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# *An Overview of the Joint Munitions Planning System*

John R. Hummel and Al L. Winiecki  
Advanced Simulation Technologies Center  
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23 July 2005

Presented to:  
73<sup>rd</sup> MORSS

USA Military Academy  
West Point, NY

## ***Argonne National Laboratory***



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# Briefing Outline

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- Overview of the Joint Munitions Planning System
  - Development History and High Level Overview
  - Operating Environment
  - Key Features
- Examples of JMPS-Developed Sourcing Solutions
- Summary



# ***JMPS Development History and High Level Overview***

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- Sponsored by US Army Field Support Command
- Developed by Argonne National Laboratory
- Began in FY 1999 with Delivery and Transitioning Scheduled for FY 2005.
- Intended as a Replacement for the Fortran-Based Ammunition Distribution System (ADS)

# ***JMPS Development History and High Level Overview (Cont.)***

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- JMPS was Developed to Support Sourcing and Movement Solutions from CONUS and OCONUS to Generate Data to Support TPFDD Development
- The Creation of JOPES Records is Done as a Two Step Process:
  - JMPS Creates External Data Files Containing Cargo Increment Numbers and Movement Data
  - These Data are Used by a Separate Program that Generates the JOPES Records



# ***JMPS Operating Environment***

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- Operates Under Windows OS on a Typical PC Desktop Computer Platform (i.e., no Specialized Equipment)
- Developed Using “Vanilla” Java (i.e., no Proprietary Software)
- Analyst’s Reports Generated Offline Using Crystal Reports



# Key Features of JMPS: Analyst-Oriented User Interface System

The screenshot shows the JMPS application window with a tree view on the left and a main workspace on the right. The tree view includes categories like Study Definition, Study Data, Ammunition Assets, Scenario Definition, and Study Execution. The main workspace displays a splash screen with the text 'Joint Munitions Planning System Version 0.9991' and a background image of a military truck and a ship. Three yellow callout boxes point to specific features: 'Windows Look and Feel' points to the main workspace area; 'Grouping of Data by Logical Types - General Data...' points to the 'User Selectable Study Parameters' folder in the tree view; and 'A Status Box Summarizing Key Data Required in a Study' points to the status bar at the bottom of the window.

