# Logistics Infrastructure:

Transformational Opportunities





Photo courtesy of: Alabama State Port Authority

## **Author Bios and Acknowledgements**

#### Author



K.C. Conway, MAI, CRE is the director of research and corporate engagement at the Alabama Center for Real Estate (ACRE) housed within the Culverhouse College of Business at The University of Alabama. Conway also serves as the chief economist for the CCIM Institute and was previously the U.S. chief economist for Colliers International and the CRE risk specialty officer at the Federal Reserve Bank of New York during the 2008 financial crisis. He is a frequent speaker to a wide array of audiences ranging from academic groups, the bank regulatory community, professional organizations, and industry associations such as NAR, the Appraisal Institute, CCIM Institute, and Counselors of Real Estate. In addition to being a frequent lecturer at international conferences, Conway has consulted with major governmental agencies, most notably briefing former Federal Reserve Chairman Ben Bernanke and the Board of Governors on the burgeoning subprime lending and housing crisis and its impact on the commercial real estate industry.

#### **Co-Author**



**Stuart Norton** is the research coordinator at the Alabama Center for Real Estate housed within the Culverhouse College of Business at The University of Alabama. Norton frequently writes and speaks on residential real estate trends in the state of Alabama. He has authored articles for the Alabama NewsCenter, Real Estate Alabama, and Wallet Hub on a variety of topics including affordable housing, home price appreciation, adaptive reuse, new construction, and site selection. He is also a frequent contributor to ACRE's Real Estate Matters podcast. Additionally, he manages the Center's database of closed residential sales transactions, building permits and housing starts, and related demographic information while also supervising the production of monthly, quarterly, and annual sales reports for 24 residential markets across the state.

#### **Additional Support**

**Cherie Moman**, Director of Education, Marketing & Communications, Alabama Center for Real Estate

Kayla Crittenden, Program Assistant, Alabama Center for Real Estate

Ryan Cheng, Research Intern, Alabama Center for Real Estate

Clayton Knavel, Research Intern, Alabama Center for Real Estate

Spencer Sellers, Research Intern, Alabama Center for Real Estate

Christian Schoerner, Research Intern, Alabama Center for Real Estate

Britton Webb, Research Intern, Alabama Center for Real Estate

Dennis Harkey, Graphic Design, D.Harkey Design

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#### **Dear Reader:**

Build the Logistics Infrastructure (LI) and development will come is not a cliché – it is transformational logistics in action. Today, LI is driving the "why" and "where" decisions for real estate development across the country.

This Logistics Infrastructure call-to-action is validated by compelling transportation statistics.

With the modern e-commerce supply chain growing 25-30 percent each year, the current age and state of existing infrastructure will inhibit future and economic development.

Our study highlights the utmost importance and impact of the Transformational Opportunities provided by LI. It also offers an outlook for LI and a glimpse into the most notable logistics, transportation, e-commerce and real estate statistics that are shaping tomorrow's discussion today.

This paper is the first in an annual series from the Center on topics that impact Alabama's real estate industry at large and the broader southeastern region of the United States, including the vitally important Guif Coast. This continued advancement of real estate research and insights would not be possible without the legislative leadership at the local and state level and the support of our founding partners: the Culverhouse College of Business, the Alabama Real Estate Commission and the Alabama Association of REALTORS, including every real estate licensee.

With your continued support, our team looks forward to providing valuable and impactful insights for years to come.

Sincerely,

Grayson Glaze

Grayson Glaze, JD, CPM, CCIM Executive Director Alabama Center for Real Estate

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Photo courtesy of: Alabama Department of Commerce

# The Key Takeaways

Logistics Infrastructure: Transformational Opportunities

## The transportation statistics that validate a call to action on Logistics Infrastructure (LI) are compelling.

Whether it's the 4.1 million miles of public roads requiring maintenance, 1.2 billion hours of annual delays for the trucking industry, the 17X increase in annual spending required to maintain the railroads, or e-commerce warehouse demand growing from less than 5 percent of industrial leasing a decade ago to 20 percent today, there is no doubt of the need for Logistics Infrastructure investment.



#### A horseless-carriage supply chain from the 1950s cannot support a modern e-commerce supply chain that is growing 25-30 percent per year.

The age and state of our existing infrastructure is inhibiting future economic and real estate development, and forcing existing industry to relocate toward destinations that have modern LI.

#### "Build the Logistics Infrastructure and development will come" is not a cliché - it is transformational logistics in action today.

Just as the steel and textile industries left the U.S. in the 1970s & 1980s in pursuit of cheap labor abroad, retail, distribution, and manufacturing businesses are at risk of leaving cities and states that don't invest in LI and update aging infrastructure.



# LI is driving the "why" and "where" decisions for commercial real estate development.

Examples of this transformation in action are the locations of new Amazon and Wal-Mart fulfillment centers developing near intermodal - places like Bessemer and Mobile, Ala.; Ohio; Polk County, Fla.; and, Tucson, Ariz. One can also look to the locations for new aircraft, auto and machinery manufacturing plants in Alabama, Georgia, South Carolina and Texas.



The shift from shop-and-take-home to online-orderand-deliver will result in less retail store square footage, but the tradeoff will be many new fulfillment centers and warehouses aligned with new LI.

E-commerce fulfillment centers will displace one-third of America's 1,100 malls.

The development metrics by the major commercial real estate brokerages suggest a boom is ahead for new industrial warehouse development.

Warehouse is the new department store or retail big-box due to e-commerce. Demand/absorption still exceeds supply resulting in another 800,000 to 1 billion square feet of new development across the U.S. over the next 3 years.

> Today the margins for Online-Shop-and-Deliver do not beat Shop-and-Take-Home, but retailers will not reverse course from e-commerce. Retailers will double-down on technology and LI to get the margins right.

> Alix Partners crunched the numbers for CNBC in 2017 and found that apparel retailers' net margin from merchandise sold at brick-and-mortar stores was 32 percent compared to 30 percent for online apparel sales.

Reliance on the federal government fund to Logistics Infrastructure for port projects, rail, intermodal or needed supply chain components is too lottery-like a strategy to fund our economy's circulation system.

Of the billions of dollars available annually to fund our ports and inland waterways via the Harbor Maintenance Trust Fund, only 10 percent of yearly balances are distributed to ports.



#### The time has come to rank our North American ports based on a more dynamic method than the current single variable of TEU container count.

A model that calibrates factors like port depth, Class I rail connectivity, number of PPMX Gantry Cranes, usage by shipping alliances, etc. should be used.

Examples of this

# Key Takeaway #1

## The transportation statistics that validate a call to action on Logistics Infrastructure (LI) are compelling.

Whether it's the 4.1 million miles of public roads requiring maintenance, 1.2 billion hours of delays for the trucking industry on our nations highway system resulting in the equivalent of 425,533 commercial truck drivers sitting idle for an entire working year, the 17X increase in annual spending required to maintain rail lines and upgrade equipment, the 15+ percent annual growth rate in e-commerce sales since 2015, or e-commerce warehouse demand growing from less than 5 percent of



## **425,533** commercial truck drivers SITTING IDLE for an entire working year

industrial leasing to 20 percent in 2018, or the D+ grade for the state of our nation's infrastructure by ASCE for the 2013-2017 period, there is no doubt the data supports a need for substantial investment in Logistics Infrastructure to keep our national and respective state economies growing. States will need to carry an increasing burden for the funding of this Logistics Infrastructure due to the growing national debt that now exceeds 100% of GDP, mismanagement of trust funds and tax revenues by Congress, and the e-commerce industry's impatience for this L1. Industry is and will continue locating where cities and states can deliver the L1 to grow their e-commerce business.

# Key Takeaway #2

#### A horseless-carriage supply chain from the 1950s cannot support a modern e-commerce supply chain that is growing 25-30 percent per year.

According to the Verizon Tracking Digital Commerce Retail Index, average e-commerce retail traffic for the Monday before Thanksgiving through Black Friday 2018 period was up nearly one-third (32.6 percent) over the same



period in 2017. The demands on supply chain infrastructure from a rapidly growing e-commerce economy only increase over the next decade. The pothole in our supply chain is reconciling how the largest economy in the world is so far behind regarding infrastructure. The United States is the largest economy globally at \$20 trillion (2nd is Europe and 3rd is China with \$12.5 trillion annual GDP), yet the American Society of Civil

Engineers gives our nation's infrastructure a cumulative grade of "D+" in its latest report covering the 2013-2017 period. The age and state of our existing infrastructure is inhibiting future economic and real estate development, and forcing existing industry to relocate toward destinations

that have modern LI. The short answer to how we got to a point where our infrastructure is so deficient is: i) one-part technological innovation - Sears catalog era to online, Amazon age; and; ii) one-part failure to update or replace our 1950s era horseless-carriage supply chain.

# Key Takeaway #3

"Build the Logistics Infrastructure and development will come" is not a cliché - it is transformative logistics in action today.



E-commerce fulfillment warehouses and modern, additive-manufacturing jobs will NOT locate where LI is missing, deficient, or at risk of failure resulting in disruption to the vital supply chain. Just as the steel and textile industries left the U.S. in

the 1970s, 1980s and 1990s in pursuit of cheap labor across the globe, retail, distribution, and manufacturing businesses are at risk of leaving cities and states that don't invest in LI and update aging infrastructure. Analysis of U.S. GDP at a state level reveals that those states investing in LI are experiencing state-level GDP in excess of the 3.5 percent national average.

# Key Takeaway #4

LI is driving the "why" and "where" decisions for real estate development.

TRIPS (Trucking, Rail, Intermodal, Port and Shipping) logistics is redefining infrastructure needs and site selection decisions for everything from manufacturing and supply chain management to e-commerce fulfillment. The



examples of this transformation in action are the locations of new Amazon and Wal-Mart fulfillment centers developing near intermodal - places like Bessemer and Mobile, Ala.; Tucson and Phoenix, Ariz.; and Columbus Ohio. One can also look to the locations for new aircraft, auto and machinery manufacturing plants in Alabama (Airbus, Mercedes, Toyota), South Carolina (Boeing, BMW, Samung Appliances, Volvo), Georgia (Kubota Tractors), and Mississippi (Nissan) for clues as to the locations of choice for new development. They are near deep-water ports with Class 1 rail connectivity. And one can also look to where Logistics dependent corporations are relocating, like Amazon HQ2 from the West Coast to the East Coast - or Norfolk Southern Railroad's recently announced HQ move from Virginia to Atlanta. As Toyota and Mazda stated in their January 2018 press release selecting Huntsville, Ala. for its next U.S. auto assembly plant...

## ..."It's all about Logistics."

# Key Takeaway #5

The shift from shop-and-take-home to online-order-and-deliver will result in less retail store square footage, but the tradeoff will be many new fulfillment centers and warehouses aligned with new LI.



Top ranked industrial property owners and developers are already capitalizing upon this trend. TWhy are the many recent 2017 and 2018 industrial development projects and investments located in places such as Charleston, S.C.; Savannah, Ga.; Atlanta; Birmingham and Mobile, Ala.; Kansas City, Mo.; Columbus, Ohio; Trenton, N.J., Arizona, Tennessee, Texas, and south Florida to name a few? The answer is that these locations have either deep-water ports, excellent Class 1 railroad service, modern intermodal facilities, and/or new Ll investments attracting e-commerce and logistics companies, such as Amazon, FedEx, UPS, Target or Wal-Mart.

# Key Takeaway #6

The development metrics by the major commercial real estate brokerages suggest a boom is ahead for new industrial warehouse development.



Cushman & Wakefield (C&W) forecasts in its 2018-2019 Industrial Outlook that North American Industrial markets will continue to add assets totaling 800,000 square feet of new distribution space by 2020. And

this new supply is not expected to adversely impact occupancy or rental rates. C&W points out in its latest report that industrial warehouse vacancy has fallen 500 basis points from 10 percent in 2009 to 5 percent in 2018 despite record new additions to supply and the Great Recession.

Warehouse is the new department store or retail big-box due to e-commerce and demand/absorption will continue to outpace new supply through 2020.

# Key Takeaway #7

Today the margins for Online-Shop-and Deliver do not beat Shop-and-Take-Home, but retailers will not reverse course from E-commerce. Retailers will double down on technology and LI to get the margins right.

The conventional assumption by manufacturers and retailers alike that online retail is more cost effective than traditional brick-and-mortar store retailing is not proven by the numbers. Alix Partners crunched the numbers for CNBC in 2017 and found that apparel retailers' net margin from merchandise sold at brick-and-mortar stores was 32 percent compared to 30 percent for online apparel sales. How can this be? It's because the cost to build the

## The consumer isn't going back to traditional retail any more than it is to traditional banking.

retail omnichannel systems, operate last-mile delivery reliant upon an inefficient 1950s to 1970s infrastructure utilizing congested highways and roadways, and the volume of returned online merchandise (now an estimated 30 percent of all merchandise sold online), are much more capital intensive than leasing, stocking, and staffing brick-and-mortar retail stores. That doesn't mean retailers are going to reverse course and go back to shop-and-take-home retailing. The e-commerce genie is out of the bottle. Amazon is doubling down on technology (especially in grocery) – as are Wal-Mart, Target (2018 Shipt acquisition), FedEx and UPS. To make the margins work, retailers and the logistics industry will relocate away from the cities and states lacking rail and intermodal, not connected to a port and/or with Ll inefficient infrastructure. The beneficiaries of new development will be locations where new Ll is in place or being developed to get the margin enhancement for a shop-online-and-deliver model to work. The consumer is not going back to traditional retail any more than it is traditional banking.

# Key Takeaway #8

Reliance on the federal government to Logistics Infrastructure for port projects, rail, intermodal or needed supply chain components is too lottery-like a strategy to fund our economy's circulation system.



States need to recognize that with an ever growing now \$21 trillion federal deficit - and Congress's history of mismanaging dedicated trust funds, such as Social Security and the lesser known Harbor Maintenance Trust Fund (HMTF) for

the maintenance of our ports and inland waterways - states are on their own to invest in a modern logistics infrastructure. States like South Carolina have demonstrated over the past decade that economic and commercial real estate development will follow if you build and fund your own LI. Communities like Polk County, Fla.; Quad-Cities, Ia.; Columbus, Ohio; and, San Antonio, Tex., are examples of what can also happen at the MSA level by connecting the Logistics Infrastructure and development dots.

# Key Takeaway #9

The time has come to rank our North American ports based on a more dynamic method than the current single variable of TEU container count.

