Maritime Transportation System National Advisory Committee

Minutes of Public Meeting

Dates: November 29-30, 2022

Location:

USDOT Headquarters – Washington, D.C.

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Robert "Bob" Wellner - Chairman, Maritime Transportation System National Advisory Committee

Wednesday, November 30, 2022

Microsoft Teams Meeting Link: click (here)

9:30 am **Call to Order & Roll Call**
Chad Dorsey, Designated Federal Official

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Robert "Bob" Wellner, Chairman, Maritime Transportation System National Advisory Committee

Acronyms and Abbreviations

CII	Carbon Intensity Indicator
Clydebank/Quad	Int'l Agreement between four nations to create green shipping corridors
CMTS	Committee on the Marine Transportation
COP	Conference of the Parties
DEI	Diversity, Equity, and Inclusion
DOD	Department of Defense
DOE	Department of Energy
DHS	Department of Homeland Security
DOC	Department of Commerce
DOS	Department of State
DOT	Department of Transportation
EEXI	Energy Efficiency Existing Ship Index
EMBARC	Every Mariner Builds a Respectful Culture
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FLOW	Federal Freight Logistics Optimization Works
FMC	Federal Maritime Commission
GHG	Greenhouse Gas
IARPC	Interagency Arctic Research Policy Committee
IMO	International Maritime Organization
INTERTANKO	International Association of Independent Tanker Owners
ISO	International Organization for Standardization
MARAD	Maritime Administration
META	Manage the Maritime Environment and Technological Assistance
MOA	Memorandum of Agreement
MSC	Military Sealift Command
MSP	Maritime Security Program
MTS	Maritime Transportation System
MTSNAC	Maritime Transportation System National Advisory Committee
NASSCO	National Steel and Shipbuilding Company
NDAA	National Defense Authorization Act
NDRF	National Defense Reserve Fleet
NOAA	National Oceanic and Atmospheric Administration
OSRA	Ocean Shipping Reform Act of 2022
PAME	Protection of the Arctic Marine Environment
Ro/Ro	Roll on/Roll off
ROS	Reduced Operating Status
RRF	Ready Reserve Fleet
SES	Senior Executive Service
SGE	Special Government Employee
SME	Subject Matter Expert
STCW	Standards of Training, Certification, and Watchkeeping
TOTE	Totem Ocean Trailer Express
TSP	Tanker Security Program
UCSA	Usable Cargo Stowage Area
USDOT	U.S. Department of Transportation
VCM	Vessel Contract Manager

	MSTNAC Meeting Presentations (Appendix Listing) November 29-30, 2022
	Presenter
Appendix A MTSNAC 2022 Work Plan	Jeffery Flumignan/MARAD
Appendix B Title XI Presentation	Paul Jasper/MARAD
Appendix C Committee on Marine Transportation System	Helen Brohl/MARAD (need notes) *Sent to Morris 12/14/2022
Appendix D Workforce Development Briefing	Dr. Sashi Kumar, MARAD
Appendix E Decarbonization/IMO Briefing	Daniel Yuska/MARAD
Appendix F NSMV Briefing	Ms. Laila Linares/MARAD
Appendix G Report out for Starboard Sub-Committee	Tom Wetherald MTSNAC/MARAD Sub-Committee Co-Chair
Appendix H Final Report – Port Resilience	University Transportation Research Center (Region 2) Stevens Institute of Technology (December 2015)
Appendix I Charter of the U.S. Maritime Transportation System National Advisory Committee	MARAD
Appendix J Maritime Transportation System National Advisory Committee Committee Bylaws	MARAD

Minutes of Maritime Transportation System National Advisory Committee Public Meeting
November 29, 2022
9:30 am–4:00 pm EST

Call to Order & Roll Call

Mr. Chad Dorsey, Designated Federal Officer with MARAD, called the meeting to order at 9:30 am EST, took the roll call, and provided important safety and other administrative information to those present.

