

NAVAL RESEARCH ADVISORY COMMITTEE

Sea Basing

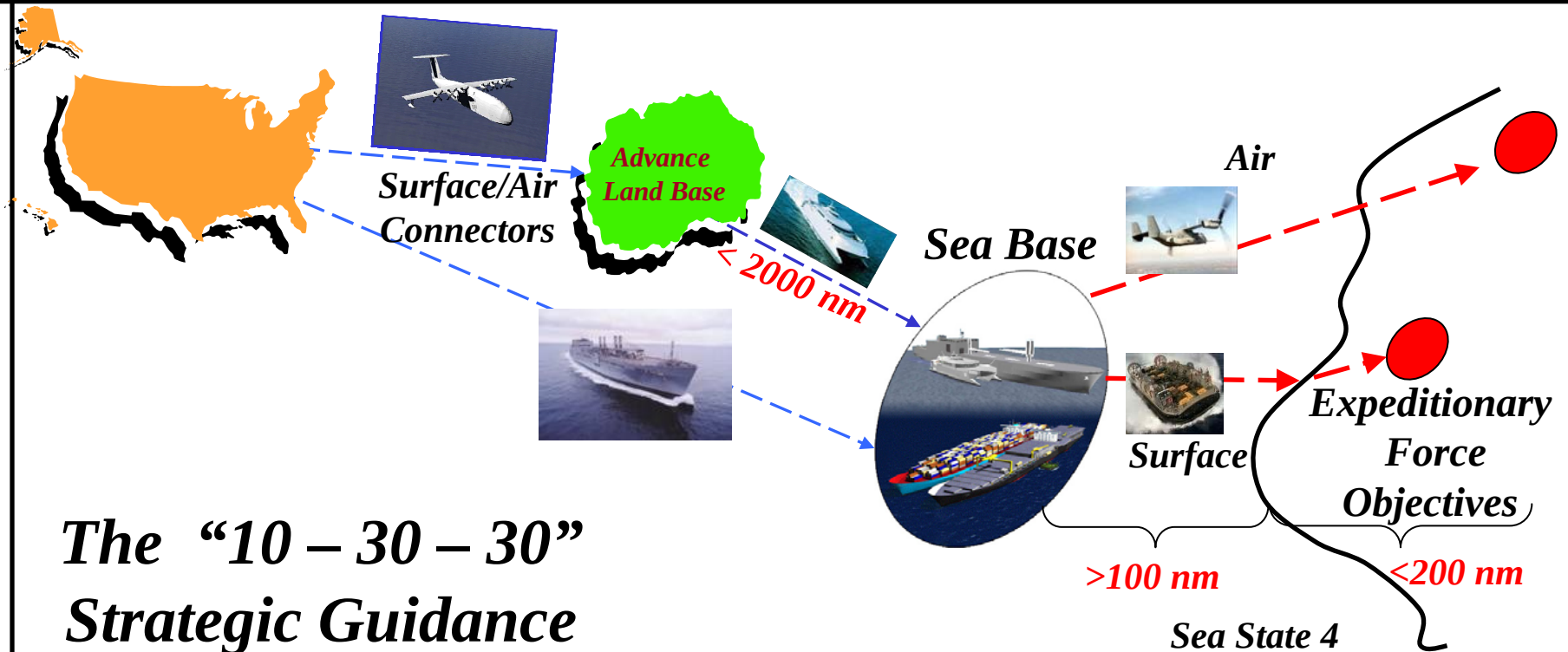
Presentation to
The Honorable John J. Young, Jr.
ASN (RD&A)
5 August 2004

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE 05 AUG 2004		2. REPORT TYPE N/A		3. DATES COVERED -	
4. TITLE AND SUBTITLE Sea Basing				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Research Advisory Committee 800 North Quincy Street Arlington, VA 22217-5660				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release, distribution unlimited					
13. SUPPLEMENTARY NOTES The original document contains color images.					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT SAR	18. NUMBER OF PAGES 28	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

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 capability₄



Study Panel and Sponsor

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“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