The capital for LI investment is and will continue to migrate toward those ports that have diversified from moving principally bulk cargo to also handling containers or processing new automobiles and high value machinery and equipment. The ranking of ports should incorporate variables such as:

- i) port depth;
- ii) Class I railroad connectivity;

- iii) number of operational Post-Panamax Gantry Cranes;
- iv) an understanding of shipping alliances using a port for import/export activity;
- v) the fiscal health of the respective port authority and state; and
- vi) an assessment of e-commerce and logistics companies located at or near the port as a proxy for future growth.

Based on the aforementioned criteria, would the ports of Los Angeles; Long Beach, Calif., and New York retain their one, two and three North American port rankings based solely on TEU count? Would Georgia and South Carolina port authorities rival New York for a top 3 ranking versus their current 4th and 9th rankings, respectively? Would port of Seattle retain a top-5 ranking, and could a port of Tampa, Fla.; Freeport, Tex.; or even Mobile, Ala. rise to a top-10 ranking with their number of Class I railroads, deep water, and attractiveness to logistics companies like Wal-Mart and FedEx? Although ACRE is still vetting a model to re-rank North American ports based on a methodology that uses more than the single variable of TEU container count, it is our hypothesis that the rankings will change when a multi-variable methodology is applied.









# ACRE Logistics Outlook

- 1. The e-commerce economy will drive online retail sales to 20 percent of total sales by 2022. Using Black Friday 2018 online sales of a record \$6.2+ billion (up 20 percent over 2017) as a proxy, the ratio of logistics related leasing will rise from its current level of 20 percent of total industrial leasing to 30-35 percent over the next three years. As annual online retail activity grows by a mid-teen to 20 percent rate, expands into more merchandise categories such as grocery, pharmacy, and big-and-bulky (like appliances, furniture, and automobiles), at least another 1 billion square feet of logistics warehouses will be needed by 2022 to meet the growth of e-commerce. Although an estimated 800,000 square feet of new warehouse space is underway or planned for development by 2022 nationwide, ACRE estimates that development activity will rise even further from the current pipeline level of 800,000 to 1 billion square feet.
- Industrial real estate will remain the top performing core commercial 2. property type again in 2019. In 2017, for the 3rd consecutive year, industrial real estate was the top preferred core property type by foreign investors in the U.S. - according to the annual AFIRE (Association of Foreign Investors in Real Estate) report conducted by the James A. Graaskamp Center for Real Estate. It is also outpacing all core-property types for price appreciation according to Green Street CPPI with 11-12 percent property price appreciation. ACRE forecasts continued double digit annual appreciation for industrial real estate, and no change to the current low vacancy rate of 5 percent despite more than 1 billion square feet of new supply expected over the next 3 years. Why? It's as basic as demand exceeding supply due to growth in online retail. An expansion that is expanding into grocery, autos and everything we consume. There are not enough warehouses near LI to keep up with the growth in online consumption.

- 3. U.S. GDP will slow but remain above 2 percent in 2019, but it will bifurcate further between states that invest in LI and those that do not. States investing in LI are experiencing state-level GDP of at least 2 percent. Those states with less than 2 percent GDP lag in LI investment. States that fail to invest in LI will experience sub-2.0 percent annual GDP and miss out on new economic development opportunities to states with modern or upgraded LI.
- 4. States that rely on the Harbor Maintenance Trust Fund (HMTF) or TIGER grants to budget needed LI investment will continue to find that strategy insufficient and lottery-like. Recognizing the HMTF's poor track record for dispersing the billions in collected revenue for port and waterway projects from the 0.125 percent tax on the value of cargo handled at ports, states with ports need to accept responsibility for funding their capital projects to dredge, diversify from bulk cargo to container handling, add RoRo (roll-on/roll-off) automobile and equipment processing operations, and develop inland ports, rail, and intermodal infrastructure, etc. to lure additive manufacturing, e-commerce fulfillment centers, and industrial warehouse development.
- 5. The ports of Charleston, S.C. and Georgia (collectively the ports of Savannah and Brunswick) will be the Los Angeles & Long Beach, Calif. of the East Coast and rival those ports in container activity by 2030 with the development of the Jasper Ocean Terminal in Jasper, S.C. Savannah, Ga. ranks fourth in container activity in North America and surpassed the 4 million TEUs threshold in 2018. It has learned the benefit of inland ports from South Carolina and is adding multiple new ones to extend its reach to users in Tennessee and Illinios. Brunswick ranks fourth for handling auto imports and exports (630,000 units in 2017 according to Automotive Logistics) behind #1 Vera Cruz in Mexico (1.05 million autos in 2017), #2 Baltimore (800,000 units) and #3 Jacksonville, Fla. (690,000 cars and trucks).

## **PROPERTY TYPE RANKINGS**



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The South Carolina State Port Authority (port of Charleston) led by Jim Newsome ranks ninth in container activity with 2.2 million TEUs - just behind Oakland, Calif. and Houston - each with 2.5 million TEUs. The SCSPA is the model of economic development for states to emulate. Over the past decade its LI investment and growth have reached a \$50 billion impact



level supporting nearly 190,000 jobs statewide. In aggregate, the port now accounts for 10 percent of the state's GDP. It has a \$2.3 billion CapEx plan in place addressing every LI item from port depth, rail connectivity, RoRo and automobile processing, to truck chasis management and port security. It ranks as a top-10 North American port and has been the fastest growing container port 2009-2017 with an 8 percent CAGR. The aforementioned is why South Carolina continues to attract or see expansion from the likes of BMW, Boeing, Michelin Tire, Volvo, Samsung, Harbor Freight, etc. The port of South Carolina epitomizes "develop LI and it will come". And finally, the port of South Carolina handles the export of all U.S. German manufacturer cars made in the U.S. (Mercedes and BMW in both Alabama and South Carolina), which now exceeds the number of vehicles made in the U.S. by either GM or Ford.

6. The ports of Mobile (Alabama) and Freeport (Texas) near Houston have the greatest opportunity for growth if they make the needed LI investments and continue to develop their container terminal and rail infrastructure. Mobile has proximity to five Class 1 railroads and Freeport three. However, both ports handle less than one-half million containers today but have the potential to handle 2 to 3 million containers within three to five years. The Port of Mobile is expanding container terminal capacity to accommodate the new addition of Wal-Mart's distribution

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center. This addition will add an estimated 1 million TEUs to Mobile by 2020. The port is also adding Roll-on, Roll-off (RoRo) operations funded by a 2018 TIGER grant. And don't forget about Port of Mobile's importance to Airbus as it manufacturers the competitive commercial jetliner to what Boeing is building in Charleston, S.C. Port Freeport has the potential to be to Dallas what Port of Savannah is to Atlanta today. It will also become the Saudi Arabia of LNG (liquified natural gas) gas exports to the rest of the world.

7. Don't underestimate or count growth out at either the ports of New York or Los Angeles and Long Beach, Calif. Each will remain top-5 container ports in North America for the next decade. The New York Port Authority is finalizing the most comprehensive and long-range maritime master plan of all North American ports that will guide development of the port's 3,000-plus acres of cargo-related property during the next 25 to 30 years. Forecasting a 68 percent rise in cargo traffic by 2045, authorities and freight industry stakeholders around the Port of New York and New Jersey aim to enhance rail systems, add barge routes, and make more



efficient use of port facilities and to mitigate truck traffic. In addition, New York City officials have released a \$100 million plan to "overhaul the city's aging freight distribution systems," and the New York and New Jersey port authorities are jointly looking to develop a container terminal in Brooklyn, N.Y. to be largely served by barges or Feeder Vessels. And in July 2018, New York State awarded a grant of \$21 million to CSX Transportation to create an inland port at the DeWitt Yard near Syracuse, N.Y. that will be tied by rail to the port. **New York does not plan to cede any more growth to the Ports of Baltimore, Virginia, Savannah or Charleston.**  A similar story is occurring at ports of Los Angeles and Long Beach, Calif. The real story at both these dominant North American container ports is that container activity at West Coast ports from Seattle/Tacoma, Wash. and Portland, Ore. on down to Oakland, Calif. is consolidating to southern California as shipping alliances consolidate. What growth Los Angeles and Long Beach have lost from the expanded Panama Canal to the gulf and East Coast ports they are more than recouping from consolidation along the West Coast. The ports of Los Angeles and Long Beach are just deeper, more modern with more gantry cranes, and favored by shipping alliances.

8. Monitor LI investment in eastern Canada and America's fourth coast (The Great Lakes) as both develop port and inland port projects. The Port of Cleveland and eastern Canada are emerging port markets. They are the up and comers to keep an eye on if you are the ports of New York or Vancouver.



- 9. Rail consolidation is ahead. With petroleum moving to pipelines freeing up carload capacity, and rail competition as fierce as in the shipping industry, not all seven Class 1 railroads can continue to exist independently. Keep an eye on CSX especially with Norfolk Southern's HQ move to Atlanta, and Kansas City Southern the only Class 1 railroad with direct access to all of Mexico and its key ports. Subscribe to the American Association of Railroad's monthly RailTime Indicators report to stay updated on rail traffic trends that are already flashing the merger signals.
- 10. The feeder vessel concept to unload mega oil tanker vessels will be applied to mega containerships in North America to better access smaller

ports in Mexico - or river ports and inland waterways in the U.S. Known as boxships, ACRE forecasts this pioneering trend by A.P. Moller-Maersk shipping will be the strategy that drives container growth at shallow ports with less than 50-foot depth, river ports, and inland waterways. Shallow-water ports in Mexico, along with river ports in the U.S. lacking 50-foot depth (Savannah, Ga. and Jacksonville, Fla.) and ports with inland waterway connectivity, such as Mobile, Ala., could be beneficiaries. Orders for feeder vessels have been rising over the past two years as operators that run mega-containerships of 20,000 containers find it cheaper and less time consuming to move containers at sea rather than docking at ports. These feeder vessels (aka boxships) are also being used in intra-Asia trade lanes as well as in routes in the Mediterranean and in Africa where small ports cannot cater to bigger vessels.



## ACRE's Dozen Most Notable Logistics, Transportation, E-commerce and Real Estate Statistics

Throughout this paper many logistics, transportation, and real estate statistics are discussed. Among the dozens researched, a handful stand out in support of this paper's premise. Whether it is e-commerce growth, increased intermodal and rail traffic, trucking delays from strained interstates, or the shift in warehouse leasing to logistics tenants, you will find these highlighted metrics support a call to action for Logistics Infrastructure investment. These measures help explain the why and where of future industrial development.



**4.1 million miles** of public municipal, county, state and federal roads requiring maintenance

# D+

## grade for the state of infrastructure

15-16

**NUAL GROWTH** 

for each of the

past 3 years

to the world's largest economy by the American Society of Civil Engineers (ASCE) for 2013-2017 period

e-commerce



## **50 million** containers handled annually

at Top 30 North American ports 80 percent from the top 9 U.S. ports led by: #1 Los Angeles (9.3 million), #2 Long Beach (7.5 million), #3 New York (6.7 million), #4 Savannah (4.0 million), #5 Seattle (3.7 million), and then 2.1 million to 2.8 million TEUs for #6 Norfolk, #7 Houston, #8 Oakland

#9 Charleston





collection to outlay/spending ratio by the Harbor Maintenance

**Trust Fund (HMTF)** – primary federal fund to maintain and improve our ports and inland waterways. Since 1998, the Beginning-of-Year balances in this fund have increased from \$1 billion 20 years

ago to over \$9 billion at start of 2017, while the annual outlays to our ports and waterways have averaged just a small fraction or less than \$1 billion (2017)

e-commerce retail traffic for the **2018 Monday before Thanksgiving through Black Friday** period over the same period in 2017



increase in the necessary annual capital spending by our Class 1 railroads since 1960 from just under \$1 billion to more than \$17 billion<sup>1</sup>

# +**6**×

increase in intermodal rail traffic since 1970

from 2.3 million containers to more than 14 million truck trailers and containers. At \$40 billion, the North American intermodal market is the largest in the world; and it relies on a fleet of more than 700,000 chassis to move 35 million containers annually to distribution centers throughout the U.S. Intermodal is a big deal in LI.





**1.445** million intermodal

rail containers in October 2018 According to AAR.org, the U.S. originated 1,443,914 containers and trailers in October 2018, up 4.2 percent (58,546 units) over October 2017. The weekly average in October 2018 was the second most (behind June 2018) for any month in history.

**E-commerce** 

distribution space



#### hours of delays for the trucking industry on our nation's highway system

in CY 2016 as a result of traffic congestion. This delay is the equivalent of 425,533 commercial truck drivers sitting idle for an entire working year. Distributing this cost across the 11.5 million registered large trucks in the U.S. results in an average congestion cost per truck of \$6,478.



demand exploding from less than 5 percent of industrial leasing to 20 percent.

%

The volume of freight shipments was up 6.2 percent YOY in October 2018 and the expenditures on freight shipments were up 12 percent (Q2 2018 was second highest reading in the index since Q2 2014) Since 1995, the Cass Freight Index® has been a reliable measure of North American freight volumes and expenditures that is closely correlated to GDP. It provides valuable insight into freight trends on all domestic freight modes derived from \$25 billion in freight transactions processed by Cass annually on behalf of its client base of hundreds of large shippers. This is one metric where the picture is worth the thousand words of explanation.





## The Historical Perspective -How did we get here?



War, taxation, regulation, infrastructure development, and technology have been shaping our supply chain and site selection decisions for commercial and industrial real estate over the course of the past 85 years. The breadth and pace of this change is

accelerating, and the stakes for global competitiveness and economic development have never been greater. The United States built a *horseless-carriage* supply chain - largely intact today - whose roots go back to 1933 (the founding of the American Trucking Associations). America's father of Logistics Malcolm McLean (pioneered the containerization of goods), and 1956 with the passage of the Federal Aid Highway Act signed into law by President Eisenhower. The *Highway Act* created a 41,000-mile "National System of Interstate and Defense Highways" that ushered in the "Interstate Highway" era. Today, those 41,000 miles of highways have grown to over 4.1 million miles of public municipal, county, state and federal roads that are strained to support our modern-day supply chain that moves 50 million shipping containers, processes 17 million new autos, and deliver millions of carloads of bulk commodities that feed us, build our homes, and fuel all that moves or requires power. The challenge today is not suppressing regulation on the transportation industry like what existed in the 1970s and 1980s before "a century's worth of heavy regulation on transportation rates. routes. and services were cast aside."

