Commercializing Ship Research via the “Decisive Demonstrator”

Presented by Steven Loui, Navatek Ltd.
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1970: Ferro-cement sport fisher
2010: Bladerunner-BR 51

Innovation Enablers

Advanced Technology
- 22 U.S. and Foreign patents
- International Reputation Within Field

Rapid Prototyping
- Shipyard to Build Demonstrators
- Ideal Test Conditions

At-Sea Validation

Strategic Partnerships
- SRI International
- General Dynamics
- Lockheed Martin
- Northrop Grumman
- QinetiQ
- SAIC
- Oceaneering

Superior Design and Optimization Tools
The Decisive Demonstrator

Def. “Settling or ending something such as a debate, controversy, or contest.

Hawaii is Ideal Test Grounds: varied sea conditions to validate performance (deep, open ocean, coastal, sheltered bays and lagoons)

Effective but Expensive vs. Industry Benchmark

- Company internal funds
- Investor funds
- Prototyping contracts
X-Craft

- Concept Validation

**Demonstrator Purpose**

Resolve science and engineering first principles

*Navatek Midfoil lifting body ship*
Y-Craft

• Technology Validation

SWATH Navatek I

Demonstrator Purpose

• Tech Transferability
• Predictability
• Acceptability
• Maintainability
• Functionality
• Style-ability

Navatek II

Kilo Moana (UH)

Damen SWATH Ferry (Holland)
Justifying the Risk/Cost of Demonstrator

EASY:
Navatek BR-51

Performance gap well-identified

BR-51 technology offers clearly superior performance

Large market size, lack of competition

Intellectual property (IP) protection

Navatek Bladerunner 51
Air Entrapment Monohull

Higher Fineness Ratio = Higher Speed Efficiency, Better Seakeeping

(Fineness Ratio: Length divided by running beam measured at hull chine)

Navatek Bladerunner 51
Length 51’ divided by running beam 6.5’ = 7.84

VS.

Fabio Buzzi 55 SC
Deep-V Hull

Length 54’ divided by running beam 9’ = 6.0

Wider Beam at Rest = Higher Weight Carrying, Better Static Stability

Wider Beam Overall = More Usable Deck Space

14.5’ Beam X 51’ Length = 740 sf.

VS.

14.5’ static waterline
6.5’ running beam

9’ static waterline/running beam

9’ Beam X 54’ Length = 486 sf.

EASY:
Navatek BR-51
Justifying the Risk/Cost of Demonstrator

HARD: HYSWAC/Sea Flyer

Alternative ways to verify the S&T issues?
• Computer validation?
• Small-scale testing?

Technology synergies? e.g. ability to test advanced polymer drag reduction

U.S. Navy Sea Flyer Large-Scale Lifting Body Demonstrator
Some Lessons Learned #1

“Communicate your value statement clearly and concisely”

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<tr>
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<th>BLB-65</th>
<th>BLB-200</th>
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<tr>
<td>Length (m)</td>
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<td>WL (m)</td>
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<td>Speed (knots)</td>
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<td>wave period (sec)</td>
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<td>wave vel. (m/sec)</td>
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<td>Encounter period (sec)</td>
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Vertical Acceleration

~.17 grms
Some Lessons Learned #2

Initial technology transition overseas often easier/effective/appropriate

BR-51 TIMELINE

2005: Prototype sets Round-Britain Record, international commercialization started

2006-2009: U.S. patent lawsuit disrupts marketing

2010: Patent lawsuit won; all appeals against decision are dismissed

2010: Prototype retrofitted with Navatek patented ride enhancement system (ARES) for Singapore demonstrations

Bladerunner-51 Sets Round-Britain Speed Record: 1,691 miles in 27 hours and ten minutes (62 mph average), beats prior record by almost 4 hours
Some Lessons Learned #3

Use Technology Insertion to extend useful life/value of demonstrator

Navatek ETM ® 11m demonstrator → U.S. Navy 11m ASW USV

Add ALB Technology

Navy SBIR
“Three ships is a lot of ships. Why can’t you prove the world is round with one ship?”

Innovate, Persevere...and Don’t Run Out of Funding!