TransOutlook

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# Panama Canal Expansion and U.S. Seaports:
## The Hub and Spoke Approach

### Outlook:
#### Atlantic Coast Ports in a Transshipment Network

An alternate approach to the now intense competition among Atlantic Coast ports is the hub-and-spoke network. As part of a National Freight Policy, a system-wide approach to seaport evaluation should be undertaken. What if two or three ports on the Atlantic and Gulf coasts are provided the United States' severely limited resources for infrastructure investment? One or two ports are absolutely ready or nearly ready for this anticipated increase of Atlantic Coast trade and transport activity via an expanded Panama Canal. We can return to the notion of maritime port hubs and spokes at least for the Panama Canal scenario. This could be considered a U.S. port hub-and-spoke approach to mitigating the impacts of the Panama Canal expansion on the U.S. freight infrastructure. This *TransOutlook* briefly describes this alternate scenario in light of current trends and available data.

American Public Media, Marketplace Economy, Panama Canal expansion brings competition for East Coast ports. Available at: http://www.marketplace.org/topics/economy/panama-canal-expansion-brings-competition-east-coast-ports as of January 29, 2013.

### U.S. Cargo Passing through the Panama Canal
(Millions of long tons)

| Market | From | To | Intra | Total |
|---|---|---|---|---|
| United States | 92.7 | 49.3 | 1.6 | 143.6 |
| Panama Canal Total | | | | 218.1 |
| U.S. Share of Total | | | | 65.8% |

SOURCE: Panama Canal Authority, www.pancanal.com/eng, May 2013.

### *Inside*



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# Super Large Ports

## In 2012, the Panama Canal handled more than 12.2 million TEUs of cargo carried by Panamax vessels of 4,500 to 5,500 TEUs, the maximum size for the Canal.

Ocean carriers are likely to pick one or two ports for the routing of their large ships via an expanded Panama Canal. This has been a global standard of operation for decades where super large ports such as Hong Kong, Singapore, and Rotterdam serve as regional load centers. Because carrier vessels cannot dock everywhere, continuing the current U.S. industry practice where vessels make successive calls to ports along its selected trade lane will not be economically feasible or efficient. Once these one or two key ports are selected, carriers will then unload all or most of their import cargo and potentially pick up U.S. exports and leave the United States for points around the world. These cargoes could then be transported to other ports on some revenue sharing basis before they are hauled to the final inland destinations via rail or truck. Such a scenario would ensure that the U.S. ports get a good proportion of the expected increase in Panama Canal big ship activity starting mid-2015.

In 2012, more than 142 million tons of cargo arriving or leaving the United States passed through the Panama Canal, accounting for 65 percent of the 218 million tons of cargo the canal handled.

Ocean carriers transiting the canal carried:

- More than 84 million tons of cargo in U.S. East Coast and Asia trade
- More than 27 million tons of cargo in U.S. East Coast and South America West Coast trade
- More than 2 million tons of cargo in U.S. East Coast and Canada/Oceania trade.

In 2012, the Panama Canal handled more than 12.2 million TEUs of cargo carried by Panamax vessels of 4,500 to 5,500 TEUs, the maximum size the Canal can currently handle. (Source: http://www.pancanal.com/eng/op/transit-stats/index.html.)

## Investment in Seaport Infrastructure

The Obama Administration has faced requests from the U.S. port community and various experts on the potential impacts of the Panama Canal expansion on the U.S. trade and transportation network and in particular on U. S. seaports. In response, in 2012, President Obama established the "We Can't Wait" initiative[1] to expedite infrastructure projects at five major Atlantic Coast ports. The goal is to ready these ports for the expected influx of trade once the expanded Panama Canal becomes operational. Ports and researchers foresee intense competition for Atlantic Coast ports once the Panama Canal expansion is completed—now scheduled for 2015. Because all U.S. ports are competing for this influx of trade and traffic, the net results will be winners and losers.

