Low-Cost, Toughened Composite Antenna Enclosure

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Navy Opportunity Forum

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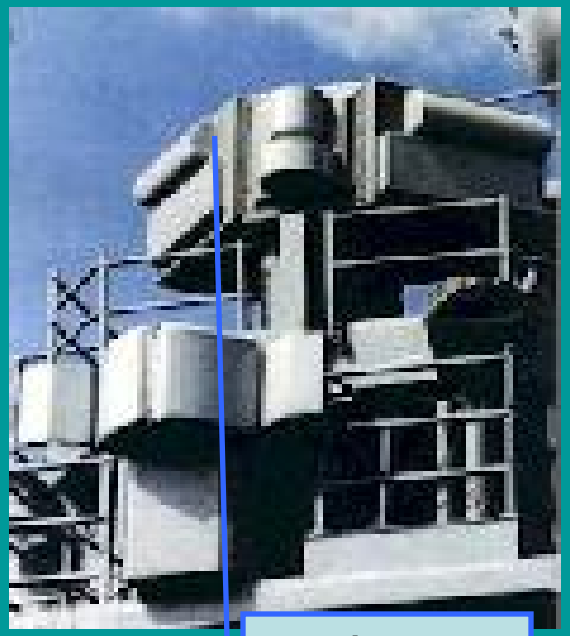
Problem Statement

- Initiative to reduce costs and improve service performance
- AN/SLQ-32 (V) 2 Electronic Warfare Antenna
  - Corrosion problems
  - Internal water damage
  - Frequent painting and repair of enclosure



Organizations With Need

- PEO IWS 2
- U.S. Navy – NAVSEA / NSWC-Crane

- Raytheon
- BAE Systems, Inc.

Baseline Technology

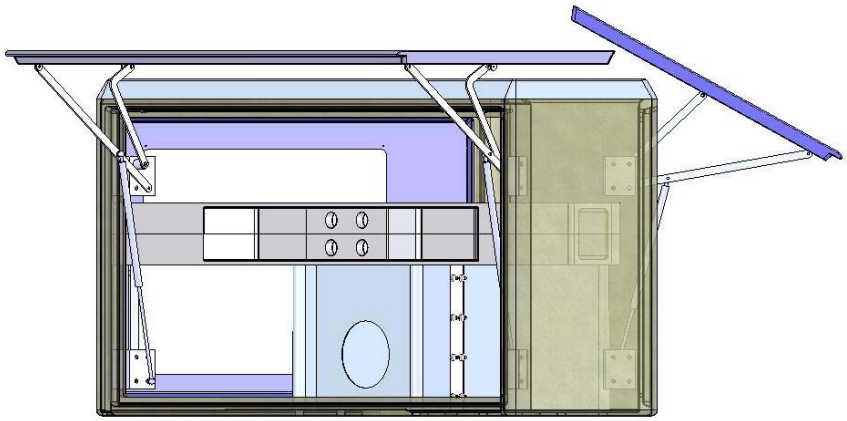
- Raytheon OEM for AN/SLQ-32 (V) 2
  - Contains surveillance and range finding equipment
- 2 units per ship
  - DDG, LPD-San Antonio class, LSD-Harpers Ferry class
- Legacy enclosure - 650 lbs
  - 45” W x 45” H x 90” L
  - Materials of construction
    - Al substructure; carbon steel hinges
    - Chopped fiber glass surface panels
  - Painted Navy gray

Customer Needs

- Primary:
  - Reduced cost (acquisition and maintenance)
  - EMI Shielding: 70 dB attenuation
  - Reduce or eliminate surface corrosion
  - Reduced radar cross-section
  - Molded in color – no painting!
- Secondary:
  - Improve access to internal components
  - Mount directly to legacy ship foundation
  - Reduced weight

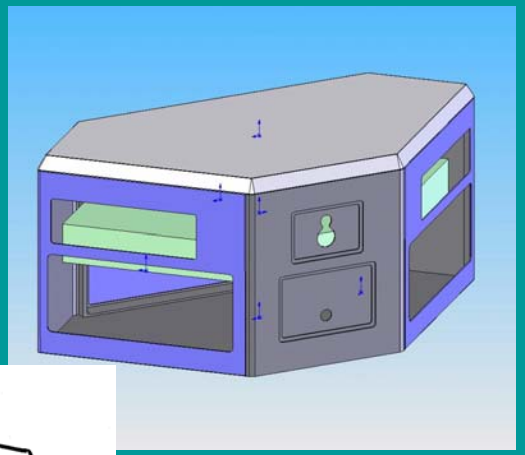
Solution

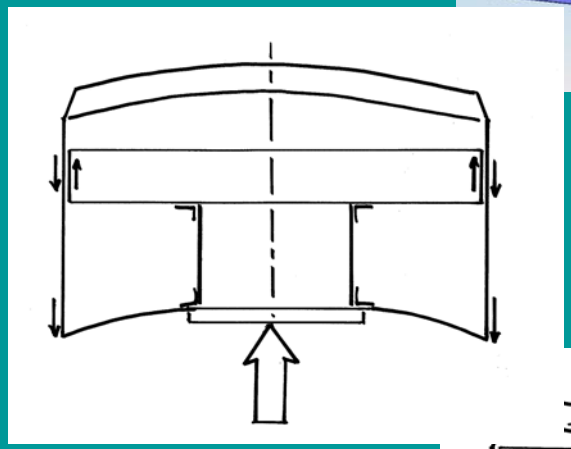
- Vinyl ester / Eglass–foam sandwich construction; mold-in color
- Re-designed to improve operational capability
- Eliminates dissimilar metals
- Incorporates EMI shielding into enclosure walls

