


Technology Needs in Shipbuilding

September 26, 2007

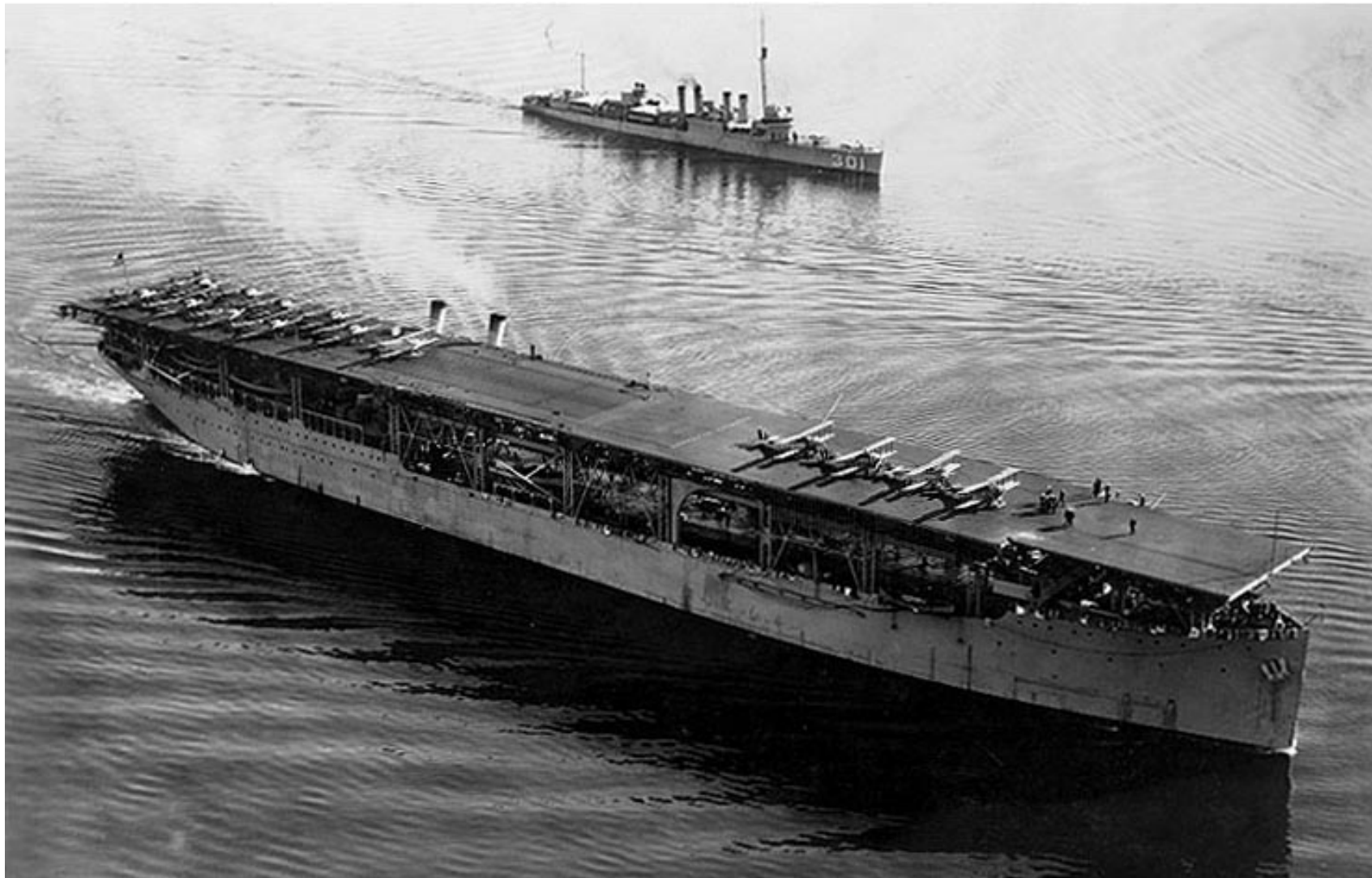
David P. Rice

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New materials and related manufacturing technologies have had an important role in the evolution of naval ships.

From the USS Langley...