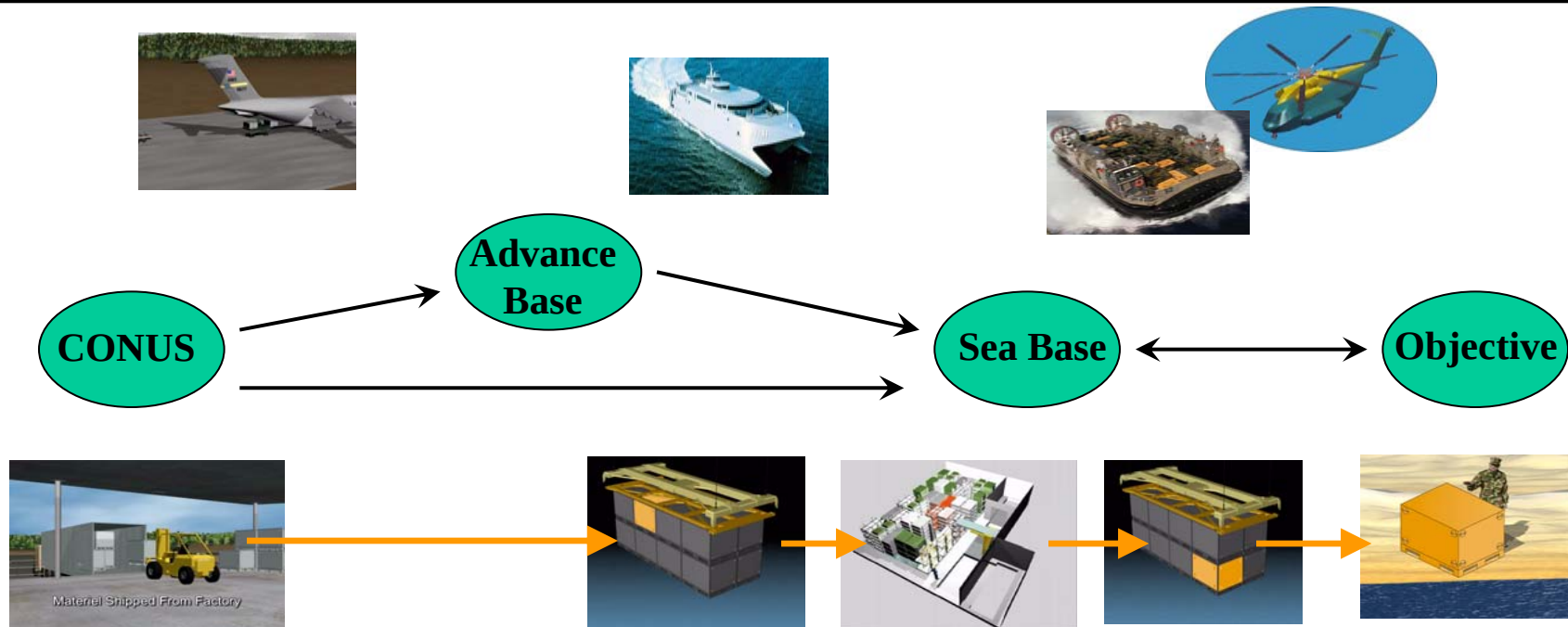
***Assumptions: Sea Shield provides force protection
FORCEnet provides communications***

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

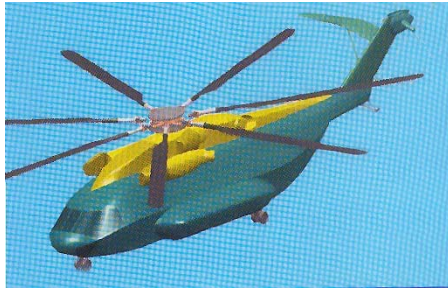
- CONOPS drives solutions
 - *100 nm standoff*
 - *8 hr insertion*
 - *Sea State 4*
- Modeling and simulation identify sensitivities
 - *Air insertion: limited to 135 -150 nm*
 - *Surface insertion: impossible in 8 hrs, limited to 50 nm*
 - *Airlift sustainment: limited to 135-150 nm*
- Connector loading problematic (ILP)
- Packaging not standardized
- Medical requirements not addressed