There are other Western Hemisphere ports vying for this expected influx of business via an expanded Panama Canal. Alternative foreign ports in Mexico, Canada, the Caribbean, and Panama, for example have vested interest in becoming the recipient hubs for these Panama Canal cargoes. Given this appropriate competition, a more pragmatic approach could put the U.S. seaports in

Panama Canal Expansion: Construction of Third Set of Locks 2012

**Figure 1. Panama Canal Location**


SOURCE: Panama Canal location, Google Images.

**Figure 2. America's Marine Highway Corridors**


SOURCE: USDOT, Maritime Administration, May 2013.

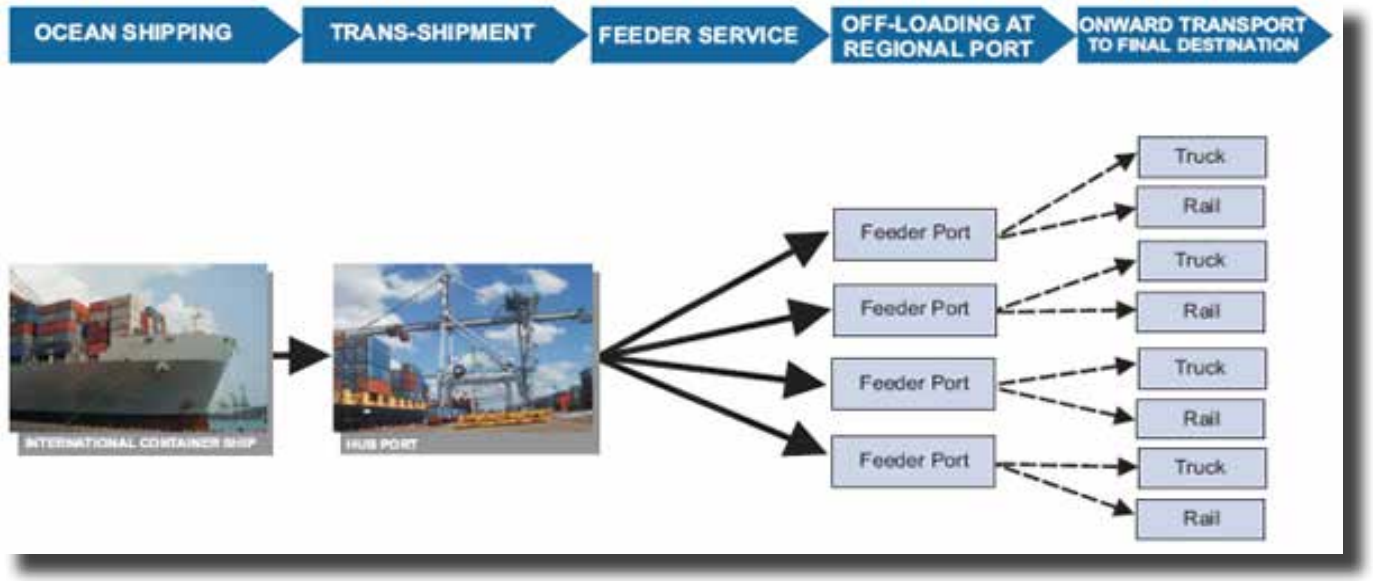
a position to win. No matter their location, channel depth, or coastwise advantages.

United States, Canada, and Europe have studied the hub-and-spoke shipping method that has been called "short sea shipping" and now called "marine highways" in the United States. Such an approach highlights the advantage of larger ports feeding cargoes to smaller ports for further distribution to alternative points along a domestic coastwise transportation network. This could result in a significant return to a viable U.S. coastwise container transport market along the Marine Highway Corridors (Figure 2).

The hub-and-spoke transport concept is predicated on transshipment of commodities (from one marine vessel to another) and "feedering" of commodities via marine transport to other regional ports.[2] In the United States, the hub-and-spoke transport concept was first started by Federal Express' in its courier service operated out of Memphis, TN and later adopted by passenger airlines. Under a hub-and-spoke transport arrangement, parcels, freight, and/or persons are transported to a central "hub" facility, then onward to interconnecting nodes via a network of "spokes."[3] A maritime hub and spoke transport network is not appropriate for all cargoes and situations. However, such a network might be appropriate and unique for the Panama Canal transport of cargoes to, from and through the United States. Figure 3 depicts typical hub-and-spoke transport.