The challenge today is not economic-suppressing regulation on the transportation industry. Deregulatory legislation like that for air cargo in 1977, the 1980 Staggers Act deregulating railroads, and the federal pre-emption of interstate trucking legislation in 1994 brought tremendous efficiency gains to commerce. The challenge today is building a new LI driven by technological innovations that are dismantling the **shop-and-take-home** commerce model and replacing it with online e-commerce. This change is straining our legacy infrastructure





Federal Aid Highway Act signed into law by President Eisenhower in 1956 **Source:** Dwight Eisenhower Library

built around trucking and roadways; and a new LI is needed. This transformation is occurring at a rapid pace. According to the St. Louis Federal Reserve (FRED), the percentage of total retail sales has grown from the 8 percent range in 2016 to 10 percent in 2017. According to CBRE, the growth in sales from e-commerce over the past five years is growing annually in the mid-teens range (14-16 percent) compared with a low single-digit growth rate for traditional retail stores (2-4 percent). More recent data based on the growth of online



Source: 2018 Verizon Tracking Digital Commerce Retail Index

sales by America's five largest e-commerce retailers suggests e-commerce sales will approach 15 percent of total sales (excluding fuel sales) by 2021, with the potential to surpass 20 percent within five years extrapolating current trends. And the Verizon Tracking Digital Commerce Retail Index pegs the 2018 increase in average e-commerce retail traffic for the Monday before Thanksgiving through Black Friday period at a record +32.6 percent over the same period in 2017. The short answer to how we got to a point where our infrastructure is so deficient is two-fold. It is one-part technological innovation - in which we evolved from a Sears catalog form of commerce to an online one pioneered by Amazon; and one-part failure to replace our 1950s era, horseless-carriage supply chain dependent on trucking and roadways.



#### E-Commerce Sales as a Percentage of Total Sales

	Seasonally Adjusted	Seasonally Unadjusted
<b>Q2</b> 2018	9.60%	9.00%
<b>Q1</b> 2018	9.40%	9.20%
<b>Q4</b> 2017	9.10%	10.40%
<b>Q3</b> 2017	9.00%	8.40%
<b>Q2</b> 2017	8.80%	8.20%
<b>Q1</b> 2017	8.40%	8.40%
<b>Q4</b> 2016	8.20%	9.40%
<b>Q3</b> 2016	8.10%	7.50%
<b>Q2</b> 2016	7.90%	7.40%
<b>Q1</b> 2016	7.80%	7.60%

Source: FRED Economic Data

#### Year-Over-Year Growth in Traditional Retail and E-Commerce Sales

	In Store	E-Commerce
2017	3.4%	16.0%
2016	1.9%	14.9%
2015	1.1%	14.0%
2014	3.4%	14.5%
2013	3.1%	13.7%
2012	4.3%	14.9%
2011	7.0%	17.5%
2010	5.2%	16.8%

Source: FRED Economic Data

## Top U.S. Companies by Percentage of Total E-Commerce Sales

Company	2016	2017
Amazon*	38.10%	43.50%
eBay	7.80%	6.80%
Walmart	2.80%	3.60%
Apple	3.20%	3.60%
Home Depot	1.40%	1.50%

\*Amazon accounted for approximately 4 percent of total retail sales in 2017 **Source:** Digital Commerce 360

## Shift from the Sears Catalog Era to an Amazon Cominated E-commerce Economy

This change in consumers making purchases for home delivery versus going to stores to take delivery of merchandise will only add to the strain on an obsolete and failing 1950s era infrastructure and commercial real estate portfolio. This shift is far from over. Amazon is not stopping at online shopping for apparel and mall merchandise. It is onto groceries, as are Walmart and Target - with its acquisition of Alabama-based Shipt in 2018. Home Depot, XPO logistics, and UPS are figuring out how the online delivery for big and bulky merchandise (like appliances) will work. FedEx is already steps ahead of everyone with delivering *big and* bulky within the last mile - and FedEx will be tough to catch up to or supplant. It is already integrating Blockchain technology into its logistics. While this shift from *shop-and-take-home* to *online-order and deliver* will result in less retail store square footage across America, the tradeoff will be many new fulfillment centers and warehouses aligned with new LI. And Trucar is pioneering the process of home delivery for car purchases. Cities and states need to be asking themselves how LI needs to evolve to go from *shop-and-take-home* and auto dealerships to car vending machines and home delivery of everything we consume.

Top ranked industrial property owners and developers are already capitalizing upon this trend, and include the likes of such dominant industrial property companies as ProLogis (#1 ranked by NREI in 2017 with 630 million square feet); GLP (#2 ranked with 490 million square feet), Blackstone (#3 ranked with 325 million square feet ), Exeter Property Group (#4 ranked with 170 million square feet), Clarion Partners (#5 ranked with 150 million square feet), and *Monmouth REIC* (a top performing public REIT ranking among top-35 industrial property owners in the U.S. with more than 21, million sqaure feet owning primarily FedExoccupied distribution buildings in or near the primary east and Gulf Coast ports and intermodal markets from Florida to New Jersey, Texas to Illinios, and Alabama to Ken-

## U.S. Industrial Market Q2 2016 to Q2 2018



Source: Colliers International

#### tucky).

It is not just these large industrial property developers and owners that are connecting the dots. Tenants and logistics companies demand for these industrial buildings is growing. Cushman & Wakefield recently reported in its 2018-2019 Industrial Outlook report that e-commerce distribution space demand increased from less than 5 percent of industrial leasing to 20 percent at the onset of 2018. It also reported that warehouse distribution space vacancy had fallen by 500 basis points over the past ten years from north of 10 percent to 5 percent - despite record new supply. Finally, all the major commercial real estate brokerage companies, such as Cushman



& Wakefield (C&W), Colliers International, Newmark, and CBRE continue to forecast a bullish outlook for industrial real estate. CBRE has introduced an interactive Logistics and Occupiers Guide. Colliers International graphically portrays the supply-lagging demand story in their mid-2018 industrial outlook report. And, C&W forecasts that North American Industrial markets will continue to add assets totaling 800,000 square feet of new distribution space by 2020.

Where will all this new development locate? A good proxy is examination of an active and successful industrial property REIT like Monmouth REIC. Monmouth REIC's most recent 2017 and 2018 industrial acquisitions were located in Charleston S.C.; Savannah, Ga.; Atlanta; Mobile, Ala.; Trenton, N.J., and south Florida. Why in these markets - and what might Monmouth's acquisitions signal about the profile of markets that are likely to attract most of this new warehouse development forecast by C&W? These locations have modernized, deep-water ports, excellent Class 1 railroad service, and/or new LI investments attracting E-commerce and logistics companies, such as Amazon, FedEx and Wal-Mart.

This shift from a *shop-and-take-home* 1950's to

1990's era supply chain model to an E-commerce economy will be as transformative as when Malcolm McLean figured out how to move freight by shipping vessels using containers versus by truck on roadways.

And while tax assessors, local zoning officials, building approval authorities, and elected leaders in municipalities across the U.S. grapple with the reality of lost revenue from empty and obsolete retail stores, the response by industry has been and will continue to be to invest in their own LI (aka omnichannel), coupled with the relocation of merchandise inventory management to new warehouse-type fulfillment centers away from obsolete and inefficient infrastructure. Goods-selling retail tenants are not coming back to fill the malls and empty big-box stores. Although some stores and malls may get back-filled with experiential retail, most will be redeveloped. This situation is analogous to post World War II and the transition of our economy from one oriented toward wartime manufacturing to a peace-time economy. *The question then was* - as it is today for malls and empty big-box retail one of highest & best use. Just as another weaponry manufacturer didn't return to the closed wartime factories in the 1950s, neither will goods-selling retail return to malls. Communities and states have

## The economics of Online-Order-and-Deliver beat Shop-and-Take-Home?

There is an interesting twist to this rush to e-commerce, though. That twist is the theory by manufacturers and retailers alike that online retail is more cost effective than traditional brick-and-mortar store retailing is not proven by the numbers. Because of the cost to build the retail omnichannel systems, operate last-mile delivery within the congested and inefficient 1950s to 1970s highways and roadways, and manage the volume of returned online merchandise (now an estimated 30 percent of all merchandise sold online), the surprising reality is that the cost of online retail is more expensive than traditional store retailing. Refer to the graphic produced by Retail consultancy *AlixPartners* (and profiled in a CNBC feature in April 2017 by Courtney Reagan) titled: "Think running retail stores is more expensive than selling online? Think again."



Source: April 19, 2017 CNBC Feature: "Think running retail stores is more expensive than selling online? Think again."

So why is online retailing and e-commerce growing so rapidly in the face of not-so-good comparative margins; and will retailers and manufacturers reverse course and go back to shop-and-take-home? The answer is a definitive No! The e-commerce genie is out of the bottle. Amazon is doubling down on technology - as are Wal-Mart, Target, FedEx and UPS to make the margins work. Industry will relocate away from the cities and states lacking rail and intermodal, not connected to a port and with inefficient infrastructure and move to where new LI is in-place or being developed. One proof of this is the reduction in the cost of goods sold already being realized due to supply chain advancements. Deregulation of the transportation industry in the 1970s and 1980s brought shipping costs down from a ratio of 16 percent cost-of-goods sold to less than 10 percent by the mid-1990s (9 percent). And technology, larger container ships, rail efficiency and U.S. energy independence have reduced this ratio drop to near one to two percent in 2017. With better alignment of e-commerce fulfillment with modern LI and reducing the returns for online merchandise, shipping costs can drop to as little as one-half percent the cost-of-goods sold. That realignment is the opportunity the retail and online merchandise industries are looking for when developing new logistics projects and warehouses and making the site selection decisions. Those ports previously focused on bulk cargo activity that can pivot or diversify to add containerization terminals and RoRo operations - and those states that invest in inland ports, intermodal and logistics infrastructure - will gain the new logistics development to replace the declining traditional retail, branch bank and financial services industries that fueled economies in the 1980s up through the financial crisis in 2008. Cities that also have the vision to allow the repurposing of dead malls and empty big-box retail with warehouses and logistics can also realize a good ROI on their LI investments. One innovative example of adaptive reuse for a dead mall is the conversion of the



Source: Monmouth REIC - Former Big Town Mall

former Big Town Mall in Mesquite TX to a FedEx distribution facility now owned by Monmouth REIC. With LI investment to build inland ports or enhance existing intermodal facilities, there is viable logistics warehouse adaptive reuse for the estimated one-third of the nation's 1,100 malls expected to close by 2025.



## The Economics and Funding for Logistics Infrastructure (LI)

Those that accept that the federal government cannot be relied upon to fully fund Logistics infrastructure because it has no fiscal discipline and routinely misappropriates or mismanages trust funds like the Harbor Maintenance Trust Fund (HMTF); and then take on the responsibility to invest in their own future, are realizing it is not a fiscal "Field of Dreams" movie plot that the funding and development of LI will draw economic and commercial real estate development. Sometimes a picture is worth more than a thousand words. Consider the two images/graphics below.

The first is a chart of the Harbor Maintenance Trust Fund (HMTF) over the past 20 years. It shows that while billions have been collected annually since 1998, a small fraction of the HMTF beginning of year balance of funds (BOY) is released to fund vital Logistics Infrastructure projects during each calendar year. In fact, only three of the past 20 years have even seen \$1 billion in outlays from the Trust Fund (2014, 2015, and 2016.) to fund vital maintenance or improvement projects at our ports and along our inland waterways. States then

#### **20 Years of the Harbor Maintenance Trust Fund** (Dollars in Millions)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
HMTF Cash Flow:	Actual	Actual	Actual	Actual						
BOY Balance	1,106	1,246	1,556	1,621	1,777	1,850	2,001	2,299	2,695	3,234
Receipts & Interest	651	607	767	816	730	737	946	1,102	1,337	1,427
Outlays	-511	-297	-702	-660	-657	-586	-648	-706	-798	-910
EOY Balance	1,246	1,556	1,621	1,777	1,850	2,001	2,299	2,695	3,234	3,751
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
HMTF Cash Flow:	2008 Actual	2009 Actual	2010 Actual	2011 Actual	2012 Actual	2013 Actual	2014 Actual	2015 Actual	2016 Actual	2017 Actual
HMTF Cash Flow: BOY Balance	2008 Actual 3,751	2009 Actual 1,559	2010 Actual 5,003	2011 Actual 5,474	2012 Actual 6,280	2013 Actual 6,958	2014 Actual 7,806	2015 Actual 8,316	2016 Actual 8,684	2017 Actual 9,064
<b>HMTF Cash Flow:</b> BOY Balance Receipts & Interest	2008 Actual 3,751 1,594	2009 Actual 1,559 1,253	2010 Actual 5,003 1,299	2011 Actual 5,474 1,629	2012 Actual 6,280 1,587	2013 Actual 6,958 1,696	2014 Actual 7,806 1,617	2015 Actual 8,316 1,517	2016 Actual 8,684 1,662	2017 Actual 9,064 1,802
<b>HMTF Cash Flow:</b> BOY Balance Receipts & Interest Outlays	2008 Actual 3,751 1,594 -786	2009 Actual 1,559 1,253 -808	2010 Actual 5,003 1,299 -828	2011 Actual 5,474 1,629 -823	2012 Actual 6,280 1,587 -909	2013 Actual 6,958 1,696 -848	2014 Actual 7,806 1,617 -1,107	2015 Actual 8,316 1,517 -1,149	2016 Actual 8,684 1,662 -1,282	2017 Actual 9,064 1,802 -986



turn to TIGER grants to supplement their funding needs. Those grants are a drop in the bucket for what is needed. They are essentially an annual lottery with no guarantee of funding. It is no way to fund vital infrastructure to grow our local, state and national economies.

The (HMTF) was created in 1986 to help fund maintenance of our inland waterways as well as port and harbor dredging activities of the Corps of Engineers. The Trust Fund is funded by the Harbor Maintenance Tax (HMT), a tax of 0.125 percent of the value of commercial cargo loaded on or unloaded from a commercial vessel at a harbor or port at which federal funds have been used since 1977 for construction, maintenance or operation.

The second picture is a graphic produced for the 2018 State of the South Carolina Port Address by Jim Newsome. It epitomizes the reality of "build it and development will come." South Carolina is realizing the "Field of Dreams" with respect to unprecedented economic and commercial real estate development in its state's history because it is investing in LI from its port depth and container terminal expansion to its rail and intermodal systems that link upstate economic, manufacturing and supply Chain development . It is a model to be emulated in which the State legislature, South Carolina State Port Authority, and voters aligned to invest in Logistics Infrastructure regardless of funding availability from the HMTF.



