



Recent Use of DES in Naval Technology, Platform, Force Architecture, and CONOPS Evaluation Methodologies

Presentation to 76th MORSS WG12
12 June 2008
New London, CT

Program Manager: Tim Barnard NAVSEA - 05D1T
Deputy Program Manager: Jonathan Slutsky, NSWCCD Code 58
Task Lead: Scott Henry, CSC
NACT Program Support: Gregory Opas, MDC

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 01 JUN 2008	2. REPORT TYPE N/A	3. DATES COVERED -	
4. TITLE AND SUBTITLE Recent Use of DES in Naval Technology, Platform, Force Architecture, and CONOPS Evaluation Methodologies		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) NAVSEA -05D1T		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 See also ADM202527. Military Operations Research Society Symposium (76th) Held in New London, Connecticut on June 10-12, 2008, The original document contains color images.			
14. ABSTRACT			
15. SUBJECT TERMS			
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified	UU
			18. NUMBER OF PAGES 20
			19a. NAME OF RESPONSIBLE PERSON



712B

MORS P#: (if known)

DEADLINE: 2 MAY 08
Fax to: 703-933-9066



PART I		Author Request - The following author(s) request authority to disclose the following presentation at the next MORS Symposium with subsequent publication in the MORSS Final Report, for inclusion on the MORSS CD and/or posting on the MORS web site.	
Principal Author: Gregory J. Opas		Other Author(s): Timothy A. Barnard, Jonathan G. Slutsky, Scott C. Henry	
Principal Author's Organization: Merrill-Dean Consulting, Inc.		X	
Complete mailing address: 4740 Farndon Ct. Fairfax, VA 22032		Principal Author's Signature: ▲ Date:	
		Phone: (571) 332-3663	
		FAX: (703) 991-5527	
		Email: gopas@merrill-dean.net	
Title of Presentation: Recent Use of DES in Naval Technology, Platform, Force Architecture, and CONOPS Evaluation Methodologies			
This presentation is believed to be: <input type="checkbox"/> SECRET <input type="checkbox"/> CONFIDENTIAL <input checked="" type="checkbox"/> UNCLASSIFIED and will be presented in:			
<input type="checkbox"/> Special Session <input type="checkbox"/> Tutorial <input type="checkbox"/> Demo <input type="checkbox"/> CG: A-B-C-D-E-F (Circle one) <input checked="" type="checkbox"/> List all WG(s) #: 12			
PART II		Government Releasing Official Endorsement and DoD Directive 5230.24 - Required Applicable Distribution Statement	
The Releasing Official, with the understanding that MORS Symposia are supervised by the OCNO N81, that all attendees have current security clearances of at least SECRET and that no foreign nationals will be present confirms that the overall classification of the presentation is:			
<input type="checkbox"/> SECRET <input type="checkbox"/> CONFIDENTIAL <input checked="" type="checkbox"/> UNCLASSIFIED <input type="checkbox"/> OTHER: _____ and authorizes disclosure at the meeting.			
Classified by:		Declassified by:	
Downgrade to:		On:	
<i>The applicable distribution statement below must be checked and stated to complete this form.</i>			
<input checked="" type="checkbox"/> Distribution statement A: This presentation/paper is unclassified, approved for public release, distribution unlimited, and is exempt from U.S. export licensing and other export approvals under the International Traffic in Arms Regulations (22 CFR 120 et seq.)		<input type="checkbox"/> Other distribution statement: (List here or attach separate sheet)	
Releasing Official's title: NACT Program Manager		X	
Printed name: Timothy Barnard		Releasing Official's Signature: ▲	
Organization: Naval Sea Systems Command, 05D1		Date: 30 April 2008	
Complete mailing address: 1333 Isaac Hull Ave, SE Washington, DC 20376		Phone: (202) 781-2315	
		FAX: (301) 227-3396	

Intro



- **Background**
- **Methodology**
 - **Scenario**
 - **Model(s)**
 - **Findings**
- **Conclusions**



Motivation



- US Navy is evaluating alternative Platforms and CONOPS for support of Ship-To-Objective-Maneuver/Operational Maneuver From The Sea (STOM/OMFTS)...
 - New systems are potentially game changing... Some are in procurement, others are still concepts; all need evaluation
 - Novel Logistics System Architectures, taking advantage of the new capabilities, are being formulated, evaluated, and ranked



1942



1975



2015?



