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AEM/S Stepping Stone to Stealth

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AEM/S ... Stepping Stone To Stealth

Bill Solitario

Professor Systems Engineering

September 04, 2003



Outline

- Background
- Concept Description
- Manufacturing Approach
- Transition to Fleet
- Summary

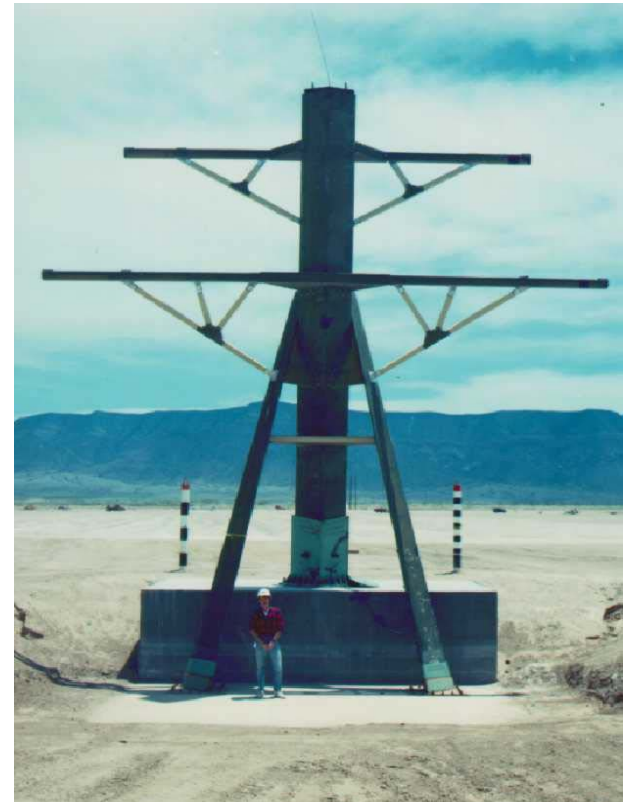
AEM/S on USS Radford





BACKGROUND

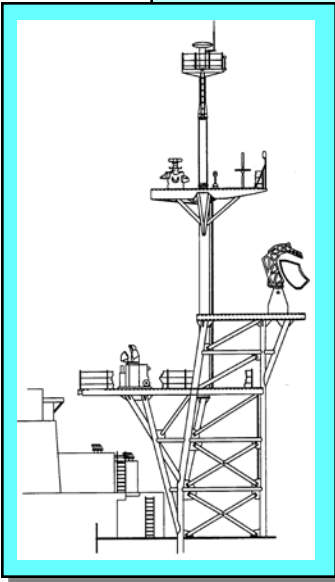
- Half scale DDG Mast
- Composite Structures



ATD PAYOFFS

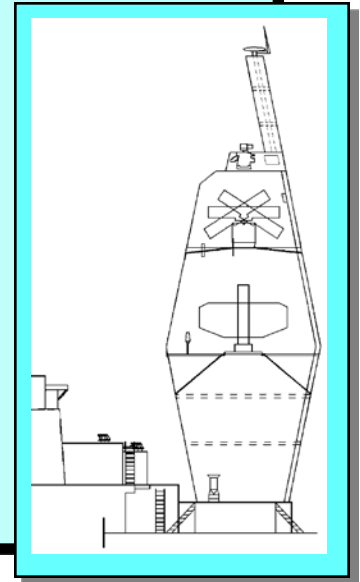
SOLVES PROBLEMS

- **Sensor Performance**
 - Blockage
 - False Targets
 - Sensor Downtime
- **Affordable Signature Control**
- **Topside Weight Limitations**
- **Life Cycle Costs**
 - Sensors
 - PCMS

