



Ship Warfare Systems Interface Descriptions

D'Angelo Technologies, LLC

Ship Warfare Systems Integration (SWSI)

Panel Project Status

February 2014



BAE SYSTEMS



Project Team



- **Technical Assessment**
- **Description Development**
- **Reporting**
- **Implementation Support**

- **Tier 1 Shipyard**
- **Mentorship, Support, and Guidance**
- **Support Development of Interface Descriptions**

- **Repair Shipyard**
- **Mentorship, Support, and Guidance**
- **SWSI Subject Matter Expert**



Technical Requirements

Analyze and Document Interfaces Used in Ship Warfare Systems

- **Itemize Connectors**
- **Group by Categories**
 - **Interface**
 - **Form, fit, function**
- **Describe Interface and Components**



Project Overview

- 1. Generate Initial List of Interface Requirements for Systems and Subsystems**
- 2. Identify Current Design and Component Selection Procedures**
- 3. Propose Preliminary Guidelines for Common Interfaces Between Subsystems**
- 4. Categorize Connectors**
- 5. Develop Final Report**



Project Goals

Goals:

1. **Develop Design Guidelines and Recommendations for Commonality**
2. **Identify Common Hardware Interfaces**
3. **Path Forward: Reduced Acquisition Costs of Connectors Through Shipyard Implementation**



Project Objectives

Objectives:

1. **Common Point of Reference for Types of Connectors**
2. **Open System Available to all Potential Users**
3. **Identification of Military and Commercial Connectors**
4. **Input from Users, Designers, Suppliers, and OEMs**
5. **Categorization by Functionality and Application**
6. **Identification of Obsolete Connectors**
7. **Direct Updates by Connector Suppliers**
8. **Forms for Buyers to Collect/Compare Systems Interface Requirements versus Vendor Solutions**



Project Targets

Targets:

- 1. Integrated Shipbuilding Database of Interfaces and Connectors**
- 2. Reduced Common Set of Connectors**
- 3. Precursor to Design Rules**



Panel Project Synergism

- 1. Ship Warfare Systems Interface Descriptions / D'Angelo Technologies, Ingalls Shipbuilding, BAE Systems – Southeast Shipyards (SWSI)**
 - To develop design guidelines and strategies which designers and manufacturers can use to incorporate common hardware interfaces for ship warfare system upgrades and new system designs.
- 2. Copper and Fiber Optics Test Equipment Integration into Shipyard Processes / BAE Ship Repair, kSARIA , Raytheon, Lockheed Martin, Gibbs & Cox (SWSI)**
 - The intent of this panel project is to leverage industry and government efforts performed to date to identify and deploy technologies to shipyards and combat systems developers that will reduce the time to terminate and test cables.
- 3. Flexible Interface for Automated Circuit Tester for Level 1 Testing / Ingalls Shipbuilding, D'Angelo Technologies (ET)**
 - Develop concepts for rapidly adapting the cable under test to the circuit tester. The concept options will be evaluated and a prototype will be manufactured to demonstrate the flexibility of the concept to adapt the cable under test to the automated tester without the need to fabricate unique adapter assemblies (i.e., jumpers) for each type of connector tested.

Notional Project Synergism



Connectors

Ship Warfare Systems Interface
Descriptions



Connector Interfaces

Flexible Interface for Automated
Circuit Tester for Level 1 Testing



Test Equipment

Copper and Fiber Optics Test
Equipment Integration into Shipyard
Processes



Methods and Procedures Required for Accomplishing Goals and Objectives

Tasks:

1. **Develop Initial List of Interface Requirements for Systems and Subsystems**
2. **Identify Design and Component Selection Procedures**
3. ***Guidelines for Interfaces Between Subsystems***
4. ***Categorization of Connectors***
5. ***Record, Analyze, and Report Results***
6. ***Final Report***



Task 1: Interface Requirements

- 1.0 Develop Initial List of Systems and Subsystems Interface Requirements for Systems and Subsystems**
 - 1.1 Generic identification of interface classifications**
 - 1.2 Mil specifications governing choices**
 - 1.2 Customer specifications influencing choices**
 - 1.3 Designer preferences**
 - 1.4 Format of data, signal, and power passing through the connector**



Interface Requirements – Identification

- **CLASS**
 - Hull
 - System/Subsystem
- **CONNECTOR**
 - Number of connectors
 - Type(circular/cylindrical, FO, Coax, etc.)
 - Pin Count
 - Pin(s) used
- **APPLICATION**
 - Power
 - Signal
 - Data
 - RF
- **Interface Requirements Document or Interface Control Document**



Task 2: Component Selection Procedures

- 2.0 Identify Design and Component Selection Procedures**
 - 2.1 Specified by the customer**
 - 2.2 Identified in qualified parts list**
 - 2.3 Preferred by company design team**
 - 2.4 Specified by vendors**
 - 2.5 Identified use of COTS**
 - 2.6 Negotiated with suppliers and allowed substitutes**



What are the Connector Resources?

- **Direct from manufacturer**
- **Distributors**
- **GFE**
- **Others**



How are Connectors Chosen?

- **List of Military Specifications**
- **List of Internal specifications/procedures**
- **Designer's Preferences - vendor/type/pin count**
- **Electrical Format (signal, power. data)**

Sample Connector Data



Discussion

- **Approach**
- **Panel Participation**
- **Areas of Prime Interest**
- **Integration with other Panel Projects**
- **Commonality Efforts Ongoing**
- **Connector Selection Template**



Next Steps

- **Continue Data Gathering**
- **Analyze Data**
- **Focus on Specific Type(s) of connectors**
- **Discuss Options with Vendors**
- **Interview Designers**
- **Discuss Approach with Navy**



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