# The U.S. has nearly 5,600 commercial waterway facilities, over 80 container ports, and 30 of these on the East Coast.

**Figure 3. Maritime Hub-and-Spoke Transportation**




SOURCE: Study on Potential Hub-and-Spoke Container Transhipment Operations in Eastern Canada for Marine Movements of Freight (Short Sea Shipping) - TP 14876E, available at: http://www.tc.gc.ca/eng/policy/report-acf-tp14876-menu-1012.htm.

## U.S. Seaport Facilities and Infrastructure

There are enough U.S. coastal facilities to support a hub and spoke network. According to the Department of Transportation, Research and Innovative Technology Administration, there are 5,588 commercial waterway facilities on the U.S. coasts.[4] Further, according to the Army Corps of Engineers there are over 80 container ports that received traffic in 2011. Approximately 30 of these ports are on the Atlantic Coast.

The top container ports on the Atlantic and Gulf coasts are the ports of Newark, NJ; Savannah, GA; Houston, TX; Norfolk, VA, Charleston, SC, and New York (Table 1). As mentioned in TransOutlook Vol. 1 No. 1, Atlantic Coast ports tend to be more balanced in exports and imports.

A selection of these top Atlantic Coast ports has or almost has the infrastructure appropriate to handle the anticipated big ship cargo coming through the expanded Panama Canal. For example, the Port of Charleston already has or nearly has the channel depth appropriate for this influx of big ships via the Panama Canal. Other ports such as the Port of Houston, already have the rail and truck access infrastructure and warehousing needed for the potential receipt and overland transport of imported Panama Canal goods. Although New York/New Jersey is ranked number one in container transport, it is the farthest from the Panama Canal. It seems unlikely that this port would become the major stop for the expected "big ships" transiting an expanded Panama

Canal. The Port of Houston being closest and the Port of Charleston as being in the middle of the U.S. East Coast, these seem the likely initial candidates for industry consideration. These would then be followed by the ports of Savannah and Norfolk for similar reasons.

The airline industry has operated in a hub and spoke arrangement for years. Although there is a natural dependency of each portion of such a network on the efficient operation of the other which implies an inherent risk, this arrangement does work on a daily basis.

**Table 1. Value of U.S. Waterborne International Containerized Trade by Top Atlantic and Gulf Coasts Ports: 2007 and 2012 (Ranked by value in 2012)**