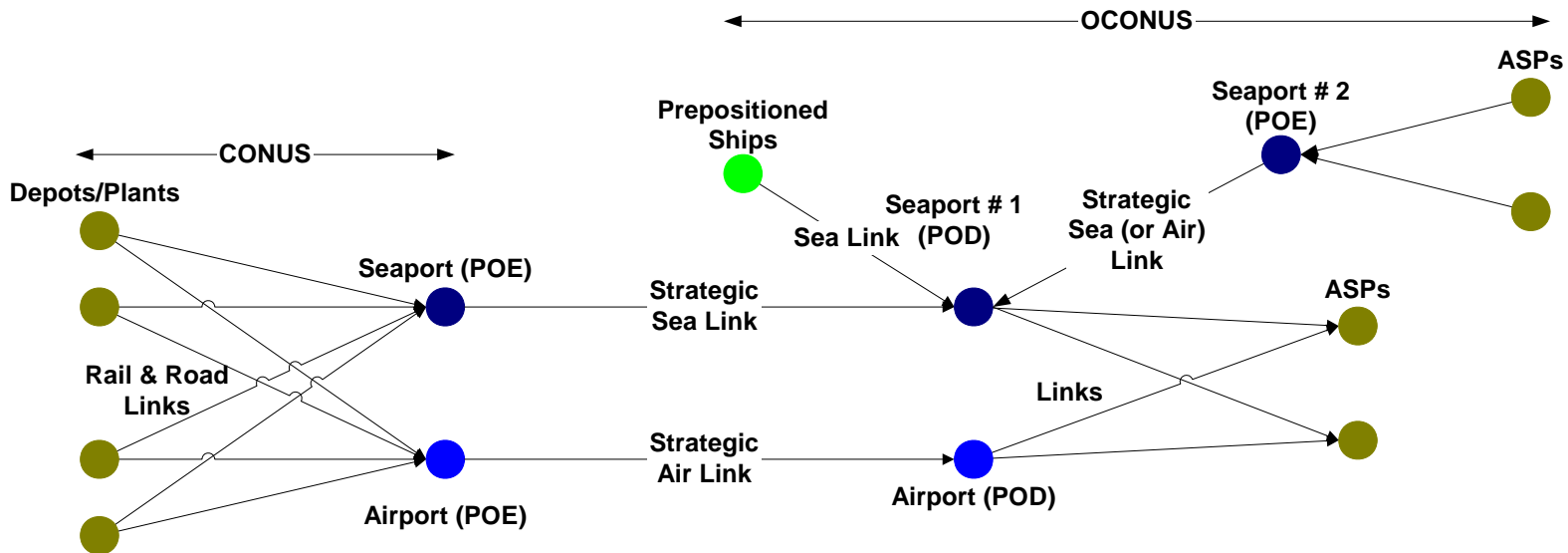
**Windows "Look and Feel"**

**Grouping of Data by "Logical Types" - General Data...**

**A "Status Box" Summarizing Key Data Required in a Study**

Scenarios:0	Sources-CONUS:0	Seaports-CONUS:0	Airports-CONUS:0	# of Ships:0
Start Day:0	Sources-OCONUS:0	Seaports-OCONUS:0	Airports-OCONUS:0	Aircraft types:0
End Day:0	ASPs:0			

# Key Features of JMPS: User Defined Transport Network



## JMPS Transport Network Features

- User-Defined Nodes (Sources, Transfer Nodes, ASPs) and Links
- Drop Shipments to SPOEs and APOEs
- Ammo Production (When Required)\*
- Support for Multiple POD Destinations\*
- Use of Prepositioned Ships as “Floating Nodes”
- Sourcing from Non-Theater OCONUS Locations

\*Future capability



# Key Features of JMPS: User Defined Transport Network – CONUS Source Nodes

The screenshot displays the JMPS software interface. On the left is a tree view with 'Facilities' selected. The main window shows the 'Facilities' tab with a 'CONUS Source Node File' field, a 'Modify Depot' field set to 'Anniston Army Depot, AL (BAD)', and buttons for 'Create New Depot', 'Edit Selected Depot', and 'Remove Selected Depot'. Below this is the 'Outloading Capabilities' section with a table of data.

Start Day	End Day	Peaceti...	Peaceti...	Peaceti...	Peaceti...	Peaceti...	Mobiliza...	Mobiliza...	Mobilizat...	Mobiliza...
0	0	1	6	1	5	10		3	14	26
1	1	3	19	2	15	29		4	29	53
2	2	3	19	2	15	29	5	4	29	53
3	3	4	48	3	39	73	5	4	47	89
4	4	5	72	4	58	108	5	5	58	108
5	5	0	0	0	0	0	5	5	58	108
6	6	0	0	0	0	0	0	0	0	0
7	7	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0
	10	0	0	0	0	0	0	0	0	0
	20	0	0	0	0	0	0	0	0	0

Buttons at the bottom include 'Add/Insert', 'Edit', 'Remove', 'Save Data', and 'Undo Edits'. A status bar at the bottom shows: Scenarios: 1, Sources-CONUS: 15, Seaports-CONUS: 2, Airports-CONUS: 1, # Of Ships: 29, Start Day: 1, Sources-OCONUS: 0, Seaports-OCONUS: 1, Airports-OCONUS: 1, Aircraft Types: 2, End Day: 180, ASP Nodes: 2.

**User can Read in External Default CONUS Source Node Data**

**User can Create/Edit/Remove Source Nodes**

**Each CONUS Source Node is Described with a Set of Editable Outloading Data Based on the DD 1726 Data**

# Key Features of JMPS: User Defined Transport Network – CONUS Transfer Nodes

The screenshot displays the JMPS interface with the following elements:

