Introduction, Operating Concept and Requirements

CDR John Lemmon, USN
Today’s Timeline

• 0830-1000: Background, Method, Results
• 1000-1015: Break
• 1015-1115: High Speed Assault Connector
• 1115-1130: Break
• 1130-1230: Results, Conclusions, Recommendations
• 1230-1345: Lunch Break
• 1345-1530: Breakout Sessions

Please hold all questions until conclusion of brief.
Video Stream Filming In Progress.
What Did We Find Out?

- 2015 Program of Record Sea Base forces are challenged to meet a 10/30/30 response timeline
- Firefighters Don’t Take a Bus to the Fire!
  - Need “dedicated” assets in order to seize the initiative within 10 days
- Rapid force employment hindered by multiple at-sea transfers
- Future non-materiel and materiel proposals look promising
What Did We Find Out?

• Promising Future Solutions
  – Dedicated Strategic Lift Assets
    • High-speed surface ships
    • Lighter-than-air ships
  – Force Employment Assets
    • Large-payload, high-speed connectors
    • Load-once, direct-to-objective connectors

• SEABASE-6 model is a viable tool for follow-on analysis
Agenda

• Background
• Purpose
• Scope
• Method
• Results
• Conclusions and Recommendations
Project Collaboration

On Campus
- SEA-6
  - Project Lead
  - 18 students (All USN)
- Total Ship Systems Engineering
  - High Speed Assault Connector
  - 12 students
- Operations Research
  - Cost Estimation
  - Scenario Development
  - War Gaming
- Information Systems
- TRAC Monterey
- 50 students
- 18 Faculty

Off Campus
- OPNAV
  - N42, N703
- MCCDC
- NSWC
- USMC I&L
- NAVSEA
- AFIT
- NRAC
- NDIA
- CNA
- ONR
Background

• “Amateurs discuss strategy; professionals study logistics.” -Anonymous

• DoD interested in addressing important logistics issues associated with successfully conducting expeditionary operations:
  – Operation Desert Shield/Desert Storm
    • Stockpiles of supplies – The “Iron Mountain”
  – Operation Iraqi Freedom
    • Denial of access
Navy Sea Power 21

www.usni.org/Proceedings/Articles02/proCNO10.htm (15 November 2004).
Importance of SEA-6 Study

Seabasing and Joint Expeditionary Logistics are important to Navy leadership and DoD:

“Seabasing unites our capabilities for projecting offensive power, defensive power, command and control, mobility and sustainment around the world. It will enable commanders to generate high tempo operational maneuver by making use of the sea as a means of gaining advantage.”

1 Testimony of the Honorable John J. Young, Jr., VADM John B. Nathman…
Project Tasking

- From OPNAV N7
- Provided to SEA-6 April 2004 by Meyer Institute of Systems Engineering

“The initial objective of the study is to examine logistics flow to, within, and from the Sea Base in a Joint Warfare environment. The study should include both systems of record as well as other proposed systems, and should examine the time frame extending over the next 20 years, as new systems replace or supplement legacy systems.”

\(^2\) OPNAV N7, Memorandum for Director, Wayne E. Meyer Institute of Systems Engineering
Purpose

• Provide the Navy with insights into this important and timely issue

• Examine architectures and systems needed to rapidly deploy and sustain joint expeditionary forces operating from a Sea Base
Scope

• Sea Base and Expeditionary Warfare discussions revolve around a “10/30/30” construct

• Considered Closure, Assembly, Employment, and Sustainment phases of Joint Expeditionary Operations

• Withdrawal and Reconstitution of forces out of scope
Scope, cont’d

• Force size
  – Joint “brigade-size” force with approximately 9,000 Seabased personnel

• Focused on Maritime Pre-positioning Group (MPG)
  – CSG and ESG are part of Sea Base, but logistical support is out of scope

• Considered the following logistics commodity classes:
  – Class I (Food and Water)
  – Class III (Fuel)
  – Class V (Ammunition)

  \[
  \text{Represent } \sim 98\% \text{ of weight of daily replenishment}^3
  \]

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Scope, cont’d

• Focused on capabilities
  – Systems and platforms over next 20 years
    • 2004-2015
      – Primarily Existing Systems and Programs of Record
    • 2015-2025
      – Primarily Advanced Concept Demonstrators (ACD) and Advanced Concept Technology Demonstrations (ACTD)
  – Considered non-materiel solutions

• Examined vertical lift capacity and sea-state effects
Method

- Conducted Extensive Literature Search

- Followed Systems Engineering Principles
  - Used DoD Joint Capabilities, Integration, and Development System (JCIDS) as framework
JCIDS Framework

Functional Area Analysis

Operating Concept

Functional Needs Analysis

Functional Solutions Analysis

DOTMLPF

Alternative Architecture

Alternative Architecture

Alternative Architecture

Conclusions / Recommendations
JCIDS Framework

Operating Concept

Functional Area Analysis

Functional Needs Analysis

Functional Solutions Analysis

D O T M L P F

Alternative Architecture

Alternative Architecture

Alternative Architecture

Conclusions / Recommendations

Alternative Architecture

JCIDS Framework

- Functional Area Analysis
- Operating Concept
- Functional Needs Analysis

Functional Solutions Analysis
- DOTMLPF
- Alternative Architecture
- Alternative Architecture
- Alternative Architecture

Conclusions / Recommendations
JCIDS Framework

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Functional Solutions Analysis

