

SUPPLY CHAIN INNOVATION INITIATIVE

Washington, DC 20573

December 5, 2017

The Honorable Michael A. Khouri
Acting Chairman
Federal Maritime Commission
800 N. Capitol St., NW
Washington, DC 20573

Dear Acting Chairman Khouri and fellow Commissioners,

As provided in the Commission's Order of February 1, 2016, it is my privilege to present to the Commission the Final Report on the Commission's Supply Chain Innovation Teams initiative. Working closely with our six Supply Chain Innovation Teams has been enlightening and worthwhile. I have included with this report a list of the FMC Import and Export Innovation Leaders, Port Authority Advisors, Trade Association Supporters and Academic and Business Advisors that participated in the project.

To the concern of many, the international freight delivery system for U.S. exports and imports strains against the current demands placed upon it. Even single events, such as a storm or a labor dispute that impacts one node in the supply chain, can have systemic consequences that impose significant costs on the U.S. economy. Without a stronger and more dependable international commercial supply chain, the United States may fail to realize our greatest potential for robust economic growth and competitiveness.

Just prior to hosting the Commissions' Gulf Ports Forum in 2014, I had returned from leading a discussion group of shipping executives at the Danish Maritime Forum in Copenhagen. I shared with the New Orleans group that, in Copenhagen, we found no easy answers to the international problem of supply chain inefficiency. Rather, the Copenhagen group determined that solutions require continual adaptation to the dynamic requirements of global trade.

There were two notable outcomes of the FMC port forums that led to the Commission issuing the Order to launch the Innovation Teams I was proud to lead. The first was that there is no single solution to the challenge of greater international supply chain performance. Second, the industry, especially trucking interests, wanted the Federal Maritime Commission to continue its leadership role in facilitating communications among all stakeholders in the international transportation system.

By the very nature of our mission, the Commission is in a unique position to draw American business leaders together to actively assess solutions to international supply chain challenges. Our primary responsibility to enforce ocean transportation competition for the benefit of the American consumer extends our commercial understanding beyond the maritime sector to the needs of American shippers. Very simply, there is no other agency that has the same commercial perspective and credibility across all sectors of transportation service providers involved in the international movement of ocean containers.

As you know, six FMC Supply Chain Innovation Teams—three focusing on import trades and three focusing on export trades—began deliberations last year. At the outset, I challenged each Team to meet one clear goal: Step “out of your enterprise silo” and develop one commercial operational innovation to increase American international supply chain reliability and resilience. Presented with this challenging task, the Teams made substantial progress in relatively few meetings.

Our Teams, as the attached Final Report explains, determined that greater visibility of critical information across the American freight delivery system was the one operational innovation that would most increase U.S. international supply chain performance. It was not about information technology per se – but an effort to (a) achieve changes in perspective and in behavior to “harmonize” the operation of the freight delivery system and to (b) increase systemic efficiency and performance. Without the right information, supply chain actors are essentially “flying blind.”

The Port of Los Angeles, which participated on our Import Teams, has undertaken an important supply chain information pilot project in conjunction with General Electric. Their willingness to unilaterally undertake this innovative effort as a way to increase supply chain efficiencies is commendable. I am closely following the progress of this project. The Federal Maritime Commission Agreement authority under the Shipping Act of 1984 may be useful if other ports in the country wish to become part of a this effort.

Based on these last eighteen months of working with some of the sharpest and most knowledgeable industry leaders in the country, I believe that a National Seaport Information Portal is the key to increasing the performance of the U.S. international freight delivery system. In this regard, the Innovation Teams’ work will be recognized as an important step toward providing a critical and timely boost to American economic growth.

In closing, I would like to express my appreciation for the interest in, and support from, our House and Senate oversight committees for our Supply Chain Innovation Teams initiative.

I would also like to thank the Commission staff members whose participation was invaluable to the project. These include Robert Blair, Joel Graham, Roy Pearson, Dylan Richmond, Christine Stavropoulos, and Susan Uhlendorf.

Finally, a well-deserved thanks to the remarkable industry leaders who devoted their time and resources to this project.

Respectfully submitted,

Rebecca F. Dye, Commissioner

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I. THE FEDERAL MARITIME COMMISSION'S ROLE

For over one hundred years, the United States has relied on the Federal Maritime Commission (and its predecessor agencies) to enforce competition in the U.S. international ocean transportation of goods. The Commission does so by implementing and enforcing the Shipping Act and other statutes.¹ The purpose of the Shipping Act, among other things, is to “provide an efficient and economic transportation system in the ocean commerce of the United States that is, insofar as possible, in harmony with, and responsive to, international shipping practices.”² Congress likewise charged the Commission with “promot[ing] the growth and development of United States exports through competitive and efficient ocean transportation and by placing a greater reliance on the marketplace.”³

In addition to its programmatic responsibility to ensure an efficient ocean commerce system, the Commission has working relationships with most key stakeholders in the commercial supply chain. The Commission enforces the Shipping Act’s competition regime, which involves the activities of ocean carriers, ports, marine terminal operators, and ocean transportation intermediaries, for the benefit of American consumers.⁴ It also regularly interacts with exporters and importers, drayage trucking companies, chassis providers, railroads, and port labor. In so doing, the Commission has developed an informed perspective on the commercial realities of the freight delivery system.

This expertise has enabled the Commission to play an important role in addressing various supply chain-related issues. In addition to holding port forums in 2014,⁵ the Commission expedited the implementation of amendments to port and terminal agreements aimed at enhancing the efficient flow of cargo.⁶ In February 2016, the Commission hosted a listening session with U.S. Coast Guard officials to address exporter uncertainty about implementing the International Maritime Organization’s new rules on verified container weight.⁷ More recently, the Commission relaxed regulatory requirements for service contract filing.⁸ And when Hanjin Shipping Company declared bankruptcy in September 2016, negatively impacting chassis availability, drayage

¹ See 46 U.S.C. §§ 301-308, 40101-44106.

² 46 U.S.C. § 40101(2).

³ 46 U.S.C. § 40101(4).

⁴ See, e.g., 46 U.S.C. §§ 41102, 41104, 41106, 40301-40307, 40901-40904.

⁵ See Part II, *infra*.

⁶ *International Ocean Transportation Supply Chain Engagement 3* (Fed. Mar. Comm’n Feb. 1, 2016) (order), available at <https://www.fmc.gov/assets/1/Page/OrderSupplyChainEngagement.pdf> [hereinafter Supply Chain Order] (citing The Los Angeles and Long Beach Port Infrastructure and Environmental Programs Cooperative Working Agreement (FMC No. 201219), West Coast MTO Agreement (FMC No. 201143), Pacific Ports Operational Improvements Agreement (FMC No. 201227), Ocean Carrier Equipment Management Association (FMC No. 202-011284), and Los Angeles/Long Beach Port Terminal Operator Administrative and Implementation Agreement (FMC No. 201178)).

⁷ Fed. Mar. Comm’n, *Listening Session on SOLAS Scheduled for February 18, 2016*, The Federal Maritime Commission Newsroom, Feb. 10, 2016, https://www.fmc.gov/listening_session_solas_amendments/?F_All=y&Archive=y.

⁸ Final Rule, Amendments to Regulations Governing Service Contracts and NVOCC Service Arrangements, 82 Fed. Reg. 16288-16297 (Apr. 4, 2017), available at <https://www.gpo.gov/fdsys/pkg/FR-2017-04-04/pdf/2017-06557.pdf>.

trucking, and marine terminal operations, the Commission provided guidance and information to affected Americans.⁹

Consequently, when supply chain actors expressed frustration about bottlenecks in the American freight delivery system to the Commission at port forums in 2014, the “bottom-line” was not whether the FMC should become involved, but rather how it could best add value. The agency considered, but rejected, options such as exploring additional regulations, establishing an advisory committee, and convening a stakeholder summit.

From the outset, the Commission recognized that additional government regulations were not the answer. The port forum participants had already indicated that they had little appetite for governmental prescriptions or requirements.¹⁰ Further, the Commission understood that the complex nature of the freight delivery system meant that any new regulation carried a substantial risk of unintended negative consequences. In particular, the Commission did not want to duplicate or impede efforts by local port performance task forces to address supply chain bottlenecks or to second-guess the decisions of port officials.¹¹

In short, the Commission found it more appropriate to serve as a *catalyst* for stakeholder-identified commercial solutions. It could assist by bringing industry leaders together in small teams to “roll up their sleeves” and actively engage in order to develop commercial improvements in the U.S. international supply chain.

This approach was reflected in a February 1, 2016, Commission Order that directed Commissioner Rebecca Dye to engage supply chain stakeholders in discussions to identify commercial solutions to unresolved supply chain issues that interfere with the smooth operation of the United States international supply chain.¹² It also authorized the Commissioner to form “a supply chain innovation team, composed of leaders from all commercial sectors of the U.S. international supply chain, to develop commercial solutions to port congestion and related supply

⁹ Fed. Mar. Comm’n, *Statement Regarding Status of Hanjin Shipping*, The Federal Maritime Commission Newsroom, Sept. 1, 2016, updated Sept. 8, 2016, <https://www.fmc.gov/NR16-17/?CategoryId=20&Month=9&Year=2016&Archive=y>; Fed. Mar. Comm’n, *FMC Establishes Protocol for All Public Communications Related to Hanjin Shipping Disruptions*, The Federal Maritime Commission Newsroom, Sept. 2, 2016, <https://www.fmc.gov/NR16-18/?CategoryId=20&Month=9&Year=2016&Archive=y>.

¹⁰ Fed. Mar. Comm’n, *U.S. Container Port Congestion & Related International Supply Chain Issues 70* (2015), available at http://www.fmc.gov/assets/1/Page/PortForumReport_FINALwebAll.pdf [hereinafter FMC Congestion Report].

¹¹ *Id.* at 69 (“Local task forces and work groups at several ports have made encouraging progress in identifying port congestion challenges and in providing forums for members of their port community to be heard, discuss their common interests, and search for workable solutions.”); see also *id.* at 73.

