MPFF AOA Support Study Force Employment Models

Sponsor: PMS 325

Modeling: CNAC and NSWCCD

Speaker: Stuart Ullman, NSWCCD Code 282, 301-227-5975

Principal Team Responsibilities

- Jason Strickland NSWCCD/ Project Manager
- Database by Theresa Kimball/CNAC
- Air Model by Gary Hall/NSWCCD
- Surface Model by Theresa Kimball/CNAC
- Analysis Runs by Theresa Kimball/CNAC
- Excel Premodel by Stuart Ullman/NSWCC

OBJECTIVE

- Support CNA Analysis of Alternatives for the Maritime Prepositioning Force (Future)
- Develop a STOM model for the employment of USMC re-inforced infantry battalion

METHODOLOGY

- Modeling and simulation: four models
  - Air insertion model
  - Air sustainment model
  - Surface insertion model
  - Surface sustainment model
- Used extend (www.imaginethatinc.com) and Excel
  - Runs on PC or MAC
  - Data functions prior to simulation using excel
  - Data > Excel > DB/Extend > Excel > Graphics
- Air insertion is large complex model
- Problems - unable to get handle on projected operational processes early on and mid-course correction

General Model Assumptions

- Unit integrity by ship
- Unit sequence order to shore
- Designated SAR, escort ship (no loading)

Model Variables

- Up to 10 ships
- Up to 10 deck spots per ship
- Up to 15 boneyard spots per ship
- Up to 15 hanger spots per ship
- Up to 10 objectives inland
- Single beach objective
- Shore to ship transfer capability also

Model Variables

- 1-3 external air lift spots
- 1-2 surface craft loading spots
- Parametric representation of air & surface delivery craft
- 2 types of aircraft (used CH53 and MV22)
- Surface transport by LCAC
- Internal and external (vehicle) loads
- Single and double external loads (double only with CH53)
- Refueling on deck after each sortie

AIR MODEL

- Aircraft and load tracking by serial number.
- Equipment and vehicle tracking in database by standard nomenclature.
- Unit arrival tracked at objective(s) by time and combat power index.
- Automatic designation, ordering and ship-to-ship movements of aircraft loading on deck.