- Tree View (Left):** Shows a hierarchy including 'Users Guide Test Study', 'Study Definition', 'Scenario Declaration', 'User Selectable Stuc', 'Study Data', 'Facilities', 'Ammunition', 'Transfer No', 'CONUS', 'OCONUS', 'ASPs', 'Transportation D', 'Transportation A', 'Network', 'Ammunition Assets', 'Scenario Definition', 'Study Execution', and 'Study Results'.
- Main Workspace:**
  - Buttons: 'Load File', 'Create New Seaport', 'Edit Selected Seaport', 'Remove Selected Seaport'.
  - Form fields: 'CONUS Seaports File: [Browse...]', 'Modify Seaport: Beaumont, TX (2E1)', 'Facility Acronym:', 'RIC Code:'.
  - Table:
- Table:**

Start Day	End Day	# BB Berths/Day(future ...	Days to Load a 30,000 S...	Berths/Day(fu...	Days to Load a 1000 Co...
1	180	3	50	3	5

**Status Bar (Bottom):**

- Scenarios: 1
- Sources-CONUS: 0
- Seaports-CONUS: 0
- Airports-CONUS: 0
- # Of Ships: 0
- Start Day: 1
- Sources-OCONUS: 0
- Seaports-OCONUS: 0
- Airports-OCONUS: 0
- Aircraft Types: 0

**User can Read in External Default CONUS Transfer Node Data**

**Each CONUS Transfer Node is Described with a Set of Editable Ship Loading Times Based on a Default Container and Break-bulk Ship**

**User can Create/Edit/Remove CONUS Transfer Nodes**

# Key Features of JMPS: User Defined Transport Network – Transportation Network Linkages

The screenshot displays the JMPS software interface with several callout boxes highlighting key features:

- PODs and PODs**: Points to the 'New Air Force and M...' menu item in the left sidebar.
- OCONUS Sources and ASPs**: Points to the 'CONUS Source to CONUS Port Road/Rail Links' tab in the main window.
- CONUS Sources and SPOEs/APOEs**: Points to the 'CONUS Sources' section in the left sidebar.
- PODs and ASPs**: Points to the 'CONUS Sources' section in the left sidebar.
- POEs and PODs**: Points to the 'CONUS Port to OCONUS Port' tab in the main window.

The main window shows a list of 'Link Start' and 'Link End' locations, including various military depots and airbases. An 'Edit Link' dialog box is open, prompting the user to enter the number of days for the link, with input fields for 'Road' (1) and 'Rail' (5). The 'Created Links' section at the bottom shows a link from 'Anniston Army Depot, AL' to 'Beaumont, TX'. The status bar at the bottom provides summary statistics:

Scenarios: 1	Sources-CONUS: 15	Seaports-CONUS: 2	Airports-CONUS: 1	# Of Ships: 29
Start Day: 1	Sources-OCONUS: 0	Seaports-OCONUS: 1	Airports-OCONUS: 1	Aircraft Types: 2
End Day: 180	ASP Nodes: 2			

# **Key Features of JMPS: Use of “Real-World” Transport Asset Data**

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- Shipments can be Transported on 16 Default Ship Classes or on User-Defined Ships
- The # of Ships Available are User-Defined as are Their Initial “In-Port” Disposition



Photo of MV Green Wave

## **MV Green Ridge**

- Length: 507'
- # of Holds: 1
- Hold Length: 507'
- Hold Width: 70'
- Hold Height: 27'
- Maximum # of Containers: 450
- Maximum Cargo Weight: 12,290 LT
- Maximum Speed: 17 knots

# Key Features of JMPS: Use of “Real-World” Transport Asset Data

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- Shipments can be Transported on 11 Default Aircraft Classes (4 Military and 7 Commercial) or on User-Defined Aircraft
- The # of Aircraft Available per Day are User-Defined



## **C-17 Globemaster III**

- Cargo Compartment: 1,056” L X 148” H X 216” W
- Pallet Positions: 18
- Maximum Cargo Capacity: 170,000 lbs.