¹² Supply Chain Order, *supra* note 6, at 4. Although the Order focused on the ports of Los Angeles and Long Beach, stakeholder interest led to the inclusion of other ports, such as New York/New Jersey, Houston, Charleston, and Seattle/Tacoma.

chain challenges.”¹³ Although the team meetings would be nonpublic, Commissioner Dye would provide periodic updates as well as a preliminary and final report.¹⁴

II. COMMISSIONER DYE’S CONCLUSIONS

Although presented with a challenging task – improving the reliability and resilience of a complex, international freight delivery system of vital importance to the Nation’s economy – the Supply Chain Innovation Teams made substantial progress. Their work can be continued and refined in concept, and it supports the following conclusions:

A. International Supply Chain is a complex ecosystem

1. The United States international supply chain is a complex, dynamic ecosystem, and the operational interdependence of the actors within it renders the system vulnerable to cascading disruption.
2. The simultaneous interactions within and without the system make it difficult to develop solutions to individual supply chain challenges in isolation from each other.
3. Major systemic challenges include:

The lack of direct customer relationships between actors in this system (such as shippers and terminals) impedes cooperative problem-solving, exacerbates disruptions (decreasing systemic reliability) and makes recovering from disruptions more difficult (decreasing systemic resilience). Where direct customer relationships exist between actors in the system, there is a commercial vehicle to harmonize the supply chain by addressing disruptions.

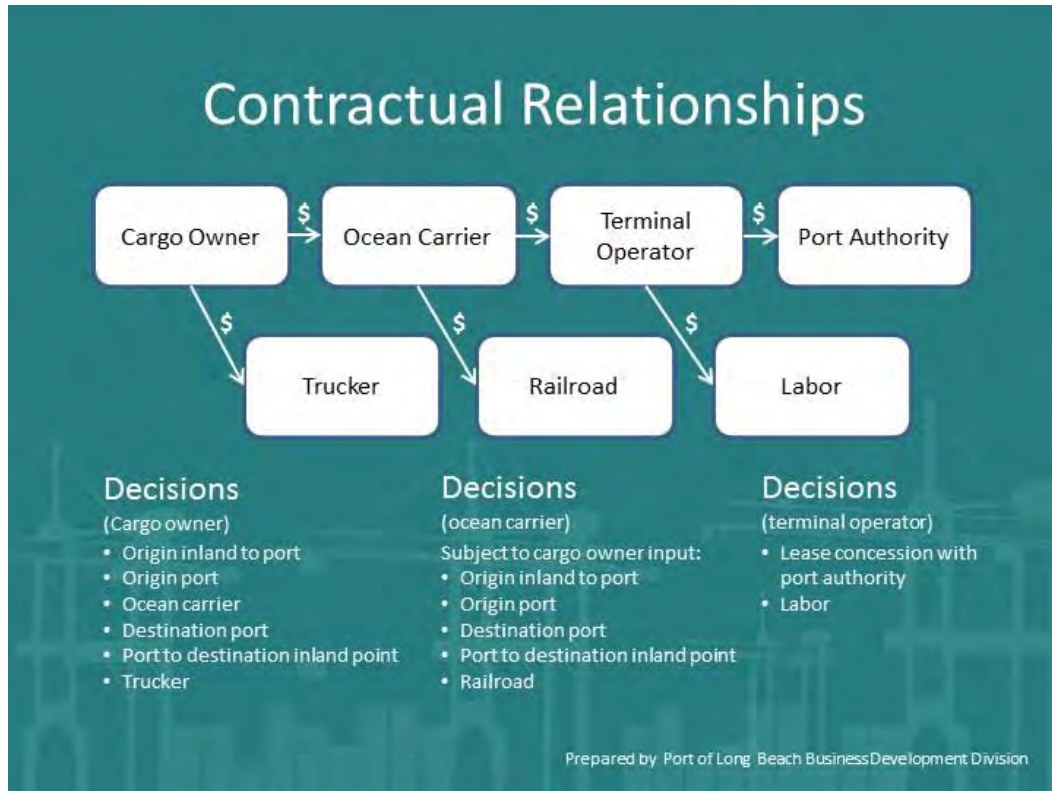
Note that marine terminals, shippers, and chassis providers have customer relationships with carriers, but not with each other.¹⁵ The absence of direct customer relationships makes it more likely that a marine terminal and a shipper or chassis provider may work at cross purposes.

Team members pointed out that there may be tension between a terminal’s desire to increase container throughput velocity and a shipper’s need for a reasonable window within which to retrieve or deliver its container.

¹³ *Id.*

¹⁴ *Id.*

¹⁵ Port of Long Beach Business Development Division.



4. Lack of mutual commitment or “skin-in-the-game” is an impediment to realizing the full benefits from customer relationships that exist in the system, including regarding service contracting and export container availability. In this regard, one Export Innovation Team recommended a “premium customer” option to deal with the problem of export container availability and carrier booking integrity.¹⁶
5. Other complications include diverse port and terminal business models, varying governance structures and priorities, and differing state and federal government regulatory approaches.
6. In a system as complex and interdependent as the U.S. international supply chain, U. S. port directors strive to exert influence and develop port efficiencies beyond the terminal gates.¹⁷

“Treat everybody as your customer.”

Port Director Interview

¹⁶ See Part IV, *infra*.

¹⁷ In conjunction with the Supply Chain Innovation Initiative, Commissioner Dye interviewed the directors of major U.S. container ports. See Part IV, *infra*.

B. Small Teams/Process Innovation

1. The best approach to international supply chain system innovation is from a broad systems perspective within small teams of industry leaders that “step out of their enterprise silos” and consider upstream and downstream freight delivery operations.
2. Small, multi-stakeholder teams of industry leaders are essential to promote active engagement among supply chain actors and create conditions that support process innovation. They can be adapted as a model for continued FMC discussions and for commercial supply chain planning projects around the country.
3. Moreover, as one of the Export Teams demonstrated, the small-teams approach can be used to address specific supply chain challenges, for example, the link between export container availability at booking and no-show bookings.

C. Value Proposition: Visibility of Critical Information

1. Increasing visibility of critical information among supply chain actors is the process innovation that would provide the greatest improvement to performance of the American international supply chain.
2. Many supply chain inefficiencies result from poor information availability, inaccurate information, or untimely information. Without timely, critical information, supply chain actors are “flying blind.”
3. Access to critical information will compensate for supply chain complexity and promote behavioral “self-correction” in the system.
4. Most important, visibility is enhanced when accurate, timely, critical information, not maximum data, is shared throughout the freight delivery system.

D. National Seaport Information Portal

1. Critical information may be shared via a national seaport information portal that is adaptable for use by any port in the country. The portal would display standardized, critical information via dashboards that are customizable, real-time, and secure.
2. The Port of Los Angeles/General Electric supply chain information project is an excellent example of ways in which supply chain actors can leverage critical information and technology.
3. The goal of a National Seaport Information Portal is to change operational behavior of actors in the commercial freight delivery system, providing a boost to the performance of the American freight delivery system.

4. The Commission’s Agreement authority under chapter 403 of title 46, United States Code, could be useful to allow ports to cooperate within a National Seaport Information Portal.

III. COMMISSIONER DYE’S RECOMMENDATIONS

In light of these conclusions, and as authorized by the Commission’s Order of February 1, 2016, Commissioner Dye recommends that:

- A. The Commission engage with U.S. seaports and other supply chain actors, trade associations, academic organizations, and others experts, to promote the commercial development of a National Seaport Information Portal for the collection and dissemination of critical supply chain information;
- B. The Commission continue to sponsor working groups using the small teams approach to address commercial supply chain challenges, especially to support further development of the Export Teams’ recommendation for a premium customer option concerning container availability;
- C. The Commission promote and encourage academic and industry-sponsored commercial supply chain research;
- D. The Commission promote and encourage supply chain mapping efforts, especially for U.S. exports;
- E. The Commission continue to actively engage with port directors and others on a regular basis to encourage development of commercial solutions to supply system challenges; and
- F. The Commission accept this final report, make it publicly available, and discontinue the International Ocean Transportation Supply Chain Engagement proceeding.

IV. INTERNATIONAL SUPPLY CHAIN AS COMPLEX SYSTEM

The complexity of the U.S. commercial supply chain and the interdependence of its actors not only make the system vulnerable to cascading disruption,¹⁸ but also make possible solutions to these operational challenges less obvious. This situation was made evident by serious bottlenecks at the Nation’s largest

“If any one element of the supply chain breaks down, the whole supply chain stops.”

Port Director Interview

¹⁸ See, e.g., Thomas J. Goldsby, Deepak Iyengar & Shashank Rao, *The Definitive Guide to Transportation* 7 (2014) (“When one level in the supply chain experiences delays and problems, it impacts the abilities of downstream members

seaports in recent years.¹⁹ In 2013-2014, severe winter weather caused the closure of terminals and a backlog of containers at the Port of New York and New Jersey and other ports.²⁰ Moreover, in July 2014, the labor agreement covering most West Coast port workers expired and was not renewed until February 2015.²¹ Although port work continued during that time, backed-up vessels sat at anchor in the San Pedro Bay and loading and unloading of cargo was delayed.²²

These supply chain disruptions had adverse economic consequences, such as increased transportation costs, decreased revenue, and reduced United States international competitiveness.²³

“The trucker is a key part of the supply chain; if drivers aren’t healthy, the industry isn’t healthy.”

Port Director Interview

Cargo delays increased freight distributions costs, forcing shippers to increase order fulfillment lead times and inventory levels.²⁴ Moreover, shippers lost revenue due to slowed production, missed opportunities, increased stock-outs, and delayed introduction of new products.²⁵ Cargo bottlenecks also led to spoiled and untimely agricultural exports.²⁶ Shippers diverted their cargo away from gridlocked ports and terminals to other ports, including Canadian ports.²⁷ Supply chain delays increased the costs

of ocean carriers.²⁸ Truckers were particularly susceptible to the effects of disruptions in the freight delivery system because delays directly reduced driver and truck productivity.²⁹

of the supply chain to serve their customers. For this reason, the larger economy is affected when transportation disruptions occur.”).

¹⁹ Although the phrase “port congestion” is often used in this context, this is not to say that cargo bottlenecks that occur at ports are necessarily caused by ports or marine terminal operators.

²⁰ FMC Congestion Report, *supra* note 10, at 59, 69, 75; Fed. Mar. Comm’n, *Rules, Rates, and Practices Relating to Detention, Demurrage, and Free Time for Containerized Imports and Exports Moving through Selected United States Ports* 26 (2015), available at <https://www.fmc.gov/assets/1/Page/reportdemurrage.pdf>; see also Port of New York & New Jersey, *Port Performance Task Force: A Collaborative Effort for a Collective Change* 4, 9, 22 (2014), available at <https://www.panynj.gov/port/pdf/pptf-final-report-june-2014.pdf>.

