

# The High-Speed Ship/Agile Port System In The Commercial / Military Market



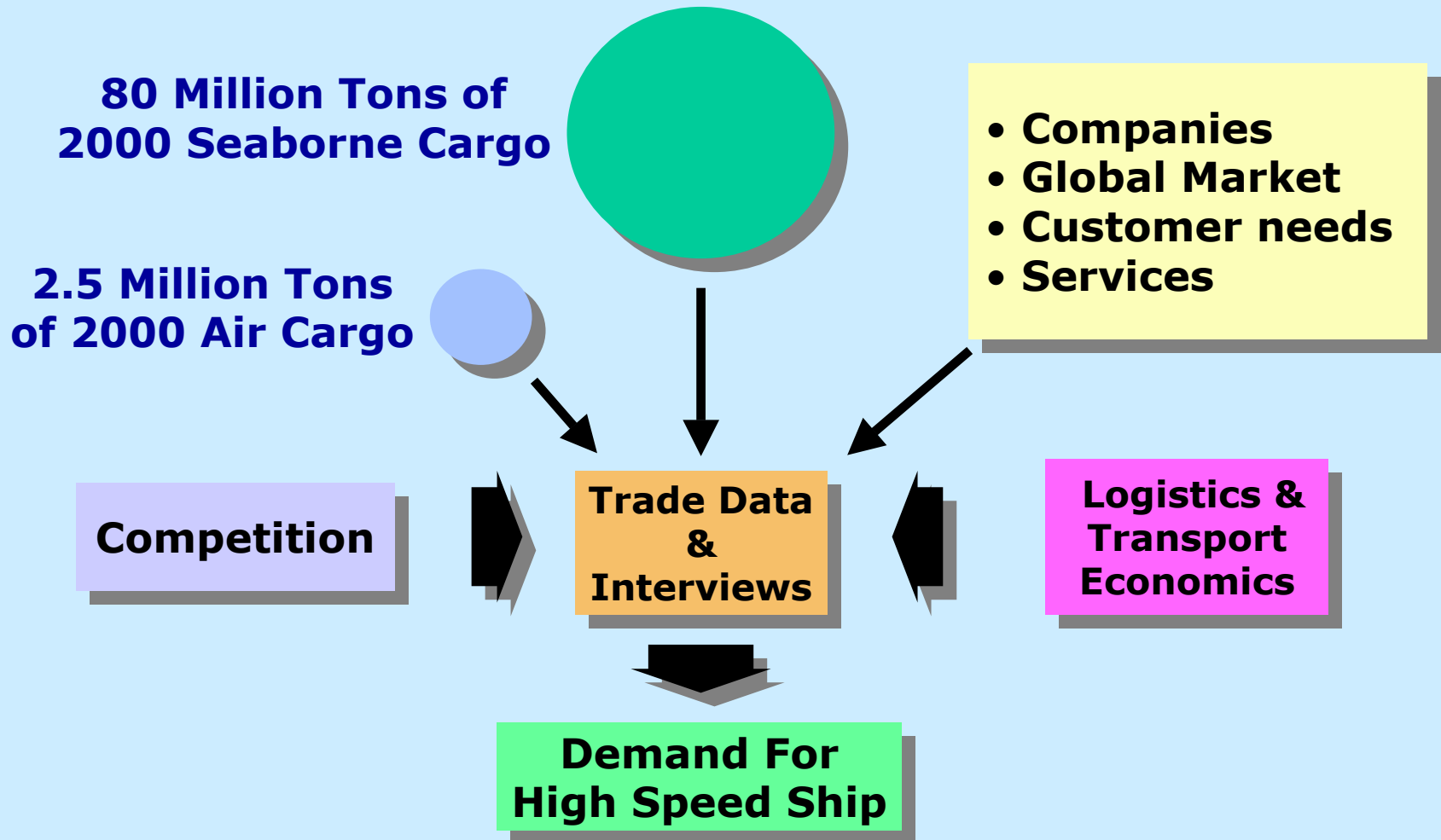
# Introduction

- Research Objective: Test the commercial viability of a High-Speed Ship/Agile Port (HSS/AP) system in the Transpacific
- Initial Concentration on:
  - *Demand for HSS/AP service by shippers*
  - *Sensitivity to price, deployments, costing*
- What is the potential for shippers to divert cargo from existing modes to HSS/AP?  
Why?