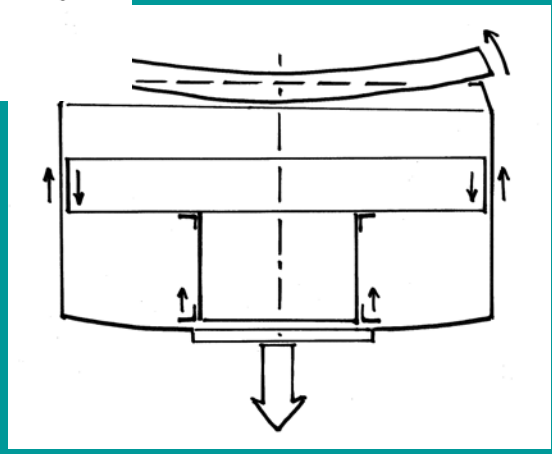


Performance Specs

- High strength
  - Grade B Shock per MIL-S-901D
  - 4-25 Hz vibration per MIL-STD-167-1
- EMI
  - 70 dB attenuation per MIL-STD-461C
- Climatic testing
  - Salt fog per ASTM B155
  - UV
  - Sand erosion

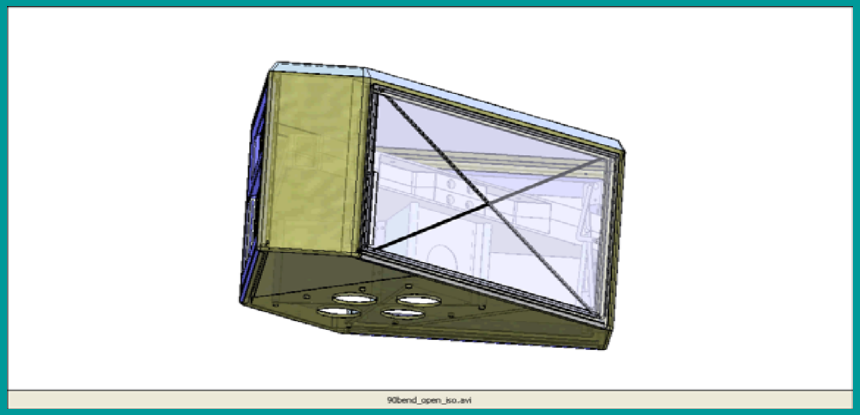


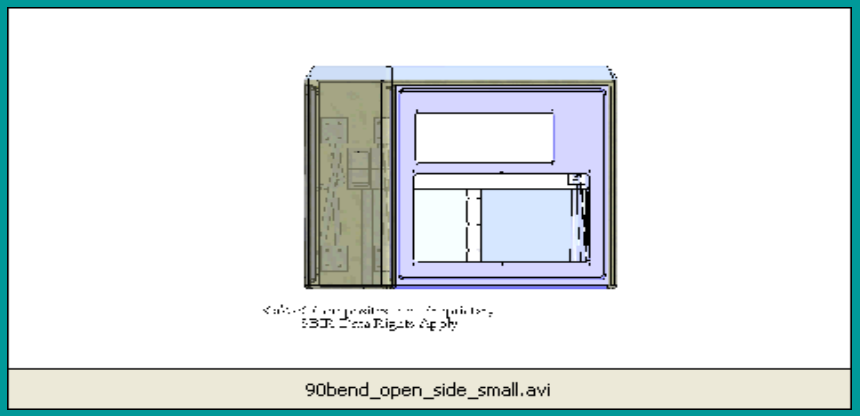




Benefits

- Lower-cost
  - Acquisition
  - Life-cycle
- 30% lighter in weight
- No corrosion or painting
- Ease of access:
  - Larger door openings
  - Larger internal space
- Shock qualified
- Improved EMI shielding





Current State of Development

- 1st prototype shock and vibration tested
- Production-ready design modifications and drawing package complete
- Production qualification unit under construction
  - Expected completion date June, 2008
- Qualification testing
  - June to August, 2008
- Phase II option ending September, 2008
- Phase III transition
  - Low Rate Initial Production (LRIP) units due October 1, 2008

Technology Development Milestones

SBIR	Milestone	TRL	TRL date
Phase 2-Yr 1	**Design a simplified composite EW enclosure based on legacy design.**	**3**	**15-Sep-06**
Phase 2-Yr 2	**Build 1st prototype enclosure and ready for testing**	**4**	**13-Aug-07**
Option 1	**Vibration and shock test 1st prototype at NTS-Rustburg**	**6**	**27-Aug-07**
Option 2	**Build Production Prototype for qualification testing; perform qualification test**	**7**	**27-Aug-08**

Transition to Fleet

TRL	Required Tests, Demos, and next steps	Target date	Organizations to be involved
7	Environmental testing per MIL-STD-810F; shock per MIL-S-901D; Vibe per MIL-STD-167-1; Inclination per DoD-STD-1399-301A	August 2008	NSWC-Crane: Charlie Cox and Tim Rocco
8	Low-Rate Initial Production (LRIP)/ship trials	October 2008	PEO IWS; NSWC-Crane
9	Full Rate Production	Fall 2009	PEO IWS; NSWC-Crane

Partners Sought

- AN/SLQ-32 antennas, current and next generation designs
  - Raytheon
  - BAE Systems, Inc.
- Other large engineered structures
- KaZaK Role
  - Design, manufacture, supply composite structures

About the Company

- High performance composite structures
- Large pultruded structures, panels and tubes
- Specializing in large and unusual pultrusions
- Established in 1992 – privately held
- Engineering – Woburn, MA
- Manufacturing – Hudson, NH

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