²¹ See, e.g., Chris Dupin, *ILWU, PMA Reach Contract Agreement*, American Shipper, Feb. 23, 2015, <https://www.americanshipper.com/main/news/news-flash-ilwu-pma-reach-contract-agreement-59534.aspx>; Bill Mongelluzzo, *West Coast Ports Claw Back Market Share Lost to Diversions*, Journal of Commerce, Sept. 24, 2015, https://www.joc.com/port-news/us-ports/port-los-angeles/west-coast-ports-claw-back-market-share-lost-diversions_20150924.html.

²² See, e.g., Dupin, *supra* note 21; Eric Kulisch, *West Coast Port Backlog Could Take Weeks to Unwind*, American Shipper, Feb. 11, 2015, <https://www.americanshipper.com/main/news/west-coast-port-backlog-could-take-weeks-to-unwind-59440.aspx>.

²³ FMC Congestion Report, *supra* note 10, at 78.

²⁴ *Id.*; Kulisch, *supra* note 22 (noting that importers and exporters complained to Congress of delayed shipments and extra transportation costs and fees).

²⁵ FMC Congestion Report, *supra* note 10, at 78; Kulisch, *supra* note 22; Joseph Bonney, *Federal Reserve Report Notes US West Coast Port Delay Impact*, Journal of Commerce, Jan. 13, 2015, <https://www.joc.com/node/2906001> (noting that retailer Lululemon Athletica told investors that congestion would cost it \$10 million in revenue).

²⁶ Supply Chain Order, *supra* note 6, at 2; Kulisch, *supra* note 22.

²⁷ FMC Congestion Report, *supra* note 10, at 78; Mongelluzzo, *supra* note 21.

²⁸ FMC Congestion Report, *supra* note 10, at 78.

²⁹ *Id.*

In response to the bottlenecks at several major seaports, the Commission held a series of regional port forums in San Pedro, California (West Coast Port Forum), Baltimore, Maryland (Mid-Atlantic and Northeast Port Forum), Charleston, South Carolina (South Atlantic Port Forum), and New Orleans, Louisiana (Gulf Coast Port Forum), between September and November 2014. Each forum was hosted by at least one Commissioner and operated as a listening session with panels of port officials, ocean carriers, truckers, warehouses, shippers, marine terminal operators, stevedoring companies, ocean transportation intermediaries, and port labor. The participants shared their views on the causes and consequences of supply chain problems, responded to the concerns of other participants, and suggested solutions.³⁰

The Commission's report on the forums, *Port Congestion & Related International Supply Chain Issues: Causes, Consequences, and Challenges*, emphasized the importance of port efficiency to America's ocean-borne commerce, and more broadly, to the U.S. economy as a whole. At the Gulf Ports forum, the participants advocated for national-level efforts by experienced executives from all segments of the freight delivery system to develop commercial solutions to supply chain problems.³¹ At that forum, Commissioner Dye also suggested a dedicated port and supply chain planning framework that would involve all international supply chain commercial stakeholders.

Recognizing the Commission's unique substantive expertise and experience with the U.S. international transportation system, FMC port forum participants pressed the Commission to remain involved in commercial supply chain efficiency efforts.³² Truckers had on several occasions requested greater Commission involvement. Although the congestion crisis had receded, the Commission determined that it should actively assist commercial efforts to deal with unresolved supply chain problems.

A reliable and resilient freight delivery system is vital to the United States' economic health. As pointed out by Rose George in *Ninety Percent of Everything*, her illuminating account of the container shipping industry, "nearly everything" moves by sea.³³ Presently, the United States is the number one importer and number two exporter in the world.³⁴ The value of U.S. merchandise imports and exports in 2016 amounted to \$2.2 and \$1.4 trillion, respectively, giving the United States 13.9 percent of the world's total imports of merchandise and 9.1 percent of the world's total exports.³⁵ As of 2016, international trade in goods made up 19 percent of the Nation's gross

³⁰ See generally FMC Congestion Report, *supra* note 10, at 6-8.

³¹ See *id.* at 69-70, 73-74, 78.

³² *Id.* at 73, 74.

³³ Rose George, *Ninety Percent of Everything* 3 (2013).

³⁴ Cent. Intelligence Agency, *The World Factbook, United States*, <https://www.cia.gov/library/publications/the-world-factbook/geos/us.html> (last visited Nov. 17, 2017).

³⁵ World Trade Org., *Trade Profiles 2017* 380-81 (2017), available at https://www.wto.org/english/res_e/booksp_e/trade_profiles17_e.pdf; see also U.S. Bureau of Econ. Analysis, U.S. Dep't of Commerce, *U.S. International Trade in Goods and Services June 2017*, at Exs.1, 5 (2017), available at <https://www.bea.gov/newsreleases/international/trade/2017/pdf/trad0617.pdf>.

domestic product.³⁶ Approximately 41 percent of this foreign trade by value, and approximately 68 percent by weight, moved by water.³⁷ Containerized ocean-borne cargo made up 25 percent of U.S. trade by value in 2016.³⁸ According to the American Association of Port Authorities, “U.S. seaports generated nearly \$4.6 trillion in total economic activity and more than \$321 billion in federal, state, and local taxes in 2014.”³⁹ In short, “[m]aintaining the effectiveness and reliability of America’s global supply chain is critically important to the Nation’s continued economic vitality.”⁴⁰

“Supply chain optimization is key to the ability to stay competitive.”

Port Director Interview

International trade by sea is not expected to slow down. Trade carried by sea has quadrupled since 1970, and “[i]n 2011, the 360 commercial ports of the United States took in international goods worth \$1.73 trillion, or eighty times the value of all U.S. trade in 1960.”⁴¹ This trajectory has continued apace, as total TEU⁴² volume has increased 17 percent since 2010. In 2016, the United States imported 20.8 million TEUs of cargo and exported 11.6 million TEUs. In fact, the Nation has set a record every year since 2011 in terms of total TEUs. The year 2017 is likely to see even higher container volumes move through U.S. ports. In the first half of 2017, total U.S. containerized cargo increased by 4 percent compared to the same period in 2016.⁴³

Higher import and export volumes have led to steadily busier U.S. container ports. Since 2010, container volumes at the Port of Long Beach have increased by about 8 percent.⁴⁴ Los Angeles moved a record of over 8 million TEUs in 2016,⁴⁵ and is on pace to surpass those totals

³⁶ U.S. Census Bureau, U.S. Dep’t of Commerce, *USA Trade Online*, <https://usatrade.census.gov/>.

³⁷ U.S. Census Bureau, U.S. Dep’t of Commerce, *USA Trade Online*, <https://usatrade.census.gov/>; cf. Bureau of Transp. Statistics, U.S. Dep’t of Transp., *Freight Facts and Figures 2015 16* (2015), available at https://www.rita.dot.gov/bts/sites/rita.dot.gov/bts/files/FFF_complete.pdf.

³⁸ U.S. Census Bureau, U.S. Dep’t of Commerce, *USA Trade Online*, <https://usatrade.census.gov/>.

³⁹ Am. Ass’n of Port Auth., *Export, Jobs & Economic Growth*, <http://www.aapa-ports.org/advocating/content.aspx?ItemNumber=21150> (last visited Nov. 17, 2017); Martin Assoc., *The 2014 National Economic Impact of the U.S. Coastal Port System* (2015), available at [http://aapa.files.cms-plus.com/US%20Coastal%20Ports%20Impact%20Report%202014%20methodology%20-%20Martin%20Associates%204-21-2015%20\(2\).pdf](http://aapa.files.cms-plus.com/US%20Coastal%20Ports%20Impact%20Report%202014%20methodology%20-%20Martin%20Associates%204-21-2015%20(2).pdf); see also A. Strauss-Wieder, Inc., *The Economic Impact of the New York-New Jersey Port Industry* i (2014), available at http://nysanet.org/wp-content/uploads/NYSA_Economic_Impact_2014V2 (noting that port industry operations led to 190,100 direct jobs, 336,600 total jobs in the region, \$21.2 billion in personal income, nearly \$53.5 billion in business income, and close to \$7.1 billion in federal, state, and local tax revenues).

⁴⁰ Supply Chain Order, *supra* note 6, at 2.

⁴¹ George, *supra* note 33, at 3.

⁴² Containerized trade is commonly measured in Twenty-Foot Equivalent Units, or “TEUs.” One TEU is approximately twenty feet long, eight feet wide, and eight-and-a-half feet tall. Most marine/intermodal containers are forty feet in length, or 2 TEUs.

⁴³ IHS Markit—PIERS data.

⁴⁴ Port of Long Beach, *Yearly TEUs*, http://www.polb.com/economics/stats/yearly_teus.asp (last visited Nov. 17, 2017).

⁴⁵ The Port of Los Angeles, *TEU Statistics (Container Counts)*, <https://www.portoflosangeles.org/maritime/stats.asp> (last visited Nov. 17, 2017).

in 2017.⁴⁶ Ports on the U.S. East and Gulf coasts have seen even more robust growth since 2010. The Port of New York-New Jersey, the third-largest U.S. port by container traffic, increased its containerized volume by 18 percent from 2010 to 2016.⁴⁷ The Port of Savannah saw container traffic increase by 29 percent,⁴⁸ Norfolk by 40 percent,⁴⁹ and Charleston by 46 percent.⁵⁰ On the Gulf Coast, the Port of Houston moved 20 percent more containers in 2016 than it did in 2010.⁵¹ And in October 2017, Los Angeles set a world record with the call of the *MAERSK EVORA*, which loaded and unloaded a total of 24,846 TEUs during its visit to the port, the most containers ever moved in a single port call.⁵²

All this activity supports American businesses and jobs. Almost 408,000 American companies exported or imported goods in 2015, and nearly 98 percent of U.S. exporters and 97 percent of U.S. importers were small- or medium-sized businesses.⁵³ Exports of manufactured goods supported approximately seven million American jobs in 2015, and exports of agricultural products, natural resources, and used products supported hundreds of thousands of additional jobs.⁵⁴ The importance of the international freight delivery system to U.S. employment can be seen at seaports, where cargo activity is vital to regional employment.⁵⁵

The economic significance of the U.S. international commercial supply chain is rivalled by its complexity. The American international supply chain is a freight delivery system that distributes cargo from one point to another. Physical transportation of cargo is central to this process, but the supply chain can also include activities such as manufacturing, finance and financial compliance, communications, human resources, and marketing.⁵⁶ Additionally, every company in America's freight delivery system has its own individual supply chain. For the purposes of this report, however, "supply chain" refers to the U.S. international ocean container freight delivery system.