# Current Research Efforts are Focused on:

- Potential customers
  - *Retailers, manufacturers and wholesalers*
  - *By Value or “Perishability” of commodity*
- Discussion drivers for modal and logistics choices
- Sensitivity to price and logistics options
- Commercial and military applications
- Logistics and operational simulation
- Infrastructure analysis

# Trade Data Is The Foundation From Which Demand Is Derived



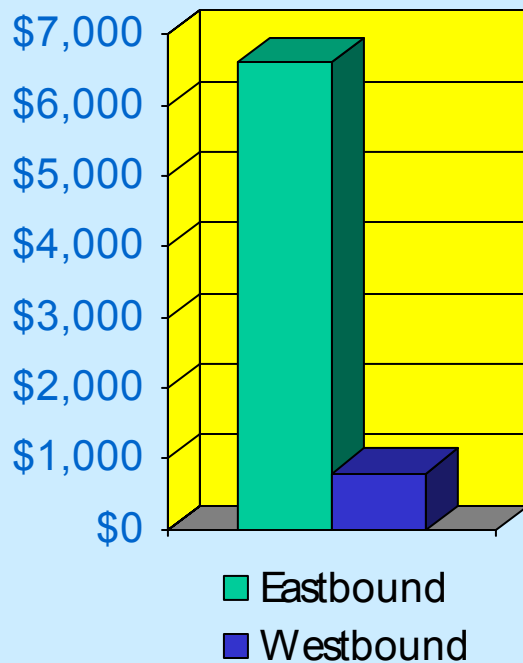
# Size and Composition of the Transpacific Market

# The Transpacific Market

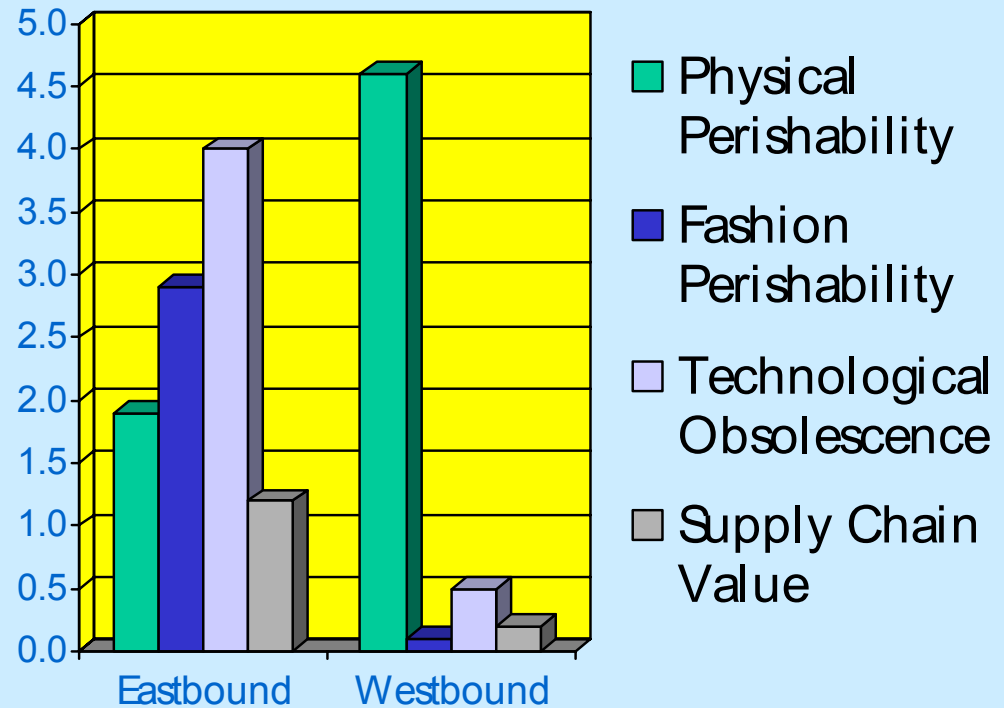
- World's largest container market - approximately 11million TEUs annually
- Relatively high concentration of high-volume, time-sensitive merchandise
- History of substitution of modes: air for ocean and vice-versa

