Sea Basing

Presentation to
The Honorable John J. Young, Jr.
ASN (RD&A)
5 August 2004
Outline

- Sea Base Operational Scenario
- Terms of Reference
- Takeaways
- Study Approach
- Observations
- Critical Obstacles
- Solution Concepts
- Conclusions and Recommendations
Sea Base Operational Scenario

The “10 – 30 – 30” Strategic Guidance

“To have Options, Maneuverability and Sanctuary”
Study Terms of Reference

To close a Marine Expeditionary Brigade …
CONUS → Sea Base → Shore Objective

1) Identify and analyze:
   • High-speed / high-capacity connectors
     – CONUS / Advance Base to Sea Base
     – Sea Base to shore objectives
   • Connector-to-platform interfaces for operations through Sea State 4

2) Recommend:
   • Near-term and long-term technology developments to achieve desired capability
Study Panel and Sponsor

Dr. George Webber—Chair
Prof. William Weldon—Vice-Chair
LtCol Kent Hansen, USMC—Executive Secretary

MajGen (Ret.) Paul Fratarangelo, USMC
Mr. Peter Gale
VADM (Ret.) William Hancock, USN
VADM (Ret.) Douglas Katz, USN
VADM (Ret.) E.R. Kohn, USN
Mr. Norman Polmar
Dr. William Neal, MD
Mr. Robert Ness
RADM (Ret.) John Tozzi, USCG
Dr. Patrick Winston

Study Sponsor: OPNAV N75 MajGen J.R. Battaglini
“What are the critical impacts on MPF(F) design?”
Takeaways

• End-to-end material transport—critical core function
  – High throughput and reliability
  – Standardized containers

• High-speed surface connector—critical enabler
  – HSC/LCAC synergies
  – Extended standoff
  – Reduced fuel consumption
  – Multi-use

• MPF(F)—new connector interface functions
  – High speed load/unload
  – Automated warehousing

• Implement an MPF(F) Spiral 0 program
  – Modified S-class container ship
  – System integration and at-sea demonstration
  – Current assets plus new technology

End-to-end systems engineering required
Study Approach

- Draw from stakeholders and guidance
- Frame the connector problem
  - Critical functions
  - Modeling and simulation (MCCDC)
  - Obstacles
- Review technology and practice
- Develop solutions

Assumptions:  
Sea Shield provides force protection
FORCEnet provides communications
Briefings and Visits

- OPNAV: N75, N42
- Marine Corps: HQMC, MCCDC
- ONR: CNR, EXLOG FNC
- Fleet Visits: FFC, Ship tours
- System Commands: PMS 325, NAVSEA 05D, NAVAIR
- Other Government: CNA, Army, DARPA
- Industry: Bell/Textron, Sikorsky, Maersk, Lockheed, UMOE, FEDEX, Navatek
What Critical Function Drives Connector Requirements?

CONUS → Advance Base → Sea Base ← Objective

End-to-end, high throughput material transport and handling
Observations

• CONOPS drives solutions
  – 100 nm standoff
  – 8 hr insertion
  – Sea State 4

• Modeling and simulation identify sensitivities
  – Air insertion: limited to 135 -150 nm
  – Surface insertion: impossible in 8 hrs, limited to 50 nm
  – Airlift sustainment: limited to 135-150 nm

• Connector loading problematic (ILP)
• Packaging not standardized
• Medical requirements not addressed
Critical Obstacles

- Air connectors
  - Operational Range
  - Heavy lift to/from Sea Base
- Surface connectors
  - Sea State 4 transfers
  - LCAC fuel consumption
  - Unimproved shore
- MPF(F) functions
  - Fast load/unload
  - Material breakout
  - Automated warehousing
Overcoming Air Connector Obstacles

- Long-range heavy lift to/from Sea Base unavailable
  - CH-53X will help—deployment a problem
  - Range/Speed enhancements are most important
  - Other options are long-term - i.e. Joint Heavy Lift
Overcoming Surface Connector Obstacles

• Transfer rate in Sea State 4
  – Eliminate relative motion
  – Load big—unload small
  – LCAC shuttle from MPF(F) to HSC

• LCAC fuel consumption
  – Use HSC as LCAC truck

• Unimproved shore
  – Deliver materiel over-the-beach
  – Use LCAC as pallet truck
Operational Concept