⁴⁶ *Id.*

⁴⁷ Port of New York and New Jersey, *2016 Trade Statistics* (2017), available at <https://www.panynj.gov/port/pdf/2005-2016-Historical-Trade-Stats-summary.pdf>.

⁴⁸ Georgia Ports Auth., *By the numbers*, <http://www.gaports.com/Portals/2/Market%20Intelligence/Monthly%20TEU%20Throughput%20September%202017.pdf> (last visited Nov. 17, 2017).

⁴⁹ The Port of Virginia, *Port Stats*, <http://www.portofvirginia.com/about/port-stats/> (last visited Nov. 17, 2017).

⁵⁰ South Carolina Ports, *Statistics*, <http://www.scspsa.com/about/statistics/> (last visited Nov. 17, 2017).

⁵¹ Port Houston, *Statistics*, <http://porthouston.com/portweb/about-us/statistics/> (last visited Nov. 17, 2017).

⁵² Peter Buxbaum, *Container Record Broken at Port of Los Angeles*, *Global Trade*, Oct. 31, 2017, <http://www.globaltrademag.com/global-logistics/container-record-broken-port-los-angeles>.

⁵³ Int'l Trade Admin., U.S. Dep't of Commerce, *U.S. Trade Overview 2016* 10 (2017), available at https://www.trade.gov/mas/ian/build/groups/public/@tg_ian/documents/webcontent/tg_ian_005537.pdf.

⁵⁴ Int'l Trade Admin., U.S. Dep't of Commerce, *Jobs Supported by State Exports 2015* 2, 6 (2016), available at https://www.trade.gov/mas/ian/build/groups/public/@tg_ian/documents/webcontent/tg_ian_005503.pdf; Int'l Trade Admin., *U.S. Trade Overview 2016*, *supra* note 53 at 9.

⁵⁵ The American Association of Port Authorities states that "[s]eaport cargo activity supports the employment of more than 23 million people in the United States – an increase of 9.8 million since 2007." Am. Ass'n. of Port Auth., *supra* note 39.

⁵⁶ *Intermodal Transportation: Moving Freight in a Global Economy* 40-42 (Lester A. Hoel, Genevieve Giuliano & Michael D. Meyer eds., 2011).

This system consists of interrelated organizations that continually affect one another, simultaneously and sometimes in unforeseen ways. It is international in scope and includes shippers (exporters and importers, also known as “beneficial cargo owners” or BCOs),⁵⁷ ocean transportation intermediaries such as freight forwarders and non-vessel-operating common carriers,⁵⁸ port authorities,⁵⁹ marine terminal operators, port labor, carriers such as ocean carriers (shipping lines), rail carriers (railroads), and motor carriers (trucking companies),⁶⁰ warehouses, and chassis providers. Each of these supply chain actors has a specific role to play, as described by the Government Accountability Office below:⁶¹

“The supply chain system works 7 days a week, 24 hours a day.”

Port Director Interview









⁵⁷ The Shipping Act defines “shipper” as “(A) a cargo owner; (B) the person for whose account the ocean transportation of cargo is provided; (C) the person to whom delivery is made; (D) a shippers’ association; or (E) a non-vessel-operating common carrier that accepts responsibility for payment of all charges applicable under the tariff or service contract.” 46 U.S.C. § 40102(22).

⁵⁸ See 46 U.S.C. § 40102(16), (18), (19); 46 C.F.R. § 515.2(m).

⁵⁹ Ports are often divided into “operating ports” which “actually administer or contract directly for the services provided to ocean carriers and cargo owners, including stevedoring (the loading and unloading of ships),” and “landlord ports,” which lease terminals to marine terminal operators. *Intermodal Transportation*, *supra* note 56, at 51. The Shipping Act’s definition of “marine terminal operator” is broad enough to include operating and landlord ports. See 46 U.S.C. § 40102(14).

⁶⁰ The Commission exercises programmatic oversight over common carriers, and the Shipping Act distinguishes between non-vessel-operating common carriers and “ocean common carriers,” i.e., vessel-operating common carriers. 46 U.S.C. § 40102(6), (16), (17).

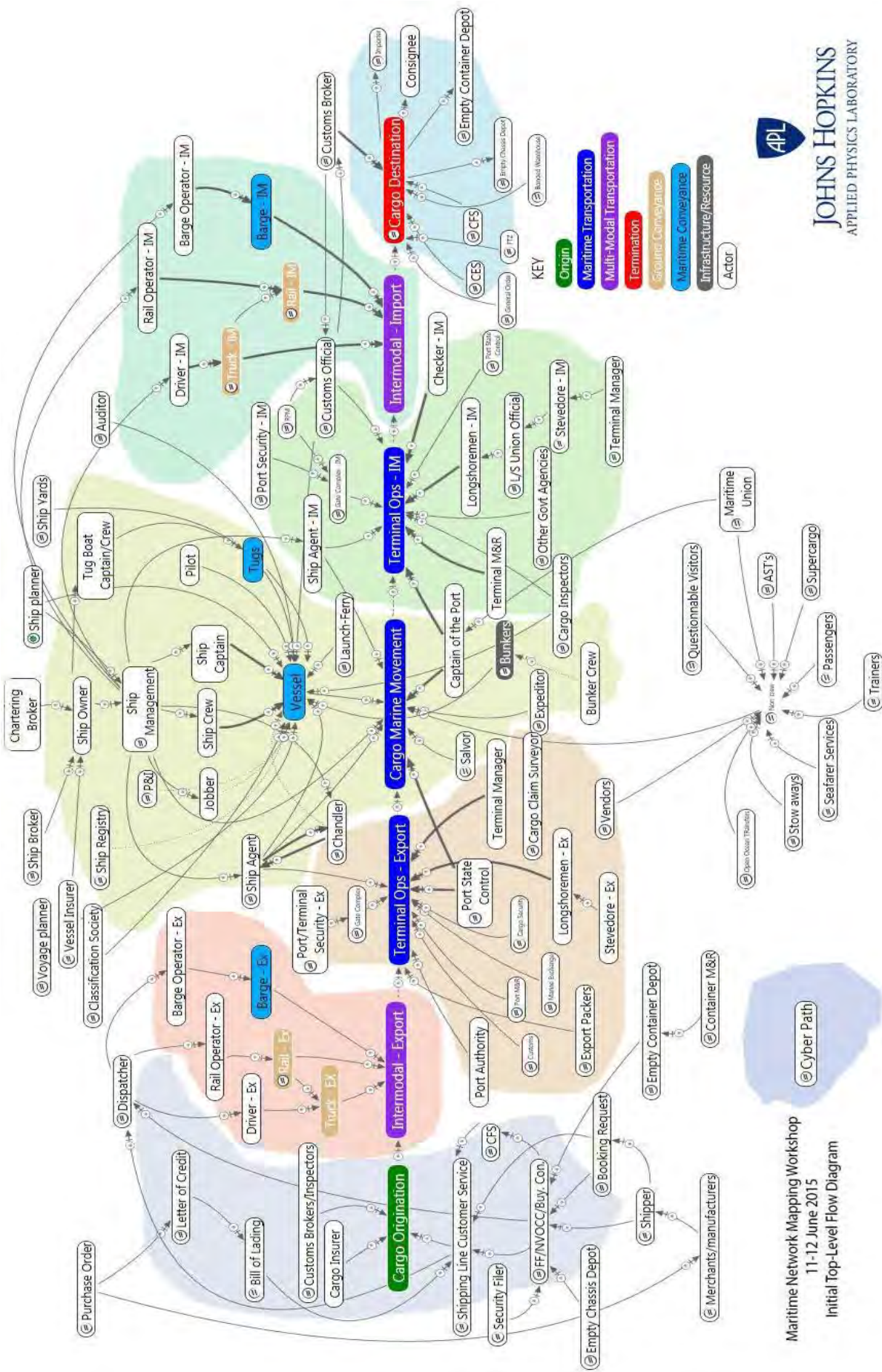
⁶¹ U.S. Gov’t Accountability Office, *West Coast Ports*, at App. II (2016), available at <https://www.gao.gov/assets/690/680719.pdf>.