D O T M L P F

Alternative Architecture

Alternative Architecture

Conclusions / Recommendations
JCIDS Framework

- Functional Area Analysis
- Operating Concept
- Functional Needs Analysis

**DOTMLPF**

- Alternative Architecture
- Alternative Architecture
- Alternative Architecture

Conclusions / Recommendations

12/2/2004
JELo Operating Concept

Expeditionary Force Objectives

Air

Surface

<200 nm

Beaufort Force 5
Sea State 4
6-8 ft wave height

Sea Base

Closure and Assembly

Forward Logistic Site

<200 nm

10/30/30 Strategic Guidance

Adapted from Naval Research Advisory Committee: Sea Basing, August 5 2004

12/2/2004

SEA-6 Seabasing and JELo Information Brief
Key Requirements

• Seize the initiative within 10 days!
  – Close to Joint Operating Area up to 2,000nm from Forward Logistics Site (FLS) in less than 10 days
  – Assemble enroute to the Sea Base
  – Employ 3 Battalion Landing Teams (BLT) at an objective within 200nm of Sea Base in 10 hours
    • 2 Surface BLTs
    • 1 Vertical BLT

• Sustain a Joint Expeditionary Brigade (JEB) at an objective within 200nm of Sea Base for 30 days
Key Requirements

• Sustain the Sea Base for 30 days

• Conduct operations up to and including Sea State 4

• Provide advanced care to critically injured personnel within one hour of injury
Key Capabilities

- Pre-position
- Strategic Lift
  - Air-lift
  - Sea-lift
- Forward Deploy
- Selective Offload
- Asset Visibility
- At-Sea Transfer
- At-Sea Assembly
- Assault Connectors
- MEDEVAC
Functional Needs Analysis

CDR Brett Foster, USN
JCIDS Framework

Functional Area Analysis → Operating Concept

Functional Needs Analysis

Functional Solutions Analysis

DOTMLPF

Alternative Architecture

Alternative Architecture

Alternative Architecture

Conclusions / Recommendations
Regional Scenario: Southeast Asia

Not an official DOD or Navy operational plan. Used for academic purposes only.

- Brigade Involvement
- Stresses Sea Base
  - Long, constrained LOC’s
  - Credible maritime threat
  - Credible land threat
  - Sensitive locale
Southeast Asia? Why Southeast Asia? That is not one of the “standard scenarios”

Or is it? The JFCOM Unified Quest 03/04 war game adopted a fictitious “Sumesia” scenario to address a less-than-MCO crisis

Secretary Rumsfield and the Joint Staff suggest that Asia will be the primary source of conflict in the 21st century

We chose South East Asia because it represents a real-world potential scenario that stresses the Sea Base concept

Long and constrained lines of communication

Sensitive Strategic location which drives a rapid response

Credible Threat

We also chose it because we had already analyzed it in our Joint Campaign Analysis class

Also used in 2002 SEA study on Expeditionary Warfare
A 2015 Southeast Asia Scenario

- Oppressive Military Regime
- Democratic Uprising
- US asked to help
- Mission to protect and support freedom fighters
- Brigade of direct support in the vicinity of a large coastal city
Objective Area

- 150 nm Sea Base-to-Objective
- Vertical and Surface Assault
- SSM, MANPAD, Infantry Threat
- Primarily Sea State 2 and 3
FNA: Method

- Defined a Joint Expeditionary Brigade (JEB)

- Defined and analyzed current capability

- Defined and analyzed 2015 capability
  - Assessed Programmed capabilities
  - Designed 2015 Architecture
  - Modeled the architecture
  - Ran model thru the Southeast Asia Scenario
  - War gamed against a South China Sea Scenario

- Identified and quantified the capability gaps
SEA-6 **Cost** Estimating

- Accepted Practices
  - Historical Data / Analogous Systems

- Primary Cost References
  - Navy Cost Analysis Division (VAMOSC)
  - Naval Air Warfare Center (NAVAIR)
  - Naval Sea Systems Command (NAVSEA)
  - DOD Budget Materials Website
    - FY 2004/5 President’s Budget
  - Navy/USMC Fact Files
  - Center for Naval Analysis
  - Jane’s resources

- NPS Operations Research faculty reviewed costing
Joint Expeditionary Brigade

- Chose 2015 MPF(F) MEB as a surrogate
  - US Army Brigade Combat Team (BCT) concept emerging
- Aboard the MPG:
  - ~9200 above ship’s company
    - Maneuver Element ≈ 4800
      - 3 Battalion Landing Teams (BLT)
    - Combat Support Element ≈ 3200
    - Naval Support Element ≈ 1200
- ~860 vehicles
Notional 2004 JEB Equivalent

- **1 JEB Sea Base Maneuver Element ≈ 4 MEU**
  - 1 JEB SBME = 3 BLT ≈ 4800 troops
  - 1 MEU ≈ 1200 troops
  - 4 MEU ≈ 4800 troops

- **1 JEB Sea Based ACE ≈ 120 aircraft ≈ 4 MEU**
  - 1 MEU ACE afloat ≈ 30 aircraft
  - 4 MEU ACE afloat ≈ 120 aircraft

- **3 BLT ≈ 500 vehicles ≈ 4 MEU**
  - 1 MEU ≈ 120 vehicles
  - 4 MEU ≈ 480 vehicles
Notional 2004 Sea Base

• Sea Based JEB ≈ 4 ESG + 1 CSG
# 4-ESG Platform Composition

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<th>Platform</th>
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<th>Joint Expeditionary Logistics Operation (JELo) Phase</th>
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<tr>
<td>AV-8B</td>
<td>20-25</td>
<td>Employment</td>
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</table>
Current Capability:
Previous Studies

Closure
- “…30 days or more…” Naval Studies Board Naval Expeditionary Logistics, 1998
- “…4-6 weeks…” OPNAV N7 Draft Sea Basing CONOPS, 2004
- “14 days” Naval Capabilities Plan Connectors Analysis, quoted 2004