High Speed Logistics Amphibian Characteristics



- **Planing hull, retractable wheel amphibian**

Size	12m LWL, 3m Beam
Cargo Capacity	6.5 LT
Cargo Fraction	0.25
Gross Vehicle Weight	26 LT (58240 lb)
Water Speed	25 knots

- **Cargo Fraction consistent with range of historical amphibian designs, but may be conservative for a modern design**
- **Cargo deck and capacity are equivalent to a long-bed MTRV at off-road load capacity**
- **Dual diesel powering assumed for fuel consumption calculations**

Philosophical Approach



Informed Course Of Action

Tools / Analysis Methodology

CONOPS

Force
Architecture

Platforms

Technologies

Legacy

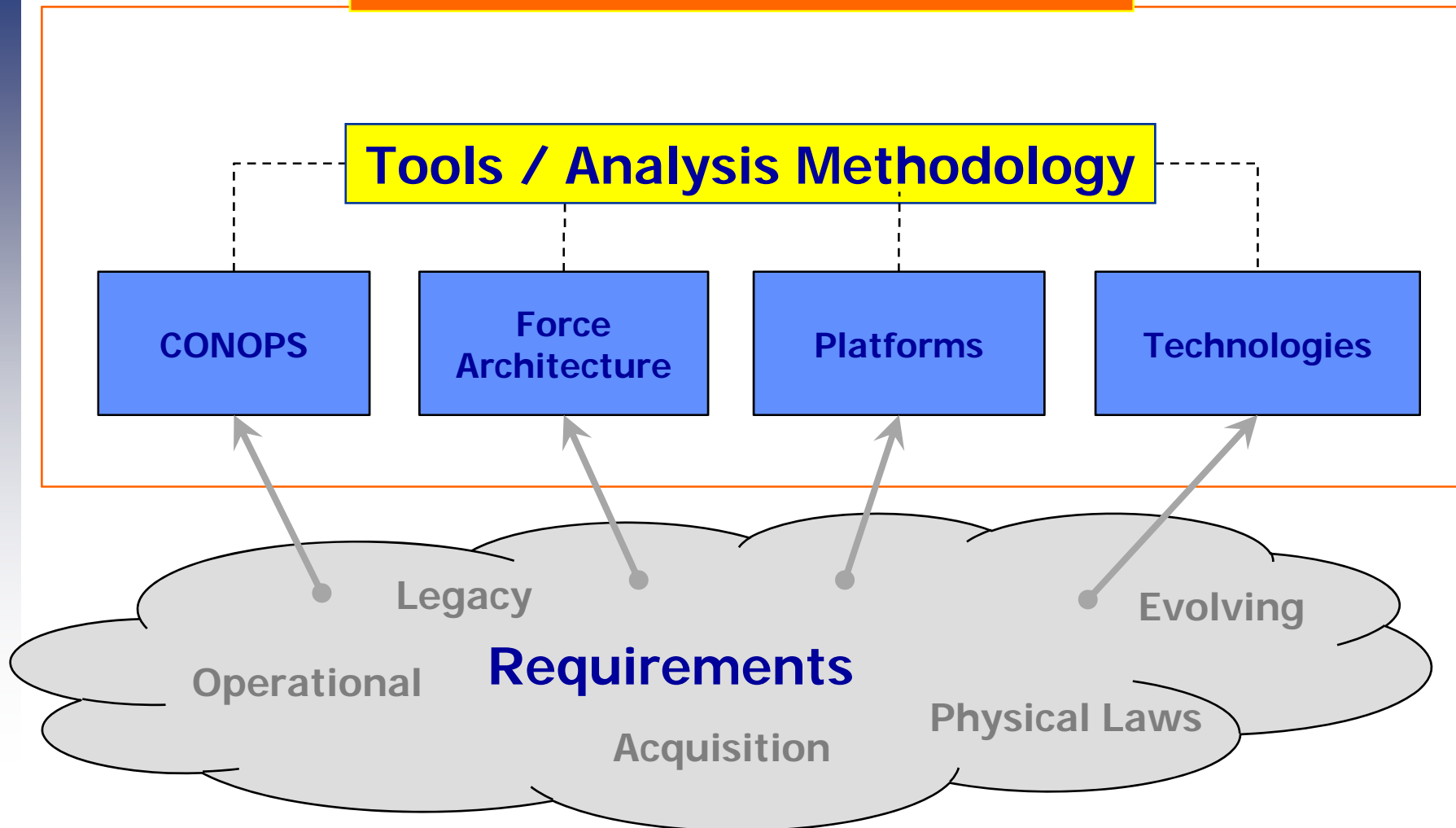
Evolving

Operational

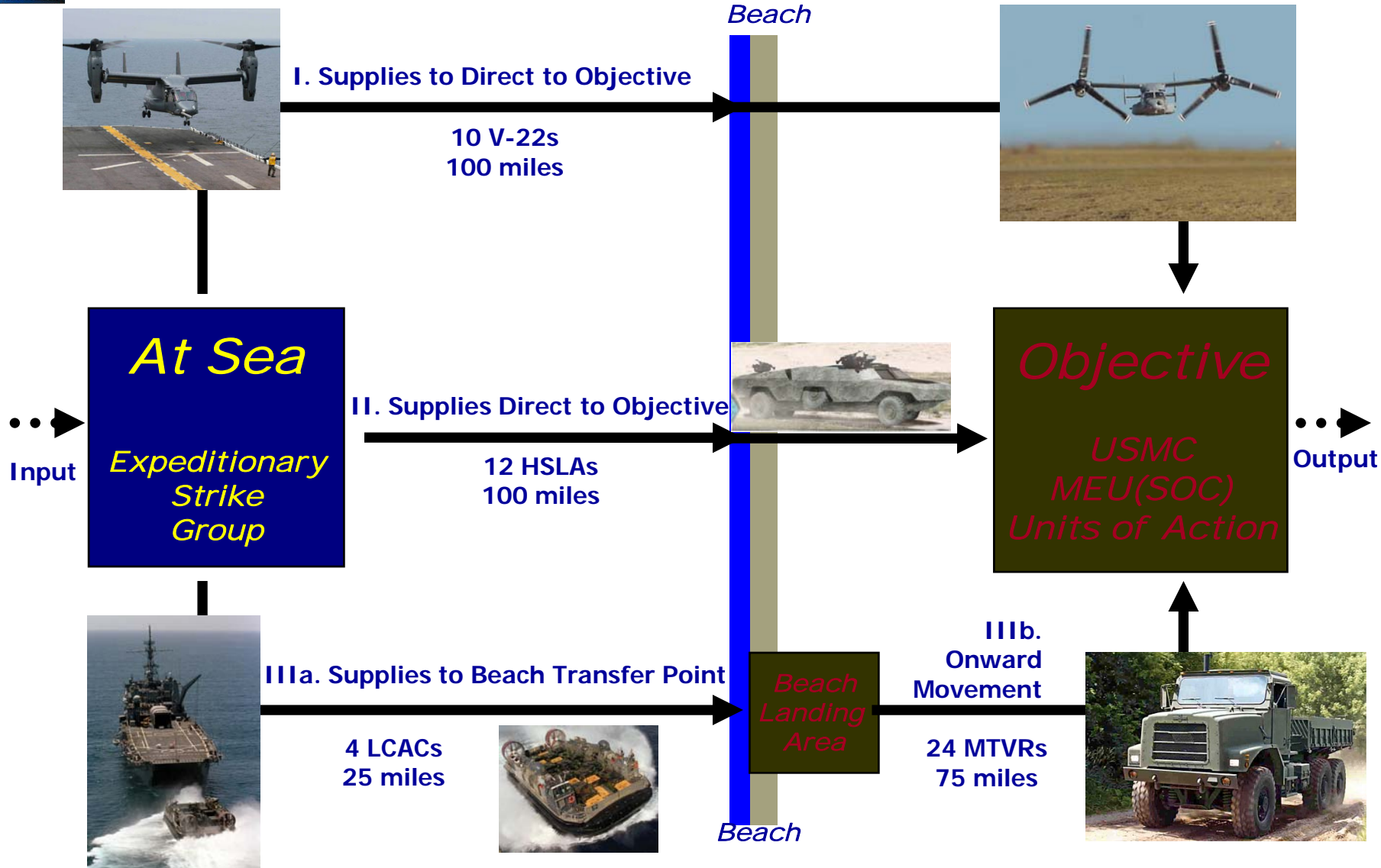