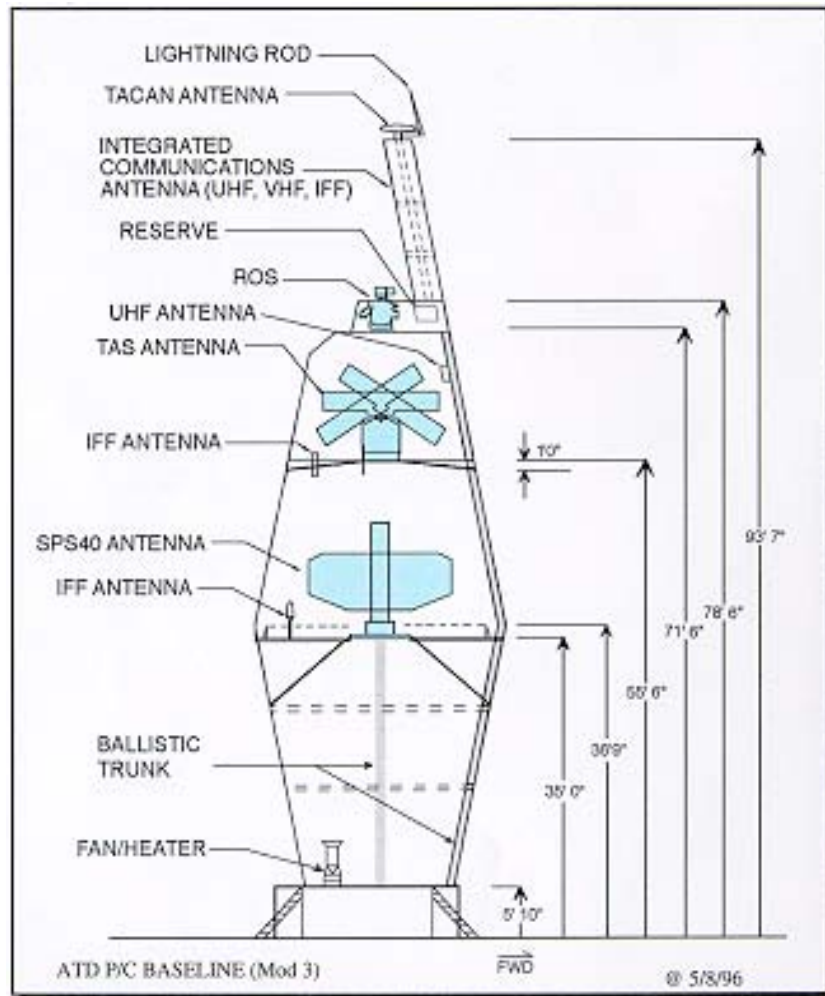


ENABLES NEW TECHNOLOGY

- **Embedded Sensors**
- **Planar Arrays**
- **Low Observable Ship Signatures**



ADVANCED ENCLOSED MAST/SENSOR AEM/S



- **LARGE COMPOSITE STRUCTURE**

- 71 1/2' High; 31' Dia; 30 Ltons

- **SHAPED TO REDUCE RCS**

- Hexagonal
- 10° Slope

- **UPPER HALF**