# ***Key Features of JMPS: Use of “Real-World” Transport Asset Data***

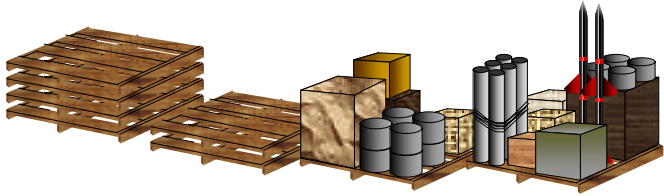
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- Default Data for Container and Break-bulk Trailers and Railcars are Provided
- A 20' Container is Taken as the Standard Container
- There is an Implicit Assumption that Sufficient Quantities Exist of Containers, Trucks, and Railcars



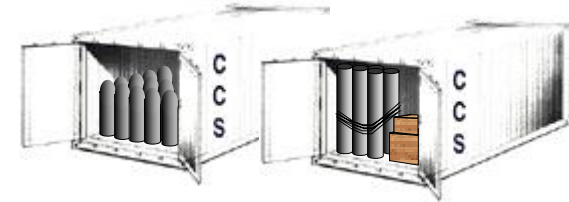
# Key Features of JMPS: Explicit Stuffing of Containers

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"Assets"

...are stuffed into...



"20' Containers"

- User can Modify Container Parameters (e.g. Container Specifications, Cargo Weight, Pallet Size and Weight, Amount of Dunnage, etc.)
- Single DODACs are Stuffed in a Container (Stuffing of Multiple DODACs was Designed, but Currently not Used)
- Support for Cropable Items has been Deferred



# Key Features of JMPS: User Controlled Processing – Defining the Transport Allocations

Ship Class	Number Available to Study
MV 1st Lt Harry L. Martin Class	4
SS Green Valley Class	4

The User Defines the Initial Distribution of Ships in Port and How Long it will Take Ships to Reach Port

The User Defines the # of Each Ship Class Available for the Study

By Aircraft Type, the User Defines the # of Aircraft Available per Day

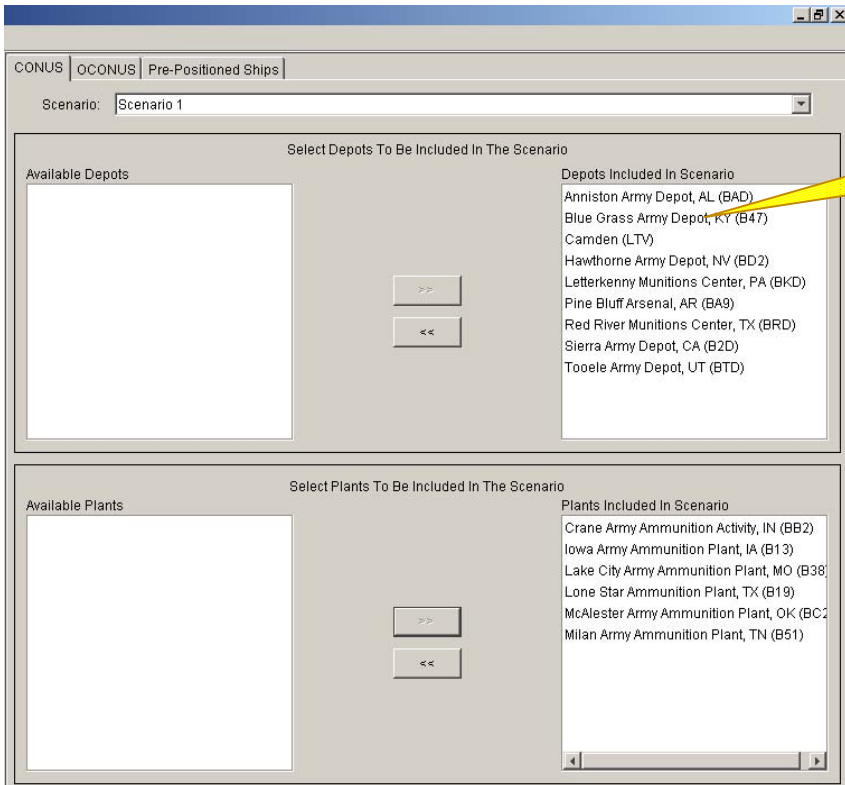
Start Day	End Day	Number Available
1	30	1

