Shared Technology Transfer Project

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NAVSEA CARDEROCK

This presentation does not contain any proprietary or confidential information

ED3

Overview

Timeline

- Feb. 2004-Sept. 30, 2006
- 30% complete

Budget

- Total project funding
  - DOE: $981,077
  - Contractor: $0
- Funding received in FY04: 100%
- Funding FY05: 0%

Barriers

- Not applicable

Partners

- Navsea-Caderock & HARC

Objectives

- Catalogue 600 Navy unclassified patents into digestible technology clusters for the end user, industries.
- Certain of these patents which pertain to hydrogen issues will be highlighted as they are uncovered.

(See Notes page for further information)

Approach

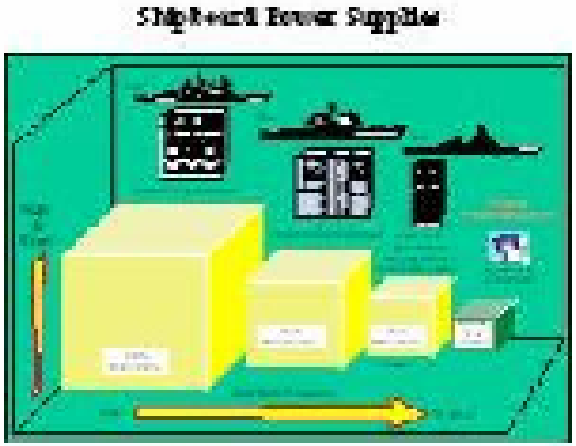
- Conversion of patents into digestible technology clusters
  - Provide
    - a technology readiness level TRL
    - an example of the type of activities that would characterize each TRL and the cost to achieve

Catalog Categories

- Acoustics
- Composite Materials
- Deep Ocean Mooring/Lifting Lines
- Electrical Wet Connectors for Cables and Fiber
- Hydrogen - General
- Mechanical Seals & Valves 
- Metallurgy and Metal Joining Methods
- Risked-Based Systems Engineering
- Structural Fatigue-Induced Cracking
- Technology Assessment Techniques/Processes
- Vortex Induced Vibration
- Wireless Communications

Mechanical Seals & Valves

Below is a list of all technologies related to this category.



Advanced Ceramics

Advanced Ceramics

- Related Categories:Composite Materials; Hydrogen - General; Mechanical Seals & ValvesApplications: Navy expertise has solutions for: High temperature structures, High temperature insulation, Wear/abrasion, Chemically aggressive environments, Electrically conductive/electrically insulating requirements, High voltage capacitors
- TRL:8 

Twisted Rudder & Conventional Rudder

Rudder Erosion due to Cavitation

Severe rudder cavitation
in a LCC test

Cavitation erosion of a
full-scale rudder

Model Tests in the Navy's Large Cavitation Channel (LCC)

Rudder Cavitation

No Rudder Cavitation

At the same test condition

Benefits of Twisted Rudders

- Suppress rudder cavitation
- Enhance turning & maneuvering capabilities
- Improve passenger and crew habitats by reducing ship hull vibration and cavitation noise
- Save fuel cost by reducing rudder cavity drag

- Underwater Hull Husbandry Robot-Hull husbandry operations can now be performed robotically.

TRL 8

- **Technology has been proven to work in its final form and under expected conditions.** In almost all cases, this TRL represents the end of true system development. By definition, all technologies being applied in actual systems go through TRL 8. In almost all cases, this level is the end of true 'system development' for most technology elements.

TRL1

- **This is the lowest "level" of technology maturation.** At this level, scientific research begins to be translated into applied research and development.

  Example: Studies of basic properties of materials (e.g., tensile strength as a function of temperature for a new fiber).

  Cost to Achieve: Very Low "Unique" Cost (investment cost is borne by scientific research programs)

TRL 2

- **Invention begins.** Once basic physical principles are observed, then at the next level of maturation, practical applications of those characteristics can be "invented" or identified.

  Example: Following the observation of high critical temperature (Htc) superconductivity, potential applications of the new material for thin film devices (e.g., SIS mixers) and in instrument systems (e.g., telescope sensors) can be defined. At this level, the application is still speculative: there is not experimental proof or detailed analysis to support the conjecture.

  Cost to Achieve: Very Low "Unique" Cost (investment cost is borne by scientific research programs)

TRL 9 (Slide 1)

- **Actual application of the technology in its final form and under mission conditions, such as those encountered in operational test and evaluation.** By definition, all technologies being applied in actual systems go through TRL 9. In almost all cases, the end of last ‘bug fixing’ aspects of true ‘system development’. For example, small fixes/changes to address problems found following launch (through ‘600 hours’ or some related date). This might include integration of new technology into an existing system (such operating a new artificial intelligence tool into operational mission control). This TRL does not include planned product improvement of ongoing or reusable systems

TRL 9 (Slide 2)

- **Example:** Using the system under operational mission conditions. New turbine for an existing subsea power generator would not start at TRL 9: such ‘technology’ upgrades would start over at the appropriate level in the TRL system.

  Cost to Achieve: Mission Specific; less than cost of TRL 8 (e.g., cost of deployment plus 600 hours of mission operations)

Technical Accomplishments/ Progress/Results

- Educational……transfer of technology

<not applicable>

(See Notes page for further information)

Accomplishments/Progress/ Results Slides

- Formed alliance with South Central Industrial Association (SCIA)

Accomplishments/Progress/ Results Slides (cont.)

- Interviewed with Radio station host Don Grady @ KTIB on the entire Louisiana Network 2:40 pm 4/27/05
- Interviewed with Houma TV Channel 10 @1 pm 4/19/05
- Initial inquiry following 4/19 SCIA

Future Work

- Continue disseminating technology clusters through
  - Web site updates
  - Email to industry association members
  - TV, radio, other industry associations and trade groups
- Industry member will tour HARC facility and
- our staff will coach company through process of securing NAVSEA licensing

(See Notes page for further information)

Publications and Presentations

Established a web page with gate ways from

- HARC (http://www.sharedtechtransfer.org/sttp/)
- Nicholls State (www.nicholls.edu/sttp)
- SCIA (http://www.sciaonline.net/)

Hydrogen Safety

Our approach to deal with this hazard is:

<not applicable for this phase>