Entity	Description	Role in the supply chain
 <p>Shippers</p>	<p>The consumer or business providing goods for shipment, or as defined by the Federal Maritime Commission (FMC), an ocean transportation intermediary (non-vessel-operating common carriers).</p>	<p>Shippers make transportation choices—such as where and how to ship goods—based on firm and commodity attributes such as market value, costs, geography, perishability, time-sensitivity, and inspection requirements. Shippers consider total logistics costs, transit time, and reliability in their supply chain and operational decision-making.</p>
 <p>Ocean carriers</p>	<p>For profit entities that own and operate the ships that move cargo from one port to another. These entities may also own or lease the containers that cargo is shipped in. They frequently operate in alliances with other carriers. Ocean common carriers frequently establish collective agreements, filed with and monitored by the FMC, to discuss and agree on common pricing policies or to jointly provide shipping services.</p>	<p>Ocean carriers select which ports and terminals to call on and formulate their routes based on a number of factors, including overall port capacity, profitability, shipper demand, and other business objectives. Ocean carriers may charge shippers fees to rent out containers and late fees if containers are not returned after a certain period of time.</p>
 <p>Port authority</p>	<p>Public entities created by a state, county, or city that own and manage port property, including land and physical assets, which may extend beyond maritime. Typically governed by a board or commission elected regionally or appointed by an elected official.</p>	<p>Port authorities develop and strategize maritime assets, for example, choosing to specialize in handling certain commodities or types of cargo. They compete with one another domestically and internationally to secure and maintain leases with marine terminal operators and to attract vessel calls from ocean carriers.^a</p>
 <p>Marine terminal operators</p>	<p>Entities that may operate terminals at multiple ports or have affiliations with ocean carriers. The FMC defines marine terminal operators as providers of wharfage, dock, warehouse, or other marine terminal facilities to ocean common carriers moving cargo in the ocean-borne, foreign commerce of the United States. They often participate in marine terminal operator agreements, filed with and overseen by the FMC, whose members collectively engage in cooperative working arrangements or discuss and regulate rates or conditions of service.</p>	<p>Marine terminal operators lease facilities (e.g., a terminal) from port authorities and coordinate all cargo operations and other maritime related functions (such as operating the equipment that loads and unloads ships). They depend on ocean carriers' ships calling on their facilities for revenue. Terminal operators are also responsible for "calling" and contracting labor. Marine terminal operators may charge storage fees (demurrage) when a container is not picked up by a shipper after a certain period of "free" time.^b</p>
 <p>Labor</p>	<p>Workers (labor) engaged in longshore division work, such as crane and equipment operators, marine clerks, and mechanics. Their employment conditions, including rates of pay, hours, worker safety provisions and protections, are statutorily mandated or negotiated in labor contracts.</p>	<p>Labor is responsible for the clerical functions associated with the receiving, delivering, checking, tallying, inventorying, etc. of cargo and the physical loading and unloading cargo on and off of ships for transport into and out of the terminal. Labor is also responsible for the maintenance and repair of cargo handling equipment (including, but not limited to, the maintenance and repair of most chassis used to transport cargo to and from the terminal).</p>
 <p>Truckers</p>	<p>Truckers are truck operators, often owner-operators, who are paid by the number of pick ups and drop offs they make (commonly referred to as "turns"), or employees of licensed motor carriers.</p>	<p>Truckers transport containers between port terminals and other intermodal facilities, such as railyards and warehouses. Many are dispatched by larger trucking companies, while others work independently.</p>
 <p>Chassis leasing company</p>	<p>Third-party leasing companies now own the majority of container chassis—truck trailer beds hooked up to truck cabs designed to accommodate specific shipping container sizes (typically 20, 40, or 45 feet long). Ocean carriers once owned chassis, but recently got out of this line of business.</p>	<p>These companies rent chassis to truckers or long-term lease chassis to shippers, truckers, and others for the movement of ocean carrier's shipping containers to and from a terminal.</p>
 <p>Rail operators</p>	<p>For profit entities that own, maintain, and manage the railroad infrastructure and equipment they are dependent upon for carrying cargo. Freight railroads are divided into three groups, called classes, based upon their annual revenues.</p>	<p>Rail operators transport cargo to and from shippers and the terminals, using railroads located on-dock, near-dock (<5 miles from port), and off-dock. Class I railroads, which are the largest railroads generally focus on providing long-haul freight services, whereas smaller or regional Class II and III railroads often provide the first and last mile of rail freight movement.</p>

Source: GAO. | GAO-17-23

Although these actors tend to focus on their own companies and industries, they also work closely with one another. With respect to a single shipment, an importer may interact with an ocean carrier, railroad, trucker, port authority, marine terminal operator, and various government authorities. The intricacy of the relationships in the freight delivery system is apparent from the following:⁶²

⁶² Johns Hopkins Applied Physics Laboratory: Supply Chain Mapping.



Maritime Network Mapping Workshop
 11-12 June 2015
 Initial Top-Level Flow Diagram

V. FMC SUPPLY CHAIN INNOVATION TEAMS

The FMC Supply Chain Innovation Teams initiative focused on two concepts: teamwork and incremental process innovation.⁶³ This initiative involved small, committed Teams of major company leaders exchanging ideas and debating creative proposals for supply chain improvements.⁶⁴ In refining this approach (and continuing throughout the course of the initiative) Commissioner Dye consulted a variety of academic and business resources and experts in supply chain management, process innovation, transportation research, and business teams.⁶⁵ For example, Commissioner Dye consulted with Dr. Dean Egli and his colleagues at the Johns Hopkins Applied Physics Laboratory; the University of Denver Transportation Institute; MIT's Center for Transportation and Logistics; the New York Shipping Exchange; and Strategic Mobility 21.

This research emphasized: (a) the importance of stakeholders moving beyond individual organizational silos, (b) the effectiveness of small teams (five to twelve individuals), and (c) that the smooth and predictable flow of cargo is more important to the effectiveness of the supply chain than maximizing velocity in any given segment of the chain.⁶⁶ It also highlighted the need for *visibility* within a supply chain and the problems associated with *data overload*.

Adapting academic research on high performing teams,⁶⁷ Commissioner Dye organized small teams of committed, experienced industry leaders from a broad range of supply chain segments that would meet in-person to identify supply chain challenges and develop and implement process innovations. As compared to other approaches, the small, multi-stakeholder teams offered several advantages:

- Teams small enough to ensure direct, meaningful, creative interaction among members, but large enough to include all relevant supply chain voices;

⁶³ “Process innovation” involves “new or significantly improved methods, equipment or skills used to perform [a] service.” The Innovation Policy Platform, *Product and Process Innovation*, <https://www.innovationpolicyplatform.org/content/product-and-process-innovation> (last visited Nov. 17, 2017).

“Incremental innovation concerns an existing product, service, process, organization or method whose performance has been significantly enhanced or upgraded.” The Innovation Policy Platform, *Radical and Incremental Innovation*, <https://www.innovationpolicyplatform.org/content/radical-and-incremental-innovation> (last visited Nov. 17, 2017).

⁶⁴ See, e.g., Patrick Lencioni, *The Five Dysfunctions of a Team* (2002).

⁶⁵ A selected bibliography is included in this Report.

⁶⁶ See generally Walter Isaacson, *The Innovators* (2015); Stanley McChrystal, *Team of Teams: New Rules of Engagement for a Complex World* (2015); Jeanne Liedtka, Robert Rosen & Robert Wiltbank, *The Catalyst* (2009); Jim Rice, *How Many Supply Chain Innovations Are Truly Revolutionary?* Supply Chain 24/7, Jan. 19, 2014, http://www.supplychain247.com/article/how_many_supply_chain_innovations_are_truly_revolutionary; Lencioni, *supra* note 64.

⁶⁷ See, e.g., Lencioni, *supra* note 64.

- Participation from across the length of the supply chain, thereby encouraging members to look at the supply chain systemically rather than from within individual company and industry silos;
- Participation by industry executives who not only have valuable perspectives to contribute but who would also be able to implement changes within their respective organizations; and
- Non-public discussions to encourage candid engagement - balanced by periodic public reports by Commissioner Dye at open Commission meetings and other public forums.

“If a supply chain actor stays in its silo, it risks becoming an impediment rather than a catalyst of cargo movement and the attendant economic growth.”

Port Director Interview

Teams were directed to focus on process innovations. Research has shown that most innovation in supply chain management is not revolutionary but rather incremental: it builds on existing achievements, methods, and technologies and takes the form of incremental advances over

“Problems are solved by a combination of people sitting down, talking about solutions, and focusing on the tactical and the strategic.”

Port Director Interview

time.⁶⁸ Consequently, the Teams were not focused on so-called radical or disruptive innovation.⁶⁹ Rather, Commissioner Dye encouraged the Teams to take advantage of past successes and focus on “transformation” or progressive innovation - realistic, actionable improvements to current processes or operations.⁷⁰ The Teams were expected to align supply chain processes among all key actors, focusing on improving reliability and resilience of the overall freight delivery system.

Per the Commission’s February 1, 2016, order, Commissioner Dye began organizing a Supply Chain Innovation Team in 2016. Due to high levels of industry interest, Commissioner Dye ultimately convened *six* Teams, each with seven to twelve members drawn from a cross-section of relevant supply chain actors, including importers, exporters, public port authorities, marine terminal operators, shipping lines, ocean transportation intermediaries, drayage trucking companies, railroads, chassis providers, and longshore labor. Because the import and export legs of America’s international supply chain differ significantly, the Commissioner divided the

⁶⁸ Rice, *supra* note 66; *see also* The Innovation Policy Platform, *Radical and Incremental Innovation*, *supra* note 63 (noting that “[i]ncremental innovation is the dominant form of innovation”).

⁶⁹ A disruptive innovation “is an innovation that has a significant impact on a market and on the economic activity of firms in that market.” The Innovation Policy Platform, *Radical and Incremental Innovation*, *supra* note 63.

⁷⁰ *Cf.* Lars Jensen, *Line Shipping 2025: How to Survive and Thrive* 12 (2017) (“When we are looking towards 2025, transformation is a more apt description than disruption.”).

initiative into an import phase (phase one) and an export phase (phase two). Each phase involved three Teams. Because different types of ports face different challenges, the Teams included both landlord ports and operating ports,⁷¹ as well as large ports and midsize ports.⁷² A general breakdown of the makeup of the Teams is as follows:

	Phase One	Phase Two
Supply Chain Involved	U.S. Import	U.S. Export
Nature of Shippers	Large Retail Goods Companies	Agriculture / Commodity Exporters
Port Size	Very Large (Los Angeles / Long Beach / New York-New Jersey)	Midsize to Large (Charleston / Houston / Seattle-Tacoma ⁷³)
Port Ranges	Pacific Southwest and Northeast Atlantic	South Atlantic, Gulf, and Pacific Northwest
Port-Terminal Relationship	Landlord Ports	Operating and Landlord Ports ⁷⁴

The Supply Chain Innovation Teams Initiative launched in May 2016 with two days of Import Team meetings at the Commission’s headquarters in Washington, D.C. Commissioner Dye asked the Teams to step outside of their enterprise silos and focus on the global supply chain from a systemic perspective, that is, to think in terms of a complex system that consists of interrelated components that continually affect one another. She directed them to a common goal: develop one “actionable” supply chain process innovation that would increase U.S. commercial supply chain reliability and resilience.

The Commissioner excluded two subjects from the initiative: infrastructure investment and port performance metrics. Commissioner Dye also emphasized that the Teams were not being asked to draft policy papers or offer general industry suggestions devoid of specific implementation recommendations.

The Import Teams met separately and independently from May 2016 to August 2016 in Washington, D.C., and elsewhere. The Commission also held various cross-team meetings among terminal operators, drayage companies, and chassis providers in September 2016 to work through issues specific to them. The results of these cross-team meetings were reported back to the full

⁷¹ See *supra* note 59, defining landlord and operating ports.

⁷² Every port that participated in the initiative is among the top-ten containerized ports in the United States. See Part IV, *infra*.

⁷³ The Port of Seattle and the Port of Tacoma are separate entities, but they are both members of the Northwest Seaport Alliance, a marine cargo operating partnership established under FMC Agreement No. 201228, Port of Seattle/Port of Tacoma Alliance Agreement.