Employment
- Quotes from NSB Naval Expeditionary Logistics, 1998:
  - “…air (employment from 85 nm) …took 12 hours…”
  - “…25 miles at sea…took 5 days…unacceptably long…”
  - “To move…ashore in (2 days)… had to close within 4 miles…”

Sustainment
- “15 days” NSWC Expeditionary Warfare Brief, 2002
- “15 days” MAGTF Planners Guide, 2002
### 2004 JEB Closure Estimate

<table>
<thead>
<tr>
<th>START POSIT</th>
<th>END</th>
<th>DISTANCE</th>
<th>ARRIVAL</th>
<th>CONSTRAINED WATER S</th>
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<td>C + 6</td>
<td>Hormuz</td>
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<td>Japan</td>
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<td>~ 3500</td>
<td>C + 7</td>
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<td>~ 5600</td>
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<td>C + 24</td>
<td>Malacca</td>
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<td>C + 27</td>
<td>Gibraltar Suez Canal Bab el Mandeb</td>
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</table>
3 ESG/MEUs off coast of South East Asia in 16 days
3/4th of combat power in 16 days
Last ESG/MEU comes from CONUS and takes 30 days
Assault phase can have most equipment and troops on beach in 12 hours, 48-72 for all support equipment
Only 15 days of supplies onboard ESG
No current CLF support

rafeese, 11/29/2004
2004 Summary

With optimistic readiness assumptions…

– Closes in 25-30 days
– Employs in 12-72 hours at a 5-10 nm range
– Self-sustains for 15 days

• Large gaps in every phase…

…transformational thinking required!
2015 Baseline Architecture

JEB

MV-22

MPF(F)

EFV

LCAC

CH-53X

12/2/2004

SEA-6 Seabasing and JELo Information Brief
We approached the 2015 Capability assessment differently

First we had to choose between the multitude of ideas to design an architecture

To assess the performance and understand the behavior, we modeled it and ran the model through a simulation of the Southeast Asia Scenario we just described

Used design in a War Game

Results of simulation and war game to determine the gaps.
rafeese, 11/29/2004
Non-Materiel Alternatives

• Doctrine
  – 10/30/30
  – Sea Power 21
    • Sea Basing
      – Assemble before arrival
      – Employ from the sea
    • Sea Shield
    • Sea Strike
      – MPG assets assault-capable

• Organization
  – JEB
  – MPSRON to MPG
    • Direct report to CJTF
Non-Materiel Alternatives
Cont’d

• Training
  – Brigade-sized workups (e.g. MEBEX)

• Leadership
  – Sea Base CO in JTF structure

• Personnel
  – More MSC personnel in MPG
  – Larger Naval Support Element

• Facilities
  – FLS as assembly site, support more ships
Materiel Alternatives

- **MPF(F)** “Unconstrained size, Distributed Capability”\(^4\) ship
  - Aviation-capable
  - Selective Offload
  - LCAC cranes
  - **STREAM (Heavy)**
  - Integrated Landing Platform (**ILP**)
  - Advanced Cargo Storage and Handling System
- **CH-53X, MV-22, JSF, VTUAV**
- **Common Logistics Picture (CLP)**
  - Global Information Grid (**GIG**)
  - Global Command and Control System-Joint (**GCCS-J**)
  - Radio Frequency ID (**RFID**)

\(^4\) CNA MPF(F) Analysis of Alternatives, Apr 2004
# 2015 Baseline Platforms

<table>
<thead>
<tr>
<th>Platform</th>
<th>Number</th>
<th>Joint Expeditionary Logistics Operation (JELo) Phase</th>
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<td>MPF(F) “Unconstrained-size, distributed-capability” ships</td>
<td>8</td>
<td>Closure / Employment / Sustainment</td>
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<tr>
<td>T-AOE</td>
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<td>Sustainment</td>
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<tr>
<td>LCU(R)</td>
<td>2</td>
<td>Employment</td>
</tr>
<tr>
<td>LCAC</td>
<td>24</td>
<td>Employment</td>
</tr>
<tr>
<td>CH-53X</td>
<td>20</td>
<td>Employment / Sustainment</td>
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<tr>
<td>MV-22</td>
<td>48</td>
<td>Employment / Sustainment</td>
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<tr>
<td>SH-60R</td>
<td>12</td>
<td>Sustainment</td>
</tr>
<tr>
<td>AH-1Z</td>
<td>18</td>
<td>Employment</td>
</tr>
<tr>
<td>JSF</td>
<td>36</td>
<td>Employment</td>
</tr>
<tr>
<td>VTUAV</td>
<td>6</td>
<td>Employment</td>
</tr>
</tbody>
</table>
2015 Baseline Architecture
SEABASE-6 Model

Systems Engineering & Analysis
Baseline Architecture & Solution Evaluator - Six

12/2/2004

SEA-6 Seabasing and JELo Information Brief 49
SEABASE-6 Modules

Closure
Assembly

Employment
Sustainment

CONUS

FLS

SEA
2015 Baseline Reduces Closure Gap

Note: 2004 “data” is from other studies.
Disassembly and Airlift
Delay Helo Arrival to FLS

2015 Baseline: A/C Arriving at FLS

5-day Gap

Equipment Arrival Time at FLS (Days)

Requirement < 2.6 Days
2015 Baseline Reduces Employment Gap

Maneuver Element Employment, 2004 vs. 2015, from 25 nm off shore

Note: 2004 value taken from CNA Study MPF 2010 Ship-to-Shore Movement and Seabased Logistics Support

4 days better
2015 Reduces Sustainment Gap Ashore

Sustainment of the Objective, 2004 vs. 2015
(Food, Water, Fuel, Ammunition)

15-day Gap

16-20 days better

Note: 2004 data from NSWC Expeditionary Warfare Brief, 2002
2015 Baseline MEDEVAC Gap

Medical Evacuation Performance, 2015 Architecture

- 20 minute Gap
- No data available for 2004 performance

Requirement < 1 hour
War Game

Not an official DOD or Navy operational plan. Used for academic purposes only.

