NAVAL RESEARCH ADVISORY COMMITTEE

Sea Basing

Presentation to

The Honorable John J. Young, Jr.

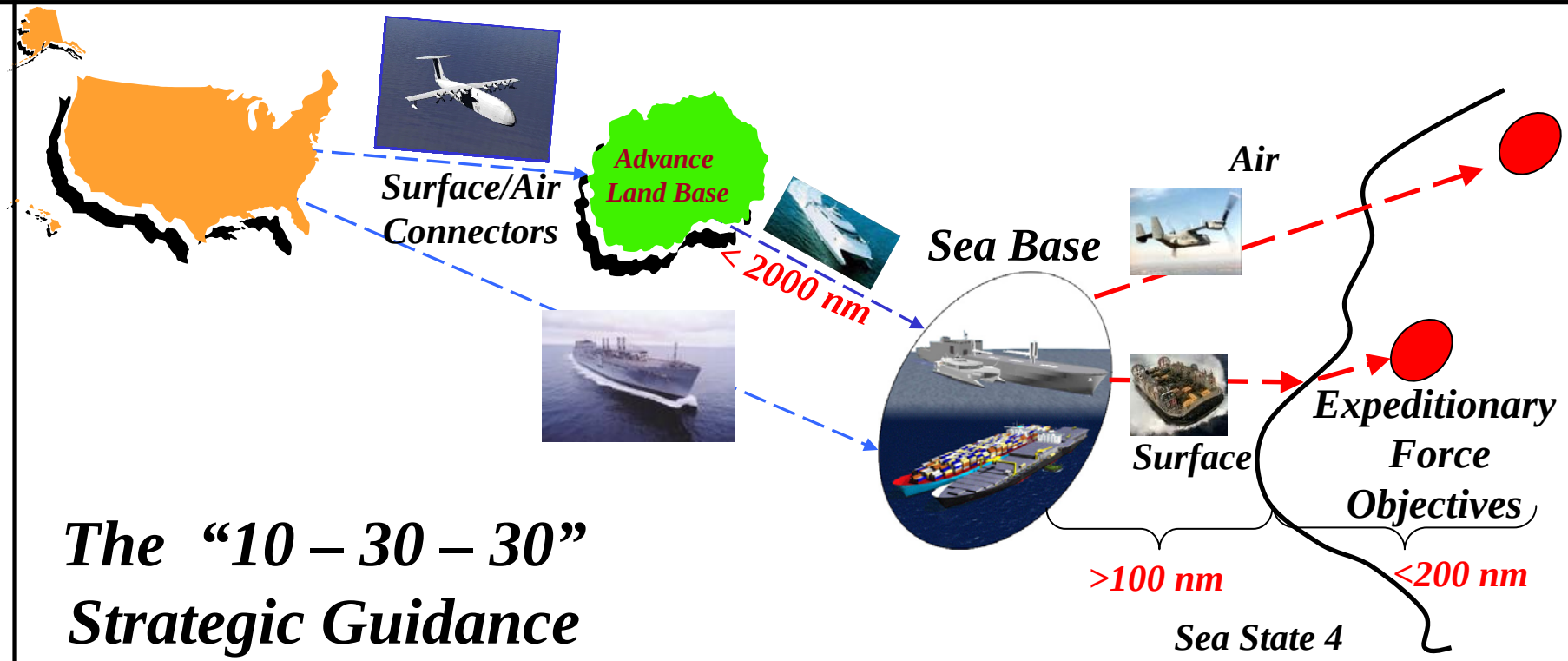
ASN (RD&A)

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

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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