## The Rail and Intermodal Components of LI

Industry response to our nation's congested network of roadways is to now shift the burden of moving truck trailers and shipping containers onto rail via intermodal facilities. In North America, we have seven Class 1 railroads that run mostly north/south from Canada and the Great Lakes down through the Midwest to the South Atlantic and Gulf Coast – with the one exception being Union-Pacific Railroad which parallels the West Coast. These primary rail arteries are displayed in the map/graphic on right. They originate and - for the most part - terminate at a seaport or inland port, such as Chicago or Memphis, Tenn. What makes them work so well today with e-commerce are intermodal facilities.

The term intermodal is used to describe the movement of cargo in shipping containers or trailers by more than one mode of transportation. How big a deal is intermodal in logistics and supply chain? It is a very big deal. Globally, 95% of all manufactured goods at one point are moved in a container. At \$40 billion, the North American intermodal market is the largest in the world; and it relies on a fleet of more than 700,000 chassis to move 35 million containers annually to distribution centers throughout the U.S.

This intermodal traffic is processed through what are known as Intermodal Facilities and monitored by the Intermodal Association of North America and American Association of Railroads in a monthly report known as RailTime Indicators. The American Association of railroads reports that 2018 will set another record for intermodal rail traffic. The map on right depicting where the seven Class 1 railroads operate is the keystone to a modern LI. If your state or community don't have or develop rail and intermodal infrastructure, future logistics, manufacturing, e-commerce fulfillment distribution and warehouse development will bypass your state. The following maps illustrate the operating geography for our seven, Class 1 railroads and the location of the majority of intermodal facilities. The American Association of Railroads and Intermodal Association of North America hold the opportunity knowledge for both future LI, supply chain development, and e-commerce warehouse activity.



Source: Intermodal.org

The configuration of where all but one of these Class 1 railroads operate (Union Pacific) is remaking our supply chain from one that has been west-coast concentric since the end of WWII to one that is more east and gulf-coast concentric. With an estimated 70 percent of the U.S. population residing east of the Ohio/Mississippi Valleys - and the modern-day centers of e-commerce being Memphis, Tenn. (HQ for FedEx) and Louisville, Ky. (UPS' central hub), the east and gulf-coast ports will need to invest in more infrastructure to process containerization to capitalize on the economic and commercial real estate development opportunities using this rail and intermodal network.



○Container Yards ●Rail ● Marine 85% of all Intermodal facilities are SE of an imaginary line from NY to TX "All that happens on the ports, doesn't stay on the ports" - KC Conway

## LI will be the Root of all Investment "Why" and "Where" opportunities for 2020 to 2030:

Ask why all automobiles made in Alabama today move to the South Carolina and Georgia ports for export versus port of Mobile? How might this activity change as Mobile develops its own RoRo infrastructure using its 2018 TIGER grant? Ask why Port Freeport has the potential to become to Dallas what the Port of Savannah is to Atlanta? Examine how Polk County, Florida has become the Inland Empire of Florida? Ask if New York and New Jersey can retain their east-coast container movement dominance with a new 10-Year Master Plan to expand reach in the northeast? In short. why should states consider inland ports or centers for logistics and cyber security as part of a LI plan? The answer resides in analysis of the success that the South Carolina and Georgia economies have experienced in response to LI investments in intermodal facilities and inland ports. Ask Mercedes why they picked Alabama for its North American Center for Logistics. Ask the Port of San Antonio about its cyber-security port. And ask GE why they picked Auburn University as its global center for 3D/Additive manufacturing? The answers from these entities will be rooted in LI.



## **The Trucking Piece of LI** Historical Perspective: Malcolm McLean to Jeff Bezos (*Amazon*) and Bill Smith (*Shipt*):



The previously referenced Malcolm McLean was instrumental in the evolution of our current-day trucking and shipping container

industries - intermodal. As owner and operator of the fifth largest trucking company in 1955 prior to the passage of the Federal Aid Highway Act, it was McLean that had the idea to put his trucks on ships. The problem, however, was that the truck took up too much space on vessels - and loading just the truck trailer was impractical as truck trailers could not be stacked. McLean solved this problem by removing the container from the chassis so the box could be safely and efficiently stacked on shipping vessels. There was just one problem. The Interstate Commerce Commission sensed that McLean was trying to monopolize the transportation industry and the ICC did not allow McLean to operate on both land and sea. McLean bet on movement of freight by sea and sold his trucking company in 1955 to invest in maritime transportation.

The McLean story is an important one covered in more depth in the *McLean Story* (Appendix A). Why is study of McLean so relevant to where we are today? The answer is that we might learn something from history and his story as we face another inflection point in commerce and freight with the rise of Amazon. In a different way, Amazon's founder Jeff Bezos is a modern-day Malcolm McLean, as are the founders of logistics companies such as Shipt (Bill Smith). Both Bezos with Amazon and Bill Smith with Shipt turned the old model for commerce and moving goods upside down. As all things consumed move to an e-commerce platform, how will the pivot from a supply chain built around highways to *Logistics Freightways* built around LI disrupt site selection for e-commerce companies, manufacturers, and supply chain fulfillment warehouses? Without the modern-day Malcolm McLean, the United States risks falling from its perch as the most competitive global economy. War, taxation, infrastructure development, and technology have shaped the trucking industry.

## The Transformative Events in Trucking:

#### 1939 Inaugural Hours of Service Truck Driver Log used 1939-2004.

In 1939, the Federal Government issued its initial "hours-of-service" regulations for truckers that would stand as-is until 2004. In this era of electronic truck driving logs fully implemented in April 2018, imagine that the following kind of manual truck driving log utilized from 1939 to 2004 was still in effect today. Regulation is timely, costly but a necessary component of evolution. As our supply chain becomes more complex, more just-in-time, and more electronic, it is going to draw more regulation to protect privacy, security, and accountability. We have not seen the end of regulation in trucking. ELD – electronic truck driver logs – will be replaced with autonomous trucking regulations.

## 1939



Source: Trucking.org

**1953: First Modern Day Truck Roadeo** hosted by Automobile Club of America in New York City to prove once and for all that trucks powered by gasoline, steam and electricity could outhaul teams of horses. Might a similar competition be in our future between human and autonomous driver trucks?





Source: Trucking.org

## 1955: Malcolm McLean (pioneer of modern day shipping containers) sells his lucrative trucking empire for \$6 million to enter the

**maritime commerce business** because the then Interstate Commerce Commission would not allow an entity to own both land and sea transportation systems. Without this bold move by a transportation innovator that first figured out how to more efficiently load and unload bales of cotton from trucks to shipping vessels, the transport of goods via shipping containers may not have evolved for many years - or decades - later.

**1956: Federal Aid Highway Act** was signed into law by President Eisenhower on June 29, 1956. The bill created a 41,000-mile "National System of Interstate and Defense Highways" that essentially ushered in the "Interstate Highway" era. Today those 41,000 miles have grown to over 4.1 million miles of public municipal, county, state and federal roads that support our modern-day supply chain.



Source: FHWA Department of Transportation

Billed by President Eisenhower as the new infrastructure that would "eliminate unsafe roads, inefficient

routes, traffic jams and all of the other things that got in the way of "speedy, safe transcontinental travel," the Federal Highway Act of 1956 was the biggest undertaking in transportation and logistics of the 20th Century. And like all federal infrastructure bills, it took multiple attempts to pass and attain funding. The 1956 Act was preceded by a similar act in 1944 that failed to secure funding. In retrospect, the 1956 Federal Highway Act worked for a few decades, but congestion returned.



## The 1990s and 2000s:

The Internet, e-commerce and Amazon are the transformative supply chain infrastructure that need funding in much the same way as the Interstate System did in 1956. Without an adequate and properly funded logistics and supply chain infrastructure in this 21st century, congestion returns and economic growth stagnates. Just consider a few statistics from the latest 2017 report by the Federal Highway Administration:

The three states with some of the most vital supply chain infrastructure, Texas (with port of Houston and its vital inland distribution function in Dallas), California (with its busiest containerized ports in Los Angeles and Long Beach) and Illinois (being America's Class 1 rail road hub and equally as vital inland distribution function to the East Coast) rank 1, 2 and 3 respectively in public roads accounting for more than 650,000 miles of our national public road system or 15 percent of the U.S. public road network. To put those figures in perspective, Texas, California and Illinois account for more miles of public roads than the 20 states with the least amount of public roads - which include D.C., Maryland, all of New England, New Jersey, Utah, Wyoming and Arizona. So why is this statistic important? It is important because Texas, California and Illinois cannot bear the cost of America's most vital port, rail and inland distribution system and have an e-commerce and last-mile supply chain that functions. All states must participate in the cost to build and maintain a modern supply chain. Alabama, for example, ranks second to only Wyoming in the most vehicle (cars and trucks) miles per capita with 14,500 miles - yet ranks in the bottom five of all states in gasoline and total per capita taxes.

**Today's Challenge:** The U.S. trucking industry is consolidating as a result of both regulatory (ELD -Electronic Log for Drivers) and margin pressures - not unlike many of the segments of our supply chain. Will advances in technology, such as autonomous long-haul trucks, blockchain and artificial intelligence scheduling break the congestion and margin pressures? States can't just look to gas taxes as a one-stop solution. Autonomous trucks in the next decade will likely be fueled by compressed natural gas that enable them to travel through states without stopping as frequently for refueling. And what kind of refueling infrastructure needs to replace our current diesel -fuel-based truck stop system? How do states plan on paying for highways with less gasoline taxes and more CapEx requirements that require embedded sensors in paving or alongside roadways? Who has crunched the numbers or is thinking about the roadway piece of modern LI? David Bronner and the Retirement Systems of Alabama have. In July 2018 The Advisor published by the Retirement Systems of Alabama ran a story with research by BEASLEYALLEN.com that analyzed the public safety aspects and a severe state trooper shortage in Alabama. If states cannot fund operation of truck weigh and inspection stations or an adequate state trooper workforce, how will they fund the required LI for trucking in an E-commerce and autonomous trucking era? As in the case of our ports and waterways with the mismanagement of the HMTF, the Federal Government is not going to be there to fund the trucking and roadway needs either. States have to develop the budgeting and funding mechanisms to invest in growing e-commerce and last-mile roadway upgrades

## The Bottom Line - Trucking Will Still Matter & Roadways Will Remain Vital

**to LI:** There is no dearth of data or research reports documenting the many ways the United States is behind in developing a modern-day logistics infrastructure needed to keep pace with the growth of our e-commerce driven economy and that has been well laid out previously in this study. What is most important now is for states to recognize that with a \$21 trillion federal budget deficit that now surpasses our \$20 trillion annual GDP, there is neither the time nor revenue at the Federal level to patch-up our 1950s era infrastructure. And with 4.15 million miles of public roads in the U.S. Federal Highway Administration, the public road system used by trucking is a critical component of our future logistics and supply chain infrastructure. Ports, rail, and air-cargo can't reach the last mile!

Trucking and highways will remain an important element of LI whether it is in the form of autonomous trucking or the "last-mile of delivery." America's urban interstates are congested to the point where traffic delays cost the country \$160 billion in wasted time and fuel each year. In 2016, the trucking industry experienced nearly 1.2 billion hours of delay on the Nations Highway System (NHS) as a result of traffic congestion. This delay is the equivalent of 425,533 commercial truck drivers sitting idle for an entire working year. Distributing this cost across the 11.5 million registered large trucks in the U.S. results in an average congestion cost per truck of \$6,478.

The e-commerce fulfillment warehouses and modern, additive-manufacturing jobs will not locate where Logistics Infrastructure is at risk of failure and disruption of its supply chain. As highlighted in the preceding sections, those states that invest/build Logistics Infrastructure (roads and bridges with embedded markers for autonomous trucking and import/export highways connecting to ports, rail, inland ports) will incubate and grow tomorrow's companies and commercial real estate development needed to replace the mature or declining physical retail and financial services industries in our communities.



## **Ports & Containerships** GDP doesn't factor in like you would think... and the next big thing may be going back small



#### GDP Growth -U.S. versus China:

The U.S. economy is the largest in the world with a GDP that surpassed \$20 trillion in 2018. It took

the U.S. nearly 50 years to double its GDP from just shy of \$7 trillion in 1960 to more than \$14 trillion in 2008. Although the growth rate in U.S. GDP has accelerated, contrast that growth with the GDP story for China. It's GDP has increased from a mere \$50 billion in 1962 to \$5 trillion in 2008 - and more than \$12 trillion in 2018. Advantage China on GDP growth.

## *Now let's contrast the container handling capabilities between the U.S. and China.*

Despite the U.S. being the largest economy in the world with a GDP almost 50 percent larger than China's, the U.S. handles less than 10 percent of the global shipping containers with only one port ranking among the top 20 global ports for container activity (Port of Los Angeles with slightly more than 9 million TEU containers).



The port of Shanghai is the world's busiest container port processing more than 40 million TEU; and the world's 10 busiest container ports are all in China, South Korea or UAE.

## The question that then follows is: How is it that the world's largest economy ranks so low in moving the world's containerized goods?

Part of the explanation is rooted in the evolution of a global economy in which the manufacturing model from the 1980s forward was to chase cheap labor; however, more of the reason for this widening gap today is being driven by Logistics Infrastructure that can support an e-commerce economy. With Asia's modern Logistics Infrastructure and the United States' obsolete horseless-carriage infrastructure, the gap is widening.

## The 5 Generations of Containerships:

The First Generation: The first container ship, the "Ideal-X," was a converted oil tanker from the World War II era. On its first voyage in 1956 it transported 58 containers from Newark, N.J. to Houston, Texas. Since that maiden voyage, container ships have evolved to the point where the largest vessels today carry more than 20,000 TEUs. These first generation container ships were modified oil tankers or bulk cargo vessels like the Ideal-X. They could hold up to 1,000 TEUs. Most port facilities in the early 1960s were not equipped to handle containers so the first generation of container vessels would carry onboard cranes. They were relatively slow, traveling only 18-20 knots. Containers could only be held on the converted decks, not in the cargo area below deck. By the early 1970s, however, containerization was recognized by the industry for its efficiency and cost-cutting potential. This resulted in the production of the first fully cellular container ships (FCC), designed to exclusively transport containerized cargo.