- NPS War Game
- Near-Peer Scenario
  - South China Sea
- Students vs. students
In speaking section.

LT's Feese and Partington participated in an on-campus war game

Brought baseline architecture to fold into JTF

Scenario against a near peer competitor in the South China Sea Region

Only student on student game

rafeese, 11/29/2004
War Game Insights

• Enemy with blue-water capability a definite threat to MPG
  – Straits and constrained waters a hazard
  – MPG needs higher survivability or escorts

• Sea Shield assumption questionable
  – Agrees with findings of “Expeditionary Warfare – Force Protection” study (SEA-4)

• Joint equipment compatibility gap
  – Some Army programmed systems incompatible with Sea Base
    • Patriot batteries
2015 Gap Summary

• 2015 Architecture narrowed, but didn’t close the gaps

  **Closure**: 6-day gap due to strategic airlift of non-self deploying aircraft delays
  **Employment**: 20-hour gap due to LCAC loading and transit delays
  **Sustainment**: 50-nm gap due to aircraft external payload limits beyond 150 nm mission radius
  **MEDEVAC**: 20-minute gap due to UH-1Y performance
Functional Solution Analysis and Sensitivity Analysis

LCDR Allen “TJ” Johnson, USN
JCIDS Framework

- Functional Area Analysis
- Operating Concept
- Functional Needs Analysis

DOTMLPF

Functional Solutions Analysis
- Alternative Architecture
- Alternative Architecture
- Alternative Architecture

Conclusions / Recommendations
FSA Methodology

1. Sensitivity Analysis on 2015 baseline
2. JCIDS Solution Priorities
3. Design Teams
4. Modeling and Simulation
5. Analysis
FSA Sensitivity Analysis

- Determine degree of impact a certain parameter or group of parameters has on system performance
  - Vary specific input variable
  - Measure system response

- Design Insights
  - System behavior and interactions
  - Performance drivers
2015 Baseline Architecture
Sensitivity Analysis Focus Areas

- # of surface trips to deliver SBME
- Reliability
- At-sea transfer delays
- Aircraft transfer delays
- # of required operational aircraft deck spots
- # of surface interface points
- Assault connector speed
- Long range sustainment
Maximum of 50 LCAC Runs To Meet 10 Hour Employment

**Insights**

- Approx. 127 LCAC trips required to deliver 2 Surface BLTs in 2015 Baseline Architecture
- Limited to 50 trips by operational requirement
- Unpredictable performance at high trip numbers due to MTBF effects with longer missions
MTBF Must Be Greater Than Planned Mission Time

**Insights**

- Unpredictable performance when MTBF approaches mission duration.

- Significant gain (27%) in performance if MTBF greater than mission duration.
Reduction/Elimination of Transfer Delay is Essential

**Insight**

- Need to significantly reduce or eliminate at-sea transfers to meet requirement
Maximum Aircraft On-Deck Delay of 18 Minutes to Sustain at 150 nm

**Insights**

- Hot-pump refueling delay drives problem at long ranges
- Inventory/storage and transfer systems drive problem at short ranges
  - Pre-staging
  - Selective off-load
Six Operational Deck Spots Needed to Sustain at 150 nm

**Insights**

- Dedicated Sea Base deck spots needed for logistics!
- Competing resources will drive the actual deck spot requirement higher
- 6 deck spots dedicated 24/7 to logistics needed at 150 nm
Additional Surface Interfaces Produce Minimal Performance Gains

**Insights**

- Minor queuing delays with single interface (~1 min)
- Slight gain in performance with second interface 11% (3 hours)
- Adding a third platform did not increase performance
Increased Surface Connector Speed Produces Minimal Performance Gains

**Insights**

- Speed not a key factor for short range assaults
- Largest gain in performance (13%) between 25-35 knots
- Transfer delay more critical than speed
200 nm Sustainment Possible Utilizing 50 CH-53X Equivalents

**Insights**

- Need approximately 50 CH-53X equivalents to sustain Objective from 200 nm

- Requires less deck space than 2015 Baseline Architecture
  - 48 MV-22
  - 20 CH-53X
Sensitivity Analysis Usage

• **Focused System Design**

• **High-Impact DOTMLPF changes**

• “Biggest Bang” for the “Smallest Buck”
FSA JCIDS Solution Priorities

• Non-Materiel
• Materiel
  – Constraints/Limitations (M-Pool)
    • Programs of Record
    • Advanced Concept Demonstrator (ACD)
    • Advanced Concept Technology Demonstration (ACTD)
  – TSSE High Speed Assault Connector (HSAC)
FSA Design Teams

• 3 Independent Teams

• Ground Rules
  – Unrestricted non-materiel solution trade space
  – Unrestricted use of M-Pool for materiel solutions
  – Additional Constraints
    • Team #1: TSSE High Speed Assault Connector (HSAC)
    • Team #2: Rapid Strategic Lift Ship (RSLS)
    • Team #3: None
FSA Alternative Solution Modeling & Simulation

• SEABASE-6
• Southeast Asia Scenario
  – Environment
  – Threat
• Consistent with Baseline
  – COIs/MOEs/MOPs
  – Data Reduction Techniques
  – Analysis
FSA Alternative Solution
Gap Analysis

• Were the capability gaps closed/reduced?