The Aircraft Allocation can Vary During the Course of a Study

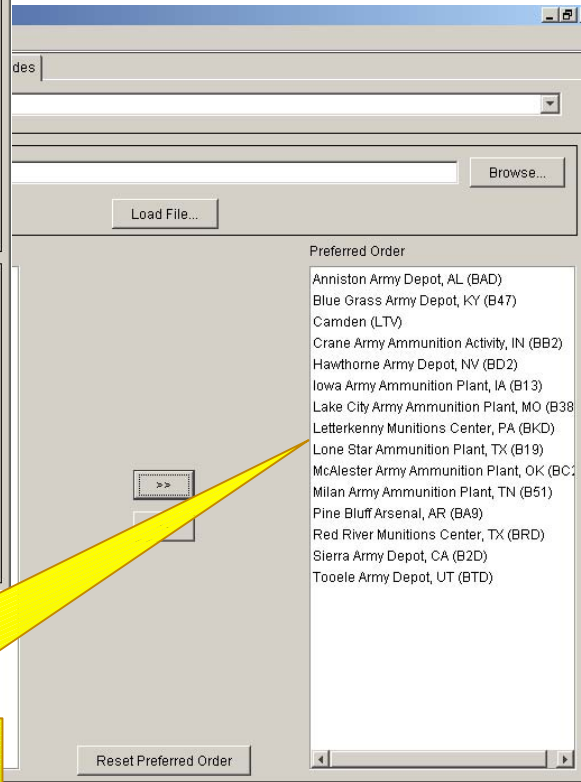
Start Day	End Day	Number Available
1	30	1
45	75	1

# Key Features of JMPS: User Controlled Processing

## – Defining the Ordering of the Network Nodes



**For Each Scenario in a Study, the User Selects the Sources that can be Used...**



**...and the Preferred Order in Which they will be used**

# Key Features of JMPS: Information Rich Environment

## “On Screen” Review of Solutions

ORIGINAL REQUEST																				
Reque...	Scena...	DODA...	Nome...	Air/Gr...	Ammo...	Service	Projec...	Desig...	Move...	Priorit...	Final D...	Final ...	Final D...	Quanti...	RDD	Soluti...	Numb...	Numb...	Total ...	Over/...
F00002	Scenar...	1325F...	BOMB ...	A	watch ...	F	AF1	A	H	2	Saudi ...	ASP	SA1	917	25	C	3	watch ...	918	1

SOLUTIONS																						
S...	Source	So...	Item Sou...	Prime...	Im...	Q...	Nu...	Weight	S...	S...	SOU...	POE ...	PO...	A...	L...	Transport Name	POD...	PO...	Arr...	Unl...	ET...	Da...
1	Crane Army ...	BB2	1325F275	PRIME	A	82	0	167157.00	20	20	Truck	Dover ...	DOV	21	22	C-17 Globemaster - Instance 1.22	King ...	KFD	23	23	25	0
2	Crane Army ...	BB2	1325F275	PRIME	A	82	0	167157.00	21	21	Truck	Dover ...	DOV	22	23	C-17 Globemaster - Instance 1.23	King ...	KFD	24	24	26	-1
3	Crane Army ...	BB2	1325F275	PRIME	A	82	0	167157.00	22	22	Truck	Dover ...	DOV	23	24	C-17 Globemaster - Instance 1.24	King ...	KFD	25	25	27	-2
4	Crane Army ...	BB2	1325F275	PRIME	A	82	0	167157.00	23	23	Truck	Dover ...	DOV	24	25	C-17 Globemaster - Instance 1.25	King ...	KFD	26	26	28	-3
5	Blue Grass A...	B47	1325F128	SUBS...	C	60	3	44825.00	1	1	Rail	Militar...	1N4	6	8	MV Green Ridge Class - Instance 2	Ad D...	PF3	29	31	33	-8
6	Blue Grass A...	B47	1325F270	SUBS...	C	60	3	122310.00	1	1	Rail	Militar...	1N4	6	8	MV Green Ridge Class - Instance 2	Ad D...	PF3	29	31	33	-8
7	Crane Army ...	BB2	1325F275	PRIME	C	372	47	33322.00	14	14	Rail	Militar...	1N4	21	23	MV Green Ridge Class - Instance 4	Ad D...	PF3	44	46	48	-23
8	McAlester Ar...	BC2	1325F128	SUBS...	C	136	17	23322.00	14	14	Rail	Militar...	1N4	21	23	MV Green Ridge Class - Instance 4	Ad D...	PF3	44	46	48	-23