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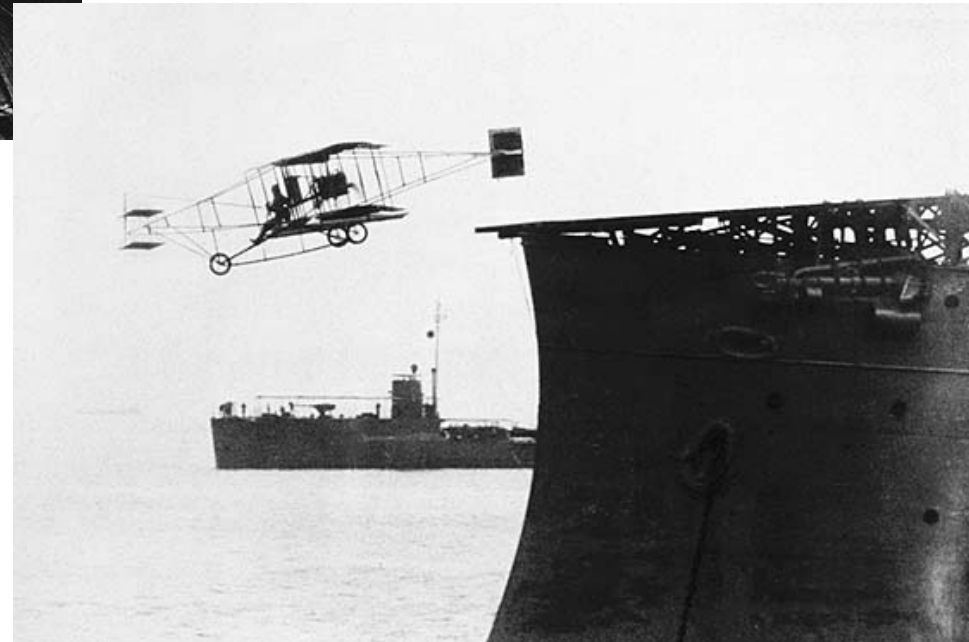
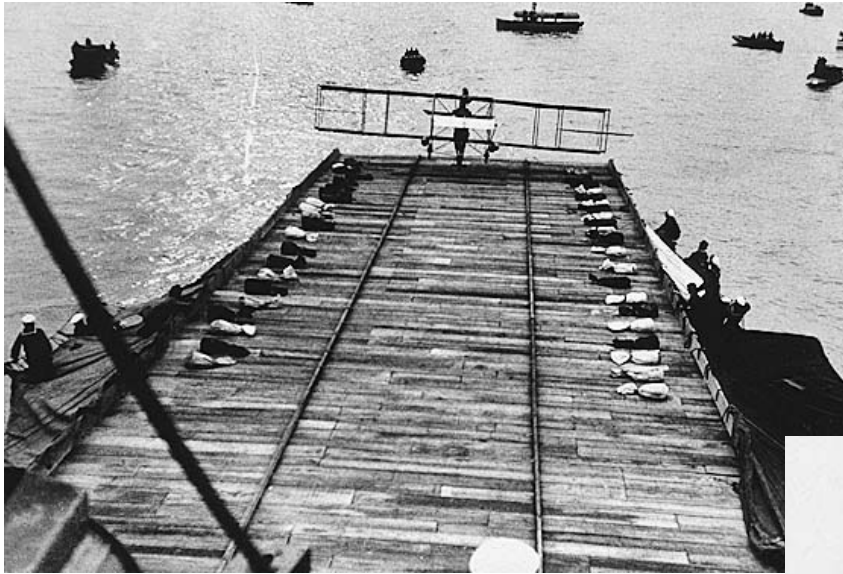
...To USS Ronald Reagan



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From This....



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...To this!



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Improvements to the Same Ship!



USS Midway CV-41



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Not limited to only ships!



From the Holland...




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...to USS Virginia



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Budget constraints and customer's requirements will drive the need for new materials and related manufacturing technologies for future ships.

How will we meet the requirements for this...