# Value and Perishability Are More Prominent in the Eastbound Direction

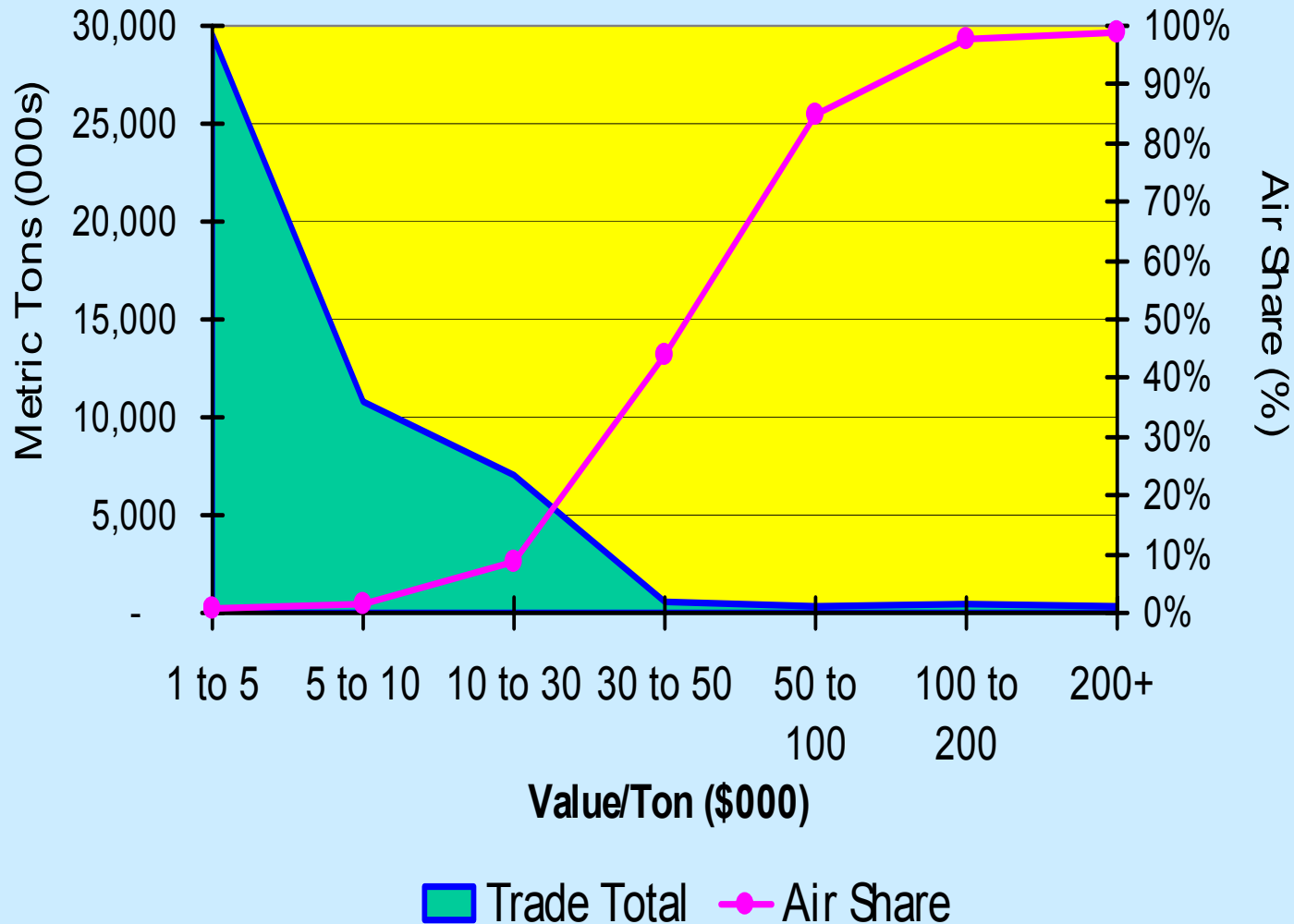
Top 5 Commodities' Value Per Ton



Metric Tons (millions)