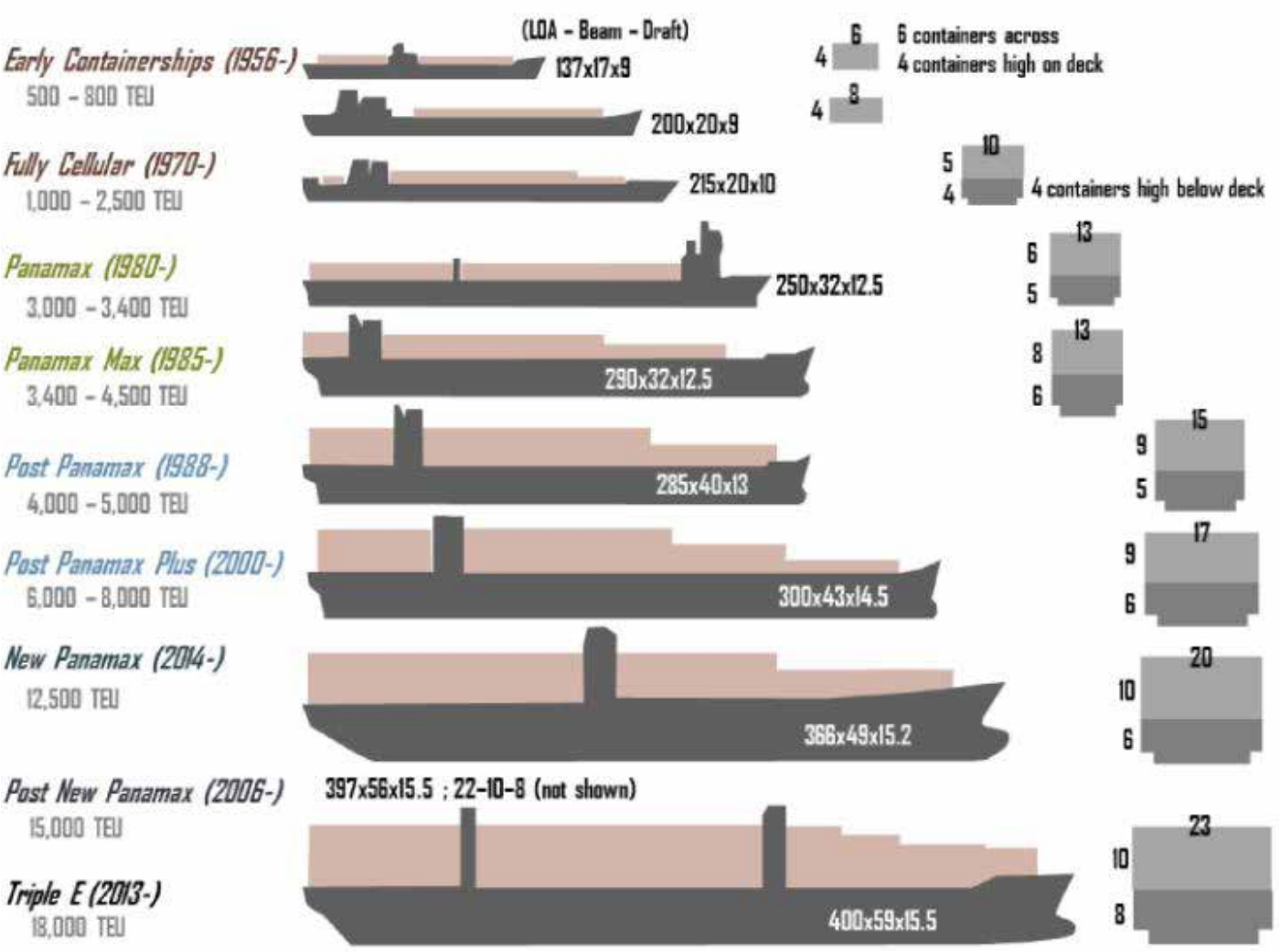
| Rank within 2012 | Port | Coast region | Value (millions of dollars) | | Weight (thousands of metric tons) | |
|---|---|---|---|---|---|---|
| | | | 2007 | 2012 | 2007 | 2012 |
| 1 | Newark, NJ | North Atlantic | 75,564 | 103,316 | 19,315 | 23,298 |
| 2 | Savannah, GA | South Atlantic | 37,463 | 59,038 | 16,983 | 19,443 |
| 3 | Norfolk, VA | North Atlantic | 41,005 | 51,589 | 11,211 | 12,770 |
| 4 | Charleston, SC | South Atlantic | 41,534 | 48,794 | 11,269 | 10,026 |
| 5 | New York, NY | North Atlantic | 32,754 | 42,862 | 10,618 | 10,558 |
| 6 | Baltimore, MD | North Atlantic | 17,696 | 21,559 | 4,566 | 5,278 |
| 7 | Miami, FL | South Atlantic | 15,657 | 20,049 | 4,499 | 4,488 |
| 8 | Port Everglades, FL | South Atlantic | 11,675 | 14,656 | 3,744 | 3,768 |
| 9 | Jacksonville, FL | South Atlantic | 3,335 | 7,536 | 1,092 | 2,459 |
| 10 | Philadelphia, PA | North Atlantic | 6,623 | 6,854 | 2,424 | 2,352 |
| 1 | Houston, TX | U.S. Gulf Coast | 38,631 | 53,517 | 15,756 | 19,693 |
| 2 | New Orleans, LA | U.S. Gulf Coast | 7,472 | 10,879 | 3,970 | 5,254 |
| 3 | Mobile, AL | U.S. Gulf Coast | 1,331 | 4,008 | 1,473 | 2,756 |
| 4 | Gulfport, MS | U.S. Gulf Coast | 2,216 | 2,077 | 1,384 | 1,234 |
| 5 | Panama City, FL | U.S. Gulf Coast | 1,165 | 1,571 | 239 | 302 |
| 6 | Corpus Christi, TX | U.S. Gulf Coast | 60 | 992 | 467 | 1,470 |
| 7 | Galveston, TX | U.S. Gulf Coast | 394 | 811 | 300 | 288 |
| 8 | Tampa, FL | U.S. Gulf Coast | 494 | 506 | 438 | 269 |
| 9 | Freeport, TX | U.S. Gulf Coast | 394 | 438 | 563 | 543 |
| 10 | Beaumont, TX | U.S. Gulf Coast | 106 | 365 | 185 | 411 |