Members Present

Federal Government Employees:

Russell Adise –U.S. Department of Commerce
Michael Moltzen – U.S. Environmental Protection Agency
Shelley Sugarman – U.S. Coast Guard (virtual)
Brian Tetreault – U.S. Army Corps of Engineers

Special Government Employees:

Lauren Beagen – Roger Williams University
Erik Stromberg– University of Memphis

Representative Members:

Aimee Andres – Inland Rivers, Ports and Terminals, Inc.
Cheryl Ball – Missouri Department of Transportation
David Cicalese – International Longshoremen's Association (virtual)
Brian Clark – North Carolina Ports Authority
Mario Cordero – Port of Long Beach (virtual)
Bill Doyle – Maryland Port Administration
Berit Eriksson – Sailors' Union of the Pacific
Joe Gasperov – International Longshore and Warehouse Union (virtual)
Roger Guenther – Port Houston
Craig Johnson – Maine Maritime Academy
Brian Jones – Nucor Corporation
David Libatique – Port of Los Angeles (Vice-Chair)
Kevin Krick (for Jack Sullivan) – Matson Navigation, Inc
Bethann Rooney – Port Authority of New York/New Jersey (virtual)
Glenda Schafer (for Penny Traina) – Columbiana County Port Authority (virtual)
Stephen Spoljaric – Bechtel
Robert Wellner – Liberty Global Logistics, LLC (Chair)
Tom Wetherald – Global Dynamics – NASSCO (retired)

Members Absent

James Dillman – Gateway Terminal

MARAD / USDOT Members Present

Bill Paape – Associate Administrator for the Office of Ports and Waterways, MARAD
Chad Dorsey – DFO / Director, Inland Waterways Gateway Office (Paducah, KY), MARAD
Jeffrey Flumignan – Director, Office of Maritime and Intermodal Outreach, MARAD
Brian Hill – Alternate DFO / Director, Western Gulf Gateway Office (Houston, TX), MARAD
Branden Villalona – Alternate DFO / Director, South Atlantic Gateway Office (Jacksonville, FL) MARAD
Thomas Morkan – Director, North Atlantic Gateway Office (New York), MARAD
Amanda Rutherford – Director, Mid-Atlantic Gateway Office (Washington, D.C.), MARAD

Public Members Present

Adrian Williams, Jr. – Amazon Web Services
Zachary Buss – Amazon Web Services
James M. Haussener – California Marine Affairs & Navigation Conference (CMANC)
Brad Trammell – American Waterways Operators

Item 1- Welcome & Comments from the MTSNAC Chairperson

Mr. Robert Wellner welcomed the group and reminded everyone that MTSNAC is an advisory group established to make recommendations to USDOT for sustaining the maritime industry, including its workforce, marine terminals, and ports and waterways. He noted that MTSNAC has 25 members, with three new ones: Bill Doyle, Joe Gasperov, and Bethann Rooney.
The Committee's charter was renewed in September 2022, and it has two Sub-Committees. Therefore, it is important to have cross-over conversations between these two Sub-Committees, the Port Sub-Committee, and the Starboard Sub-Committee. Mr. Wellner then reviewed the agenda for today's meeting. Mr. Jeffery Flumignan of MARAD presented a briefing on the MTSNAC Workplan Revision (Appendix A). The group will have two speakers today: Ms. Helen Brohl of CMTS and Port Supply Chain Envoy, General Stephen Lyons.

He noted that the Port Sub-Committee has had two meetings, the first on FLOW and freight optimization and the second on the maritime workforce. The Starboard Sub-Committee has had two meetings, focusing on strategic sealift and NSMV (National Security Multi-mission Vessel). Mr. Libatique (Vice-Chair) said seeing more faces across the table at this meeting was good. He hoped the group would have a broader infrastructure conversation and an opportunity to integrate the silos within industry and government. Mr. Bill Paape (Associate Administrator for the Office of Ports and Waterways at MARAD) thanked everyone for attending today's meeting. MARAD will greatly appreciate their participation.

Item 2- Briefing on the Workplan Revisions/Updates & Status

Mr. Jeffrey Flumignan provided a briefing on updates to the MTSNAC Workplan. Some of the statutory authorities were cleaned up. The Objective and Scope have remained almost the same as before. The timeline for initial deliverables has been updated and moved to mid-2023. The focus areas remain the same. Priority 1 includes two requests each for recommendations from the Port and Starboard Sub-Committees.

