable of being manufactured into complex routing shapes
- AC ratings up to 36 kV and 6.5 kA
- DC ratings up to 60 kV and 7 kA
- Shielding/Protection options
  - Electromagnetic shielding
  - Flame resistance capability
  - Developing coaxial IBP for low magnetic signature solution
- Prefabricated sections installed similarly to pipes in pre-outfitting
- Smaller bend radius than cable
- Directly supports Naval Power and Energy Systems (NPES) Technology Development Roadmap (TDR)



Insulated Bus Pipe (IBP) System Model

### Project Benefits

- Provides SWAP-C savings for increased endurance and design margin
- Supports modular ship construction
- Manufactured into complex shapes that can be routed in tight spaces
- Easily repaired where only the damaged modular section is replaced
- High abrasion resistance and increased survivability

### Project ROI

- >20% labor cost savings let alone schedule cost savings by installing during pre-outfitting
- 50% weight savings over LSTSGU-400 MCM cable for 450VAC 4kA applications
- 50% savings in connection time using boltless controlled contact connector as compared to bolted connections

**>20%**  
**Installation Labor Savings over Standard Cables**

**Up to 50%**  
**Weight Savings Over Standard Cable Depending on Electrical Ratings of Application**

**Significant Reduction in Bend Radius Compared to Traditional Cable**

**40+ years Designed Lifespan of IBP**

**16+ years Research and Development for U.S. Navy Applications via NSRP & SBIR/STTR**