Requirements

Physical Laws

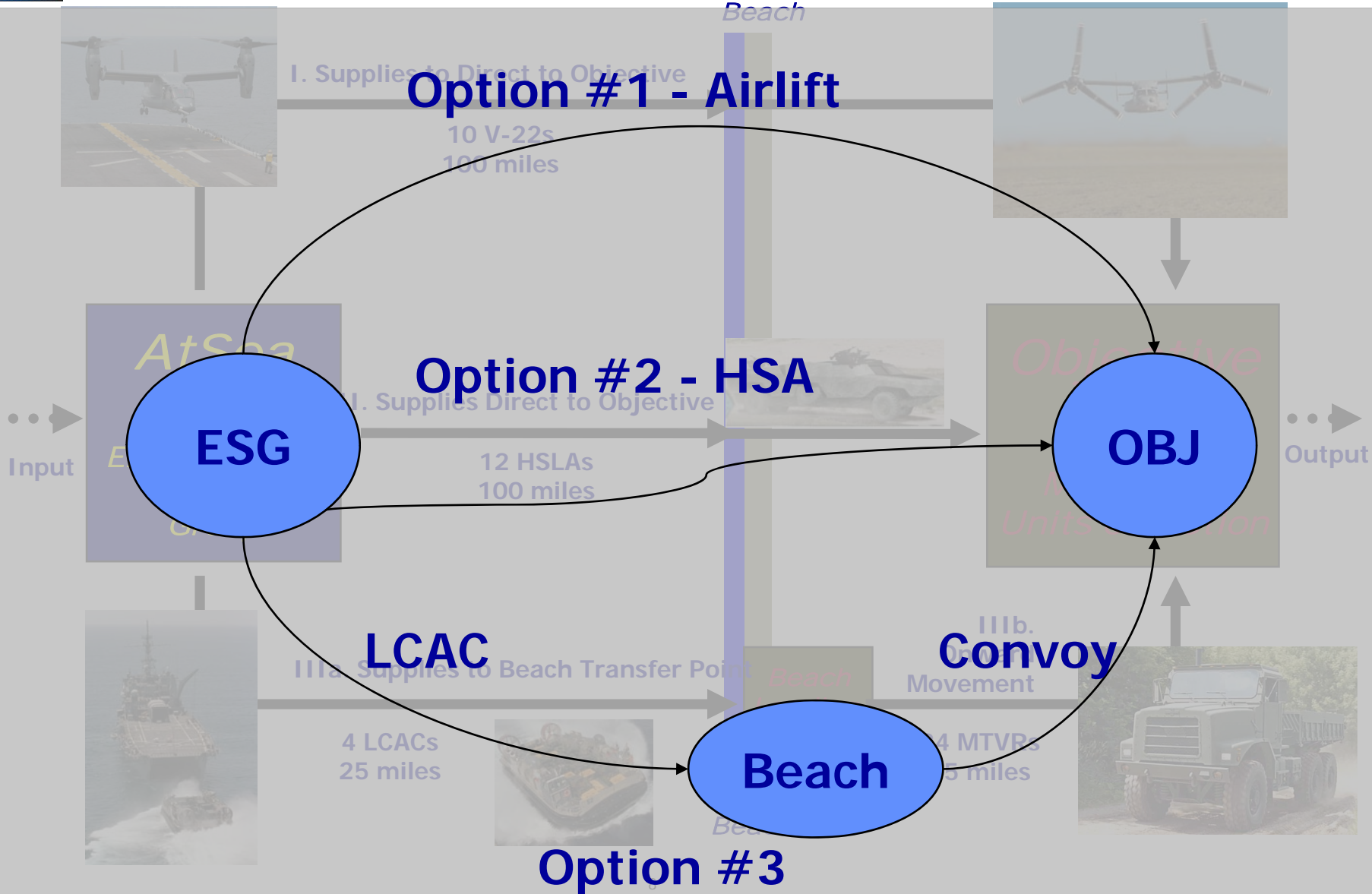
Acquisition



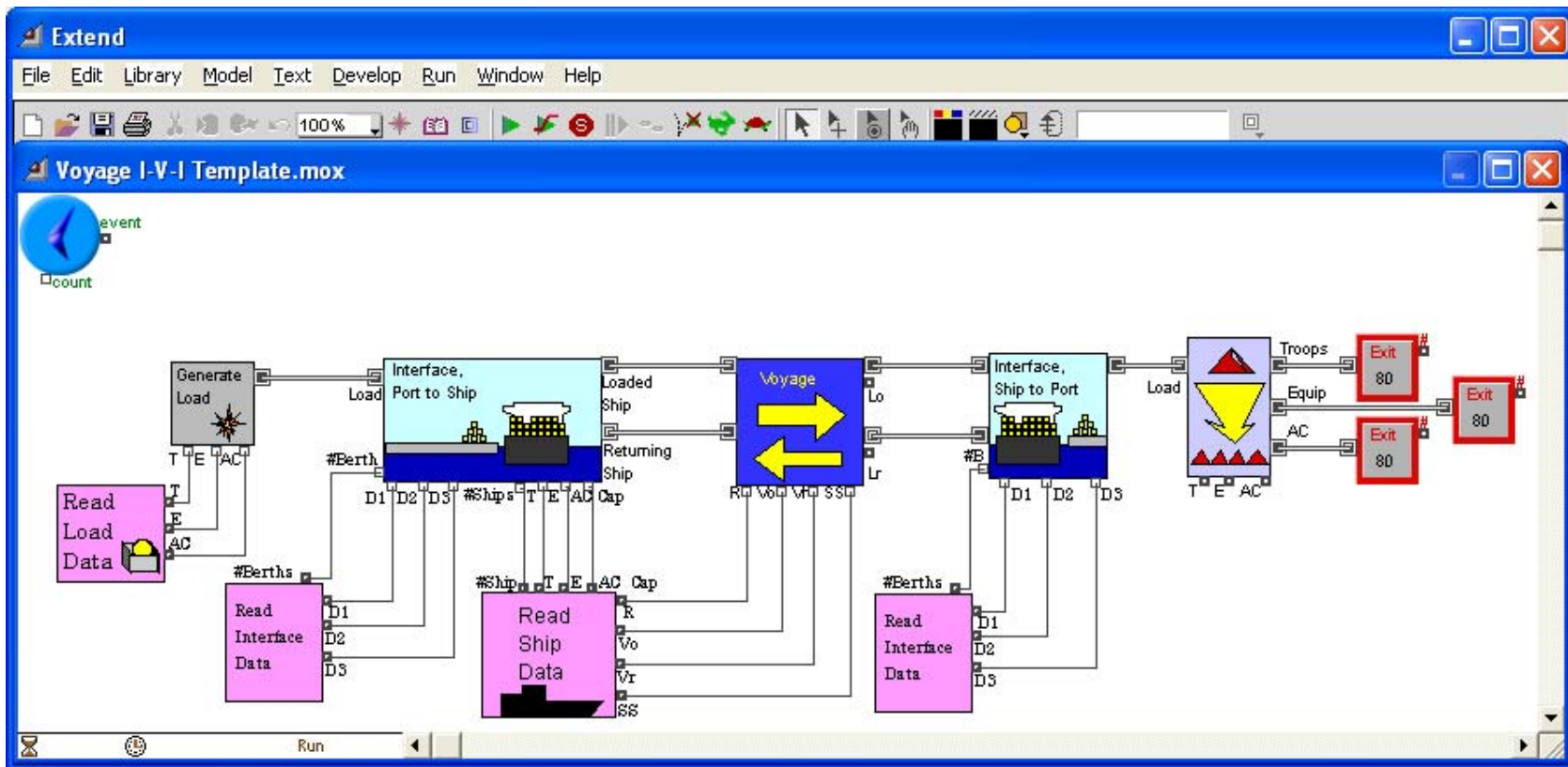
Overall Scenario Description



Leg Network Diagram



Reusable Base Object: Transport Leg

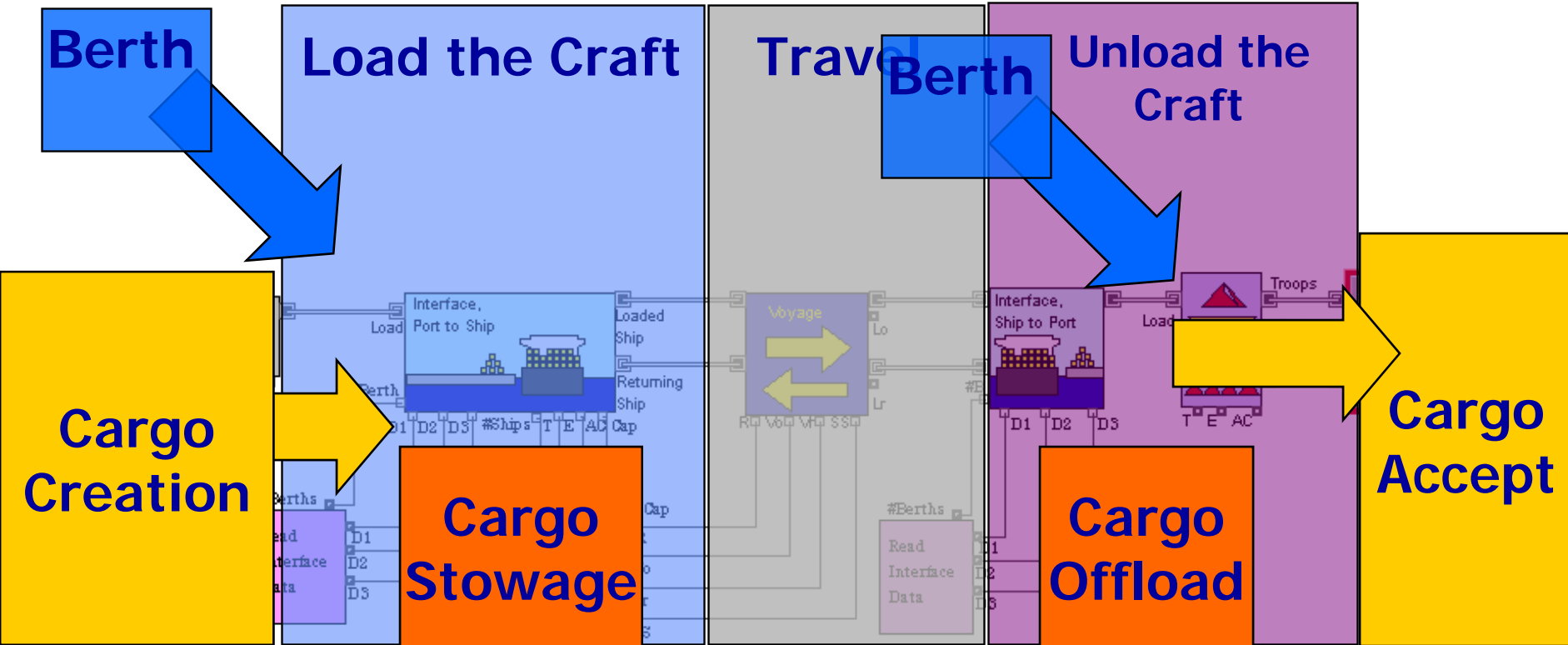


Pt A

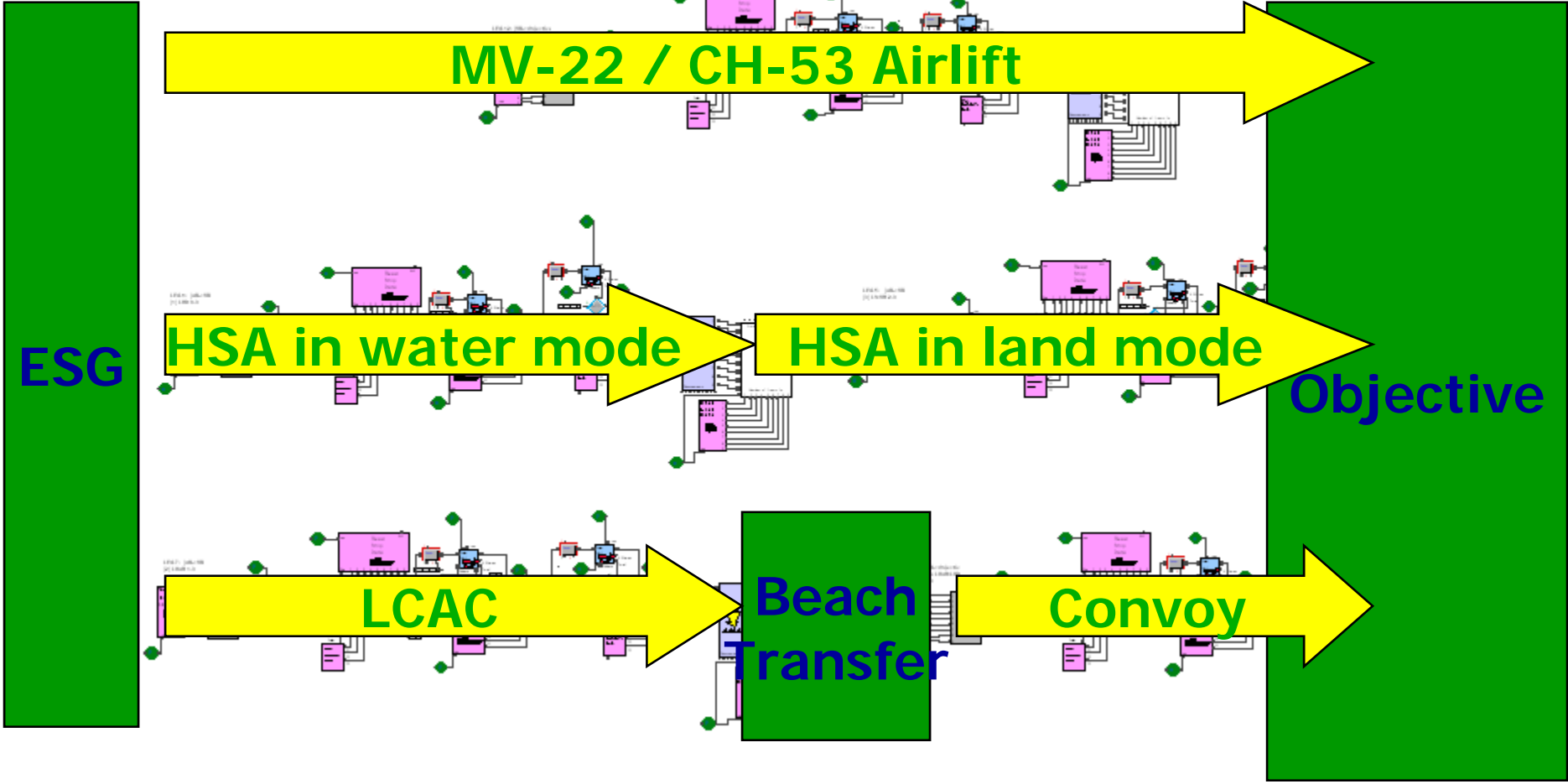
Interface-Voyage-Interface LEG

Pt B

Reusable Base Object: Transport Leg