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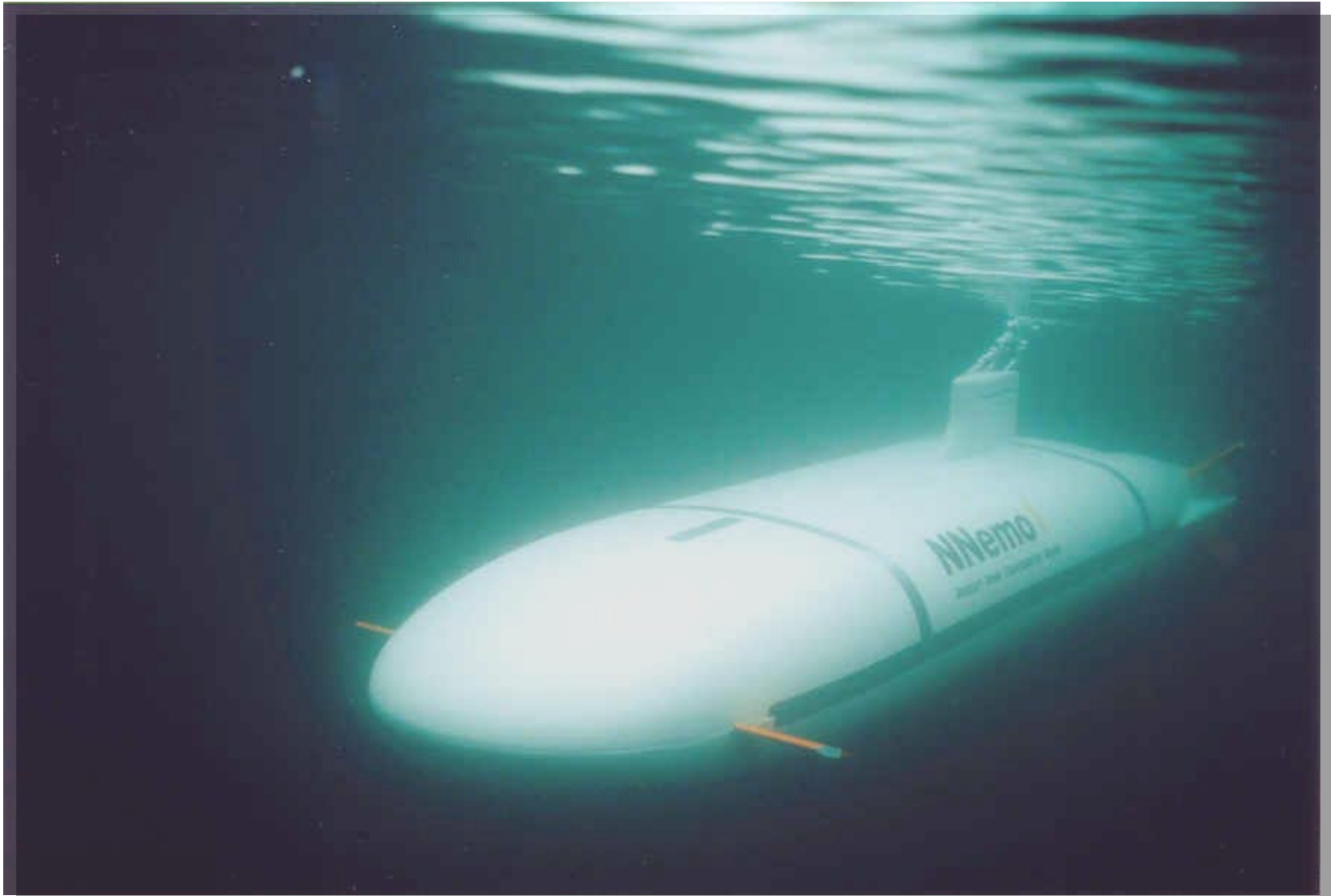
Or reduce the cost of CVN 79 by \$500M?



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How will we meet the requirements for this? How will we be able to afford this?



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Take a lesson from the car manufacturers



1957 Ford

2008 Corvette



Lessons Learned

- **Improved performance**
- **More fuel efficient**
- **Safer**
- **Low or no Maintenance**
- **New Fabrication Methods**
- **Improved Coatings**
- **Improved Metals**
- **Increased use of Polymers**
- **Lightweight Materials**

Application to Shipbuilding

- **Use improved metals**
 - higher strength metals
 - lightweight materials (Aluminums, Ti)
 - corrosion resistant
- **Use more “blast” resistant materials**
- **Use more composites**
- **Use improved coatings**
- **Use improved fabrication technology**