Multi-mode operation common HSC
High-rate LCAC Loading Enabler #1

Transverse Tunnel (Drywell)  Stern Elevator

Intermediate Transfer Platform
High Speed Connector
Enabler #2

Threshold capabilities:

• > 30 kts, 2000 nm loaded
• 3 loaded LCACs + additional cargo/troops
• Rapid LCAC launch and recovery
• Three loading modes
  – LCAC
  – Vertical
  – RO/RO
Shipboard Automated Warehouse Enabler #3

Need time to integrate best commercial practices
Benefits of Candidate Solution

- Standoff range increased
- LCAC advantages retained
- HSC serves multiple purposes
- Rapid loading
  - LCAC on MPF(F)
  - HSC via LCACs
- Modular container breakout
  - Large for loading efficiency
  - Small for beach movement
  - No TEUs on shore

No technical breakthroughs needed
Overcoming MPF(F) Platform Obstacles

• Spiral 0 system integration and sea-trial program
  – Commercial platform
  – Joint with JFCOM and TRANSCOM

• High Rate LCAC loading in Sea State 4
  – Demonstrate promising designs

• Automated warehousing
  – Demonstrate JMIC compatibility
  – Apply best commercial technology
  – Develop and test shipboard handling system
### MPF(F) Vision Unclear

- All-purpose ship versus family of ships
- Command and control
- Manning (civilian, Navy, Marine)
- Maintenance/repair capability
- Troop accommodations
- Medical facilities
- Reconstitution requirements
  - Retrograde
  - Personnel
  - Equipment/supplies/vehicles
- Connector deployment

*Too many unknowns; not ready to build*
MPF(F) Spiral Development—New Initiatives

• Near term (12 to 18 months)
  – S-Class container ship conversion
    • LCAC transverse tunnel interface
    • Flight deck and hangar
    • Automated warehousing
  – SeaBee stern elevator/LCAC interface demo
  – Intermediate transfer platform demo

• Mid-Term (18 to 36 months)
  – Initiate MPF(F) shipbuilding program

Cost effective and timely investment
Maersk S-Class Conversion Concept

With flight deck, elevators, hangar, and transverse tunnel

- Two Flight deck elevators
- Deck spots for 15 V-22 equivalents
- Hangar stowage for 72 H-46 Equivalents
- Hangar environmentally controlled for Army SOF aircraft
Why an S-Class Conversion?

• Commercially operational
• Preliminary conversion design done for DoD
• Sea test in 12 to 18 months
• Provides deck spots and hangar
• Demonstrates critical MPF(F) enablers
  – Automated warehousing
  – Rapid LCAC loading
• Affordable

Deployable for near-term strategic missions
### Summary of Conclusions

- **Material Handling**
  - JMIC essential for throughput
  - Automated warehousing
  - LCACs as pallet-trucks/lighters

- **Connectors**
  - HSC efforts lack system focus
  - HSC and LCAC synergy possible
  - HSC needs multiple loading options
  - Fuel consumption limits operations
  - Heavy cargo is a problem
  - Airlift options limited
Summary of Conclusions (continued)

• MPF(F) Ships
  – Current interface concepts inadequate
  – Automated warehousing critical
  – Need:
    • Total Sea Base systems engineering
    • Refined CONOPs and requirements
    • Connector interface system
    • Logistics C2 system
    • At-sea demonstrations
Recommendations

• Mandate standardized JMIC container program
• Develop HSC prototype to exploit synergies with LCAC
• Pursue S-class conversion as MPF(F) Spiral 0 capability
• Conduct MPF(F) defining demonstrations
  – Automated material handling system
  – Transverse LCAC loading tunnel
  – SeaBee-type stern elevator LCAC loading
  – FLO/FLO LCAC loading/cargo transfer
• Maintain CH-53X funding
• Support the Joint Heavy Lift Task Force
Recommendations (continued)

• S&T Investment
  – **Pursue aggressive EXLOG FNC Program**
  – **Develop innovative HSC hull and propulsion technology**
  – **Invest in advanced air-cushion technology**
  – **Focus ONR Innovative Naval Prototyping on MPF(F)/HSC Spiral 0 initiative**
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**Takeaways**

- End-to-end material transport—critical core function
- High speed surface connector—critical enabler
- MPF(F) facilitating functions—critical demos
- MPF(F) Spiral 0 program