- Frequency Selective Structure
- Integrated Communications

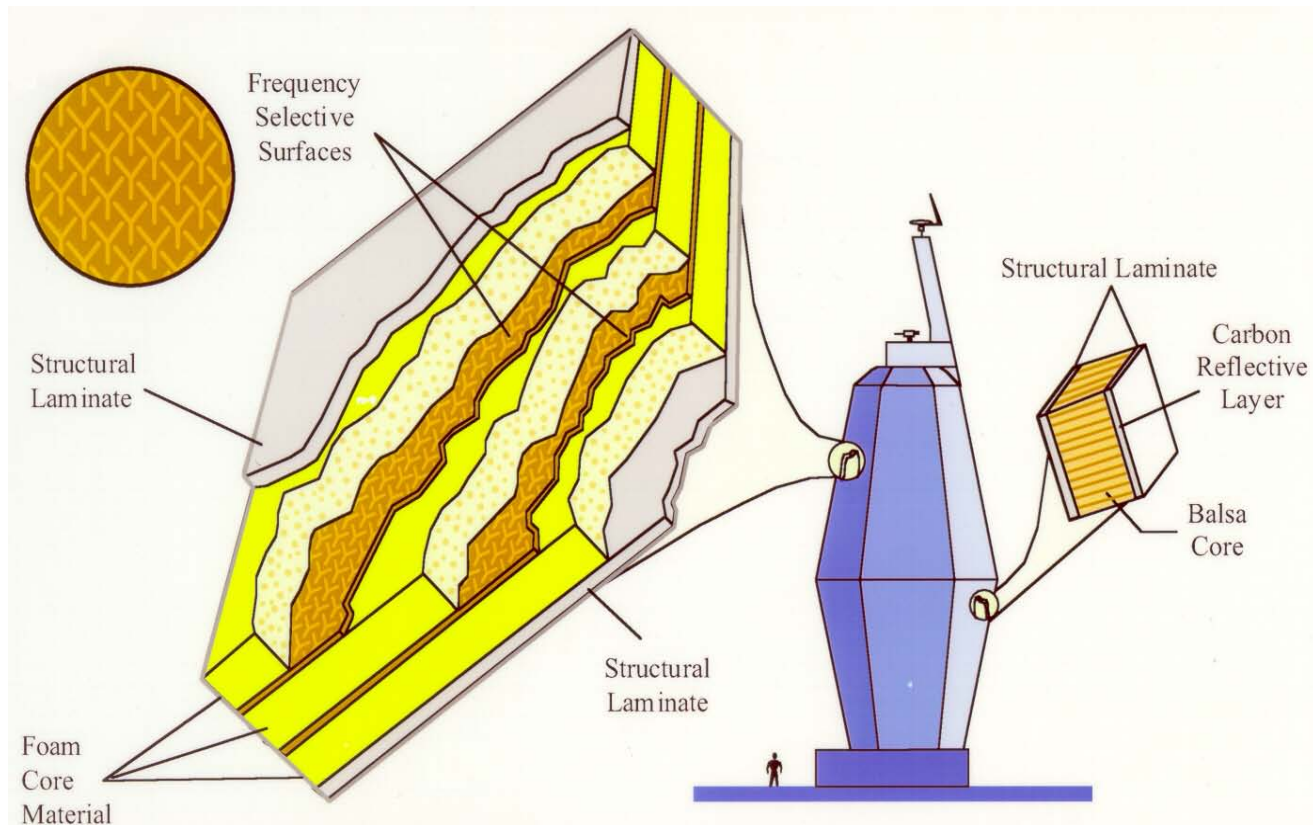
- **LOWER HALF**

- Reflective; RAS Option
- Metallic Shielding

- **BALLISTIC WAVEGUIDE TRUNK**

- **INTEGRATED EMI/EMP**

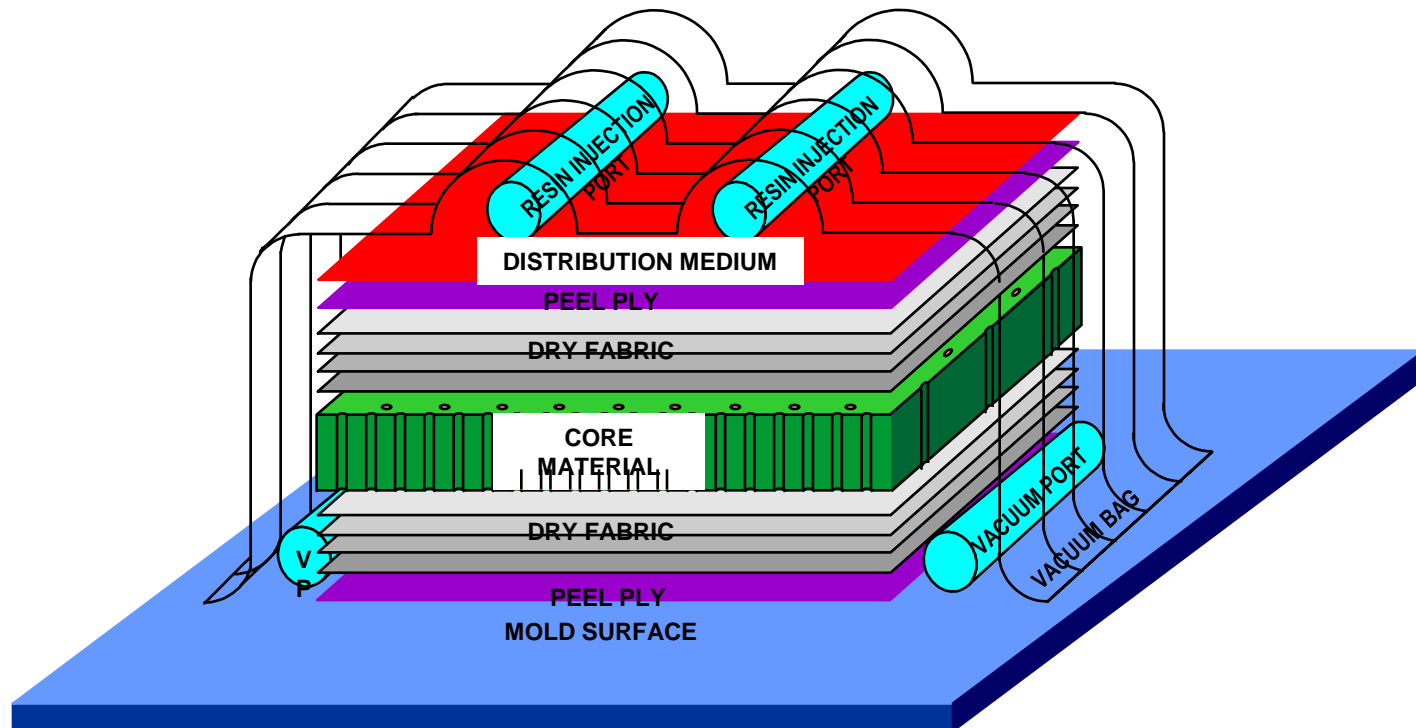
TAILORED MATERIAL SYSTEMS



Manufacturing Process