The first fully cellular container ships were launched in 1968. Called the C7 class, these vessels could hold approximately 1,000-2,500 TEUs, both above and below the deck. A fully loaded C7 vessel had up to 5 rows of stacked containers above deck, and 4 rows of stacked containers below deck. The vessels were wide enough to hold 10 containers placed side-by-side above deck, with up to 8 below deck. Although some specialized container ships today still have their own cranes, cranes were generally removed on C7 vessels to accommodate more containers. Ports around the world built container terminals in response to the efficiency offered by the C7 class of vessels. They traveled with speeds of 20-24 knots.

**The second generation** of container ships, the Panamax, were developed in the 1980s to lower per TEU shipping costs. The Panamax standard was based on the size limit of the Panama Canal. In 1985 this was approximately 4,000 TEUs. The width of Panamax vessels allowed for 13 containers placed side-by-side, stacked in rows of six above deck and rows of five below deck. Because the Panama Canal was built by the US Army Corp of Engineers, the dimensions of the Panama Canal were similar to the dimensions of the locks on US inland waterways. The result was a long and narrow ship design.

**The third generation** of containerships, the Post Panamax I and II, were introduced in 1988 and 2000 respectively. The width of Post Panamax vessels allowed for 15 containers placed side-by-side, stacked in rows of nine above deck and rows of five below deck. Also called the APL C10 class, these vessels could transport 4,000 to 6,000 TEUs. These were the first class of container ships to exceed the 32.2 meter with of the Panama Canal. This class of container vessel was expanded to carry up to 6,600 TEUs by 1996. The growth of global trade during the mid-1990s warranted the development of container ships beyond the capacities of the Panama Canal. Once the Panamax size limit was eclipsed, ship sizes continued to increase to upwards of 8,000 TEUs by the year 2000. These Post Panamax II vessels had deeper drafts, and ports had to dredge their harbors to at least 43 feet. The width of a Post Panamax II vessel allowed for 17 containers placed side-by-side, stacked in rows of nine above the deck and six below.

**The fourth generation** of container ships, the New-Panamax (NPX), were introduced in 2014. These vessels carried up to 12,500 TEUs. The Panama Canal was widened to accommodate larger ships and it opened in June 2016. NPX ships can fit exactly into the locks of the newly expanded Panama Canal. The width of a NPX vessel allows for 20 containers to be placed side-by-side, stacked in rows of 10 above deck and six below deck.

**The fifth generation** of container ships include the Very Large Container Ship (VLCS) and the Ultra Large Container Ship (ULCS). The VLCS was introduced in 2006 and carries between 11,000 and 15,000 TEUs while the ULCS was introduced in 2013 and carries between 18,000 and 21,000 TEUs. Both vessels allow for containers to be stacked in rows of 10 above deck and eight below deck. The ULCS is wider, however, allowing 23 containers to be placed side-by-side, while the VLCS accommodates 22 containers placed side-by-side.

Port infrastructure, however, has not kept up with the increasing size of today's container ships. Larger vessels require deeper harbors, bigger cranes, additional dock space, and larger intermodal facilities, all of which require significant capital investment. While economy of scale provides strong incentives for shipping companies to use the largest vessels available, there are a limited number of ports capable of accommodating the newest generation of container ships. So could the NextGen of container vessels that bridges the VLCS and ULCS size to port infrastructure limitations be feeder vessels/boxships?



The NexGen of Container Ships: Known as feeder vessels or boxships, these vessels have been used to unload mega oil tanker vessels off the coast of China for a number of years. This feeder concept is now being used in intra-Asia trade lanes, as well as in routes in the Mediterranean and in Africa, where small ports can't cater to bigger vessels. This pioneering concept and vessel by A.P. Moller-Maersk shipping is likely to be the strategy that drives container growth at shallow ports throughout North America. Orders for feeder vessels have been rising steadily over the past two years as operators that run behemoths moving more than 20,000 20-foot equivalent units, or TEUs, find it cheaper and less time consuming to move containers at sea rather than docking at ports. At the end of 2018, Denmark's A.P. Moller-Maersk A/S was in talks with China's Jiangnan Shipyard for up to 10

small container ships, joining a growing list of operators investing in so-called feeder vessels that move cargo to and from much bigger vessels at sea. ACRE forecasts that this feeder concept - and these boxships - will be applied to mega containerships in North America to better access smaller ports in Mexico - or river ports and inland waterways in the U.S. Shallow-water ports in Mexico, along with river ports in the U.S. lacking 50-foot depth (Savannah, S.C. and Jacksonville, Fla.) and ports with inland waterway connectivity, such as Mobile, Ala., could be big beneficiaries. Orders for feeder vessels have been rising over the past two years as operators that run mega-containerships of 20,000 containers find it cheaper and less time consuming to move containers at sea rather than docking at ports.

Source: wsj.com maersk-line-looks-to-buy-feeder-boxships



## **Port Vital Statistics and Rankings:**

2017 Port Rank Port	Total TEUs 2017	Total TEUs 2016	% Change
1. Los Angeles, CA	9,343,192	8,856,783	5.5%
<b>2.</b> Long Beach, CA	7,544,507	6,775,170	11.4%
3. New York/ New Jersey	6,710,817	6,251,953	7.3%
<b>4.</b> Savannah, GA	4,046,212	3,644,521	11.0%
<b>5.</b> Seattle / Tacoma, WA	3,665,329	3,615,752	1.4%
6. Vancouver, Canada	3,252,223	2,929,585	11.0%
7. Hampton Roads, VA	2,841,016	2,655,707	7.0%
8. Manzanillo, Mexico	2,830,370	2,578,822	9.8%
<b>9.</b> Houston, TX	2,459,107	2,182,894	12.7%
10. Oakland, CA	2,420,837	2,369,641	2.2%
<b>11.</b> Charleston, SC	2,177,550	1,996,276	9.1%
12. Montreal, Canada	1,537,669	1,447,566	6.2%
<b>13.</b> San Juan, Puerto Rico	1,319,572	1,084,374	21.7%
<b>14.</b> Honolulu, HI	1,204,568	1,211,997	-0.6%
<b>15.</b> Lazaro Cardenas, Mexico	1,149,079	1,115,452	3.0%
<b>16.</b> Veracruz, Mexico	1,117,304	965,294	15.7%
17. Port Everglades, FL	1,076,893	1,037,226	3.8%
18. Jacksonville. FL	1,033,068	968,279	6.7%
<b>19.</b> Miami. FL	1,024,338	1,028,156	-0.4%
20. Baltimore, MD	962,484	869,485	10.7

## **Top 20 North American Ports Ranked by Total TEUs (2017)**

Source: American Association of Port Authorities (AAPA)

2017 Port Rank Port	Total Tonnage 2017	Total Tonnage 2016	% Change
<b>1.</b> South Louisiana, LA	275,064,082	261,898,079	5.03%
2. Houston, TX	260,070,837	247,981,663	4.88%
3. New York / New Jersey	135,874,693	133,396,832	1.86%
4. New Orleans, LA	96,341.576	90,270,859	6.73%
5. Beaumont, TX	89,437,326	84,528,063	5.8%
6. CorpusChristi, TX	87,322,735	81,981,061	6.52%
<b>7.</b> Long Beach, CA	85,997,092	77,813,233	10.52%
8. Baton Rough, LA	77,013,042	72,998,561	5.50%
<b>9.</b> Virginia, VA	67,251,530	54,047,937	24.43%
10. Los Angeles, CA	65,826,557	62,615,644	5.13%
<b>11.</b> Mobile, AL	58,157,248	58,024,317	0.23%
12. Plaquemines, LA	54,465,907	56,780,632	-4.08%
13. Lake Charles, LA	54,316,852	56,045,838	-3.08%
14. Baltimore, MD	45,474,946	38,837,979	17.09%
<b>15.</b> Cincinnati-Northern, KY	42,676,566	43,050,399	-0.87%
<b>16.</b> Savannah, GA	39,865,610	36,443,795	9.39%
17. Port Arthur, TX	39,203,245	35,198,425	11.38%
<b>18.</b> Texas City, TX	37,751,062	41,260,475	-8.51%
<b>19.</b> Duluth-Superior, MN and WI	34,783,190	30,277,995	14.88%
<b>20.</b> Huntington - Tristate	34,151,107	37,401,755	-8.69

## Top 20 North American Ports Ranked by Total Tonnage (2017)

Source: Waterborne Commerce Statistics Center, USACE



Port	Panamax Cranes	Post- Panamax Cranes	Super-Post- Panamax Cranes	Total Cranes
1. Los Angeles, CA	-	38	45	83
2. Long Beach, CA	2	25	45	72
3. New York / New Jersey	9	44	17	70
4. Norfolk, VA	-	6	22	28
<b>5.</b> Savannah, GA	-	6	20	26
6. Tacoma, WA	5	12	9	26
7. Oakland, CA	-	10	15	25
8. Houston, TX	5	11	7	23
9. Seattle, WA	3	6	13	22
10. Jacksonville. FL	-	10	7	17
<b>11.</b> Charleston, SC	-	8	8	16
12. Baltimore, MD	4	7	4	15
<b>13.</b> Miami. FL	-	7	6	13
14. Port Everglades, FL	1	8	-	9
15. New Orleans, LA	2	4	-	6
16. Boston, MA	2	4	-	6
17. Wilmington, NC	2	4	-	6
18. Philadelphia PA	4	2	-	6
<b>19.</b> Tampa, FL	3	2	-	5
20. Mobile, AL	-	2	-	2

## **Top 20 North American Ports Ranked by Gantry Cranes (2017)**

Source: Bureau of Transportation Statistics, Port Performance Profiles



Port	2017 Total Autos	2016 Total Autos	% Change
1. Veracruz, Mexico	1,041,692	770,729	35.2%
2. Baltimore, MD	807,194	731,750	10.3%
<b>3.</b> Jacksonville, FL	693,248	652,265	6.3%
4. Brunswick, GA	629,420	631,713	-0.4%
5. New York / New Jersey	577,223	505,151	14.3%
6. Lazaro Cardenas, Mexico	442,869	311,774	42.1%
7. Vancouver, Canada	429,875	393,280	9.3%
8. San Diego, CA	371,827	390,954	-4.9%
9. Hueneme, CA	318,576	306,816	3.8%
<b>10.</b> Portland, OR	314,000	291,242	7.8%
<b>11.</b> Long Beach, CA	313,226	263,994	18.7%
12. Houston, TX	276,338	85,499	223.3%
13. Los Angeles, CA	236,956	199,027	19.1%
14. Charleston, SC	234,253	265,017	-11.6%
<b>15.</b> Davisville, RI	222,521	214,189	3.9%
16. Altamira, Mexico	197,032	111,934	76.0%
17. Halifax, Canada	170,000	142,420	19.4%
18. Philadelphia, PA	164,901	138,872	18.7%
<b>19.</b> Tacoma, WA	146,885	165,687	-11.4%
<b>20.</b> Vancouver, WA	87,978	87,600	0.4%

## Top 20 North American Ports Ranked by Automobiles Moved (2017)

Source: Automotive Logistics: North American Light Vehicle Ports Survey





## **Conclusion & Development Trends Today:**

## "Build the Logistics Infrastructure (LI) and development will come" is not a cliché. It is transformative logistics in action today.

What are some of the examples of this transformation in action, and where are some of the places most focused on Logistics Infrastructure? Follow the Amazon and Walmart new fulfillment centers being developed near intermodal in Bessemer and Mobile, Ala.; Tucson, Ariz., Columbus, Ohio; and places in between, or new aircraft and auto manufacturing plants by Airbus, Boeing, BMW, Mercedes, Nissan, Toyota and Volvo in Alabama, Mississippi and South Carolina. And follow the logistics-dependent corporate relocations like Amazon HQ2 from the West Coast to the East Coast or Norfolk Southern Railroad's recently announced HQ move from Virginia to Atlanta. Ask why a Quad Cities, Iowa is becoming a logistics and additive manufacturing hub, or a San Antonio is becoming a cyber-security port. And ask why a Nucor steel develops its most modern micro steel mill in Polk County, Fla., to make the steel rebar and beams used in infrastructure projects and commercial real estate construction? When state of the art steel manufacturing locates in central Florida because it figured out LI and decided to become the "Inland Empire" of Florida, one has to take notice of LI.

The common link in all these development and location decision is the economics of Logistics Infrastructure. LI is driving the why and where decisions for commercial real estate development.

## Some Metrics to Put the Economics of Logistics in Perspective:

The evolution of an e-commerce economy in which economic and commercial real estate development follow the Logistics more so than cheap labor means the economic stakes have never been higher in a post WWII era.

However, in just the past decade the U.S. GDP has grown by nearly one-third from \$14.5 trillion to more than \$20 trillion due to an e-commerce induced economy. That rate of growth that now exceeds 3 percent annually, is not sustainable without a modern Logistics Infrastructure. According to AAR.org, the U.S. originated 1,443,914 containers and trailers in October 2018. up 4.2 percent (58,546 units) over October 2017. The weekly average in October 2018 was the second most (behind June 2018) for any month in history. And these railroads are connected to our ports in more complex networks known as Inland Ports. Virginia built the first such inland port in Front Royal, Va., but South Carolina perfected today's modern inland port model with new Inland Ports in Greer and Dillon South Carolina that have become economic and commercial real estate development magnets with state-wide benefits. And now Georgia is emulating the South Carolina model with multiple inland ports attracting economic and commercial real estate development.

As we shift dependence on North America's ports from a West Coast concentric model to one that is more broadly dispersed among the four coasts (East, West, Gulf and yes Great Lakes) and aligned with our Class 1 railroad network in which six of these seven primary rail arterials criss-cross from the Great Lakes and Canada to the East and Gulf Coasts where 70 percent of the U.S. population resides, it is clear that North America is both remaking it's supply chain and in need of a new type of Logistics Infrastructure. The need to replace the 1950s era horseless-carriage infrastructure rooted in highways and interstates with an e-commerce Logistics Infrastructure utilizing a multimodal transportation system is fueled by online retail activity. With online retail activity experiencing double-digit annual growth rates as e-commerce expands into everything we consume from groceries to autos, highways and interstates are too one-dimensional an infrastructure to meet the needs of an online economy. According to Verizon's Holiday Retail Index that tracks retail traffic for the 25 largest U.S. online retailers, retail commerce grew nearly 30 percent for the recently passed 2018 4-day Black Friday weekend. This 20th Century supply chain is sorely in need of replacement and modernizing to meet the demands from an e-commerce driven economy that will see online retail sales grow from its current 10 - <15 percent level to 25 - 35 percent of



total retail sales activity by 2025. So the answer to the why the study of how our 20th Century horseless-carriage supply chain will change to a multimodal supply chain rooted in logistics is it will define where the economic and commercial real estate development will go.