Critical Obstacles

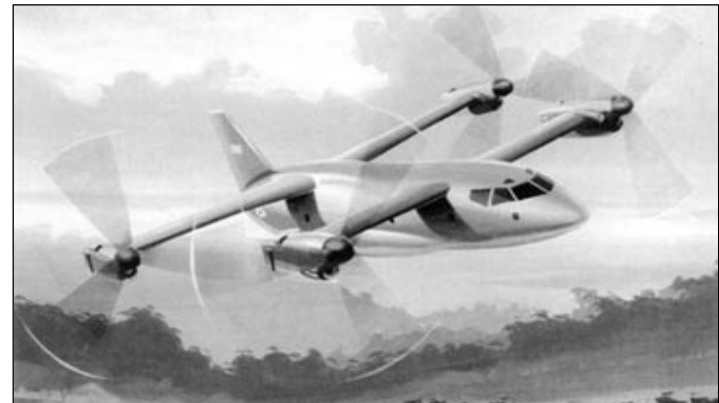
- Air connectors
 - *Operational Range*
 - *Heavy lift to/from Sea Base*
- Surface connectors
 - *Sea State 4 transfers*
 - *LCAC fuel consumption*
 - *Unimproved shore*
- MPF(F) functions
 - *Fast load/unload*
 - *Material breakout*
 - *Automated warehousing*