# Air Share Increases With Commodity Value



# **Shipper Receptivity to the High Speed Ship/Agile Port Concept**

# The Sample Was Import-Oriented With Broad Industry Representation

## Industry and Transpacific Import/Export Mix of Sample (Number of Respondents)

Industry	Mainly Import	Mainly Export	Mixed	Total
Automotive	10	3	3	16
Retail/Footwear/Apparel	18	2	1	21
Food & Beverage	4	10	-	14
Electronics	13	5	1	19
High Tech	11	3	2	16
Medical/Pharmaceutical	1	5	2	8
Chemicals	-	9	3	12
Heavy Industry	-	10	1	11
Other Manufacturing	24	22	1	47
Textile	8	2	-	10
Other	10	13	4	27
<b>Total</b>	<b>99</b>	<b>84</b>	<b>18</b>	<b>201</b>

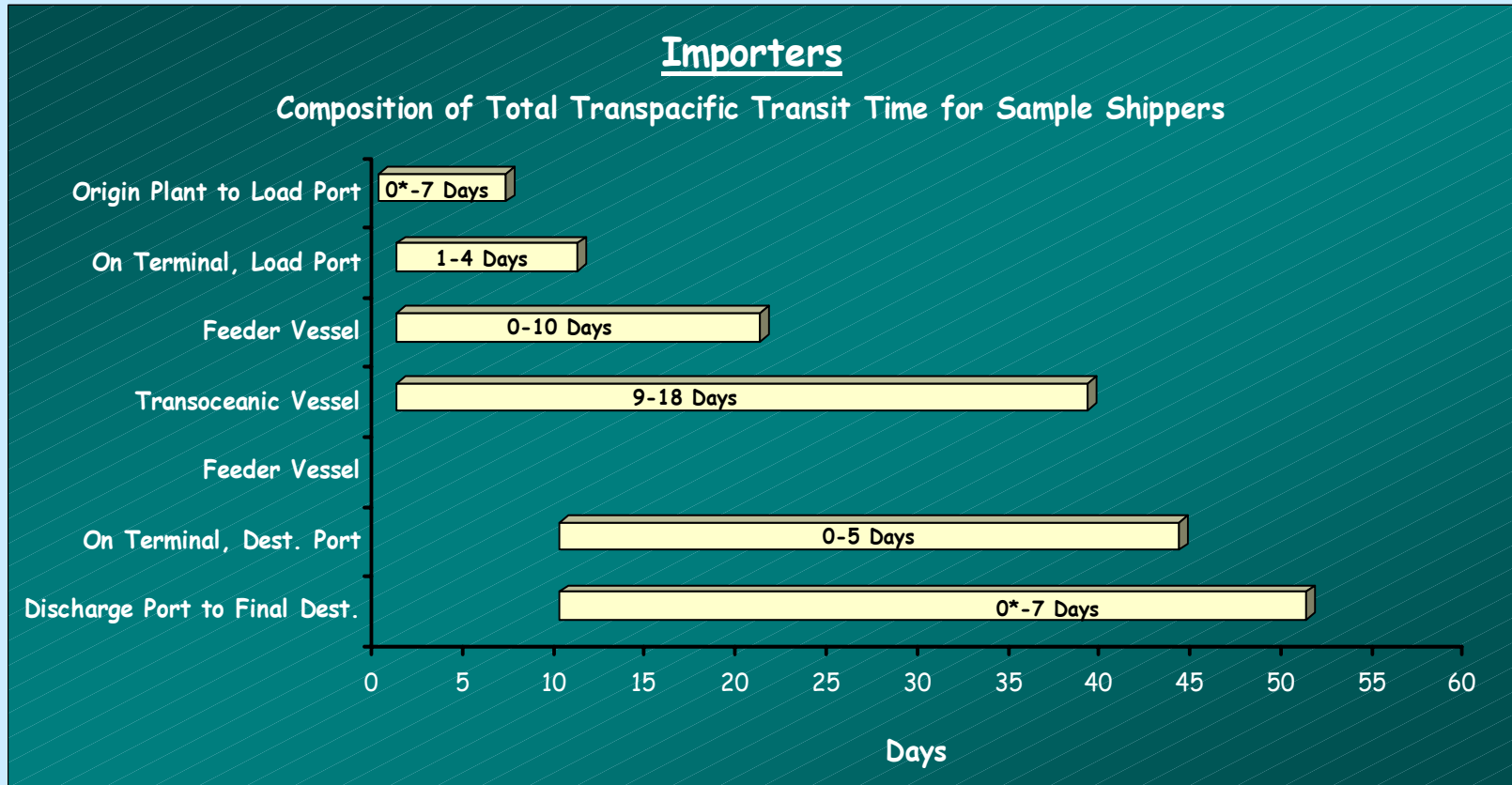
# A Majority of Shippers Have a Door-to-Door Perspective