War, taxation, infrastructure development, and technology have been shaping our supply chain over the course of the past 85 years. The breadth and pace of this change is accelerating, and the stakes for global competitiveness and economic development have never been greater.

A transportation and shipping pioneer with Mobile, Ala. roots, Malcolm Mclean, was instrumental in the evolution of our current-day trucking and shipping container industries. Are Jeff Bezos, Amazon, and the founders of such



Malcolm McLean's first container ship, the *Ideal X*. He is widely regarded as the *"father of containerization."* 

logistics companies as Shipt our 21st Century Malcolm McLeans? If they are, who are our Dwight Eisenhowers that will lead on legislation to develop infrastructure? And how will the pivot from a supply chain built around highways to "freightways" disrupt site selection for e-commerce companies, manufacturers, and supply chain fulfillment warehouses? Without the modern-day Malcolm McLeans and Dwight Eisenhowers, the United States risks falling from our perch as the most competitive global economy, according to the World Economic Forum's 2018 report on the most competitive economies. There is no dearth of data or research reports documenting the many ways the United States is behind in developing a modern-day logistics infrastructure needed to keep pace with the growth of our e-commerce driven economy. The challenges are formidable and commence with a dysfunctional Congress addicted to deficit spending. The federal budget line item experiencing the most growth is "Net Interest on National Debt." According to the Congressional Budget Office, it is up nearly 20 percent September 2017 to September 2018 due to another \$1 trillion in deficit spending - and four Federal Reserve interest rate hikes. Our nation cannot sustain such a fiscal path that will require an additional one-half trillion dollars to service our national debt in 2019, and expect to invest in the logistics infrastructure to keep our economy globally competitive. And these fiscal challenges extend deep to states at critical intersections for our national supply chain, such as Illinois with its critical rail infrastructure that is arguably in the worst fiscal health of all states, and those that have made a conscious decision to trade off investment in infrastructure for low taxes, such as Alabama with its underfunded port of Mobile and vital automobile and aerospace manufacturing industries.



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## The Top 16 Ports of Call in North America:



Photo courtesy of: The Maryland Port Administration

## Vital Statistics

2017 Total Tonnage: **45,474,946 (17.09%)** 2017 Total TEUs: 962,484 (10.7%) 2017 Total Autos: 807,194 (10.27%) Total Number of Post Panamax Cranes: 15 Current Channel Depth: 50 Number of Class I Railroads: 2

## Summary of Strategic Plan:

The port of Baltimore's ongoing strategic plan includes an overall goal of growth and expansion, including actions like increasing community involvement via outreach meetings, and with this hopes to search for funds to improve the port's overall functionality. Recent actions in place include a July 2017 purchase of 70 acres of land in close proximity to the Seagirt terminal. This land is to be used for Ro/Ro and container storage for the port. MPA (Maryland Port Administration) reports that they are in a good spot to face challenges between now and 2020, but are planning ahead for funding in order to increase air drafts, and increase capacity for vessel traffic.

## Five Facts to Know About the Port of Baltimore, Maryland

- Baltimore imported and exported 807,194 automobiles in 2017, more than any other port in the United States
- One of the most efficient container ports in the country
- In 2017, the Port of Baltimore ranked second in the country for exporting coal, the Port's top export commodity, based on tonnage
- The port plays a vital role generating nearly \$3 billion in annual wages and salary, supporting 13,650 direct jobs and 127,000 jobs connected to port work
- Baltimore is one of the just few ports in the north with year-round cruise schedules

Sources:

Bureau of Transportation Statistics (BTS) Port Performance Profiles: Port of Baltimore

The Port Authority of Baltimore

## Port of Charleston, South Carolina



#### **Vital Statistics**

2017 Total Tonnage:26,980,805 (17.23%)2017 Total TEUs:2,177,550 (9.08%)2017 Total Autos:234,253 (-11.60%)Total Number of Post Panamax Cranes:16Current Channel Depth:45Number of Class I Railroads:2

Photo courtesy of: The South Carolina Ports Authority

## Summary of Strategic Plan:

The South Carolina Ports Authority (SCPA) is currently implementing new projects with two major goals: deepening the harbor and expanding the ports cold storage. USACE is overseeing the dredging project, with plans to deepen the main channel of Charleston harbor to 52 feet by 2020. The cold storage expansion took place at the Wando Welch Terminal, opening a six acre refrigerated container service area in 2017. SCPA's main objective looking forward is to increase space and capacity for cargo. Construction of a 280-acre container terminal is already underway and is scheduled to be completed by 2020.

## Five Facts to Know About the Port of Charleston, South Carolina

- When the dredging is complete, Port of Charleston will be the deepest port on the East Coast
- The port boasts the deepest water in the Southeast
- The port authority provides services to 18 of the top 20 cargo container ship lines
- Paper products and auto parts are the biggest export, while auto parts are also the biggest import
- The port is responsible for 1 in 11 jobs statewide

Sources:

Bureau of Trade Statistics (BTS) Port Performance Profiles: Port of Charleston

The Port Authority of Charleston

## Port Freeport, Texas



## **Vital Statistics**

 2017 Total Tonnage:
 24,484,399 (24.69%)

 2017 Total TEUs:
 85,540 (-6.42%)

 2017 Total Autos:
 74,000 (39.62%)

 Total Number of Post Panamax Cranes:
 2

 Current Channel Depth:
 45

 Number of Class I Railroads:
 1

Photo courtesy of: Port Freeport

#### Summary of Strategic Plan:

Port Freeport has several strategic initiatives in place to facilitate the growth of the port. A \$295 million harbor improvement project plans to deepen the channel from 46 to 53 feet, making it the deepest port in Texas once completed. This will allow Port Freeport to accommodate New Panamax ships which require at least 50 feet of water to operate. Other planned improvements include expansion of the port's container handling facilities by purchasing five additional STS Post-Panamax Gantry cranes by 2021. Port Freeport also plans to develop rail-served ware-houses and distribution facilities with the ultimate goal of creating a rail and highway transportation corridor linking Freeport to Rosenberg.

## Five Facts to Know About the Port Freeport, Texas

- The port plans to install five additional Post-Panamax Gantry cranes by 2021
- It will be the deepest port in Texas (53 feet) after a \$295 million harbor improvement project is completed
- Vessel calls are forecasted to increase by approximately 25 percent over the next four years
- It is ranked 26th in international tonnage and occupies approximately 8,000 acres on deep water
- The port's new container terminal is the deepest container berth on the Gulf of Mexico, and the new, deeper main channel of 55 feet will offer the fastest transit time in the U.S. at one hour

Source:

Bureau of Trade Statistics (BTS) Port Performance Profiles: Port of Freeport

The Port Authority of Freeport

## Port of Houston, Texas



#### **Vital Statistics**

2017 Total Tonnage:260,070,837 (4.88%)2017 Total TEUs:2,459,107 (12.65%)2017 Total Autos:276,338 (225.10%)Total Number of Post Panamax Cranes:23Current Channel Depth:45Number of Class I Railroads:3

Photo courtesy of: The Port of Houston Authority

## Summary of Strategic Plan:

Port Houston's current strategic plan includes four goals that form their "big picture" moving forward: invest in people and plan for success, diversify and grow the base, provide and maintain infrastructure to meet demand, and lastly, to sustain the overall well-being of Port Houston. Actions recently completed to improve the port include a project in December 2016 which increased the depth of the Bayport entrance channel to 45 feet and the width to 400 feet; this allows for better maintaining of the increasing vessel traffic at the port. Currently underway at Port Houston is a project at the Barbour's Cut terminal to add 1,000 linear feet of wharf, which will allow for the installation of new cranes which can easily transport containers and other cargo from ship-to-shore.

## Five Facts to Know About the Port of Houston, Texas

- Ist ranked U.S. port in foreign waterborne tonnage 173 million short tons; 2nd ranked U.S. port in total foreign and domestic waterborne tonnage -260 million short tons
- 3rd ranked U.S. port in terms of total foreign cargo value
- Largest Texas port with 45 percent of market share by tonnage and 96 percent market share in containers
- Port Houston recently climbed to the fifth largest container port (in 2018), up from #6
- Petroleum and petroleum products counts more than 65 percent of the port's total tonnage

Source:

Bureau of Trade Statistics (BTS) Port Performance Profiles: Port of Houston

## Port of Jacksonville, Florida



#### **Vital Statistics**

2017 Total Tonnage: 18,526,032 (.04%) 2017 Total TEUs: 1,033,068 (6.69%) 2017 Total Autos: 693,248 (6.33%) Total Number of Post Panamax Cranes: 17 Current Channel Depth: 42 Number of Class I Railroads: 2

Photo courtesy of: The Jacksonville Port Authority

## Summary of Strategic Plan:

Recently added to the Port of Jacksonville (JAXPORT) is an Intermodal Container Transfer Facility, a \$10 million dollar project completed in 2016 which was funded by a Federal Transportation Investment Generating Economic Recovery (TIGER) grants. Plans moving forward include eliminating the Mile Point navigational issue, as well as working with the Florida Department of Transportations to enhance highways and railroads surrounding the port to increase overall port efficiency.

## Five Facts to Know About the Port of Jacksonville, Florida

- It is the second busiest vehicle handling port in the United States
- It is one of the only 17 US strategic ports on call to move military cargo for national defense (the only one in Florida)
- Logistics Management Magazine just named JAXPORT the easiest port to do business with in the southern US
- JAXPORT is the #1 U.S. port for trade with Puerto Rico
- JAXPORT serves 17 of the top 20 global ocean carriers

#### Sources:

Bureau of Trade Statistics (BTS) Port Performance Profiles: Port of Jacksonville

The Port Authority of Jacksonville

## Port of Long Beach, California



#### **Vital Statistics**

 2017 Total Tonnage:
 85,997,092 (10.52%)

 2017 Total TEUs:
 7,544,507 (11.36%)

 2017 Total Autos:
 313,226 (18.65%)

 Total Number of Post Panamax Cranes:
 72

 Current Channel Depth:
 81

 Number of Class I Railroads:
 2

Photo courtesy of: The Port of Long Beach

## **Summary of Strategic Plan:**

The port of Long Beach developed a list of short term three-year goals in their most recent strategic plan in 2017. They include enhancing short-term and long-term financial strength, achieving key milestones of the ten-year capital plan, attracting and retaining a high-performing, diverse workforce, developing the green port of the future roadmap, and achieving sustained market share growth. Some projects currently underway in-line with these goals include the port's Middle Harbor redevelopment, which is scheduled to be completed by 2019 and will rehabilitate and upgrade container yards and modernize the overall infrastructure. The port also plans to replace the Gerald Desmond Bridge this year, which covers the port's main channel. These projects are being paid for by a combination of federal and state funds.

## Five Facts to Know About the Port of Long Beach, California

- It has the deepest (81 feet) channel among all the ports in the country
- Long Beach is the second-busiest port in the United States, the 21st-busiest container cargo port in the world
- East Asian trade accounts for more than 90 percent of the shipments
- Top import is crude oil, while the top export is petroleum coke
- Industry leaders have named it "The Best Seaport in North America" for 19 of the past 22 years

Sources:

Bureau of Trade Statistics (BTS) Port Performance Profiles: Port of Long Beach

The Port Authority of Long Beach

## Port of Los Angeles, California



#### **Vital Statistics**

2017 Total Tonnage: **65,826,557 (5.13%)** 2017 Total TEUs: **9,343,192 (5.49%)** 2017 Total Autos: **237,000 (19.10%)** Total Number of Post Panamax Cranes: **83** Current Channel Depth: **81** Number of Class I Railroads: **2** 

Photo courtesy of: The Port of Los Angeles

## Summary of Strategic Plan:

The Port of Los Angeles' planning efforts center around a long-range master plan, which guides the future development of the port consistent with the provisions of the California Coastal Act. The port's economic development initiatives, strategies, and programs aim to be consistent with the City of Los Angeles' overall program for creating employment opportunities within the international trade and goods movement sectors of the economy, both city-wide and in the local harbor community. The Port of Los Angeles has five long-range development goals to guide the future development and expansion of the port. They include: optimizing land use, increasing cargo terminal efficiency, accommodating diverse cargoes, increasing public access to the waterfront, and protecting historic resources through adaptive reuse.

## Five Facts to Know About the Port of Los Angeles, California

- Its top containerized import is furniture, followed by auto parts; and the top containerized export is paper/waste paper
- Port of Los Angeles occupies 18 percent of the nation's market share
- The TraPac Terminal is one of the first terminals implementing the fully automated (24 hours) straddle carriers in the United States
- Ranked as the #1 container port in the country
- It has 83 Post Panamax Cranes, tops among ports in the country

Sources:

Bureau of Trade Statistics (BTS) Port Performance Profiles: Port of Los Angeles

The Port of Los Angeles Master Plan

## Port of Miami, Florida



## **Vital Statistics**

2017 Total Tonnage: **7,824,022 (-2.52%)** 2017 Total TEUs: **1,024,338 (-0.37%)** 2017 Total Autos: **N/A** Total Number of Post Panamax Cranes: **13** Current Channel Depth: **44** Number of Class I Railroads: **2** 

Photo courtesy of: PortMiami

## **Summary of Strategic Plan:**

The port of Miami has recently completed several projects improving the overall quality of the port and surrounding land. These projects had a total cost of \$1 billion, and included rehabilitation of rail facilities that were in poor condition due to Hurricane Wilma, along with the completion of a new tunnel which connect the ports freight's facilities to surrounding interstates. Moving forward, the Port of Miami is planning projects to continually widen, deepen, and dredge numerous shipping channels.

## Five Facts to Know About the Port of Miami, Florida

- The busiest passenger cruise port in the world
- Nearly four million cruise passengers passed through the port in 2017
- Largest container port in the state of Florida
- The port has an economic impact in Miami-Dade County of over \$12 billion
- Cruise and cargo activities at the port support approximately 98,000 jobs

Sources:

Bureau of Trade Statistics (BTS) Port Performance Profiles: Port of Miami

The Port Authority of Miami

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## Port of Mobile, Alabama



#### **Vital Statistics**

2017 Total Tonnage: **58,157,248 (.23%)** 2017 Total TEUs: **318,889 (16.92%)** 2017 Total Autos: **N/A** Total Number of Post Panamax Cranes: **2** Current Channel Depth: **45** Number of Class I Railroads: **5** 

Photo courtesy of: The Alabama State Port Authority

## Summary of Strategic Plan:

Recent improvements at the port of Mobile include the addition of Alabama Steel Terminals which opened in 2015. It includes rail, truck, and barge access to handle steel coils. The resurgence of the region's steel making industry has made Mobile one of the largest US ports for steel, handling approximately five million tons of steel per year. Another recent improvement was an intermodal container transfer facility opened in 2016. The facility's main user is the Canadian National Railway, which modeled its Mobile operation after a successful ship-to-rail terminal at Prince Rupert, Canada. To service Alabama's growing automotive manufacturing sector, the port of Mobile has a \$48 million roll on/roll off facility included in its 2018 strategic plan. With access to five class I railroads and two interstates, the port of Mobile is a natural hub for transportation and logistics. With an expanding container terminal, a planned automotive terminal facility, and dock and harbor improvements, the port of Mobile is poised to grow as it adapts to service the needs of Alabama's changing economy.