⁷⁴ Seattle and Tacoma are landlord ports.

Teams. During the course of the meetings, Commissioner Dye regularly updated the Commission at public meetings on the Teams’ progress, and the Commission established a webpage on its website to keep other interested parties informed.

The three Import Teams reconvened in Washington, D.C., for two days of meetings in October 2016, completing phase one. In December 2016, Commissioner Dye gave an interim status report to the Commission. The Commissioner reported that the Import Teams had: (1) decided to focus on improved supply chain visibility; (2) developed lists of critical information needed to improve operations; and (3) explored the concept of a national information portal.

The three Export Teams met on July 11-12, 2017 in Washington, D.C. They adopted the goal developed by the Import Teams – better information visibility throughout the freight delivery system – and created lists of critical information needed to improve the reliability and resiliency of the export supply chain. The Export Teams also explored the concept of a national supply chain information portal and various practical considerations about how one might be implemented. They discussed a number of related supply chain issues as well, and one of the Teams held a follow-up meeting in September 2017.

VI. INCREASED RELIABILITY AND RESILIENCE THROUGH VISIBILITY OF INFORMATION

Once Commissioner Dye “set the table” for Team discussions, the Teams agreed that increasing supply chain visibility was the operational innovation that would most improve supply chain reliability and resilience. Because enhanced visibility depends on the availability of timely and accurate critical information, both the Import and Export Teams identified supply chain actors’ unmet critical information needs and the operational improvements that would likely result from timely access to that information. The Teams also explored using information technology to make this critical information available via a national supply chain information portal.

At the outset, Commissioner Dye challenged the Import Teams to identify one specific actionable process innovation – building on past success – that they could collectively implement. Each Team member was to ask: “what can other supply chain actors do to allow me to increase my reliability?” The Teams were not expected to provide a “quick fix” to supply chain gridlock. Rather, they were to select a particular challenge and a realistic solution that could begin increasing supply chain reliability and resiliency. With this guidance, the Import Teams decided to focus on enhancing the visibility of timely and accurate critical information via a national information portal. The Export Teams subsequently adopted this focus in phase two of the initiative.

“There is no one lever for fixing port problems.”

Port Director Interview

In settling on improved supply information visibility as a goal, the Import Team members discussed a number of issues that they believed constrained the fluidity of cargo movement and interfered with making critical information available. The Teams also debated numerous other potential supply chain issues, such as appointment systems, equipment availability, and terminal gate hours.

The Import Teams nonetheless recognized that many problems were related to a lack of critical information. Shippers described the time period between a ship's arrival at a port and the container being drayed out of the port as a "black box." That is, shippers lacked information about the status of their containers once they reached the port or terminal. And even when information was available, Team members complained about its timeliness and accuracy. As one participant put it, "if you're flying blind, you can only conform your behavior to what little you know."

"A big challenge is access to information, obtaining information and distributing it to shippers."

Port Director Interview

The Import Teams decided that increased access to information would enable supply chain actors to better align their business practices and more quickly "self-correct" when circumstances change. When information is visible, the solutions to problems are more self-evident. For example, better access to timely information could allow chassis providers to better forecast demand, leading to a more stable, less imbalanced, and better positioned chassis supply. Likewise, with more key information, marine terminal operators would have more lead time to allocate labor and equipment, and trucks could better schedule container pickups and dual moves. Marine terminal operators assured of chassis availability could also inform shippers of cargo pickup times with greater precision and certainty.

"We need to avoid creating new choke points when reacting to existing choke points."

Port Director Interview

The Export Teams subsequently embraced the Import Team's focus on information. They saw a lack of timely information as a major impediment to export supply chain actors' planning ability. More complete and accurate information could lead to not only better forecasting, but a greater coordination between supply chain actors and better utilization of assets such as land, chassis, containers, and human resources.

In addition to the Teams' work on supply chain visibility, the initiative gave rise to other benefits. The size and composition of the Teams allowed the Team members to gain greater insight into sources of supply chain inefficiencies and the business realities of other actors. And during their meetings, the participants engaged in give-and-take about myriad issues related to supply chain efficiency, reliability, and resilience.

The insights gained by Team members into the business realities facing other supply chain actors were an invaluable benefit to the Innovation Teams. The diversity of supply chain challenges discussed by the Teams illustrates a key finding of this Report: the systemic complexity of the American freight delivery system makes it difficult to develop solutions in isolation. Discussions of one complexity leads invariably to another interconnected challenge.

A. Critical Information, Not Just More Data

Having identified supply chain visibility as the central focus, the members of the Import and Export Teams worked to identify each supply chain actor's critical information needs. Because supply chain visibility requires the timely availability of accurate information, the participants deliberated on how to provide the right information, to the right person, at the right time, in order to more fully integrate and harmonize the supply chain system.

The Teams were encouraged to look beyond *data* to critical, actionable *information*. Data involves the capture and recording of raw numbers about an event, condition, or entity based on observations that are collected according to some specific standard. Information, however, is the result of organizing and analyzing multiple data points in ways that produce meaningful patterns that allow users to understand, plan for, and act upon the events, conditions, or entities being studied. Team members noted that they often had access to data. Ports, terminals, and ocean carriers have large databases, which may be useful for their own business purposes. In some instances, importers collect fifty or more real-time data points, from cargo booking confirmation at origin to acceptance of return equipment by the destination terminal. But Team members recognized that raw data from different sources does not always assist them in interacting effectively with other actors and making key operational decisions. In some cases, too much non-critical data impede planning. Consequently, what they wanted was information that “moves the needle” – information that supports effective action.

“We measure everything.”

Port Director Interview

The Teams emphasized that for critical information to be actionable, it had to be available and provided at the right time.⁷⁵ As for availability, the issue was who had ready access to that information and could provide it to others. In some cases, it was less about creating new information and more about being smarter with the data that stakeholders already collect. As for timeliness, participants noted that even when they received information, such as changes to gate openings or closures, it often came too late for them to adjust accordingly. This did not mean that the Team members necessarily thought that “real time is always the right time.” Rather, they wanted information to be made available in time for the relevant actor to make use of it in planning operations or in reacting to changed circumstances.

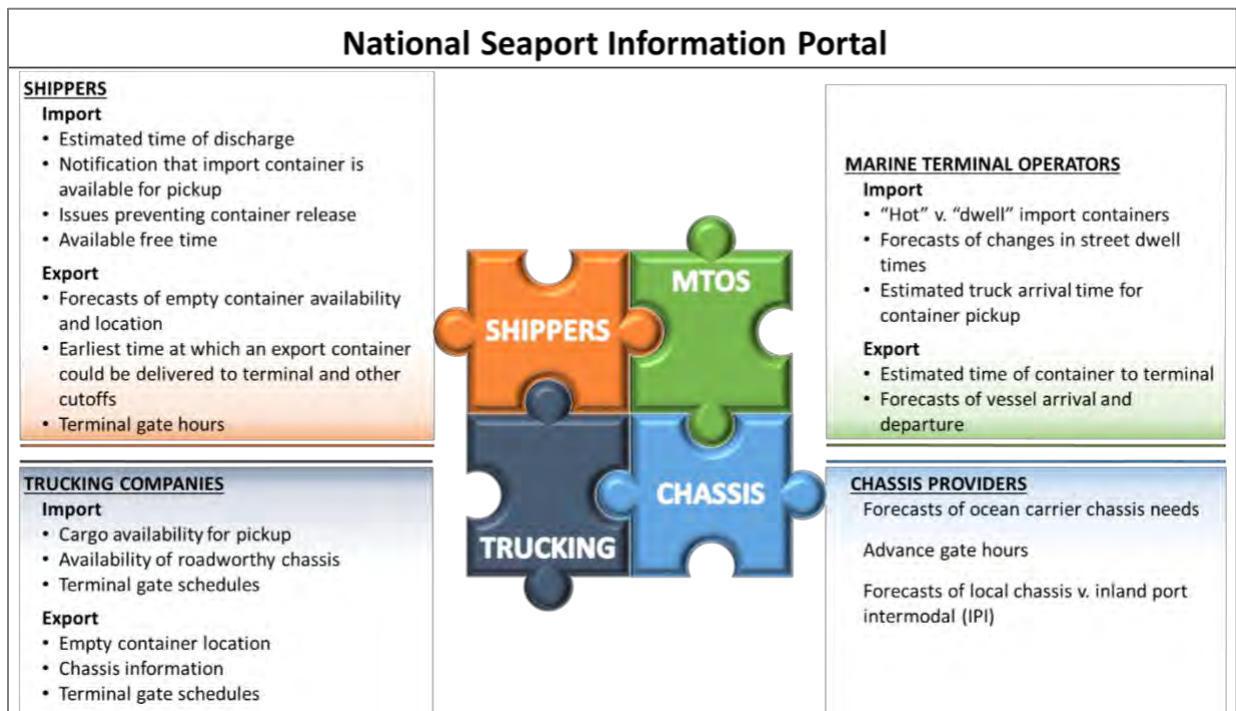
⁷⁵ Participants also noted that to be actionable, information must be accurate, and they critiqued the accuracy of various sources of information.

Based on their discussions, the Teams determined that they needed to identify: (a) the critical information needs of each supply chain actor; (b) which other actor had (or could develop) that information; and (c) the timing and most appropriate format for delivery of the information. The Import Teams developed “critical information grids” to structure further discussions.

The Teams produced lists of the high-priority information needs of key supply chain actors. For example, importers were primarily concerned with information regarding container availability for pickup. This depends on information about, among other things: (i) vessel arrival; (ii) container off-loading; (iii) container yard storage; (iv) container documentation; (v) Customs and Border Protection hours and activities; (vi) terminal gate hours; and (vii) chassis availability. Exporters, for their part, were primarily concerned with empty container availability and how early a loaded export container could be returned to the marine or rail terminal.

The Export Teams emphasized the variety of different information needs. For instance, an exporter of a temperature-sensitive agricultural product needs different information at different times than an exporter of nonperishable goods.