- Most respondents, exporters and importers, purchase international transportation from the point of origin (typically a manufacturing plant) to destination (typically a distribution center), or door-to-door
- However, a significant minority, mainly exporters, purchase on a port-to-port basis

## *Distribution of Ocean Freight Movements*

	<u>% of Respondents</u>	<u>% of Volume</u>
Door-to-door	62	53
Door-to-port	7	7
Port-to-door	7	18
Port-to-port	24	22

# The Ocean Portion Is Usually Less Than Half of Total Transit Time



*\* For port-to-port shipments, inland transit time is not relevant*

*Source: Interview data; Manalytics estimates*

# **Impact of the High-Speed Ship/Agile Port on Shipper Supply Chains**

# Participants in In-Depth Analysis: Five Distinct Segments

- The Phase 1 analysis suggests that the potential demand for HSS/AP can be grouped into five segments, each representing a significant portion of the Transpacific trade
- The in-depth analysis includes 30 companies, representing the five segments as follows:
  - *Consumer Goods Retailers (6) – general merchandise (3), household furnishings (2) and apparel*
  - *Plant-to-Plant Shippers of Raw Materials and Semi-Finished Goods (6) – automotive, computers, chemicals, machinery(2), electronics*
  - *Manufacturer/Wholesalers (12) – footwear (2), apparel (2), textiles, motors, electronics (3), musical instruments, toys and toiletries*
  - *Refrigerated Food Products Shippers (3) – fish, meat, fruits & vegetables*

# Retailers: Response to HSS/AP Offerings

Percentage Diversion to HSS/AP - Based System							
Potential Benefits of HSS/AP	Price Premium = \$1,500 per FEU				Price Premium = \$3,000 per FEU		
	Days Saved				Days Saved		
	6	8	10		6	8	10
<b>Reduction of In-Transit Inventory</b>	5%	7%	12%		0%	0%	2%
<b>Avoidance of Retail Markdowns</b>	12%	15%	21%		3%	6%	8%
<b>Reduction in Warehouse Inventory</b>	2%	2%	3%		0%	0%	1%
<b>Total Diversion</b>	18%	24%	36%		3%	6%	11%

*Note: Diversion estimates are derived on an incremental basis to avoid double counting*

# 2000 HSS "Unconstrained" Market with 40/50-Knot Ship & 50% Price Premium

<u>Diverted From:</u>	Mtons (Millions)	
	<u>40 knots</u>	<u>50 knots</u>
Transpacific EB Surface 3.7	2.5	
Transpacific WB Surface	0.5	0.9
Transpacific EB Air	0.3	0.4
Transpacific WB Air	0.2	0.2
<b>Subtotal</b>	<b>3.5</b>	<b>5.2</b>
Logistics Considerations 1.0	0.7	
<b>Subtotal</b>	<b>4.2</b>	<b>6.2</b>
<b>Intra-Asia</b>	TBD	TBD
<b>Total</b>	<b>4.2+</b>	<b>6.2+</b>

# Potential Military Applications



# There Are Specific Military Requirements In The Sea-Lift Sector

- Speed over a long distance: 40 knots may be acceptable for shorter lanes and smaller vessels, but 60 knots is the goal for main-line ocean sea-lift.
- Roll-on roll-off capability: the anticipated conflict is not in a developed country with shoreside infrastructure in place, but rather in locations where the sea-to-land transfer must be self sustaining.
- Heavy lift: a variety of cargo types would travel by sea, and a significant portion of these cargoes will be tanks, humvees, artillery and heavy machinery, requiring reinforced decks and a 70-ton stern ramp. Heavy lift containers are also part of the logistics profile and hence of the ship design.