## Five Facts to Know About the Port of Mobile, Alabama

- With 5 Class I railroads, Mobile is second in the US behind New Orleans
- It was the second largest steel port in the country in 2017
- It ranked 11th nationally in total tonnage in 2017
- It is Alabama's only deep-water port
- It is one of the most the third fastest growing port in the U.S. (measured by Import TEUs)

#### Sources:

Bureau of Trade Statistics (BTS) Port Performance Profiles: Port of Mobile

The Port Authority of Mobile

## Port of New Orleans, Louisiana



#### **Vital Statistics**

 2017 Total Tonnage:
 96,341,576 (6.73%)

 2017 Total TEUs:
 532,597 (1.96%)

 2017 Total Autos:
 N/A

 Total Number of Post Panamax Cranes:
 6

 Current Channel Depth:
 45

 Number of Class I Railroads:
 6

Photo courtesy of: The Port of New Orleans

## Summary of Strategic Plan:

The four guiding goals for Port NOLA include: to operate efficiently, capitalize on gateway position, improve relations, and develop sustainably. Port NOLA has recently made additions and improvements to their port in 2016 which abide by these guiding goals. One of these involved a \$1.75 million MARAD grant to better the service with container-on-barge between Baton Rouge and New Orleans. This grant allowed funding for specialized equipment to accomplish the task of improvement. Also in 2016, a new intermodal terminal (funded by \$16.7 million in TIGER grants) was opened to replace an outdated terminal, thus improving transfer and handling of containerized goods to railroads and highways. Looking ahead, Port NOLA plans to continue to expansion as ideas are developed and more funding becomes available. The port is currently very efficient, as well as successful.

## Five Facts to Know About the Port of New Orleans, Louisiana

- New Orleans has more Class I railroad connections (6) than any other port in the US
- Petroleum and petroleum products plays an important part in Port NOLA's tonnage volume (about 33%)
- Port NOLA generates \$100 million in revenue annually
- Breakbulk accounts for 50 percent of Port NOLA's cargo profile
- Port-related industries generate 1 in 5 jobs in Louisiana

Sources:

Bureau of Trade Statistics (BTS) Port Performance Profiles: Port of New Orleans

The Port Authority of New Orleans

## Port of New York and New Jersey



**Vital Statistics** 

 2017 Total Tonnage:
 135,874,693 (1.86%)

 2017 Total TEUs:
 6,710,817 (7.34%)

 2017 Total Autos:
 577,233 (14.30%)

 Total Number of Post Panamax Cranes:
 70

 Current Channel Depth:
 45

 Number of Class I Railroads:
 3

Photo courtesy of: The Port Authority of New York and New Jersey

## Summary of Strategic Plan:

The Port of New York and New Jersey (PANYNJ) plans to complete large-scale projects in order to adapt to sea levels rising, climate fluctuations, while reducing emissions in the process. While these projects are potentially long term, many improvements to the port are currently underway and close to completion as well. The railroads at PANYNJ are continuing to be improved thanks to \$10.67 million in Federal Grant funds received in 2016. These improvements are through the Cross Harbor Freight Program, which exists to ensure freight traffic moves across the New York Harbor as efficiently and safely as possible. On top of all of this, the PANYNJ is funding a \$1.6 billion rebuild of the Bayonne Bridge, which is currently underway and is expected to be completed by mid-2019. This project increases the bridge air draft to 215 feet, which helps accommodate the increasing size of vessels traveling to the port.

## Five Facts to Know About the Port of New York and New Jersey

- Port of New York and New Jersey is the third largest seaport in the country, the largest on East Coast
- The port is the birthplace of modern container shipping
- The top import is beverages, and the top export is paper, scraps and waste (TEUs)
- The port receives 80 percent of the imports for use in the nation
- The port is the largest container complex in the world

Sources:

The Port Authority of New York and New Jersey

## Port of Norfolk, Virginia



#### **Vital Statistics**

 2017 Total Tonnage:
 67,251,530 (24.43%)

 2017 Total TEUs:
 2,841,016 (6.98%)

 2017 Total Autos:
 N/A

 Total Number of Post Panamax Cranes:
 28

 Current Channel Depth:
 50

 Number of Class I Railroads:
 2

Photo courtesy of: The Virginia Port Authority

#### Summary of Strategic Plan:

Virginia Port Authority (VPA) has challenges abound in the coming years revolving around the population growth in the state, and thus the demand for cargo being beyond what the current port's capabilities can handle. Near term improvements to prepare for these challenges include a transition to advanced equipment that reduces operating costs and helps the environment, and accordingly increases overall efficiency of the port. VPA also plans to include railroad and highway conditions in order to have a higher weight capacity to safely transport cargo. The current project underway that is VPA's top priority is the development of a new container terminal, Craney Island Marine Terminal. This new terminal plans to be the answer to handling the port's growing container cargo traffic. 50 percent of this project is federal funded, with the rest being from terminal revenues and other local funds. The VPA plans to be in good standing with challenges of rapid growth within five years and the completion of these projects.

## Five Facts to Know About the Port of Norfolk, Virginia

- The only US East Coast port with Congressional authorization for 55-foot depth channels
- 37 percent of cargo arrives and departs the port by rail, the largest percentage of any US East Coast port
- Coal & lignite count 40 percent of the port's total tonnage
- The Port of Virginia is the first port in North America to introduce hybrid shuttle carriers into its operating fleet, funded through a grant from the EPA
- Pollutant removal from storm water runoff at the Port of Virginia's Norfolk International Terminals exceeds state standards by 50 percent

Sources:

Bureau of Trade Statistics (BTS) Port Performance Profiles: Port of Virginia

The Port Authority of Norfolk

## Port of Oakland, California



Photo courtesy of: The Port of Oakland

#### **Vital Statistics**

2017 Total Tonnage: **19,393,310 (1.79%)** 2017 Total TEUs: **2,420,837 (2.16%)** 2017 Total Autos: **N/A** Total Number of Post Panamax Cranes: **25** Current Channel Depth: **45** Number of Class I Railroads: **2** 

## **Summary of Strategic Plan:**

The Port of Oakland has laid out a business plan for the years of 2018-2022 with the key objectives being development of projections for record business volumes over five years in the Port's Aviation and Maritime businesses, large capital investments on major projects, and an emphasis on sustainability to minimize the environmental impact of growth. This plan includes goals of having 2.6 million 20-foot containers by 2022 and increasing containerized cargo volume by 8 percent. Two major projects currently being developed are the construction of a cool port (refrigerated import/export facility), and the Seaport Logistics Complex. These projects help guide the port in the direction of their goal of overall growth and sustainability as a port.

## Five Facts to Know About the Port of Oakland, California

- The Port of Oakland loads and discharges more than 99 percent of the containerized goods moving through Northern California
- Oakland's cargo volume makes it the seventh busiest container port in the United States based on Calendar Year 2016 data
- It was one of the first ports to develop an intermodal container operation
- Its top imports are beverages and spirits
- Out of 1,045 calls in Jan-Aug 2018, 772 (74 percent) vessels successfully used shore power

Sources:

Bureau of Trade Statistics (BTS) Port Performance Profiles: Port of Oakland

## Port of Savannah, Georgia



## **Vital Statistics**

 2017 Total Tonnage:
 **39,865,610 (9.39%)** 

 2017 Total TEUs:
 **4,046,212 (11.02%)** 

 2017 Total Autos:
 **629,420 (-0.41%)** 

 Total Number of Post Panamax Cranes:
 **26** 

 Current Channel Depth:
 **44** 

 Number of Class I Railroads:
 **2**

Photo courtesy of: The Georgia Ports Authority

## Summary of Strategic Plan:

The Port of Savannah has the largest single container and roll-on/roll-off facilities in all of North America. The main challenge faced by Georgia Ports Authority (GPA) is increasing capacity of vessel traffic to accommodate the ports increasing demand for imports. Projects in place to help this cause include a \$44 million expansion of the Garden City railroad; this was funded by federal grants in 2016 and is scheduled to be completed by 2020. Also, the GPA developed a plan in February 2018 to double the container capacity at the port by 2028. Alongside the main objective of allocating more space at the port, deepening of the outer harbor has recently been completed in early 2018, and deepening of the inner harbor is scheduled to be completed by 2022.

## Five Facts to Know About the Port of Savannah, Georgia

- The port of Savannah is the largest single container terminal in North America, the fourth busiest port in the country
- It boasts the highest refrigerated container capacity of any port on the East Coast, and handles 40 percent of the packaged poultry exports from the U.S.
- Furniture is the biggest import
- The port handles 36 weekly vessel calls, more than any other port on the East Coast
- The port has the largest concentration of import distribution centers on the East Coast

Sources:

Bureau of Trade Statistics (BTS) Port Performance Profiles: Port of Savannah

The Port Authority of Savannah

## Port of Seattle / Tacoma, Washington



#### **Vital Statistics**

2017 Total Tonnage: 25,206,600 (4.14%) 2017 Total TEUs: 3,665,329 (1.37%) 2017 Total Autos: 146,885 (-11.52%) Total Number of Post Panamax Cranes: 48 Current Channel Depth: 51 Number of Class I Railroads: 2

Photo courtesy of: The Northwest Seaport Alliance

#### Summary of Strategic Plan:

The Northwest Seaport Alliance developed a 10-year strategic plan to address the competitive challenges of growing cargo volumes, creating jobs, and improving financial performance. The port plans to develop strategic terminals equipped to handle ultra-large container ships and the increased cargo volumes these ships offer. The proposal includes a phased build-out of the strategic terminals based on market demand, opportunities to enhance existing facilities and use excess container acreage for alternative cargo to diversify the port's cargo portfolio. By 2025 the Northwest Seaport Alliance aims to surpass 6 million TEUs, create 14,600 jobs, and reach financial sustainability through net income growth and solid financial margins.

## Five Facts to Know About the Port of Seattle / Tacoma, Washington

- Recently merged to form the Northwest Seaport Alliance
- It ranked fifth nationally in total tonnage in 2017
- #1 North American gateway for refrigerated exports, the fourth-largest container gateway in North America (2018)
- By Jan. 1, 2019, all trucks serving the international container terminals must have a 2007 (or newer) engine, or a certified equivalent emission control system
- More than 80 percent of the total trade volume between Alaska and the lower 48 states moves through the Tacoma and Seattle harbors

Sources:

Bureau of Trade Statistics (BTS) Port Performance Profiles: Port of Seattle

Northwest Seaport Alliance's Strategic Plan Bureau of Trade Statistics (BTS) Port Performance Profiles: Port of Tacoma

## Port of Tampa, Florida



#### **Vital Statistics**

 2017 Total Tonnage:
 33,120,240 (-6.22%)

 2017 Total TEUs:
 56,555 (13.76%)

 2017 Total Autos:
 N/A

 Total Number of Post Panamax Cranes:
 5

 Current Channel Depth:
 43

 Number of Class I Railroads:
 1

Photo courtesy of: The Port Authority of Tampa

#### Summary of Strategic Plan:

Overall, the future plans for the port of Tampa involve completing several major projects by 2030. These projects include rehabilitating, expanding, modernizing, and managing the Port of Tampa Bay's marine terminals, along with supporting and maintaining the infrastructure throughout the port. A specific project already underway in Tampa is deepening and widening the Big Bend channel. The Big Bend channel directly connects to the port's main entrance channel. This project was funded by USACE with a total cost of \$9 million. Additional infrastructure improvements include a 2016 addition of two new post-Panamax gantry cranes to service increased container traffic.

## Five Facts to Know About the Port of Tampa, Florida

- Port Tampa Bay is the largest port in Florida in term of physical size encompassing over 5,000 acres
- Port Tampa Bay is one of the world's largest exporters of fertilizers
- Port Tampa Bay is Florida's only port with large tracts of property zoned and available for manufacturing and industrial development adjacent to deep water with excellent highway access, rail access and competitive energy costs
- Port Tampa Bay offers Florida's only on-dock unit train capability
- Port Tampa Bay is the largest economic engine in the region, contributing more than \$15 billion in economic impact and affecting more than 80,000 jobs directly or indirectly

#### Sources:

Bureau of Trade Statistics (BTS) Port Performance Profiles: Port of Tampa

The Port Authority of Tampa





## Malcolm McLean – Father of Containerization



Source: Port Authority of New York & New Jersey

Sometimes it's the simple ideas that change the world. Such is true of Malcolm McLean and his revolutionary idea, the humble shipping container.