Separate Records when Split Shipments are Required

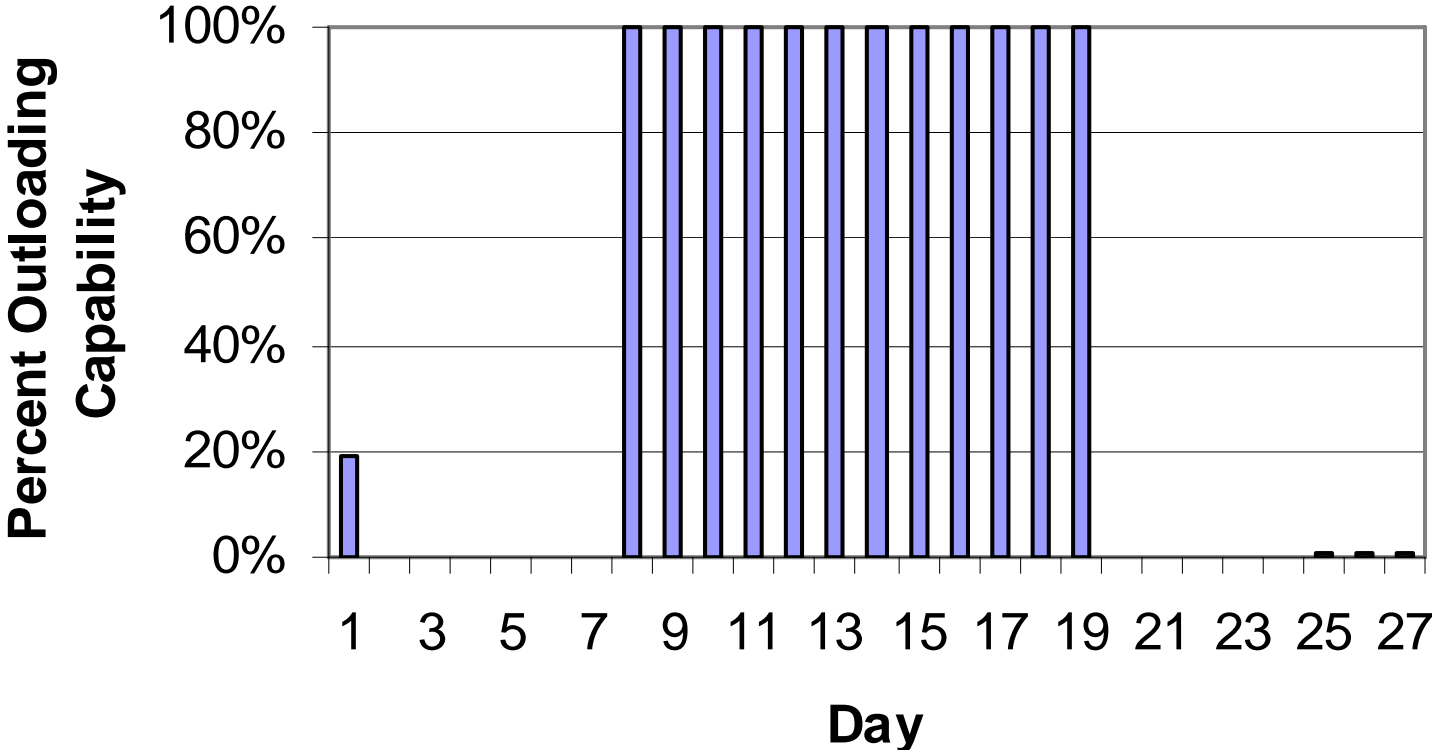
Describes if the Item Shipped was a “Prime” or “Substitute” Item



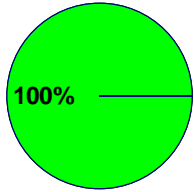
# ***JMPS Information Rich Environment Enables Insight into Depot Outloading Issues***

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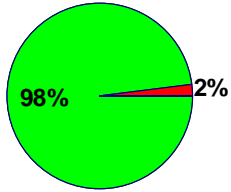
## **Crane Army Ammunition Plant**