Seemann Composite Resin Infusion Molding Process (SCRIMP):

- Near Autoclave Laminate Quality At Shipyard Prices
- Extremely Low Void Content Laminate
- High Fiber to Resin Volume Ratio = High Strength to Weight



SCRIMP = Cost Effective Advanced Composite Structures



FABRICATING THE STRUCTURAL MAST



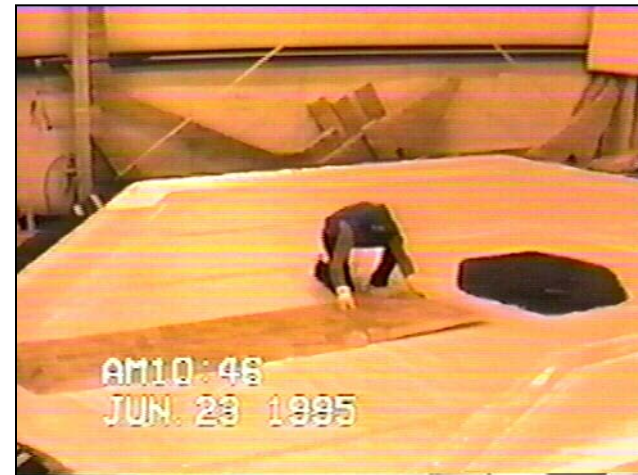
(10/20/95)