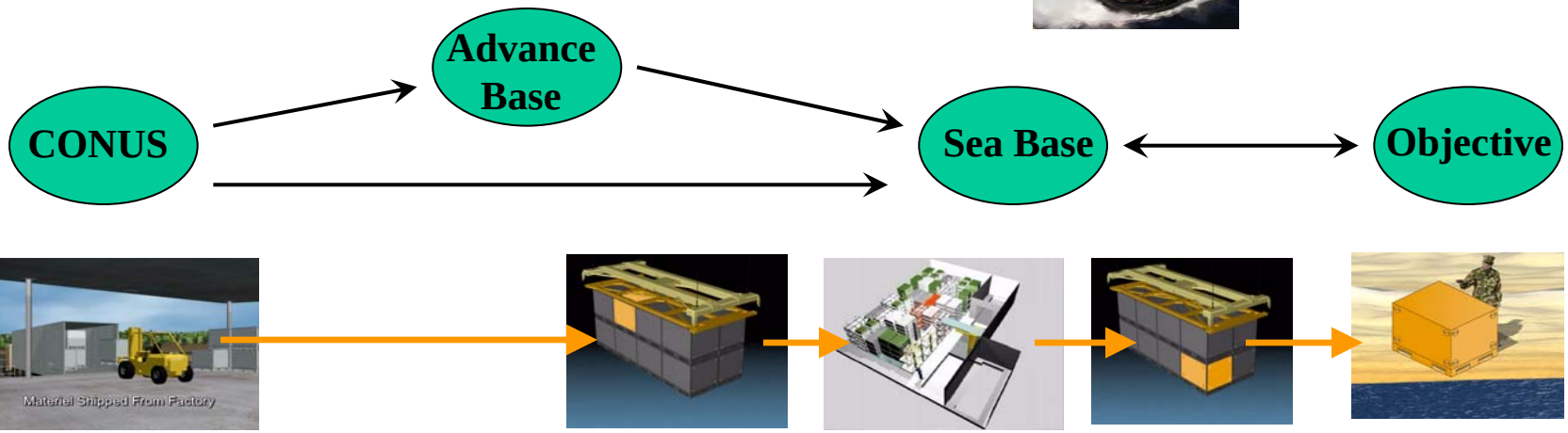
Assumptions: Sea Shield provides force protection
FORCEnet provides communications

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?