# Specific Military Sea-Lift Requirements (continued)

- Flexibility to perform operations at sea: the time spent reaching destination would be used for all types of on-board operations, including vehicle outfitting, materials sequencing, maintenance, and parts assembly.
- Helicopter operations: the Chinook is the workhorse for lifting vehicles and equipment, and a helo flight deck would be required on board, for off-shore use. Helo storage and maintenance capability is also required.
- Ships' gear: to handle heavy cargoes and perform simultaneous operations at shoreside.

# Specific Military Sea-Lift Requirements (continued)

- Human cargoes (supercargoes): some 50-75 personnel would be a reasonable complement for a ship in the Pacific lanes.
- Command and control suite: for the commanding officer, staff, and support equipment.
- Computer and communications capability: related to the command and control requirement, but also with the capability to manage/ track/ highlight any and all of the materials and equipment on board.
- Tactical flexibility: responsiveness of the vehicle to adapt to changing scenarios and requirements.

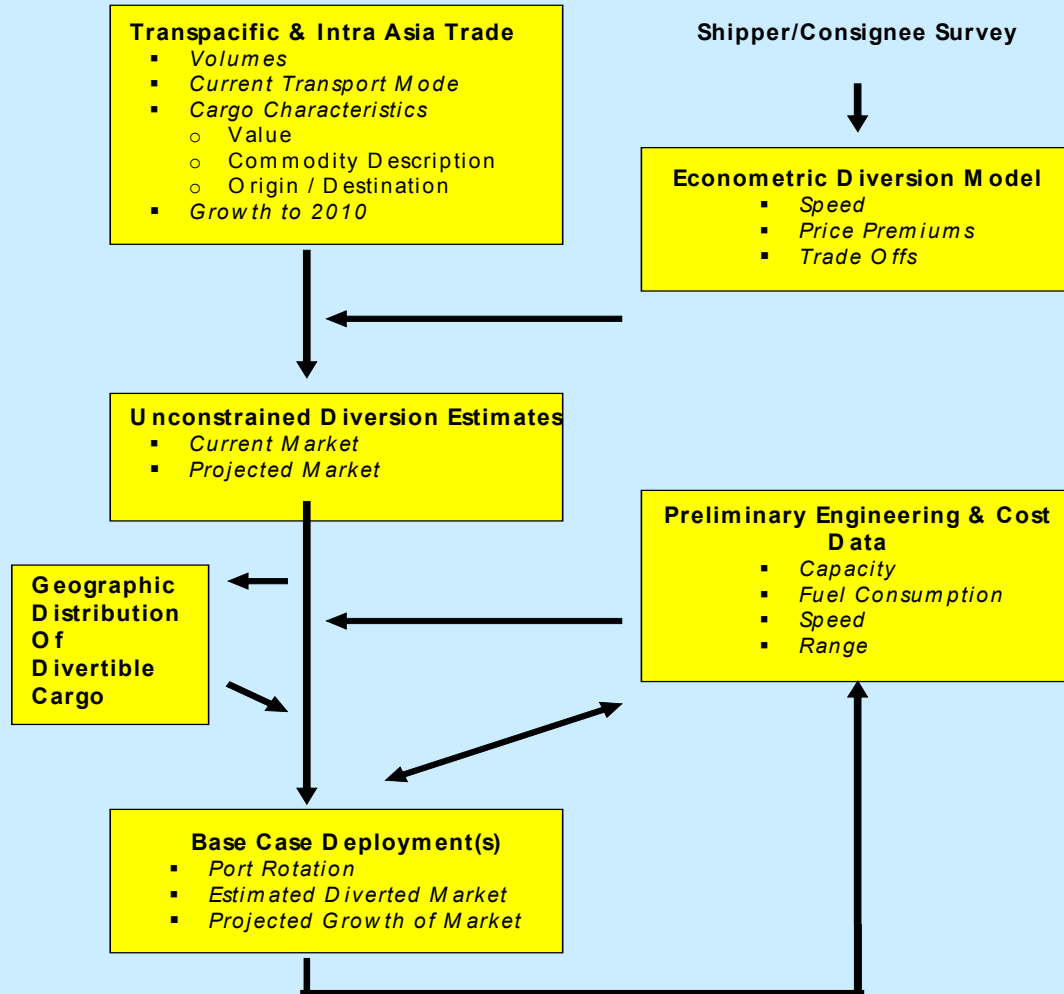
# **Logistics and Operations Simulation**