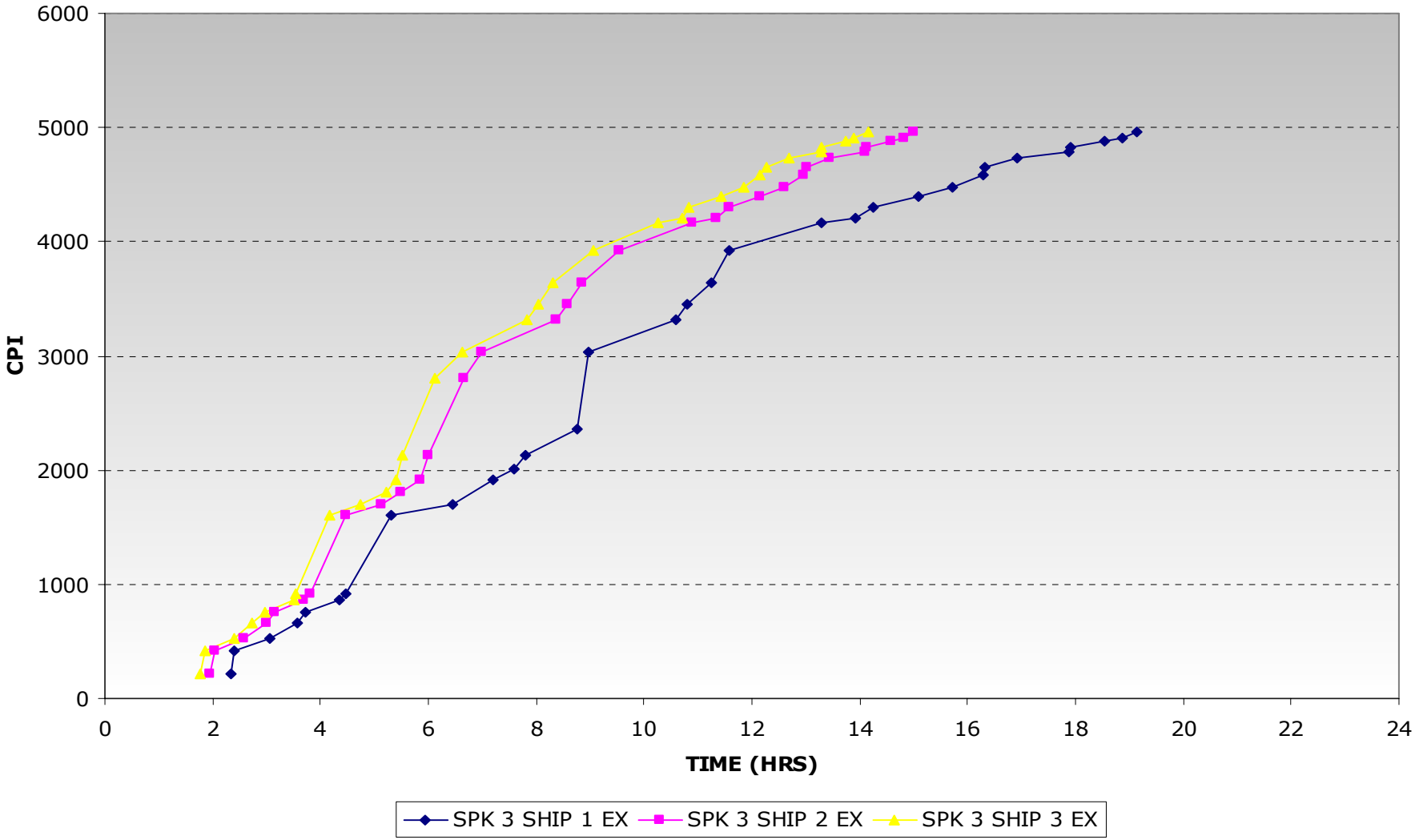
TYPICAL INPUT SERIAL

Landing Priority	Unit	Ship (3 ship spread)	# Pax	Equipment Type	Equipment Quantity	Each vehicle weighs	Notes:	Total A/C required (single veh per A/C)	Total A/C required (2 veh per A/C) (implies CH-53)	Recommended A/C MV-22	Recommended A/C CH-53
1	Rifle Co A (Rein)	1	209	None			MV-22 internal	9	9	1	
2	Scout sniper	2	4	ITV(D1161)	2	4915	MV-22 internal	2	2	1	
3	Rifle Co B (Rein)	3	209	None			MV-22 internal	9	9	1	
4	Scout sniper	2	4	ITV(D1161)	2	4915	MV-22 internal	2	2	1	
5	A Command	2	39	M1043 (D1159)	1	8270	Either A/C	5	5	1	0
				MRC JTRS (AX001)	4	8270	Either A/C				
6	Scout sniper	2	4	ITV(D1161)	2	4915	MV-22 internal	2	2	1	
7	81mm Mortar Plt (-)	1	60	None			MV-22 internal	3	3	1	
8	CAAT Sec 2	2	36	M1043 (D1159)	4	8270	Either A/C	8	4	0	1
				M1045 (D1125)	4	8330	Either A/C				
9	Wpn Co HQ	2	9	M998 (D1158)	1	7330	Either A/C	1	1	1	
10	CEB Plt(-) & Det, Wpns Co	2	23	M998 (D1158)	3	7330	Either A/C	3	2	0	1
11	HST Det, MatRedPlt, CSS C	1	8	M998 (D1158)	2	7330	Either A/C	2	1		1
12	Rifle Co C (Rein)	2	209	None			MV-22 internal	9	9	1	
13	Scout sniper	2	4	ITV(D1161)	2	4915	MV-22 internal	2	1	1	
14	81mm Mortar Plt vehicles	1	13	M998 (D1158)	10	7330	Either A/C	1	5		1
15	CAAT Sec 1	1	36	M1043 (D1159)	4	8270	Either A/C	8	4		1
				M1045 (D1125)	4	8330	Either A/C				