Although the Teams only met a few times, and the development of critical information needs could be further refined, it was apparent that the concept of critical information could be used, in conjunction with an information portal, to develop actor-specific dashboards. Based on the Teams input during their initial meetings, examples of critical information that could be useful in these dashboards include:



B. National Seaport Information Portal

Both the Import and Export Teams recognized that it was not enough to just identify the various supply chain actors' critical information needs. For the key information to improve operations, there must be an effective delivery technology. As one participant put it, "information technology is the new infrastructure." Building on the critical needs assessment, the Teams raised the possibility of developing a supply chain information portal to provide that critical information. The Teams' focus was not on simply digitizing business processes; it was on what sort of portal would allow supply chain actors to align their business processes and change behavior. They also considered potential challenges in implementation, both technical and financial.

"The winning combo is systems process management, an infusion of information technology, and creating relationships."

Port Director Interview

The consensus was that supply chain visibility could be enhanced by a common portal for critical shipment information, possibly organized by dashboards tailored to the needs of each supply chain actor. The goal would be for a portal to provide end-to-end supply chain visibility, with controlled access to information that is specific to a transaction. The Teams largely agreed on the attributes of such a seaport information portal:

- **Nationally Standardized Information:** Focusing on supply chain visibility at a national level could incentivize standardization of terminology and information. A common, familiar solution to locating and navigating critical information would produce the most downstream value for those who operate in multiple gateways.⁷⁶ That being said, regional variation and the diversity of the Nation's ports could make a truly national portal difficult to implement. As a consequence, Team members mentioned potentially implementing a portal at one port before adapting it to ports nationally. The ongoing effort at the Port of Los Angeles, which was in part influenced by the Supply Chain Innovation Teams Initiative, is an example of how information can be leveraged.⁷⁷
- **Adaptable/Customizable:** A portal and its associated dashboards would need to be customizable to take into account the different informational needs of different regions and supply chain actors.

"When it comes to port policy, one size does not fit all."

Port Director Interview

⁷⁶ Team members also noted that a national-level focus could assist in obtaining funding for a portal.

⁷⁷ The Port of Los Angeles' pilot of the project with GE began in November 2016.

- **Accessible:** A portal would need to be accessible to all relevant actors in the supply chain. Some participants suggested that a portal could have “layered” access so that each actor could get, and provide, the specific information it needs. Others noted that certain methods of funding a portal, such as subscription fees, could affect accessibility, especially for small- and medium-sized shippers. Others noted that shipper association subscriptions could mitigate such concerns.
- **One-Stop Shop:** For a portal to have significant value, it would need to consolidate critical information into a single interface. Presently, a supply chain actor often has to check multiple websites to obtain critical information. There was some suggestion that the portal function as a business intelligence “dashboard” – an at-a-glance management tool that presents critical information.⁷⁸
- **Pushes Information:** Participants believed that it would be beneficial for the portal to push desired information to a user rather than functioning solely as a query service. Others cautioned against notifications of every “hiccup” in the supply chain, as that could overwhelm users.
- **Interoperable:** On the technical front, some Team members advocated making a portal that could network with other, existing information systems, especially those of individual ports.
- **Secure:** The Teams were concerned with the cybersecurity of the portal.

While supportive of a portal, the Teams also raised issues that would need to be addressed in an information portal project. At the technical level, the Teams noted that the large number of actors in the supply chain has contributed to a lack of standardized data and inconsistent data codes, reporting fields, and terminology. Another concern was whether a portal designed for the national level could affect competition among ports.

Additionally, the Teams raised the question of who would manage, maintain, and fund a national supply chain portal. The Commission had made clear at the outset that the Teams should focus on private commercial solutions, taking the government out of the managerial equation. The Teams discussed the importance of getting buy-in from all the major stakeholders and of defining a value proposition for the portal. Funding was also a major topic of discussion because information technology may be costly. The Teams identified options such as cargo fees and self-funding the portal, i.e., access to the portal by subscription. All participants

“Ports aren’t necessarily out to steal each other’s business; the goal is to create an efficient logistics chain for a container, and then the container will go where it will.”

Port Director Interview

⁷⁸ See, e.g., TechTarget, *Business Intelligence Dashboard Definition*, <http://searchbusinessanalytics.techtarget.com/definition/business-intelligence-dashboard> (last updated November 2010) (“The essential features of a BI dashboard product include a customizable interface and the ability to pull real-time data from multiple sources.”).

recognized that someone would need to pay for the supply chain improvements resulting from a national portal. Federal funds, however, were viewed as a potential source for initial funding.

VII. UNRESOLVED SUPPLY CHAIN ISSUES

A. Export Supply Chain Mapping and Research

Export supply chain mapping was of particular interest to the Export Teams. The Team members believed that high-level process mapping of the export supply chains could highlight “pinch points” and other areas of concern, enhance forecasting, and allow the development of best practices. The Team members suggested the possibility of getting assistance from academia regarding process mapping, the overall booking process, and terminal gate issues.

B. Extended Terminal Gate Programs

During the first phase of the project, the licensed motor carrier members of the Import Teams met separately to discuss their common critical information concerns. Following these discussions, they met with the Import Team marine terminal operators and chassis providers about gate schedules, chassis availability issues, terminal appointments, and truck turn times.

The discussions were valuable to help refine critical information needs for marine terminal operators and chassis providers, as well as truckers. The wide-ranging discussions were also beneficial for general port operational efficiency purposes.

One Export Team demonstrated how the Innovation Teams approach could be adapted to tackle supply chain issues beyond the project’s supply chain visibility considerations. In addition to identifying their critical information needs, this Team took the opportunity to address expanded gate hours. The Team members agreed that ports and terminals should optimize day, week, and time-of-day cargo flow before exploring extended gates. And although they did not recommend a global best practice for offsetting the costs of extended terminal gate hours, the Team members explored several options that could be developed in the future.

“Although what works in one port won’t necessarily work in another, achieving stakeholder buy-in for port initiatives requires trust and transparency and for stakeholders to see the value of a proposal.”

Port Director Interview

C. Export Container Availability and Booking Integrity

This Export Team also used the Innovation Team approach to delve into the related issues of export container availability and booking integrity. As this Team and others noted, carriers have

long complained about exporters booking space on ships and then not showing up with the cargo. These “ghost” or “no-show” bookings lead to overbooking of ships and create a cascade of unnecessary costs in the supply chain. But as shippers have pointed out, they make multiple bookings against the same shipment as a hedge against container and vessel space unavailability; carriers accept bookings without any guarantee to the shipper that a container or space on a vessel will be available.⁷⁹ As the participants noted, uncertain container and space availability leads to defensive overbooking, which itself can contribute to increased rolling of cargo in certain cases.

The participants agreed that solving these problems would require mutual accountability – both shippers and carriers must not only be good stewards of the supply chain, but each must also put some “skin in the game.” The members of this Export Team proposed that:

1. Shippers should provide container fall-down information to carriers and cancel unused bookings 7-10 days in advance of the early return date to give ocean carriers the opportunity to offer the space and equipment to other shippers.
2. Ocean carriers should establish, on a trial basis, a premium customer option that would allow exporters to confirm vessel space and equipment availability and allow carriers to rely on a booking. Under this option, in exchange for an exporter paying a reasonable fee, an ocean carrier would:
 - a. Provide the exporter reconfirmation of space/equipment availability 7 days in advance of the early return date; and
 - b. Promise, to the greatest extent possible, that the exporter’s shipments would not be split or rolled.⁸⁰

VIII. PORT DIRECTOR INTERVIEWS

In conjunction with the Supply Chain Innovation Teams Initiative, Commissioner Dye interviewed the directors of the largest United States container ports to obtain additional insight into the issues raised during the Team meetings and the operations of the Nation’s supply chain.⁸¹ U.S. ports are key nodes in the freight delivery system, as the

“The economic health of our Nation depends on the health of our ports.”

Port Director Interview

⁷⁹ In addition to defensive overbooking, “ghost bookings” may result from commodity production problems, sales forecasting problems, and the pursuit of spot rates by shippers.

⁸⁰ A shipment is “split” when it is broken up into two or more smaller shipments that are transported on separate vessels. A shipment is “rolled” when a carrier moves the shipment to a later date. Selection of the “premium option” would not mean that all of a customer’s cargo would need to move on the same ship. Rather, the cargo would simply have to make the intended vessel or intended destination complete – without splits or rolls.

⁸¹ The interviews occurred between phase one and phase two of the initiative.

U.S. containerized trade is relatively concentrated.⁸² In 2016, the Nation’s top three container ports accounted for almost half of its containerized international trade, and the top ten container ports accounted for over 87 percent.⁸³

	Port	Loaded TEUs (2016)	Share of U.S. Total
1	Los Angeles	6,075,304	18.8%
2	Long Beach	4,638,543	14.3%
3	New York	4,458,220	13.9%
4	Savannah	2,865,170	8.8%
5	Seattle-Tacoma	2,344,060	7.2%
6	Norfolk	2,063,773	6.4%
7	Houston	1,787,713	5.5%
8	Oakland	1,649,912	5.1%
9	Charleston	1,597,099	4.9%
10	Miami	771,215	2.4%
	All U.S. Ports Combined	32,400,534	100.0%

Commissioner Dye asked each Port Director interviewed for a SWOT (strengths, weaknesses, opportunities, threats) analysis of that director’s port. The port directors emphasized that U.S. ports are about more than simply maximizing revenue. They are engines for regional economic development, job creation, and developing a competitive environment for world trade. Port revenue is frequently reinvested in a port and its community. As one port director put it, “the economic health of our Nation depends on the health of our ports.”

⁸² FMC Congestion Report, *supra* note 10, at 1-2.

⁸³ IHS Markit—PIERS data.

Much of that reinvestment, the port directors stated, is aimed proactively at addressing the supply chain inefficiencies that create cargo bottlenecks.⁸⁴ Ports have prepared and are preparing for the larger ships coming through the expanded Panama Canal. They are exploiting existing technologies (e.g., shorthaul rail), exploring new technologies (e.g., freight shuttles, GeoStamp, active RFID), and enhancing workforce development. (e.g., partnering with schools and recruiting the next generation of port professionals). And while a port might not have direct commercial relationships with all stakeholders in the freight delivery system, it is important, according to one port director, to “treat everybody as your customer.”

“What can appear as congestion in some cases results from ports and terminals trying to prepare for the future while continuing to operate efficiently – it’s like changing tires on a moving car.”