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*

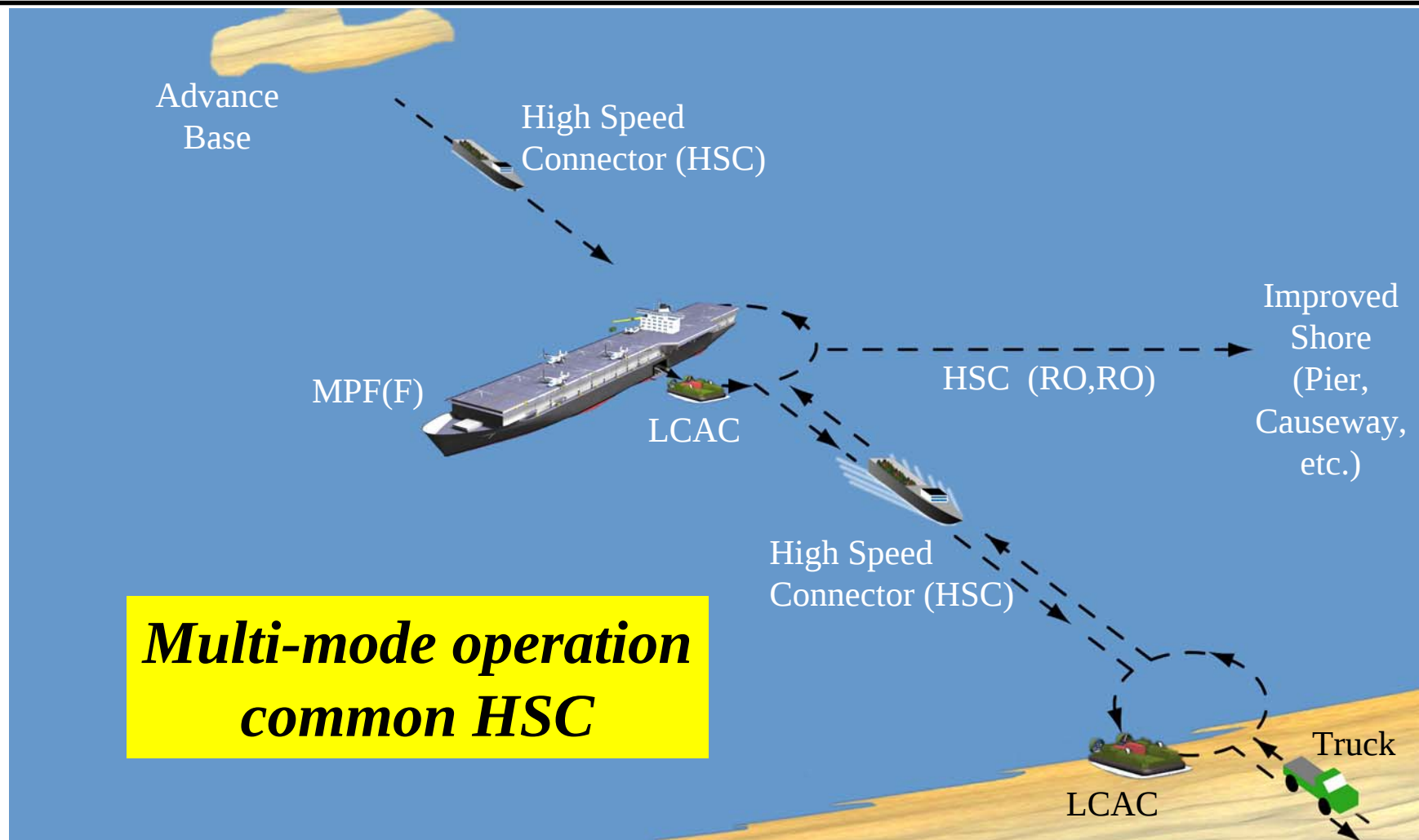




Overcoming Surface Connector Obstacles

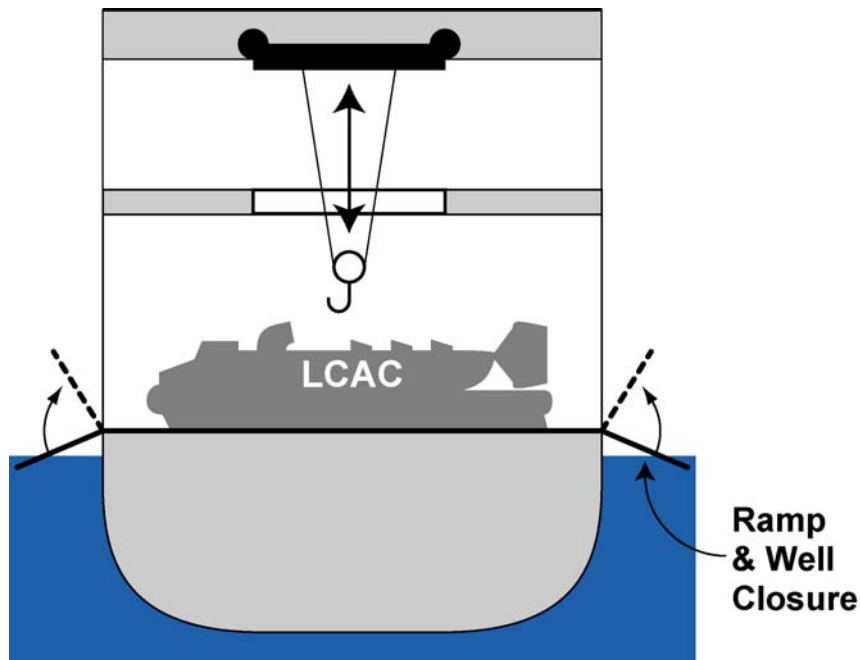
- Transfer rate in Sea State 4
 - *Eliminate relative motion*
 - *Load big—unload small*
 - *LCAC shuttle from MPF(F) to HSC*
- LCAC fuel consumption
 - *Use HSC as LCAC truck*
- Unimproved shore
 - *Deliver materiel over-the-beach*
 - *Use LCAC as pallet truck*

Operational Concept

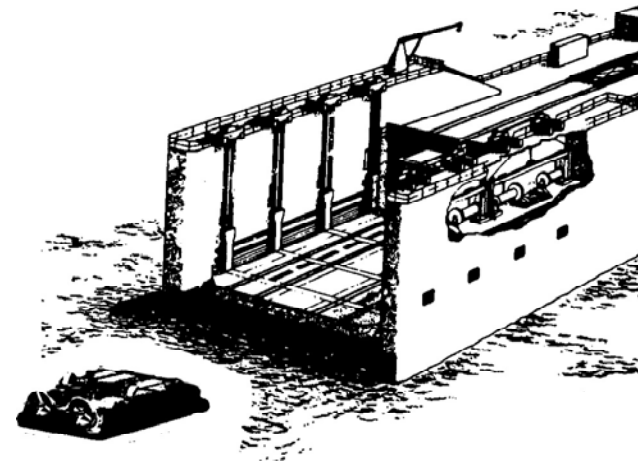


High-rate LCAC Loading Enabler #1

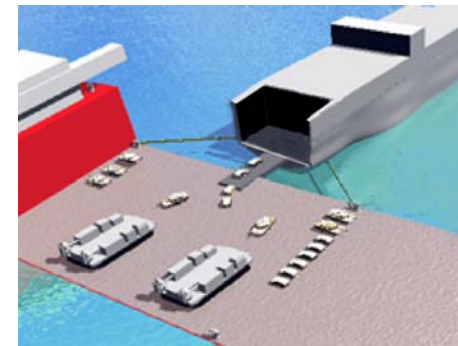
Transverse Tunnel (Drywell)