• Did new gaps emerge?
TSSE HSAC

TSSE HSAC Briefing will follow the break
Alternative Architectures

LT Brent Johnson, USNR
JCIDS Framework

Functional Area Analysis

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Alternative Architecture I

MPF(F) “Unconstrained-size, Distributed-capability” ship

Joint ACCESS HSAC

MPF(F) “Afloat Forward Staging Base (AFSB)” ship
Alternative Architecture I
Non-Materiel Alternatives

• Closure Phase
  – Assemble CH-53X enroute to Sea Base
    • CH-53X loaded onto MPF(F) upon arrival at FLS
    • Eliminates reassembly delay at FLS
    • Doctrine Change

• Sustainment Phase
  – Reduced selective offload requirement
    • Increase usable storage capacity of MPF(F)
      – 48% to 60%
    • Facility change

• MEDEVAC
  – Tasked MV-22 with MEDEVAC mission
    • MV-22 pick up wounded prior to returning to Sea Base
    • Similar for each 2025 Alternative Architecture
    • Doctrine change
Alternative Architecture I

Materiel Alternatives

- **Closure Phase**
  - Reduce MPF(F) ships to 4
    - 2 MPF(F) “Unconstrained-size, distributed-capability” ships
    - 2 MPF(F) “Afloat Forward Staging Base (AFSB)” ships
    - Surface BLT equipment on Joint ACCESS High Speed Assault Connector (HSAC)
  - Utilize 12 Joint ACCESS HSACs
    - Used to transport equipment of 2 surface BLTs to AO

- **Employment Phase**
  - Replace LCACs and LCU(R) with 12 Joint ACCESS HSACs
    - Employs 2 surface BLTs
    - Provides 1 wave for insertion

- **Sustainment Phase**
  - Joint ACCESS HSAC serves as high speed logistics shuttle between FLS and Sea Base

- **MEDEVAC**
  - Eliminated UH-1Ys as primary MEDEVAC asset
    - MV-22s conduct MEDEVAC
    - Similar for each alternative architecture
### Alternative Architecture I

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<th>Platform</th>
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<td>Eliminated 6 ships</td>
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<td>MPF(F) “Afloat Forward Staging Base (AFSB)” ships</td>
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</tr>
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</table>
Alternative Architecture 1

CH-53X Non-Materiel Change Reduces Closure Phase Gap

Time to Form the Sea Base (Days)

2015 Arch  Alt Arch I

6-day Gap  3-day Reduction  3-day Gap

Closure

Requirement < 9.6 Days

n=30

9.6

3-day Reduction

3-day Gap
Alternative Architecture I

Joint ACCESS HSAC Reduces Employment Phase Gap

Employment

Time to Complete Employment (Hours)

20-hour Gap

20-hour Reduction

Requirement < 10 hours

2015 Arch

Alt Arch I (Joint ACCESS)

Joint ACCESS Reduces Gap

n = 30

n = 30

10
Alternative Architecture I

Non-Materiel Change Eliminates MEDEVAC Gap

MEDEVAC

Time to MEDEVAC Troops (Hours)

20-Minute Gap
50-Minute Reduction
MV-22 Eliminates Gap

Requirement < 1 Hour

2015 Arch Alt Arch 1 Alt Arch 2 Alt Arch 3

n=30

Similar Results For Each Alternative Architecture
Bottom Line for Alternative Architecture I
Does Not Seize the Initiative In 10 Days

Sieze the Initiative

3-day Reduction

3-day Gap

6-day Gap

Closure + Employment Time (Days)

2015 ARCH

Alt Arch I

Requirement < 10 Days

n = 30

12/2/2004
SEA-6 Seabasing and JELo Information Brief
Alternative Architecture I

Summary

• Reliance on Strategic Airlift
  – Cause of failure to meet Closure Phase requirement
    • Strategic Airlift requires up to 4 days preparation
    • Results in late arrival of non self-deployable aircraft

• Joint ACCESS HSAC
  – Reduces Employment Phase Gap
    • Transit directly to Objective from FLS
    • Reduces need for transfer at sea
    • Replaces LCACs and LCU(R)s
    • Carries 2 Surface BLTs directly to Objective
    • Forward Deployed at FLS
  – Multifunctional
    • Augments CLF
  – Survivability
    • Has self-defense capability
Alternative Architecture I
Summary

• Non Materiel Alternatives
  – Reassemble CH-53X in transit from FLS to Sea Base
    • Reduces Closure Gap
  – MEDEVAC
    • All alternative architectures use MV-22 vice UH-1Y as primary MEDEVAC asset
    • Eliminates MEDEVAC Gap

• Cost Estimation (Acquisition + 10 Years of O&S) Per Squadron
  – 2015 Baseline Architecture: $34 - $42B (FY04$)
  – Cost Savings: 18%
Alternative Architecture II

LT Dan Olvera, USN

RSLS  
LCU(R)  
CH-53X
Alternative Architecture II

Non-Materiel Alternatives

• **Closure Phase**
  – No Reliance on Strategic Airlift
    • Rapid Strategic Lift Ship transports all aircraft except JSF
      – Still requires tanker support for JSF
    • No need for disassembly of CH-53X
    • RSLS forward deployed
    • Doctrine Change

• **Employment Phase**
  – Explored moving Sea Base to 10 nm
    • Small decrease in time for large increase in risk
    • Doctrine Change
Alternative Architecture II

Materiel Alternatives

• **Closure Phase**
  – Utilize **RSLS** (36 knots) to transport all helicopters and MV-22 aircraft

• **Employment Phase**
  – 16 Landing Craft Utility Replacement (**LCU(R)**) replace 24 LCAC
  – **CH-53X** aircraft (35 vice 20)
  – MV-22 aircraft (15 vice 48)
  – Explored using **HLCAC**