Model Example



Findings



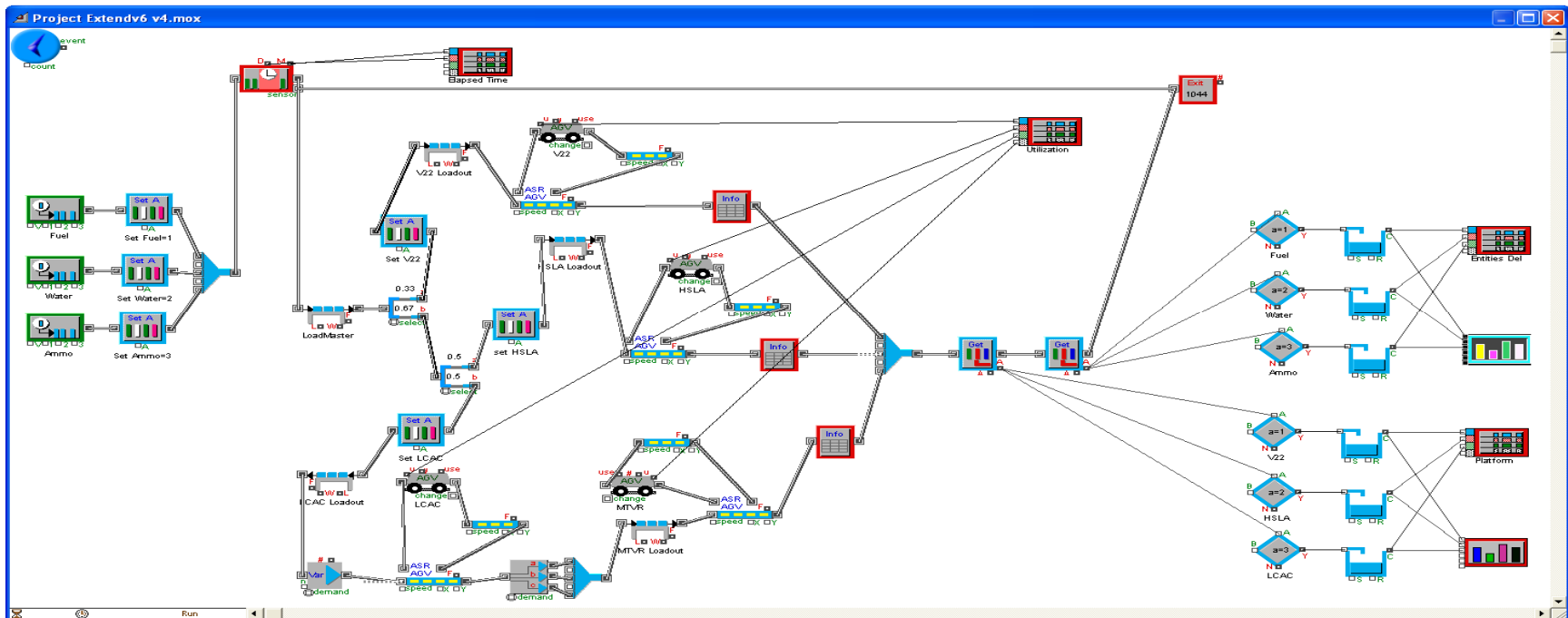
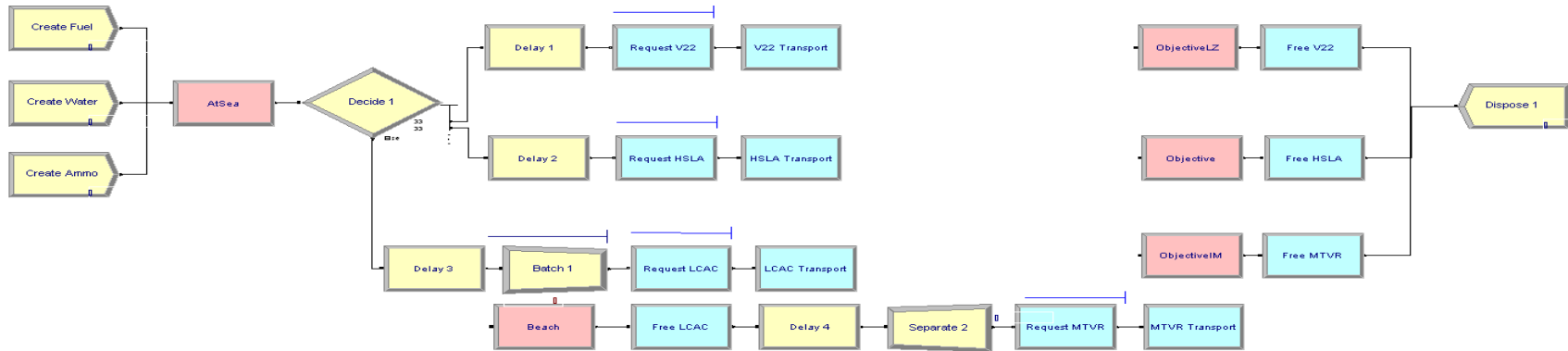
- **This was the third study to use CAESaR to analyze Technology-Platform-Force Architecture mixes**
 - At this point, clearly supports a validated methodology for comparative analysis...
 - particularly for mixtures of platform types...
- **HSLA Performance**
 - Very preliminary (ROM) results
 - Strong throughput performance compared to LCAC/convoy option
 - Provides flexibility in connector dispatching
 - Merits further study

Lower LOD Modeling



- Led to some interesting results, but also raised a key question:
 - The HSA Scenario is much simpler than the one the original model was delivered...
 - Could a simpler, purpose built model be developed to confirm results of CAESaR runs?
- To attempt an answer, a Lower Level Of Detail (LOD) QuickLook Models were developed
 - Using same Scenario depiction, and simplified parameterizations of transport elements
 - One model in Extend, one in Arena...
 - Durations of modeling effort in each tool were captured
 - Models were run through similar mix of scenarios