Stern Elevator



Intermediate
Transfer Platform





High Speed Connector Enabler #2

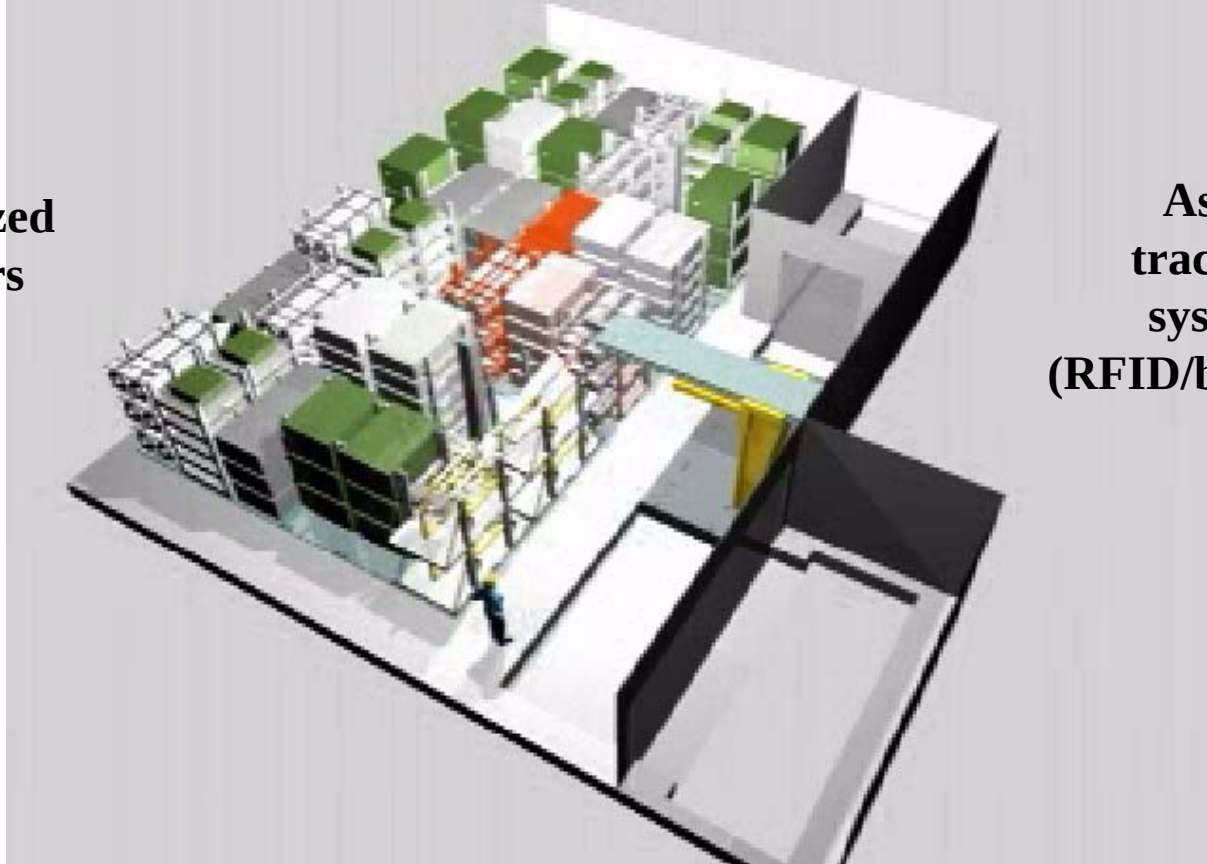
Threshold capabilities:

- *> 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**



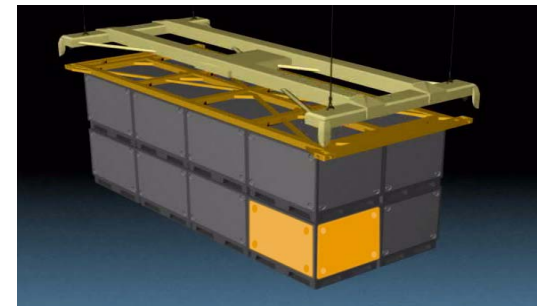
**Asset
tracking
system
(RFID/bar code)**

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

*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*

Sea Basing

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