SOURCE: E-Ternational Research Consulting and Aubey LLC, based on data drawn from U.S. Department of Commerce, Census Bureau, Foreign Trade Division, USA Trade Online, available at http://data.usatradeonline.gov, as of April 25, 2013.

# Promoting U.S. Coastwise Transport and U.S.-Flag Vessels

A maritime hub-and-spoke in the United States will require U.S.-flag vessels to perform the coastwise operations. Under this scenario, the capacity, readiness, and operating environment of the current U.S.-flag fleet will become an issue. As the Department of Transportation's Maritime Administration reported in its September 2011 report entitled Comparison of U.S. and Foreign-Flag Operating Costs, U.S.-flag vessel operators have a much higher operating cost than their foreign-flag counterparts.[6] Such is the challenge of establishing a strong container feeder coastwise vessel system in the United States and a continuing challenge of maintaining a strong U.S.-flag vessel fleet operating in global transport. This challenge is difficult but not impossible to overcome given the appropriate measures to encourage and ultimately maintain investment in this market.

**Figure 4. Global Containerships Evolutio: From Ideal X to Ultra Post Panamax**




SOURCE: Hofstra University, Department of Geography, based on Ashar and Rodrigue, 2012. All dimensions are in meters. LOA: Length overall. http://people.hofstra.edu/geotrans/eng/ch3en/conc3en/containerships.html.

# U.S.-Flag Fleet by Vessel Type

A strong U.S.-flag fleet is critical for our export and import efficiency and for our national security. The Maritime Administration administers maritime security programs meant to ensure "the availability of sufficient U.S. commercial sealift capability and the U.S. intermodal system to sustain U.S. military operations overseas in an emergency."[7] There were only 81 containerships in the U.S.-flag fleet as of April 2011, 53 of which operate in foreign transport and 28 domestic. (Table 2)

Industry reports in 2013 indicate that there is an over-capacity of containerships of varying sizes in the global freight market. See Figure 4. This overcapacity has led to the removal of some vessel capacity in order to maintain steady revenue-generating shipping rates. As the larger capacity ships are deployed in select hub ports around the world, the smaller capacity container ships could be re-deployed in newly established hub markets around the U.S. coasts. An inviting environment would need to be established, however, for this to occur. This inviting environment may mean changes to regulations and the development of other kinds of incentives that could be established specifically for the purpose of developing a strong U.S. coastwise transport market which may lead to reduction in congestion in other modes. Also, such incentives could re-establish a strong U.S.-flag fleet similar to those of other major trading nations. A strong U.S. flag fleet would secure our effective and efficient U.S. import traffic and the expected growth in U.S. exports worldwide.