# Deployment Development Process

- Deployment objective is to divert cargo from current pool of available air and ocean cargo onto the HSS/AP logistics solution
- Deployments simulate real-world environment
- Scenario development enables sensitivities to service, cost and price to be understood

*Critical to the analysis are the assumptions on vessel speed, operating costs, capital cost, range and payload*

# Deployment Analysis Process



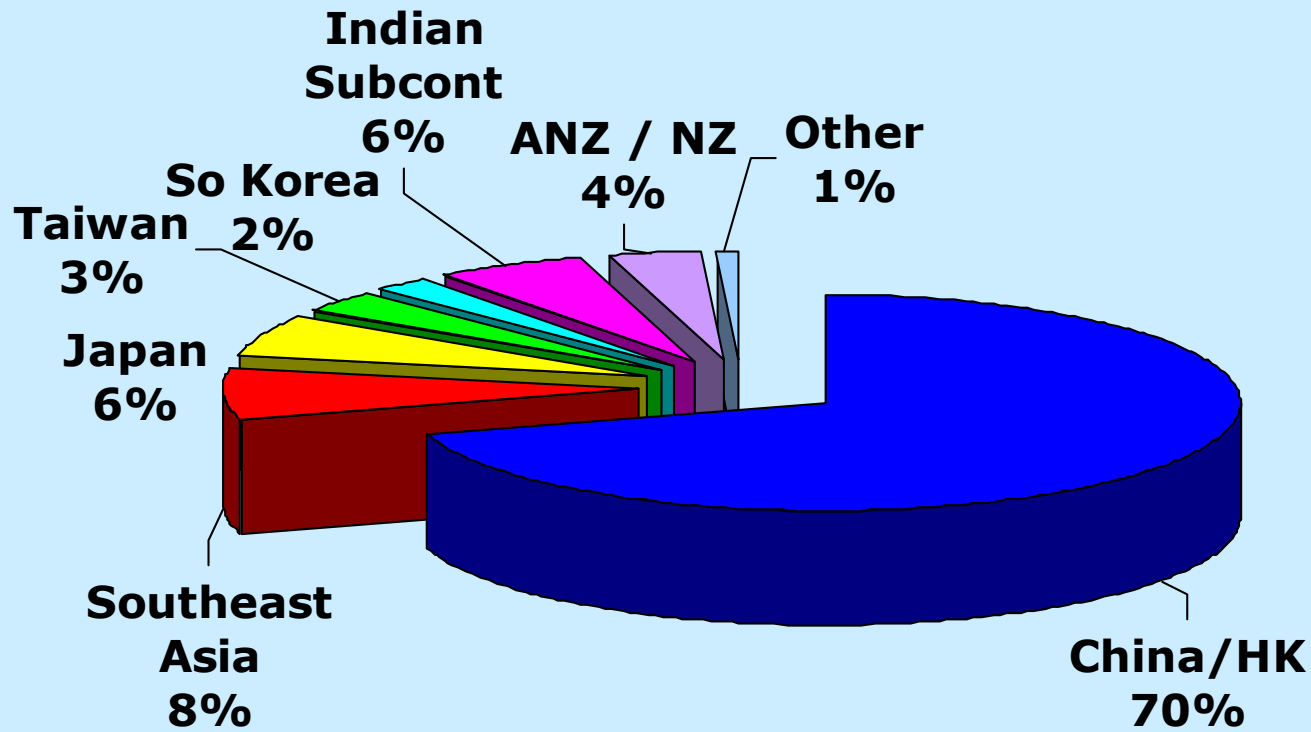
# Manalytics Made Projections of Future Surface Volumes