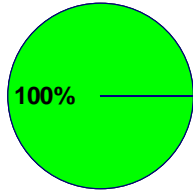
# JMPS Information Rich Environment Enables “Better” Transport Allocation Solutions



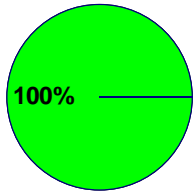
MV Green Ridge # 1



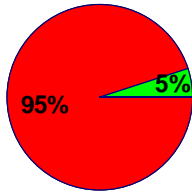
MV Green Ridge # 2



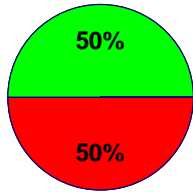
MV Green Ridge # 3



MV Green Ridge # 4



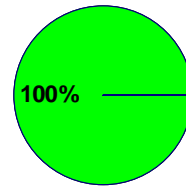
MV Capt Steven I. Bennett # 1



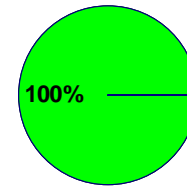
MV Capt Steven I. Bennett # 2

A “Smarter” Initial Distribution of Ships with Fewer Ships in Port at the Beginning Maximizes Ship Usage

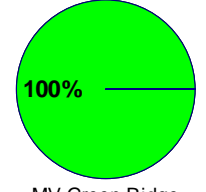
In JMPS, the Controlling Factor is the Initial Distribution of Ships Assumed in Port at the Beginning of a Study



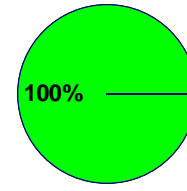
MV Green Ridge # 1



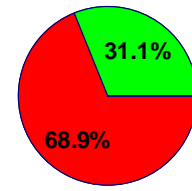
MV Green Ridge # 2



MV Green Ridge # 3



MV Green Ridge # 4



MV Capt Steven I. Bennett # 2

# ***An Example of a JMPS Sourcing Solution: Air Force and Marine Study***

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- High Level Overview:
  - 458 requests involving two ASPs
  - Air window created for days 1 to 30 (1 C-5/day for days 1 – 5 and 1 C-17/day for days 6 – 30)
  - Nine classes of ships created
  - Substitute items included
  - 151 requests unsatisfied in whole or in part



# ***JMPS Sourcing Solution: Air Force and Marine Study – High Level Overview***

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- 15,771,608.13 lbs of drop shipments
- 4,557,240.20 lbs of air shipments
  - 2 C-5 flights, 89 & 98 % full
  - 25 C-17 flights, 97-98% full
- 2,753 containers on 4 ships holding 72,228,324.75 lbs. of cargo
  - MV Capt Steven L. Bennett, 1,336 containers, 70% full
  - MV Green Ridge, 450 containers, 100% full
  - 1<sup>st</sup> SS Austral Rainbow, 840 containers, 100% full
  - 2<sup>nd</sup> SS Austral Rainbow, 127 containers, 15% full



# ***JMPS Sourcing Solution: Air Force and Marine Study – High Level Overview***

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## **Sourcing Summary**

<b>Source</b>	<b>lbs</b>	<b># containers</b>	<b>Avg % Booked</b>
Anniston	1,012,241	58	2.0
Blue Grass	948,419	39	1.6
Crane	73,200,233	2,003	86.5
Hawthorne	833,840	48	1.0
Letterkenny	284,540	22	0.8
McAlester	12,251,720	384	6.0
Pine Bluff	598,516	24	0.3
Red River	22,398	2	0.1
Sierra	261,933	16	0.2
Tooele	3,203,329	157	3.9



# Summary

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- JMPS will Provide AFSC/JMC with an Advanced Tool for the Deliberate Planning of Class V Materiel
- A JMPS Study Uses “Real World” Data and “Business Practices”
- JMPS has been Developed for the Analyst to Enable Her/Him to Quickly Set Up a Study, Run it, and Analyze it
- JMPS Tools are Being Provided to Enable the Analyst to Understand *How* and *Why* a Sourcing Solution was Achieved



# Questions???

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