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

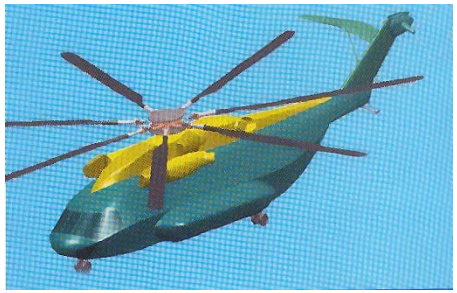
Observations

- 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

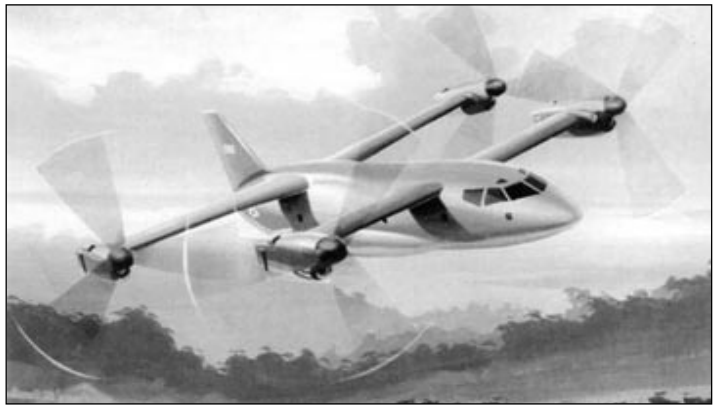
Critical Obstacles

- 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



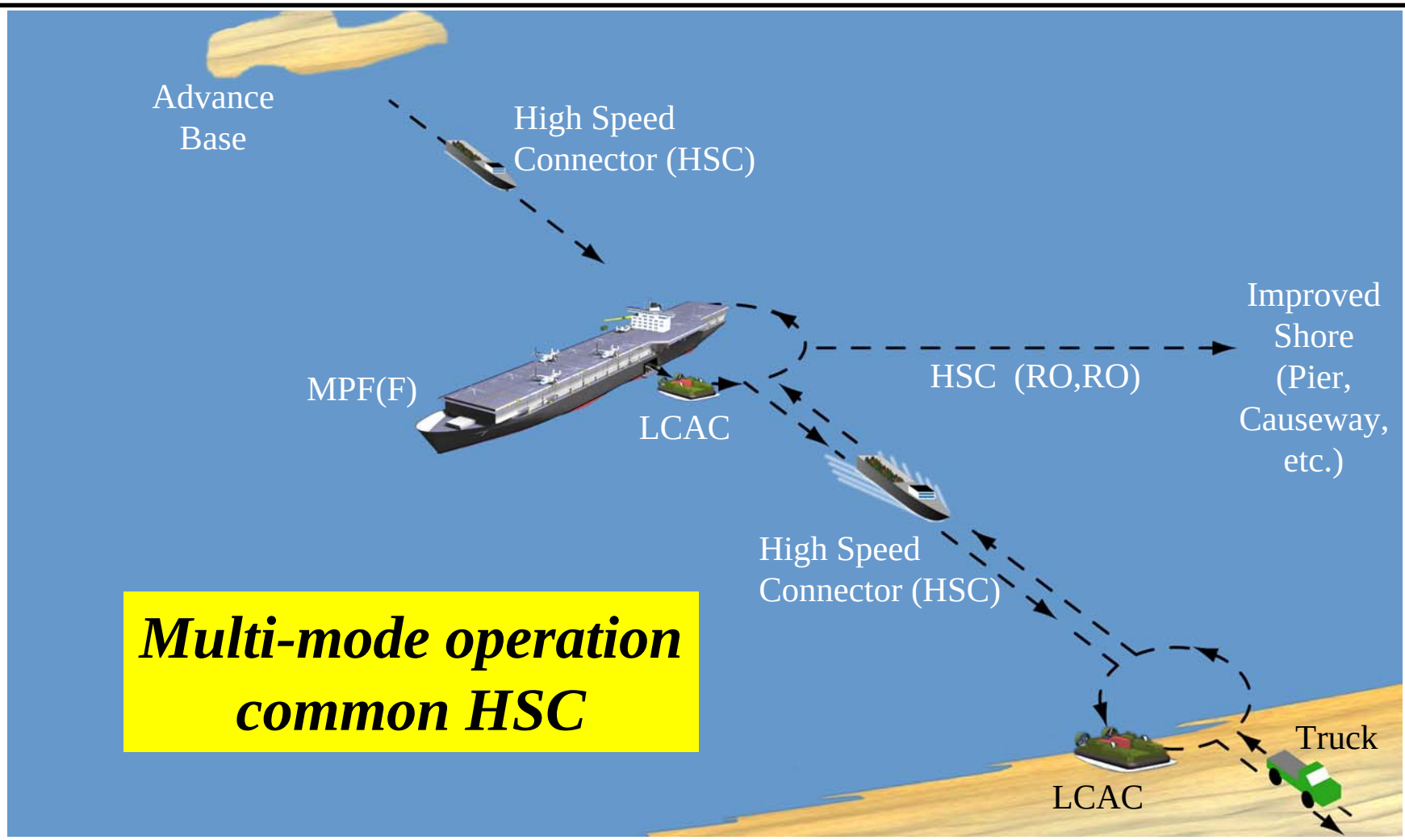
- Long-range heavy lift to/from Sea Base unavailable
  - *– CH-53X will help—deployment a problem*
  - *– Range/Speed enhancements are most important*
  - *– Other options are long-term - -i.e. Joint Heavy Lift*