**Table 2. U.S. Flag Oceangoing Privately-Owned Fleet: April 2011**

| Vessel type | Ship | Deadweight tons |
|---|---|---|
| **JONES ACT TOTAL** | **98** | **4,945,555** |
| Dry Bulk | 4 | 137,015 |
| Containership | 28 | 807,470 |
| General Cargo | 0 | 0 |
| Ron-on/Roll-off | 14 | 283,314 |
| Tanker | 52 | 3,717,756 |
| **FOREIGN TRADE TOTAL** | **93** | **3,978,392** |
| Dry Bulk | 6 | 322,376 |
| Containership | 53 | 2,833,877 |
| General Cargo | 4 | 84,368 |
| Ron-on/Roll-off | 26 | 562,699 |
| Tanker | 4 | 175,072 |
| **TOTAL U.S. FLAG** | **191** | **8,923,947** |
| Dry Bulk | 10 | 459,391 |
| Containership | 81 | 3,641,347 |
| General Cargo | 4 | 84,368 |
| Roll-on/Roll-off | 40 | 846,013 |
| Tanker | 56 | 3,892,828 |

SOURCE: American Maritime Congress, *Modern Merchant Marine*. Available at: http://www.americanmaritime.org/merchant/ as of March 8, 2013.

Panama Canal Centennial Bridge

*SpotLight*

## Previous Issue:

"Connecting Global Commerce: America's Container Ports Remain Critical Gateways" *TransOutlook* Vol. 1 No. 1.

## Interesting Read:

"Two Canals, One Amazing Race" in *Journal of Commerce*, V.14.N.8 April 15, 2013.

**Panama Canal Traffic by Market Segment: 2012**

| Market | Transits | TEUs | Cargo (long tons) (Thousands) |
|---|---|---|---|
| Container | 3,331 | 12,187 | 50,760 |
| Dry Bulk | 3,339 | 0 | 98,620 |
| Refrigerated | 1,116 | 109 | 3,543 |
| Tankers | 2,475 | 0 | 47,979 |
| General Cargo | 917 | 54 | 6,494 |
| Vehicle Carriers | 669 | 0 | 3,501 |
| Others | 804 | 6 | 7,161 |
| Passengers | 211 | 0 | 0 |
| Total | 12,862 | 12,357 | 218,058 |

SOURCE: Panama Canal Authority, www.pancanal.com/eng/, May 2013.

Photo credits: American Public Media and Panama Canal Authority.

## Endnotes

[1] The White House Office of the Press Secretary, Briefing Room, We Can't Wait: Obama Administration Announces 5 Major Port Projects to Be Expedited. Available at: http://www.whitehouse.gov/the-press-office/2012/07/19/we-can-t-wait-obama-administration-announces-5-major-port-projects-be-ex as of January 29, 2013.

[2] Study on Potential Hub-and-Spoke Container Transhipment Operations in Eastern Canada for Marine Movements of Freight (Short Sea Shipping) - TP 14876E. Available at: http://www.tc.gc.ca/eng/policy/report-acf-tp14876-menu-1012.htm, as of January 24, 2012.

[3] Study on Potential Hub-and-Spoke Container Transhipment Operations in Eastern Canada for Marine Movements of Freight (Short Sea Shipping) - TP 14876E, available at: http://www.tc.gc.ca/eng/policy/report-acf-tp14876-menu-1012.htm.

[4] U.S. Department of Transportation, Research and Innovative Technology Administration, Pocket Guide to Transportation 2013, "The Transportation System and Equipment," page 11.

[5] U.S. Army Corps of Engineers, Navigation Data Center, Waterborne Commerce Statistics Center, "U.S. Waterborne Container Traffic by Port/Waterway in 2011" available at: http://www.ndc.iwr.usace.army.mil/wcsc/by_portnames11.html as of February 5, as of February 4, 2013.

[6] Available at: http://www.marad.dot.gov/documents/Comparison_of_US_and_Foreign_Flag_Operating_Costs.pdf.

[7] U.S. Department of Transportation, U.S. Maritime Administration, Ships and Shipping, Associate Administrator for National Security available at: www.marad.dot.gov/ships_shipping_landing_page/national_security/national_security.htm.

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