• **Sustainment Phase**
  – RSLS used as Combat Logistics Force (CLF) ship
  – CH-53X aircraft (35 vice 20)
  – MV-22 aircraft (15 vice 48)
## Alternative Architecture II

<table>
<thead>
<tr>
<th>Platform</th>
<th>Number</th>
<th>Changes from 2015 Baseline Architecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid Strategic Lift Ship (RSLS)</td>
<td>1</td>
<td>Replaces C-5s and C-17s in the closure phase and the T-AOE in the sustainment phase</td>
</tr>
<tr>
<td>MPF(F) “Unconstrained-size, distributed-capability” ships</td>
<td>8</td>
<td>None</td>
</tr>
<tr>
<td>Landing Craft Utility Replacement (LCU(R))</td>
<td>16</td>
<td>Replaces 24 Landing Craft Air Cushion (LCACs)</td>
</tr>
<tr>
<td>MV-22</td>
<td>15</td>
<td>Removes 33 MV-22</td>
</tr>
<tr>
<td>CH-53X</td>
<td>35</td>
<td>Adds 15 CH-53Xs</td>
</tr>
<tr>
<td>SH-60R</td>
<td>12</td>
<td>None</td>
</tr>
<tr>
<td>AH-1Z</td>
<td>18</td>
<td>None</td>
</tr>
<tr>
<td>F-35 Joint Strike Fighter (JSF)</td>
<td>36</td>
<td>None</td>
</tr>
<tr>
<td>V-TUAV</td>
<td>6</td>
<td>None</td>
</tr>
</tbody>
</table>
Alternative Architecture II
Alternative Architecture II
RSLS Eliminates Closure Phase Gap

Closure: Sea Base Formation

- **6 day Gap**
- **7-day Reduction**
- **RSLS Eliminates Gap**
- Requirement < 9.6 Days

n=30
Alternative Architecture II
LCU(R) Reduces Employment Gap
Alternative Architecture II
HLCAC Reduces Employment Gap

Employment

Time to Complete Employment (Hours)

20-hour Gap

2-hour Reduction

18-hour Gap

Requirement <10 Hours

n=30

2015 Arch

Alt Arch 2 (HLCAC)
Bottom Line for Alternative Architecture II
Does Seize the Initiative In 10 Days

Sieze the Initiative

6-day Reduction

6-day Gap

RSLS + LCU(R) Eliminates Gap

Closure + Employment Time (Days)

n=30

2015 ARCH

Alt Arch 2 (RSLS + LCU(R))
Alternative Architecture II
Summary

• RSLs
  – Meets Closure Requirement
    • Transit directly to Sea Base
    • Eliminates reliance on Strategic Airlift
    • Eliminates need for CH-53X disassembly
  – Multifunctional
    • Replaces need for CLF
  – Single Point of Failure
    • All non self-deploying aircraft embarked
    • Survivability reduced if built as planned to Commercial Standards

• Air Connectors
  – Meets Employment and Sustainment Requirements
    • More CH-53X (33) fewer MV-22 (15)
      – CH-53X has twice the range and three times the external payload of MV-22
      – CH-53X has internal cargo capability
Alternative Architecture II Summary

• LCU(R)
  – Reduces Employment Requirement Gap
    • Increased area and payload require fewer trips to deliver both surface BLTs

• HLCAC
  – Does not meet Employment Requirement
    • Can only embark two per MPF(F)
    • Increased area and payload still requires 71 trips (56% improvement) to deliver both surface BLTs
    • 10nm only saves 5 hours with a large increase in risk

• Cost Estimation (Acquisition + 10 Years of O&S) Per Squadron
  – 2025 Alternative Architecture II : $29 - $36B (FY04$)
  – 2015 Baseline Architecture : $34 - $42B (FY04$)
  – Cost Savings : 17%
Alternative Architecture III

CDR Paul Tanks, USN

MPF(F) Aviation Ship  Airship (SkyCat™1000)  Advanced Theater Transport (ATT)
Alternative Architecture III

Non-Materiel Alternatives

• Closure Phase
  – No reliance on Strategic Airlift
    • Airship to transport all aircraft except ATT and JSF to FLS
      – Still requires tanker support
    • No CH-53Xs
    • Doctrine Change

• Employment Phase
  – All LCU(R)s loaded prior to start of 10 hour period
    • Doctrine Change
  – Air assets complete vertical BLT employment then assist with surface BLT’s
    • Doctrine Change

• Sustainment Phase
  – Removed the Sustained Operations Ashore Echelon (SOAE) and Forward Base Echelon (FBE) equipment
    • Doctrine Change
Alternative Architecture III

Materiel Alternatives

- **Closure Phase**
  - Added 6 airships
    - Transport all helicopters and MV-22 aircraft from CONUS to FLS
  - Reduce MPF(F) ships to 5
    - 4 MPF(F) “Unconstrained-size distributed capability” ships
    - 1 Aviation MPF(F) ship

- **Employment Phase**
  - 10 additional LCU(R)s Replace 24 LCAC
  - 8 ATT aircraft replace 20 CH-53
  - MV-22 aircraft (65 vice 48)
  - 2 Integrated Landing Platforms (ILP) per MPF(F)

- **Sustainment Phase**
  - 8 ATT aircraft
  - 65 MV-22 aircraft
  - 1 Airship
## Alternative Architecture III