Overcoming Surface Connector Obstacles

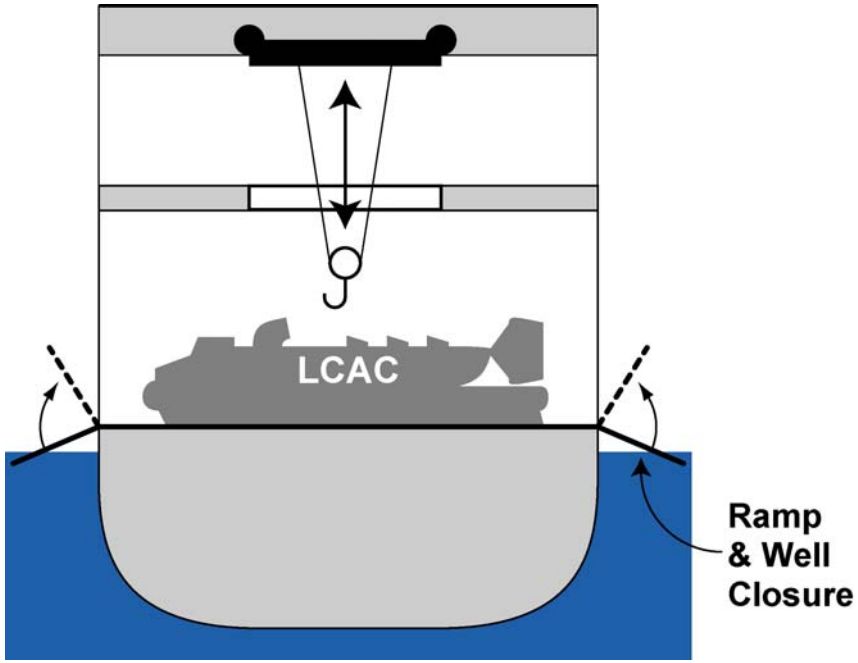
- Transfer rate in Sea State 4
  - *Eliminate relative motion*
  - *Load big—unload small*
  - *LCAC shuttle from MPF(F) to HSC*
- LCAC fuel consumption
  - *Use HSC as LCAC truck*
- Unimproved shore
  - *Deliver materiel over-the-beach*
  - *Use LCAC as pallet truck*

Operational Concept

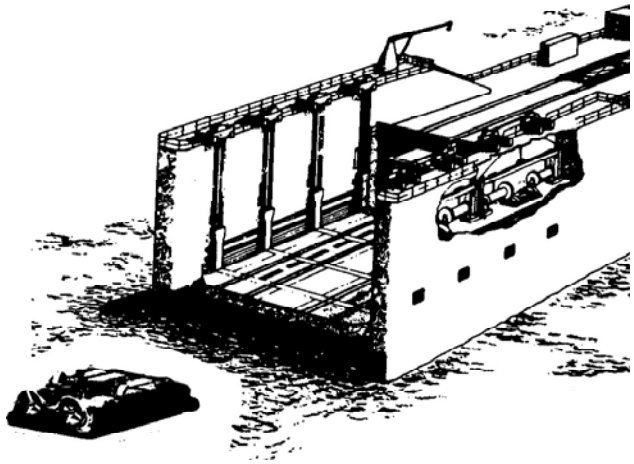


High-rate LCAC Loading Enabler #1

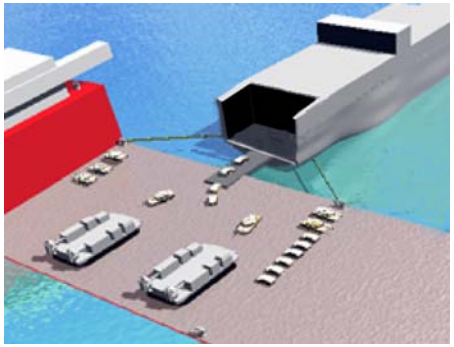
Transverse Tunnel (Drywell)