Resultant QuickLook Models



Findings



- **Use of lower LOD models provided second set of data points regarding architectural performance.**
 - **Independent, “double-blind” effort provides confidence that things were “reasonably well modeled”**
 - **Might actually be more suitable for ROM Concept Cost analysis, given how costs roll up and aggregate... more detailed models might miss this**

Conclusions



- **Which comes first (detailed model then check model, or vice versa?)**
 - Is it Chicken->Egg or Egg-> Chicken ... Depends on situation
- **Level of Detail of DES modeling should be matched to LOD of technology/concept being evaluated...**
 - No need to go deep on LOD if technology/concept is not fully defined...
 - Little utility in low LOD model if concept is matured and subtleties of system behavior are being analyzed.
- **Importance of having a consistent organization-wide modeling strategy**
 - Consistent methodology with related baselined models leads to predictability of approach...
 - Baseline model needs to be flexible enough to model wide ranges of technology parameters without requiring structural changes / rework



Questions?

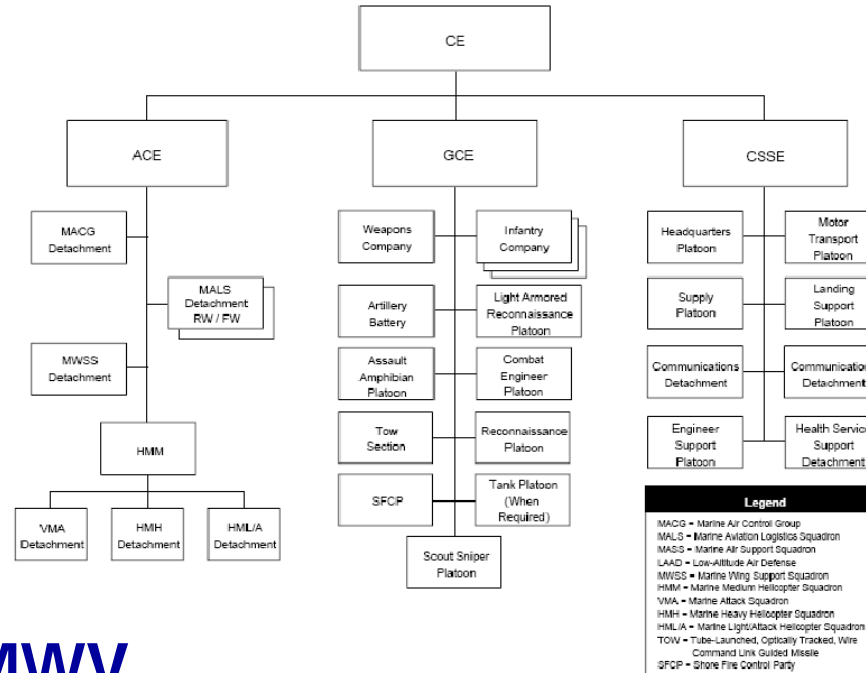
Backup Material



MEU Force Structure and Major Equipment



• 2236 Personnel



• 101 HMMWV

• 24 MTRV

• 5 LVS

• 8 Misc.

• 4 M1A1

• 16 AAV/EFV

• 8 LAV

• 6 155mm

• 12 MV-22

• 4 CH-53E

• 6 AH-1

MEU(SOC) Calculated Daily Supply Requirements



CNA Notional MEU

Low Intensity

8hr Vehicle Days
 12hr Transport Days (MTVR/LVS)
 24hr Generator Days
 Low Intensity Ammo Usage

	Weight (lb)	Volume	
Class I (Subsistence)	10401.12	386.78	ft3
Water	99457.76	11929.6	gal
Class II (General)	3525.426	?	ft3
Class III (POL)	101969	14567	gal
Class IV (Engineer Supplies)	15079.76		ft3
Class V (Ammunition)	10528.68	207.1458	ft3
Class VI (Personal Items)	N/A	N/A	ft3
Class VII (Major End Items)	N/A	N/A	ft3
Class VIII (Medical)	2050.4		ft3
20.79269 ST Dry Supply			
11929.6 Gal Water			
14567 Gal POL			

High Intensity

12hr Vehicle Days
 12hr Transport Days (MTVR/LVS)
 24hr Generator Days
 High Intensity Ammo Usage

	Weight (lb)	Volume	
Class I (Subsistence)	10401.12	386.78	ft3
Water	99457.76	11929.6	gal
Class II (General)	3525.426	?	ft3
Class III (POL)	122021.4	17431.63	gal
Class IV (Engineer Supplies)	15079.76		ft3
Class V (Ammunition)	37104.4	747.3565	ft3
Class VI (Personal Items)	N/A	N/A	ft3
Class VII (Major End Items)	N/A	N/A	ft3
Class VIII (Medical)	2050.4		ft3
34.08055 ST Dry Supply			
11929.6 Gal Water			
17431.63 Gal POL			