<table>
<thead>
<tr>
<th>Platform</th>
<th>Number</th>
<th>Changes from 2015 Baseline Architecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>(MPF(F)) “Unconstrained-size, distributed-capability” ships</td>
<td>4</td>
<td>Removes 4 ships and adds a second Integrated Landing Platform (ILP) per MPF(F)</td>
</tr>
<tr>
<td>Landing Craft Utility Replacement (LCU(R))</td>
<td>12</td>
<td>Increase of 10 to replace 24 Landing Craft Air Cushion (LCACs)</td>
</tr>
<tr>
<td>MPF(F) Aviation Ship</td>
<td>1</td>
<td>Addition</td>
</tr>
<tr>
<td>Advanced Theater Transport (ATT)</td>
<td>8</td>
<td>Replaces 20 CH-53Xs</td>
</tr>
<tr>
<td>MV-22</td>
<td>65</td>
<td>Adds 17 MV-22s Replaces 9 UH-1Ys</td>
</tr>
<tr>
<td>Airship (SkyCat™1000)</td>
<td>6</td>
<td>Replaces C-5s and C-17s in the closure phase and moves all helicopters and MV-22s</td>
</tr>
<tr>
<td>SH-60R</td>
<td>12</td>
<td>None</td>
</tr>
<tr>
<td>AH-1Z</td>
<td>18</td>
<td>None</td>
</tr>
<tr>
<td>F-35 Joint Strike Fighter (JSF)</td>
<td>36</td>
<td>None</td>
</tr>
<tr>
<td>V-TUAV</td>
<td>6</td>
<td>None</td>
</tr>
</tbody>
</table>
Alternative Architecture III

FLS

MPG 5 ships

CSG/ESG

Objective
Alternative Architecture III
Airships Eliminate Closure Phase Gap

Time to Form Sea Base (Days)

6-day Gap

Closure

7-day Reduction

Airship Eliminates Gap

Requirement < 9.6 Days

2015 Arch

Alt Arch 3

n=30
Alternative Architecture III

LCU(R)/ATT’s Reduces Employment Phase Gap

20-hour Gap

21-hour Reduction

LCU(R)/ATT Reduces Gap

n=30

Requirement < 10 Days

Time to Complete Employment (Hours)

0 10 20 30 40 50

2015 Arch

Alt Arch 3

12/2/2004

SEA-6 Seabasing and JELo Information Brief
Bottom Line for Alternative Architecture III

Seize the Initiative In 10 Days

6-day Gap

7 day Reduction

Eliminates Gap

n=30
Requirement <9.6 Days
Alternative Architecture III

Summary

• Airship/ATT
  – Meets Closure Requirement
    • Transit from CONUS to FLS
    • ATT and JSF self-deploy
    • Eliminates reliance on Strategic Airlift

• Aviation MPF(F)
  – Platform allows for use of ATT
  – Single point of failure
Alternative Architecture III
Summary

• LCU(R)
  – Does meet Employment Requirement (9 hours)
    • ILP at sea transfers required
    • Single point failure

• Air Connectors
  – Meets Employment and Sustainment Requirements
    • More MV-22 (65) and 8 ATT

• Cost Estimation (Acquisition + 10 Years of O&S) Per Squadron
  – 2015 Baseline Architecture : $34 - $42B (FY04$)
  – Cost Savings : 17%
Conclusions

CDR Brett Foster, USN
## Architecture Summary

<table>
<thead>
<tr>
<th>ARCHITECTURE</th>
<th>Closure Time (Days)</th>
<th>Employment Time (Hours)</th>
<th>Seize the Initiative (Days)</th>
<th>Total Cost (FY04$B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>16</td>
<td>30</td>
<td>16</td>
<td>$34-$42</td>
</tr>
<tr>
<td>Alternative 1</td>
<td>13</td>
<td>10</td>
<td>13</td>
<td>$28-$35</td>
</tr>
<tr>
<td>Alternative 2</td>
<td>9</td>
<td>12</td>
<td>9</td>
<td>$29-$36</td>
</tr>
<tr>
<td>Alternative 3</td>
<td>9</td>
<td>9</td>
<td>10</td>
<td>$28-$35</td>
</tr>
</tbody>
</table>
Single MPF(F) Squadron

Architecture Cost Comparisons
(FY04$ - In Billions)

Cost (in Billions)

<table>
<thead>
<tr>
<th>Year/Architecture</th>
<th>Cost (in Billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004 BLA</td>
<td>$20</td>
</tr>
<tr>
<td>2015 AA I</td>
<td>$30</td>
</tr>
<tr>
<td>2015 AA II</td>
<td>$30</td>
</tr>
<tr>
<td>2015 AA III</td>
<td>$30</td>
</tr>
</tbody>
</table>

- O&S Costs (10 Years)
- Acquisition Costs
Dedicated Lift Assets IncreaseClosure Performance

Rely On Joint Airlift

Rely On Dedicated Lift

Time to Form Sea Base (Days)

- 2015 Arch: MPF(F) (8), LCU(R) (2)
- Alt Arch 1: JOINT ACCESS/HSAC (12), MPF(F) (4), CH53 Doctrine
- Alt Arch 2: RSLS (1), MPF(F) (8)
- Alt Arch 3: SKYCAT (6), MPF(F) (5)

Requirement < 9.6 Days

n=30
Closure Systems: Performance vs. Cost

Time to Form Sea Base (Days)

Cost of Major Contributing Systems (FY04$B)

- ALT ARCH 1
  - JOINT ACCESS
  - CH53 Change

- BASELINE
  - 2015

- Doctrine Change
- SKYCAT
  - Promising
- ALT ARCH 3
  - SKYCAT
- ALT ARCH 2
  - RSLS

Dedicated Lift for Rapid Closure
Large-Payload Assault Connectors Improve Employment Performance

- **LCAC**: 100+ trips & transfers
- Larger LCU(R) & Joint ACCESS < 60 trips & transfers

<table>
<thead>
<tr>
<th>Time to Complete Employment (Hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>20</td>
</tr>
<tr>
<td>30</td>
</tr>
<tr>
<td>40</td>
</tr>
<tr>
<td>50</td>
</tr>
</tbody>
</table>

- **2015 Arch**
  - MV22 (48)
  - CH53X (20)
  - LCU(R) (2)
  - LCAC (24)
- **Alt Arch 1**
  - JOINT ACCESS/HSAC (12)
  - MV22 (12)
  - CH53X (20)
- **Alt Arch 2**
  - LCU(R) (16)
  - MV22 (15)
  - CH53X (35)
- **Alt Arch 3**
  - ATT (8)
  - MV22 (65)
  - LCU(R) (12)

- Requirement < 10 Hours

n=30
LCU(R) Outperforms HLCAC (given a suitable beach)

- LCU(R) completes employment in 57% less time compared to HLCAC.
- This improvement is achieved at 27% of the cost.