The AEM/S Experience – Fiber Reinforcement & Core Lay-up For A Deck



Cloth Lay-up On Mold



Core Laid On Cloth



Core Laid On Cloth



Cloth Lay-up On Core

The AEM/S Experience – Fiber Reinforcement & Core Lay-up For The Mast



Cloth Lay-up In Full-Round Mold



Panel Laminated & Mold Rotated



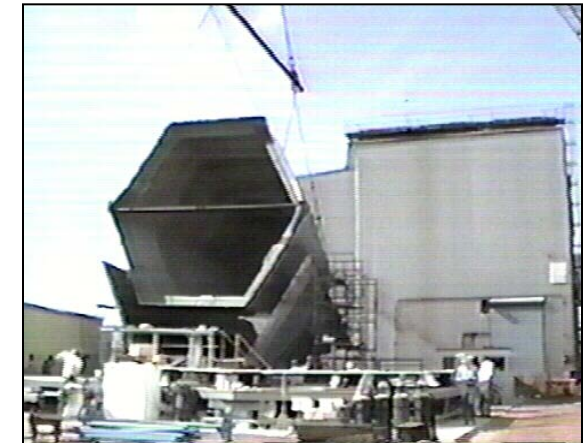
Lay-up For Sixth Side Panel



Ring Girder Installation

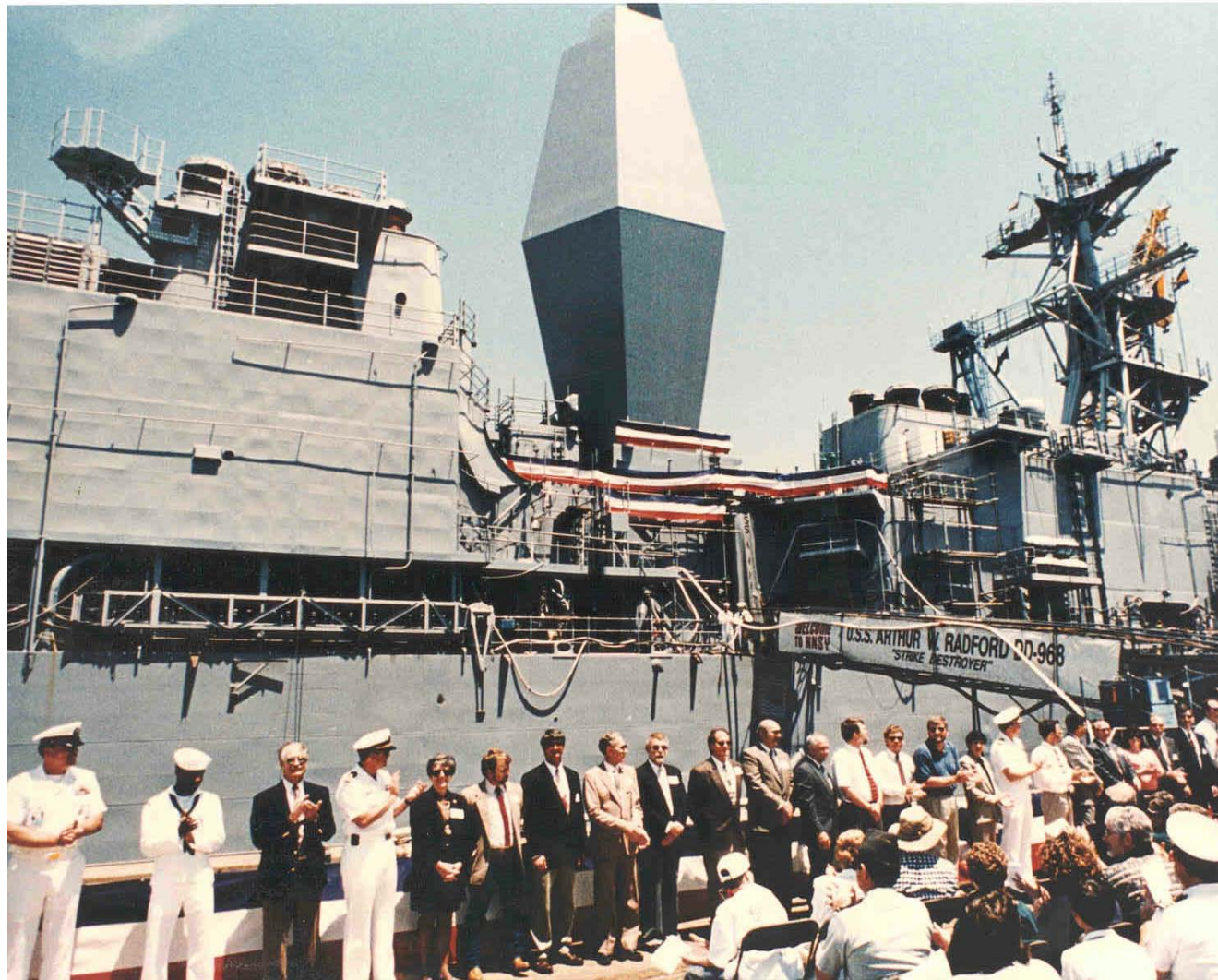


Ring Girders Laminated In-Place



Lower-Half Removed From Mold

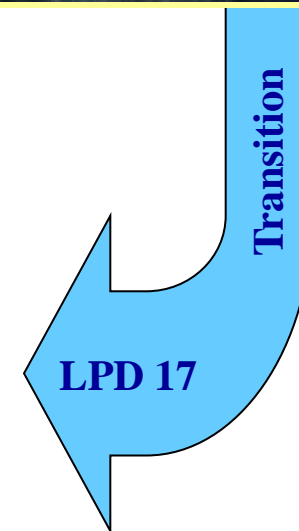
The USS Radford AEM/S Mast Stepping Ceremony



AEM/S Fleet Transition to LPD 17

- Successful ONR Funded Advanced Technology Demonstration (ATD) project
- Rapid Transition from R&D to New Construction
- Example of what can be Accomplished when the Navy and Private Industry Work Together

Advanced Composite Mast on USS Radford



Integrated Topside Goal