## *Transpacific Surface Volumes*

<b>Transpacific Market</b>	<b>2000 A</b>	<b>2006 F</b>	<b>2010 F</b>
Eastbound Mtons (MM)	44.7	56.5	70.6
<i>CAGR</i>		4.0%	5.7%
Westbound Mtons (MM)	35.1	47.6	60.7
<i>CAGR</i>		5.2%	6.3%
Total Trade Mtons (MM)	79.8	104.1	131.3
<i>CAGR</i>		4.5%	6.0%

# Eastbound Projections Were Also Made by Country of Origin

## 2010 US Surface Import TEU by Asian Origin



# Vessel Characteristics Used in the Base Case Logistics Scenario

## *Vessel Specifications Utilized in Base Case Deployment Simulations*

Vessel Max Service Speed	55 knots
Vessel Avg. Service Speed	50 knots
Capacity	1,700 TEU
Range (@ max capacity)	3,500 nmi
Fuel Burn/Hour @ 50 knots	58 tons
Capital Cost	USD \$105-\$150 MM
Load / Discharge Speed	70 – 80 lifts per hour

*Source: Kvaerner Masa, FastShip Atlantic, Band, Lavis & Associates, Manalytics estimates*

# Freight Rate Performance Is Critical to the Evaluation

## *Transpacific Ocean Freight Rates per TEU for HSS "Premium" Cargo*

<b>Transpacific Rates per TEU</b>	<b>Eastbound</b>	<b>Westbound</b>	<b>Intra- Asia</b>
Current Ocean Rate*	\$1,110	\$600	\$595
Est. Current HSS Rate**	\$1,730	\$990	\$980
Projected 2006 HSS Rate**	\$2,080	\$1,140	\$1,130
Projected 2010 HSS Rate**	\$2,280	\$1,200	\$1,180

\* *Excludes the inland portion of the freight rate for intermodal cargoes, i.e. "ocean freight only"*

\*\* *Assumes a 50% premium on surface-diverted cargo and 75% discount on air-diverted cargo; for Westbound, only one-half of surface-diverted cargo is premium-priced*

# The Base Case Logistics Scenario Focused on These Critical Ports

*LA – DH – YK – HK – SHG – YK – DH – LA*



# Alternative Scenario Descriptions

1. 50 knots / 50% price premium with a Southeast Asia vessel call
2. 40 knots / 50% price premium with same deployment as base case
3. 40 knots / 50% price premium with a Southeast Asia vessel call
4. 50 knots / 60% price premium with same deployment as base case
5. 2,000 TEU vessel with the same deployment as base case
6. Doubling the lifts per hour with the same deployment as the base case (50 knot vessel)

# Scenario Results Comparison

Scenario #	# of Vessels Req'd	Annual # of Full TEU Carried*	Transpac Market Share**	Est '06 Rev (\$MM)	Annual Fuel Consumption (000's tons)
Base	7	477,200	2.6%	\$735.6	2,408.6
1	8	624,100	2.6%	\$902.4	2,869.3
2	8	322,500	1.5%	\$457.7	2,439.7
3	10	468,100	1.4%	\$623.3	3,906.4
4	7	355,000	1.7%	\$554.7	2,408.6
5	7	542,200	2.9%	824.3	2,699.3
6	6***	477,200	2.6%	\$735.6	2,408.6

\* Includes both transpacific and Intra-Asia cargoes

\*\* Share calculated against estimated 2006 volumes (excluding Intra-Asia volumes)

\*\*\* Contingency had to be reduced from 10% to 8% to allow for a savings of one vessel

# Next Steps in the Evaluation

- Infrastructure analysis
  - *Ports*
  - *Cargo handling*
  - *Inland transportation*
  - *IT and management*
- Completion of commercial and military supply chain analyses
- Enterprise analysis
  - *Economic and logistical viability*
  - *Scenario development*
  - *Investment vehicle*

# Considerations for 2003

- Commercial applications of the concept outside of the Pacific
- Military applications of the concept
- Impact of security on the international supply chain and the requirements / opportunities for the High Speed Ship / Agile Port door-to-door concept