Stern Elevator



Intermediate Transfer Platform



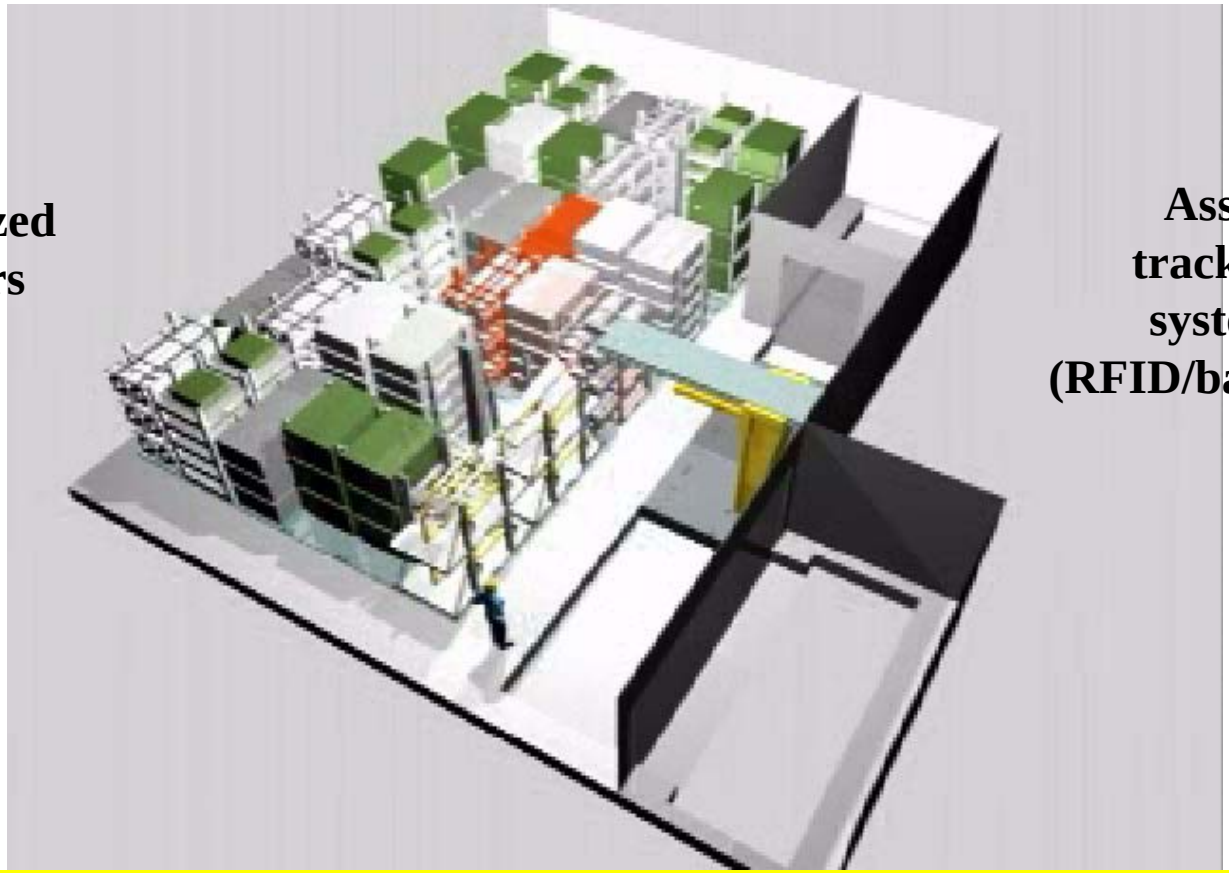
High Speed Connector Enabler #2

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

Standardized containers



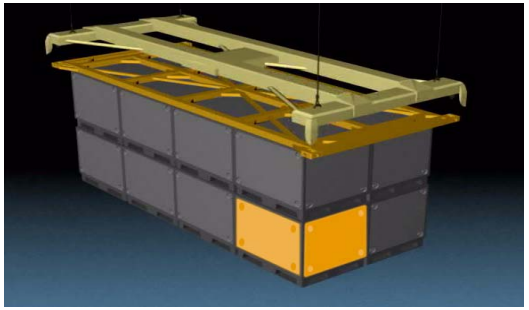
Asset tracking system (RFID/bar code)

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*

LCAC offers over-the-beach capability



16 JMIC containers equal 1 TEU

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

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**