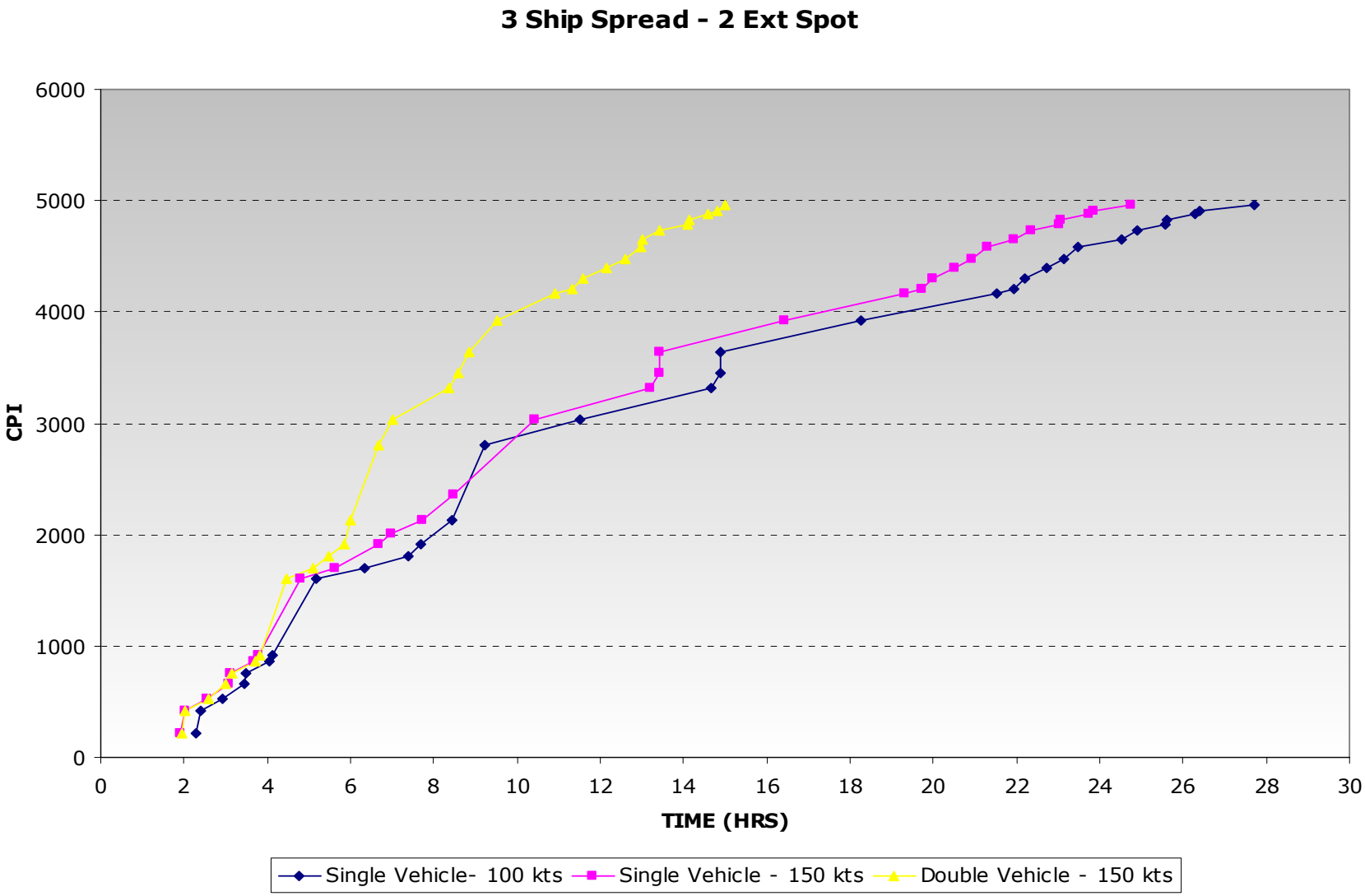
RESULTS

- Phased deployment times required
- Sensitivity to:
  - Single vs. Double external loads
  - Number of ships and initial unit spread across ships
  - Initial A/C allocation to ships (type and quantity to each ship
  - A/C speeds
  - Number of loading spots, external lift spots, hangar spots, boneyard spots
- Bottlenecks identified
- Combat power buildup over time