Improved Metals

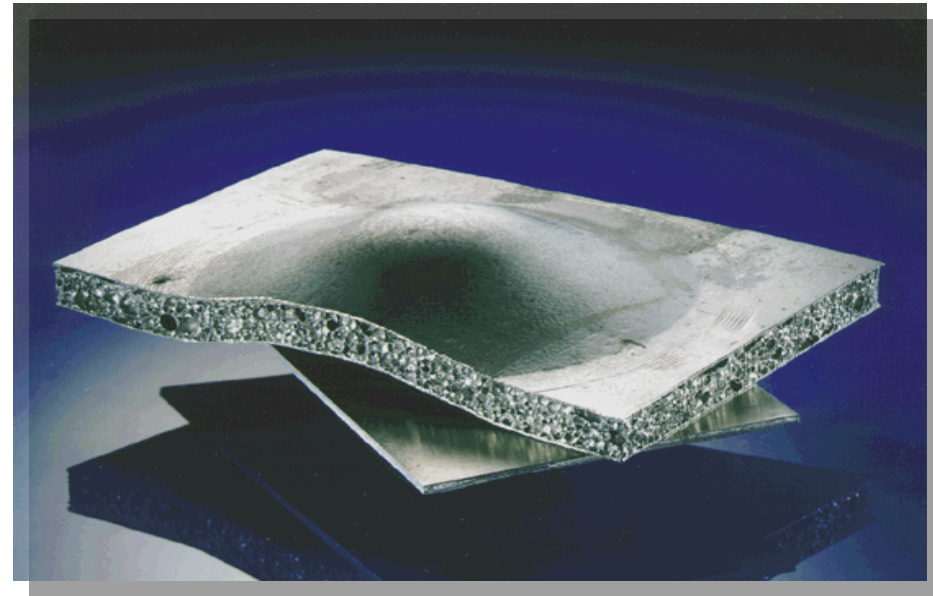
- Higher strength metals
- Less corrosive
- Lightweight
- High temperature tolerant
- Weldable
- Cost effective



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Manufactured Materials

- **Sandwich Materials**
 - All Metal
 - Composites
 - Polymer core
- **Ceramics**
- **Tougher, Higher Strength Metals**



Composites

- Ease of Fabrication
- UV Resistance
- Repairability



- Low Maintenance
- Fire & High Temperature Tolerance
- Low Cost

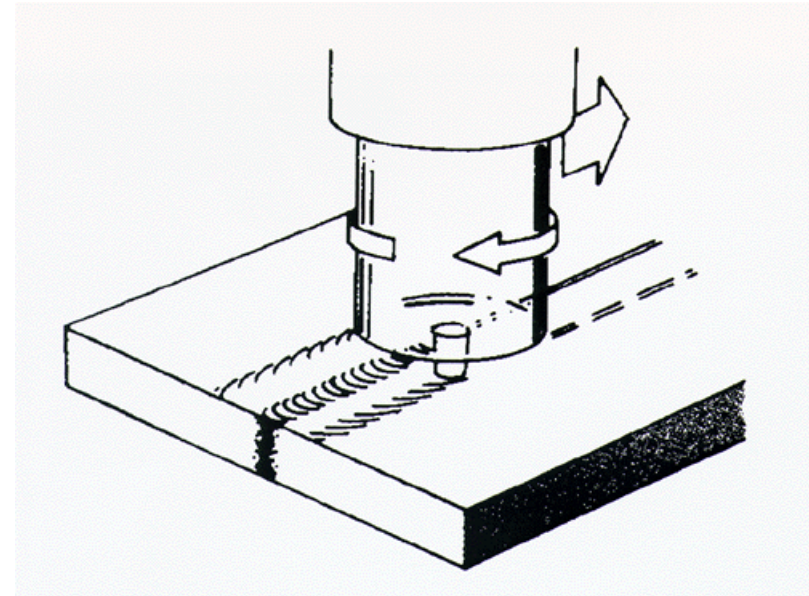
Coatings

- Life of the ship coating
- Improved Tank coatings
- High Temperature Tolerance
- Insulations
- Ease of Application
- Improved Deck Coverings
- Improved Nonskid



Fabrication/Joining Technology

- More use of automation
- Improved Welding Processes & Consumables
- Laser Cutting
- Laser/Hybrid Welding
- Friction Stir Welding
- Adhesives
- Improved Fasteners
- Improved Nondestructive Testing





Customer's requirements and budget constraint will require the use of new materials and fabrication methods in future shipbuilding. R & D will need to continue in these areas to facilitate these needed technologies. Programs like NSRP, ManTech and SBIR are helping lead the way.