 Requirement < 10 Hours
Employment Systems: Performance vs. Cost

Cost of Major Contributing Systems (FY04$B)

Time to Complete Employment (Hours)

Reduced At-sea Transfers

BASELINE 2015

ALT ARCH 1
JOINT ACCESS

ALT ARCH 2
LCU(R)

ALT ARCH 3
LCU(R) + ATT
“Seize the Initiative in 10 Days”

Dedicated Lift For Fast Response

Firefighters Don’t Take The Bus!!

Sea Base Formation + Employment (Days)

2015 Arch
- MPF(F) (8)
- LCAC (24)
- LCU(R) (2)

Alt Arch 1
- JOINT ACCESS/HSAC (12)
- MPF(F) (4)
- CH53 Doctrine

Alt Arch 2
- RSLS (1)
- MPF(F) (8)
- LCU(R) (16)

Alt Arch 3
- SKYCAT (6)
- ATT (8)
- MPF(F) (5)

Requirement < 10 Days

n=30
Closure and Employment Systems: Performance vs. Cost

<table>
<thead>
<tr>
<th>Baseline 2015</th>
<th>Sea Base Formation + Employment (Days)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$0</td>
</tr>
<tr>
<td>ALT ARCH 1</td>
<td>Joint Access + CH53 Change</td>
</tr>
<tr>
<td>ALT ARCH 2</td>
<td>RSLS + LCU(R)</td>
</tr>
<tr>
<td>ALT ARCH 3</td>
<td>SKYCAT + ATT</td>
</tr>
</tbody>
</table>

“10” Requires Dedicated Lift
Sustainment Conclusions

- All architectures sustained vertically inside 150 nm

- Vertical sustainment cliff at mission radius greater than 150 nm
  - MV-22 limitations

- MV-22 best suited for troop transport
  - Benefits diminished when used for cargo re-supply

- Near-real time asset-visibility system critical to avoid over-supplying the objective.

- Majority of MPF(F) air operating spots needed to achieve sustainment
  - Few spots for non-logistical air missions
Project Conclusions

• A Sea Base solution that meets 10/30/30 response timeline is a tough, but do-able problem

• Firefighters Don’t Take the Bus!
  – Dedicated strategic lift needed to meet response times

• At-sea transfers slow force employment
  – Reducing at-sea transfers needed to meet response times

• Several promising non-materiel and materiel alternatives
Project Conclusions, cont’d

• Promising Future Capabilities:
  – Dedicated Strategic Lift Assets
    • High-speed surface ships
    • Air ships
  – Force Employment Assets
    • Large-payload, high-speed connectors
    • Direct-to-objective connectors that minimize transfers

• The SEABASE-6 model a useful tool
Recommended For Further Study

• Explore a Unified Expeditionary Command concept
  – Vis-à-vis SOCCOM

• Consider SkyCat™ and other airship concepts
  – Survivability and Reliability analysis

• Further analyze RSLS and other dedicated sealift concepts
  – Survivability analysis

• Consider Joint ACCESS (HSAC) and/or LCU(R)-type concepts
  – CONOPS development

• Consider alternate vertical lift compositions
  – Post-employment remix toward heavier lift
  – Temporary employment augments
Recommended For Further Study

- Conduct a detailed MPF(F) survivability analysis
- Conduct trade study of MPF(F) selective off-load technology versus manning, overall cargo capacity, and survivability
- Develop a conceptual design for a Sea Base Common Logistics Picture (CLP) architecture
- Conduct trade study on alternate command structures
- Conduct at-sea experimentation to measure transfer performance with sea state
  - Focus on tactical at-sea transfer (lighterage & ILPs)
- Conduct SEABASE-6 factorial experiment to determine interaction of key design features
The Sea-Base is much more than just Logistics...

but Logistics gives you the Sea-Base

Future Logistics and Sea Basing
Col R. M. Nixon, USMC HQMC C/LPV, 14 Nov 2003
Closing Remarks

CDR John Lemmon, USN
Wrap-Up

• Thank you for coming!

• Breakout Session at 1345 in Bullard Hall Conference Room
### SEA-6 Students

- LT Amy Bender
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- LT Timothy Craddock
- LT Justin Dowd
- LT Rick Feese
- CDR Brett Foster
- LT JD Gainey
- LT Ivan Jimenez
- LCDR Terry Johnson
- LT Brent Johnson
- CDR John Lemmon
- LT Michael Levendofske
- ENS Dale Liskey
- ENS Anthony Oliphant
- LT Daniel Olvera
- LT William Partington
- LT Steven Peace
- CDR Paul Tanks

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- LT Jon Brisar
- LTJG Adnen Chaabane
- LTJG Sotirios Dimas
- LT Matt Harding
- LT Tim King
- LT Steven Peace
- LCDR Francisco Perez
- LT Derek Peterson
- LT Rolando Reuse
- LT Scott Roberts
Questions?!