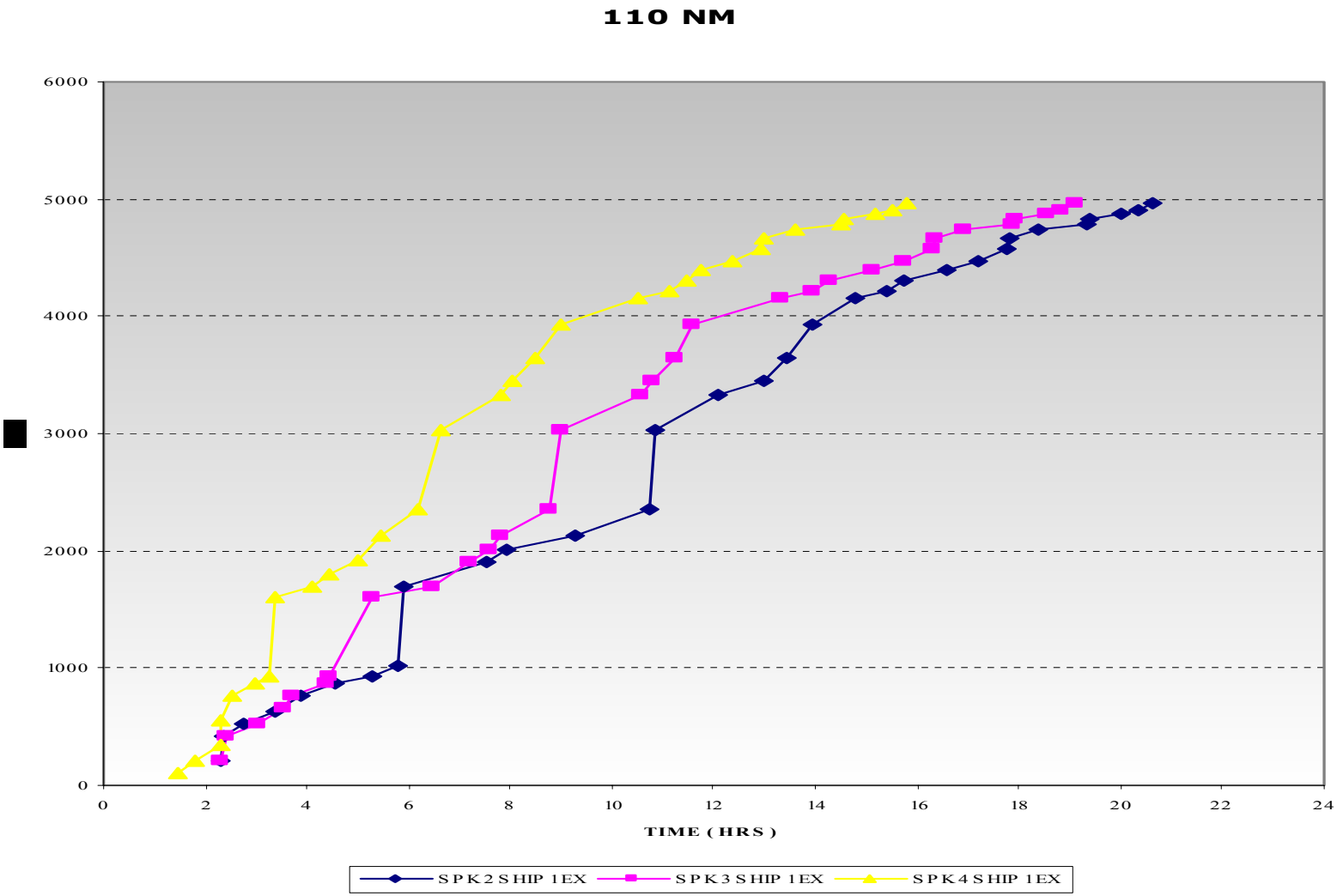
TYPICAL OUTPUT



TYPICAL OUTPUT



TYPICAL OUTPUT

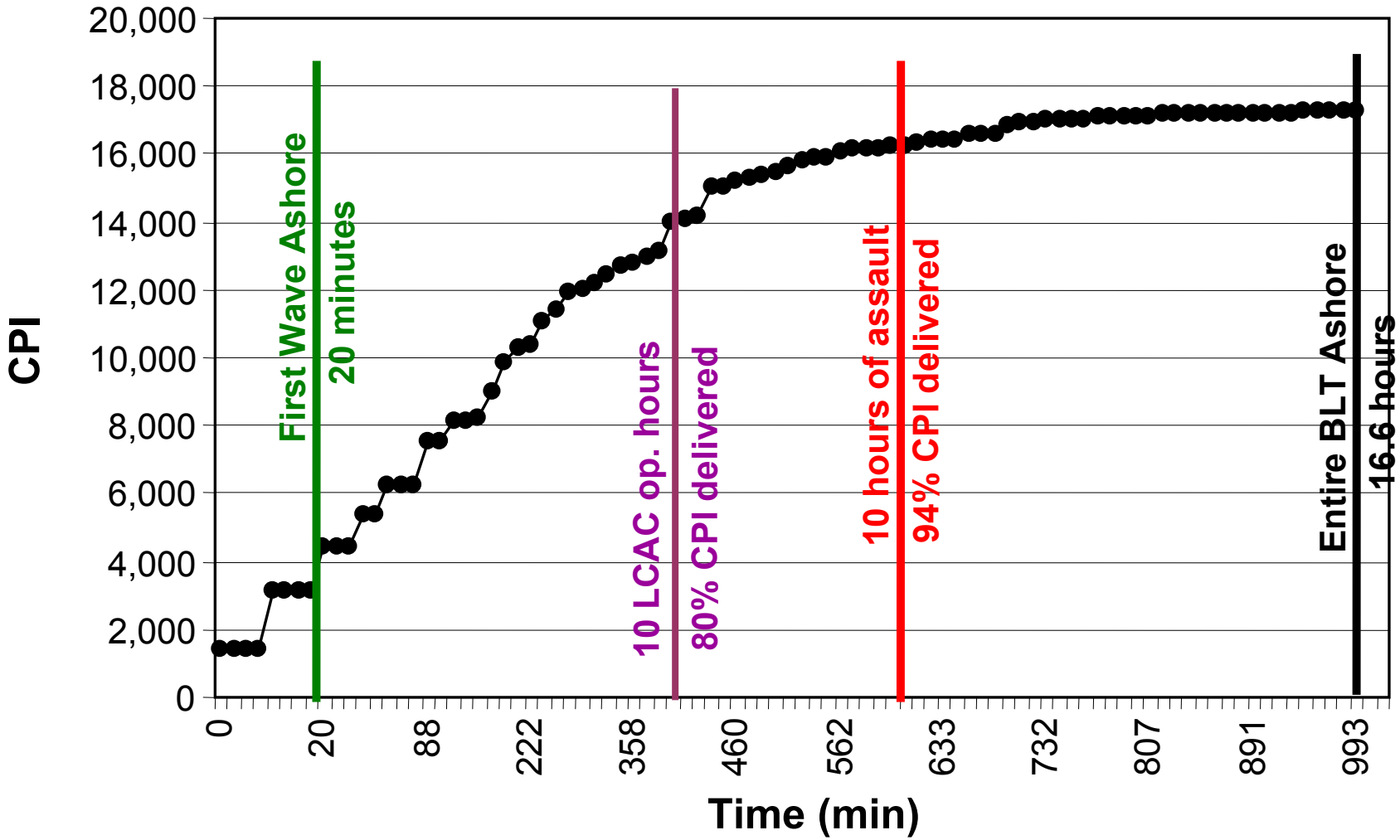


Surface Insertion Model

- 18 LCAC loading at 4 different ships, each ship having a single load point.
- Assumed no combat attrition losses.
- Used the USMC provided landing plan, described as follows:
  - Landing time begins when the first AAAV hits the beach.
    - 88 LCAC loads.
    - First 13 LCAC held until all 13 are loaded, they roll in together.
    - Next 5 LCAC hold until all 5 are loaded, they roll in together.
    - Remaining 70 LCAC loads launch to beach singly as soon as they are loaded.
    - 30 AAAVs launch to coordinate landing just ahead of first LCAC wave.

Surface BLT Landing Results

Combat Power Delivered Ashore



Sustainment Models

- Multiple units at different distances
- there are two day types: sustain and assault, units may be experiencing different types of days at the same time.
- the rates of ammo and fuel consumption vary according to day type, mre and water consumption do not
- the goal for sustainment was to deliver under 10 hrs with the minimum number of aircrafts and ships.

Results

1 ext spot	# of units	# of loads	# of ships	# of CH53	# of V22	# of hrs to complete	# of internal Ch53 loads	#of external CH53 loads	# of internal V22 loads	#of external V22 loads
Korea	6	122	2	7	10	9.95	17	26	32	47
C+30	7	136	2	7	12	9.94	15	34	44	43
C+55	9	132	2	7	10	9.99	19	32	55	26
2 ext spot	# of units	# of loads	# of ships	# of CH53	# of V22	# of hrs to complete	# of internal Ch53 loads	#of external CH53 loads	# of internal V22 loads	#of external V22 loads
Korea	6	122	2	7	9	9.80	17	26	32	47
C+30	7	136	2	7	10	9.78	15	34	44	43
C+55	9	132	2	7	10	9.26	19	32	55	26

Way Ahead

- CNA Report will be issued with official results
- AOA follow on studies as engineering tool for MPF(F)
- Assess variability/volatility of results w/different assumptions