Port Director Interview

Consistent with the work of the Supply Chain Innovation Teams, the port directors focused on the importance of supply chain actors sharing information and aligning their activities. One port director noted that if a supply chain actor stays in its silo, it risks becoming an impediment rather than catalyst of cargo movement and the attendant economic growth. Heeding that lesson, the Port of Los Angeles, for example, borrowed from the work of the FMC’s Innovation Teams and focused on information sharing – “knocking down fences, both physical and virtual.” As another port director mentioned, the “winning combo” is process management, an infusion of information technology, and creating relationships. And, despite the challenges they face, the port directors were “bullish on the future” of their ports.

“Regardless of what the seas of change bring, ports are figuring out how they can serve all their stakeholders.”

Port Director Interview

ACKNOWLEDGEMENT

A well-deserved thanks to the remarkable industry leaders who devoted their time and resources to this project. Implementation of the work of the FMC Innovation Teams will provide a critical and timely boost to American economic growth. A list of the FMC Import and Export Innovation Leaders, Port Authority Advisors, Trade Association Supporters, and Academic and Business Advisors that participated in the project is included in this Report.

⁸⁴ The port directors pointed out that some of the challenges they face are outside their control, such as geography and carrier decisions.

IX. FMC INNOVATION LEADERS

Innovation Leaders (Import)

Port of Los Angeles
Port of Long Beach
Port of New York and New Jersey
Mediterranean Shipping Company (USA)
Mitsui O.S.K. Lines, Ltd (America)
United Arab Shipping (North America)
Maersk Line
Long Beach Container Terminal
SSA Marine
APM Terminals
Port Newark Container Terminal NY/NJ
Walmart Stores
Best Buy
IKEA
Electrolux
Hasbro
J Crew Group, Inc.
Abercrombie & Fitch
Gemini Shippers
Johnson & Johnson Consumer, Inc.
ILWU Local 13
ILWU Local 63
BNSF Railway
Union Pacific Railroad
Centric Parts, Inc.
Crane Worldwide Logistics, LLC
Mohawk Global Logistics
A.N. Deringer
APL Logistics
CMI/Cal Cartage
TGS Transportation
Best Transportation
Direct Chassis Link, Inc.
TRAC Intermodal

Innovation Leaders (Export)

South Carolina Ports Authority
Port of Houston Authority
Northwest Seaport Alliance
Mediterranean Shipping Company (USA)
Hamburg Sud North America, Inc.
MOL (America), Inc.
Evergreen Line
APL Logistics
Hapag Lloyd/UASC
Boise Cascade
Toyota Tsusho America
Bunge Limited
Allenberg Cotton
Derco Foods
The Scoular Company
Seaboard Foods
BOSSCO Trading
Anderson Hay and Grain
Border Valley Trading
JBS, USA
Tyson Foods
Smithfield Foods
Dairy Farmers of America
Pacific Northwest Asia Shippers Association
US Shippers Association
Lineage Logistics
North Point Development
Double River Forwarding, LLC
E*Dray
International Bridge, Inc.
Damco
IMC Companies
BNSF Railway
CSX
Norfolk Southern
Union Pacific Railroad
International Longshoreman & Warehouse
Union

Port Authority Advisors

South Carolina Ports Authority
Port of Houston Authority
Northwest Seaport Alliance
Port of Los Angeles
Port of Long Beach
Port Authority of New York & New Jersey
Georgia Ports Authority
Virginia Port Authority
Port of New Orleans
Port of Oakland

Academic and Business Advisors

Johns Hopkins University, Applied Physics
Laboratory
MIT's Center for Transportation and
Logistics
University of Denver, Transportation
Institute
New York Shipping Exchange
Strategic Mobility 21
Center for Ports & Waterways, Texas A&M
Transportation Institute
USC Center for Global Supply Chain
Management
Virginia Tech, Pamplin College of Business
State University of New York – Maritime
College
Massachusetts Maritime Academy
Freightgate, Inc.
The Tioga Group
Mi-Jack Products, Inc.
Atadex, LLC
Pier Truck
Global Logistics Associates
International Paper
Griffin Creek Consulting

Trade Association Supporters

Retail Industry Leaders Association
National Retail Federation
Agriculture Transportation Coalition
Waterfront Coalition
National Customs Brokers & Forwarders
Association of America
Intermodal Motor Carriers Association
American Association of Railroads
Coalition for American Gateways and Trade
Corridors
Intermodal Association of North America
Institute of Container Lessors
Great Lakes Dredge & Dock Company
International Longshore & Warehouse
Union
American Association of Exporters and
Importers
American Association of Port Authorities
N.Y. Shipping Association Inc.
Coalition for American Gateways and
Corridors
Pacific Merchant Shipping Association
World Shipping Council
Harbor Trucking Association
National Association of Waterfront
Employers

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XI. SUPPLY CHAIN ORDER

(S E R V E D)
(FEBRUARY 1, 2016)
(FEDERAL MARITIME COMMISSION)

FEDERAL MARITIME COMMISSION

**INTERNATIONAL OCEAN TRANSPORTATION
SUPPLY CHAIN ENGAGEMENT**

ORDER

Pursuant to the Shipping Act of 1984, 46 U.S.C. 40101 *et seq.* (Shipping Act), the Federal Maritime Commission (FMC or Commission) regulates the U.S. international ocean transportation system that supports the transportation of goods by water. The purposes of the Shipping Act include the requirements to “provide an efficient and economic transportation system in the ocean commerce of the United States that is, insofar as possible, in harmony with, and responsive to, international shipping practices,” and also “to promote the growth and development of United States exports through competitive and efficient ocean transportation and by placing a greater reliance on the marketplace.”

In carrying out its broad responsibilities under the Shipping Act with respect to ocean common carriers, U.S. ports, marine terminal operators, ocean transportation intermediaries and the American exporters and importers they serve, the Commission has developed an understanding of and an expertise in evaluating the U.S. international supply chain. As the premier competition agency with oversight responsibilities for the United States foreign ocean transportation system, the Commission has extensive experience with global maritime and marine terminal innovation and efficiency issues.

Maintaining the effectiveness and reliability of America's global supply chain is critically important to the Nation's continued economic vitality. Approximately \$980 billion of containerized ocean commerce moves through U.S. ports annually. Unfortunately, congestion and related bottlenecks at ports and other points in the Nation's supply chain have become a serious risk to the growth of the U.S. economy, job growth, and to our Nation's competitive position in the world. Past congestion at major U.S. ports has highlighted the impact of congestion on the U.S. economy. As a result, the U.S. economy suffered billions of dollars in losses to the supply chain.

In addition, congestion problems contributed to hundreds of millions of dollars in losses for U.S. agricultural exporters including poultry and meat farmers. Perishable fruit and vegetable exporters suffered when their cargo was not loaded onto ships and sent overseas within specific time frames.

Although the congestion crisis has receded, unresolved supply chain problems that could produce new challenges remain.

In response to those events, and the desire of affected parties to find ways to prevent or mitigate similar future occurrences, the Commission hosted four regional port forums during the fall of 2014, in San Pedro, CA (West Coast Port Forum), Baltimore, MD (Mid-Atlantic and Northeast Port Forum), Charleston, SC (South Atlantic Port Forum) and New Orleans, LA (Gulf Coast Port Forum). The forums brought together port officials, ocean carriers, trucking and warehousing service providers, beneficial cargo owners, marine terminal operators, stevedoring companies, ocean transportation intermediaries, and port labor to discuss and offer ideas to address port congestion. The comments and suggestions offered at those forums were summarized and developed in an FMC report entitled "*U.S.*

Port Congestion & Related International Supply Chain Issues: Causes, Consequences and Challenges” that was released in July 2015.

The report identified six major themes from the port forums: investment and planning; chassis availability and related issues; port drayage and truck turn times; extended gate hours, PierPASS, and congestion pricing; vessel and terminal operations; and supply chain planning, collaboration, and communication. Some of these topics involve longer-term issues such as investment and planning. Others focus on short and medium-term concerns. All of them, however, are at the heart of current efforts by various groups to develop the flexible, resilient and reliable systems necessary for ensuring well-functioning international supply chains.

The Commission has also advanced port and marine terminal efforts to improve supply chain efficiency by expediting the implementation of port and terminal amendments aimed at enhancing the efficient flow of cargo. For example, several port and marine terminal operator agreements on file with the Commission that cover the Pacific Coast ports, commit the parties to exploring measures for achieving improvements with regard to congestion, efficiency, fluidity, and other operational conditions.*

Given the economic importance of reliable port and terminal operations to the effectiveness of the United States international supply chain, and the Commission’s mandate to ensure an efficient and economic transportation system for its ocean commerce, the Commission has a clear and compelling responsibility to actively assist efforts to improve the effectiveness of the global supply chain.

* The Los Angeles and Long Beach Port Infrastructure and Environmental Programs Cooperative Working Agreement (FMC No. 201219), West Coast MTO Agreement (FMC No. 201143), Pacific Ports Operational Improvements Agreement (FMC No. 201227), Ocean Carrier Equipment Management Association (FMC No. 202-011284), and Los Angeles/Long Beach Port Terminal Operator Administrative and Implementation Agreement (FMC No. 201178).

THEREFORE IT IS ORDERED, That, pursuant to 46 U.S.C. §§ 41302, 40302, 41101 to 41109, 41301 to 41309, and 40104, and 46 C.F.R. § 502.281 *et seq.*, Commissioner Rebecca F. Dye engage supply chain stakeholders in public or non-public discussions to identify commercial solutions to certain unresolved supply chain issues that interfere with the smooth operation of the U.S. international supply chain, focusing on the San Pedro Bay ports at Los Angeles and Long Beach.

IT IS FURTHER ORDERED, That, the Commissioner form a supply chain innovation team, composed of leaders from all commercial sectors of the U.S. international supply chain, to develop commercial solutions to port congestion and related supply chain challenges.

IT IS FURTHER ORDERED, That, the Commissioner provide a preliminary report and periodic updates to the Commission on the results of efforts undertaken by this Order.

IT IS FURTHER ORDERED, That, the Commissioner have full authority under 46 C.F.R. §§ 502.281 to 502.291, to perform such duties as may be necessary in accordance with U.S. law and Commission regulations. The Commissioner will be assisted by staff members as may be assigned by the Chairman.

IT IS FURTHER ORDERED, That, this Proceeding be discontinued upon the acceptance of a final report and possible recommendations by the Commissioner, unless otherwise ordered by the Commission; and

IT IS FINALLY ORDERED, That, notice of this Order be published in the Federal Register.

By The Commission.

Karen V. Gregory
Secretary