The son of a North Carolina farming family, Malcolm entered the transportation industry by purchasing a used truck for \$120. This was during the Depression years and Malcolm drove the truck himself, taking whatever work was available at the time. A transformative event in his life happened during a routine workday when he was driving bales of cotton from Fayetteville, North Carolina to Hoboken, New Jersey. He waited in line for hours as the cargo of each truck in line in front of him was manually transferred to the ship. Thinking back to that frustrating day, McLean recalls: "I had to wait most of the day to deliver the bales, sitting there in my truck, watching stevedores load other cargo. It struck me that I was looking at a lot of wasted time and money. I watched them take each crate off the truck and slip it into a sling, which would then lift the crate into the hold of the ship." Although he would not act on the idea for another 20

years, the concept of containerization was born as he sat there in line thinking "there has to be a better way!"<sup>1</sup>

By 1955 McLean Trucking owned over 1,770 vehicles and operated 37 transport terminals along the Atlantic coast making him the largest trucking firm in the southeast and fifth largest in the United States at the time. Wanting to cut costs, McLean had the idea to put his trucks on ships. The problem, however, was that the truck took up too much valuable space. Loading just the trailer was also impractical as they could not be stacked. The next logical step was to remove the container from the chassis. If just the container were loaded, they could be safely and efficiently stacked on the ship and quickly transferred onto awaiting trains or trucks when it arrived at the next port. There was just one problem. The Interstate Commerce Commission sensed that he was trying to monopolize the transportation industry and did not allow McLean to operate on both land and sea. Not one to shy away from risk, McLean sold his lucrative trucking empire for \$6 million in 1955 and entered an industry he had no experience in, maritime commerce.<sup>2</sup>

McLean purchased the Mobile, Ala. based Pan-Atlantic Steamship Company in 1955 for \$7 million, which he then renamed SeaLand Industries. McLean then purchased an oil tanker and converted it to accommodate his recently patented shipping containers. The maiden voyage of the Ideal X transported 58 containers from Newark, N.J. to Houston in April of 1956. Many in the industry were skeptical of McLean's idea but when the ship arrived safely with undamaged cargo, containerization and intermodal transport began to gain traction. By the early 1960's, ports that embraced containerization were reaping the profits that the labor saving system provided. A big win for McLean and SeaLand Industries occurred in the early 1960s when Oakland, California invested \$600,000 in a container terminal hoping that it would "revolutionize trade with Asia." The rest, as they say, is history.<sup>3</sup>

It's quite easy to underestimate the impact of McLean's shipping container on today's global marketplace. Approximately 95 percent of manufactured goods are shipped via container. Containerization has reduced transportation costs by up to 75 percent. For example, one container holds approximately 10,000 iPads and they can be shipped from Asia to Europe for about 5 cents each. A television can be shipped from China to the USA for approximately \$2. Our modern economy is rooted in global trade, and it's not surprising that Forbes magazine cited McLean as one of "15 people who changed the world."<sup>4</sup>

Norman Mineta, former U.S. Secretary of Transportation, had the following to say about McLean when he passed away in 2001 at the age of 89: "A true giant, he revolutionized the maritime industry in the 20th century. His idea for modernizing the loading and unloading of ships, which was previously conducted in much the same way the ancient Phoenicians did 3,000 years ago, has resulted in much safer and less expensive transportation of goods, faster delivery and better service. We owe much to a man of vision, the Father of Containerization."<sup>5</sup>

#### Sources:

Harvard Business School: The Truck Driver Who Reinvented Shipping

> Wall Street Journal: A Brief History of Shipping

Investors Business Daily: Malcolm Mclean Made Waves with Shipping Containers

## Appendix B

## **Port of Mobile History**

## **Early History**

The first European settlers were attracted to Mobile Bay because of its natural harbor and strategic location along the Gulf of Mexico. The Black Warrior River, Alabama River, and Tombigbee River all drain into Mobile Bay, providing excellent water access to inland markets in both Alabama and Mississippi. During its early history, large cargo and passenger vessels had to dock at Dauphin Island (closer to the Gulf of Mexico) due to the relatively shallow channel in Mobile Bay. Smaller ships would then take passengers and cargo to the docks in Mobile. This inefficient process was addressed in 1824 by the Alabama state legislature. Federal funds were secured in the following year, allowing the main channel to be deepened by seven feet. These improvements helped Mobile become one of the larger ports in the south by the 1850s.

## **Post-Civil War Era**

The port struggled in the post war years as cotton exports dropped by more than 50 percent from approximately 800,000 bales per year before the war to around 300,000 bales per year after the war. Additionally, railroad improvements in the Selma and Montgomery region threatened to bypass the port altogether. The port responded by raising \$1.5 million in bonds to finance a railroad to connect Mobile to Birmingham, an emerging industrial city with vast mineral resources. The financial panic of 1874, however, caused the project to go into default.

The port was back on its feet in the late 1800s thanks to federally financed harbor improvements. Senator Edmund Wilson Pettus and and Congressman John Hollis Bankhead secured more than \$7 million of federal spending to deepen Mobile's harbor and improve the navigability of inland waterways by constructing a series of locks and dams. Deep-draft oceangoing vessels were finally able to dock directly in Mobile in 1890 when the main channel was deepened to 23 feet. Additionally, an expanded railroad network, combined with more navigable inland waterways and a deeper harbor, helped revive Mobile's waterfront. More than one billion feet of lumber were shipped in 1889 and by 1893 Mobile was one of the largest importers of commodities from Central and South America, fruit in particular.

## World Wars I and II

World War I had a large impact on Mobile as the city's first shipbuilding contract was landed in 1917 and approximately 50 vessels were built by 1921. During this time the Mobile-based Waterman Steamship Corporation became one of the largest shipping companies in the world and began lobbying the state legislature to expand the city's docks. The Alabama State Docks were authorized in 1922 and opened in 1928 on a 500-acre site. doubling the capacity of the port of Mobile. Not surprisingly, the advent of World War II was also beneficial to the Mobile area as shipbuilding activity increased dramatically. More than 200 ships were built during the war years. The boom was short-lived, however, as the industry was dependent on government contracts.

## **Post-war Improvements**

The port of Mobile's expanded its coal shipping capacity in 1971 through a \$16 million coal terminal authorized by the state legislature. The Alabama State Docks issued \$45 million in bonds in 1975 to finance internal improvements and expand the port's facilities.

## **Tennessee-Tombigbee Waterway**

Completed in 1984 at a cost of \$2 billion, the Tennessee-Tombigbee Waterway was arguably the most significant improvement in the port's history. This canal, long envisioned, connects Mobile Bay to the Mississippi and Ohio Rivers via a canal between the Tombigbee River and the Tennessee River. The two major exports shipped on the Tenn-Tom include coal and timber.

## **Recent Improvements**

The port has executed roughly \$500 million in improvement and expansion projects since 2000 which serve containerized, bulk, and break bulk commodities. From 2010 to 2015, the port of Mobile spent approximately \$360 million on infrastructure improvements including new rail and intermodal yards, land acquisition, and cargo terminal investments. The investments also aim to improve the port's servicing of deep-water oil and gas vessels and related equipment.

## **Containerized Cargo**

The port of Mobile opened its first container terminal in 2008. In 2017 Mobile was ranked 28th in North America in container traffic volume, which increased 16.9 percent from 272,734 TEUs in 2016 to 318,889 in 2017. A 2.6 million-square-foot Wal-Mart import distribution center is nearing completion and will add approximately 50,000 TEUs per year. APM Terminals, an independent terminal operating division of the Maersk Group, expanded their container terminal at the port of Mobile by 20 acres in 2017. Another 20 acre expansion is planned for 2018-2019, bringing the total to 135 acres. A 400-foot dock extension is also planned, allowing two ships to birth at the same time. These improvements will expand Mobile's throughput capacity to 650,000 TEU, while additional expansions would increase annual capacity to the 1.5 million TEU range.

## Intermodal Container Transfer Facility

An intermodal container transfer facilitopened at the port of Mobile in 2016. The facility's main user is the Canadian National Railway, which modeled its Mobile operation after a successful ship-to-rail terminal at Prince Rupert, Canada.

## **Coal and Steel**

Alabama Steel Terminals opened a terminal in 2015 with rail, truck, and barge access to handle steel coils. The resurgence of the region's steel making industry has made Mobile one of the largest US ports for steel, handling approximately 5 million tons of steel per year.





## **Proposed Ro/Ro Terminal**

To service Alabama's growing automotive manufacturing sector, the port of Mobile has a \$48 million roll on/roll off facility included in its 2018 strategic plan. The facility is proposed for a 57-acre site that was formerly used to service bulk cargo.

#### Summary

With access to 5 class I railroads and two interstates, the port of Mobile is a natural hub for transportation and logistics. Going forward, Mobile will continue its important role in processing bulk commodities like coal and steel. With an expanding container terminal, a planned ro/ro automotive terminal facility, and dock and harbor improvements, the port of Mobile is poised to grow as it adapts to service the needs of Alabama's changing economy.

> Sources: Encyclopedia of Alabama, Port of Mobile Amazing Alabama, Port of Mobile Journal of Commerce: Port of Mobile is poised for growth across trade operations



## Appendix C

## LI Resource Library

Air Cargo World, Top 50 Cargo Airports aircargoworld.com

American Association of Port Authorities aapa-ports.org

American Association of Railroads, Rail Traffic Data aar.org

American Trucking Associations trucking.org

Automotive Logistics automotivelogistics.media

Bureau of Transportation Statistics, Air Cargo Summary Data transtats.bts.gov

Bureau of Transportation Statistics, Port Performance Freight Statistics, Annual Report to Congress 2017 www.bts.gov

Bureau of Transportation Statistics, Port Performance Profiles bts.gov

Cass Freight Index cassinfo.com

Intermodal Association of North America intermodal.org

Journal of Commerce

US Army Corps of Engineers, Waterborne Commerce Statistics Center iwr.usace.army.mil

Wall Street Journal Logistics Report wsj.com

# Appendix D

## LI Acronyms and Meanings

3PL	Third Party Logistics	GBL	Government Bill of Lading
AID	Agency for International Development	GMII	Global Maritime Intelligence Integration
AAR	Association of American Railroads	GRI	General Rate Increase
AMS	Automated Manifest System	GT	Gross Tonnage
ANOA	Advanced Notice of Arrival	I.S.O.	International Standards Organization
AWWL	Always within Institute Warranties Limits	I.T.	In–Transis Entry
BAF	Bunker Adjustment Factor	IE	Immediate Exit
BB	Ballast Bonus/Bareboat	IPI	Inland Point Intermodal
BBL	Barrel	TIL	Just In Time
BIMCO	The Baltic and International Maritime Council	KT	Kilo or metric ton
CAD	Cash Against Documents	LNGC	Liquefied Natural Gas Container
CAF	Currency Adjustment Factor	MBM	1.000 board feet
Cargo NOS	Cargo Not Otherwise Specified	MCFS	Master Container Freight Station
CBM	Cubic Meter	MSA	Maritime Security Act
CFR	Cost and Freight	MSSIS	Maritime Security and Safety Information System
CI	Cost and Insurance	MT	Metric Ton
CIA	CashinAdvance	MTSA	The Maritime TransportationSecurity Act
CIF	Cost Insurance Freight	N.M.F.C.	National Motor Freight Classification
CIF&E	Cost, Insurance, Freight and Exchange	NBC	National Cargo Bureau
CIFCI	Cost Insurance Freight Collection and Interest	NRT	Net Register Tons
CI	Carload/Containerload	NT	Net Tonnage
COD	Collect (cash) on Delivery / Carried on Docket (pricing)	0.P.I.C.	Overseas Private Investment Corporation
COFC	Container On Flat Car	OCP	Overland Common Points
COGSA	Carriage of Goods bySea Act	005	Operating Differential Subsidy
	Container Security Initiative	0\$20	Over Short or Damage
(Y	Container Yard	PADAG	Please Authorize Delivery Against Guarantee
DOT	IIS Department of Transportation	POD	Port of Damage / Port of Destination / Port of Delivery
D/A	Documents Against Accentance	POL	Port of Landing / Petroleum Oiland Lubricants
D/P	Documents Against Payment	PPMX	Post-Panamax
D&H	Dangerous and Hazardous	Ro/Ro	Roll On / Roll Off
	Destination Delivery Charge	RT	Revenue Ton
DFS	Delivered Ex Shin / Named Port of Destination	RVNX	Released Value Not Exceeding
DF Car	Damage-Free Car	S/D	Sight Draft / Sea Damage
DRES	Destination Rail Freight Station	SCAC	Standard Carrier Abbreviation Code
FDI	Electronic Data Interface	SIC	Standard Industrial Classification
FTACDRS	Estimated Time of Arrival Completion Departure Readiness or Sailing	SITC	Standard International Trade Classification
F D A	Free of Particular Average	5110	Shinner's Load & Count
FAS	Free Alongside Shin	SPA	Subject to Particular Average
FCA	Free Carrier	ST	Short Ton
FCI	Full Container Load	T&F	Transportation & Exit
FD	Free Discharge	TI	Trailer Load
FFII	Forty-Foof Fourivalent Units	IICP	Uniform Customs and Practice for Documentary Credits
FIO	Free In and Out	IIFC	Uniform Freight Classification
FO	Free Out	VIEO	Vessel Load Free Out
FOR	Free On Roard	VSIF	Vessel Supplies for Immediate Exportation
FDDI	Foreign Drincinal Darty of Interest	WWD	Weather Working Days
FTK	Freight Toppa Kilomatars	11110	
111			

## END NOTES

<sup>1</sup> 2017 Edition of RailRoad Facts by American Association of Railroads

<sup>2</sup> ATRI 2018 updated "Cost of Congestion to the Trucking Industry" report using 2016 data

<sup>3</sup> Cushman & Wakefield 2018-2019 North American Industrial Forecast Report

<sup>4</sup> Cass Freight Index – October 2018 report - https://www.cassinfo.com/freight-audit-payment/cass-transportation-indexes/cass-freight-index

<sup>5</sup> WSJ March 25, 2016 – How Trade Made America Great by Frederick W. Smith – www.wsj.com/articles/how-trade-made-america-great-1458943320

<sup>6</sup> Verizon Tracking Digital Commerce Retail Index - https://www.verizon.com/about/news/2018-holiday-retail-index-verizon-tracking-digital-commerce

<sup>7</sup> NREI – 2018 ranking of top Industrial Real Property Owners/Developers based on YR-End 2017 holdings https://www.nreionline.com/industrial-cre-market-study/2018-top-industrial-owners?full=1

<sup>8</sup> Colliers Mid-2018 Industrial Outlook by James Breeze - https://www2.colliers.com/en/research/2018-Q2-US-Industrial-Market-Outlook-Report

<sup>9</sup> Think running retail stores is more expensive than selling online? Think again.
 April 2017 feature by Courtney Reagan 
 https://www.cnbc.com/2017/04/19/think-running-retail-stores-is-more-expensive-than-selling-online-think-again.html
 Published 2:28 PM ET Wed, 19 April 2017 Updated 5:50 PM ET Wed, 19 April 2017

<sup>10</sup> WSJ March 25, 2016 – How Trade Made America Great by Frederick W. Smith – www.wsj.com/articles/how-trade-made-america-great-1458943320

" Eno Center for Transportation - https://www.enotrans.org/article/harbor-maintenance-trust-fund/

<sup>12</sup> IANA – Intermodal Association of North America - https://www.intermodal.org/what-intermodal

<sup>13</sup> American Association of Railroads October 2018 RailTime Indicators Report

<sup>14</sup> World Economic Forum's 2018 report on the most competitive economies.

<sup>15</sup> ATRI 2018 updated "Cost of Congestion to the Trucking Industry" report (using 2016 data)





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