For the Port Sub-Committee, there are new requests for recommendations under **the Export Enhancements and Decarbonization and Emissions Reductions at Ports** Problem Statements. **Removing Impediments to Marine Highway Services** has been moved to the Port Sub-Committee, and **Freight Logistics Optimization** has been renamed. In addition, **Helping Communities near Ports** has been cleaned up, and the **Disaster Response Framework** Problem Statement has been rewritten.

For the Starboard Sub-Committee, the **Recapitalization of the RRF** is underway. **Decarbonization and the U.S. Fleet** is a new problem statement. Under **Growing the U.S. Flag Fleet** has new recommendations under **Retaining and Attracting Talent.** Lastly, the template both Sub-Committees will use for their recommendations has been updated.

Mr. Wellner pointed out that the prioritization items order is based on the subject matter's timing vs. the item's importance. He also urged the group to think outside the box while staying close to the requests for recommendations.

Item 3- Chair Guidance and Breakout Session – Breakout Rooms

Mr. Dorsey advised that before the breakout, Mr. Paul Jasper, Financial Analyst, Office of Marine Financing at MARAD, will present a Title XI briefing (Appendix B). Mr. Jasper gave a quick overview of the Maritime Financing Office. Mr. David Gilmore is the Director, and Mr. Jeremy Chang is the newest member of the office.

The Title XI Program provides shipyard and shipowners financial support to build and reconstruct vessels and modernize facilities. This program lowers the interest rates that the borrowers receive. To receive MARAD's assistance, the borrower's vessel or facility must comply with specific regulatory requirements, financial requirements (at least 12.5% equity on the borrower's part), economic soundness (the ability of the borrower to repay the debt), and technical acceptance (vessel must meet U.S. or International classification society standards). In addition, the vessel must be built in a U.S. shipyard and meet applicable insurance standards.

The primary goals of the Title XI Program are to strengthen the U.S. maritime industry, maintain domestic shipbuilding and maintenance, and sustain a vibrant U.S. Merchant Marine. Several laws govern the construction and operation of U.S. Flag vessels, including the Merchant Marine Act of 1920 (Jones Act) and the Merchant Marine Act of 1936, as amended in 1970 and 1993. MARAD's Title XI portfolio currently has $9.3 billion in loan guarantees. This program can finance up to 87.5% of the project's cost, and the term is up to 25 years. Vessels of national interest that are U.S.-crewed and support offshore wind farm development can qualify for the Title XI Program. The applicant must be a U.S. citizen or a U.S. corporation to be eligible. To date, the program has financed two LNG-capable vessels, two LNG-powered container vessels

on the East Coast, and two container ships on the West Coast. In addition, in the inland waterways, the program has financed tank barges and towboats.

Mr. Jasper explained that there are four main steps in the Title XI process:

1) Application intake
2) Application review (various MARAD offices review)
3) Project approval
4) Loan Closing

He added that applications are accepted on a rolling basis, and there is a $5,000 application fee. Therefore, the Title XI barges market is riskier and more of a spot market. Finally, he emphasized that the application needs to be complete and thorough. Otherwise, it bogs down the process.

Mr. Wellner made two comments and asked one question:

1) Loan guarantees are Federal funds
2) Duration of the approval process generally takes 9 months – 2 years
3) What % of the loan represents MARAD fees? Mr. Jasper replied that the guarantee fee is 5.5%

Ms. Erkisson asked if the program covers heavy lift ships for wind farms. Mr. Jasper replied that it does. Since wind farms are floating structures on the West Coast, this involves cable. Is there enough U.S. Flag cable-laying capacity? Mr. Wellner responded that cable-laying vessels are not required to be Jones Act compliant, so this should not be an issue. Ms. Sugarman asked if a Title XI loan would be linked to emissions level. Mr. Jasper replied that this had been discussed. When asked if shoreside facilities can be financed under Title XI, Mr. Jasper replied yes. Mr. Krick asked who hires the independent assessor. They are hired under contract by the Director of the Marine Financing Office of MARAD. Mr. Clark asked if barges needed to be ABS classed, to which Mr. Jasper responded no. Mr. Wetherald pointed out that any American classification society is acceptable.

Another question concerned whether LNG infrastructure was tied to a shipyard. Mr. Jasper replied no. One member added that the Export-Import Bank is involved in exporting LNG. When asked about offshore wind farm vessels, Mr. Jasper responded there are currently several applications under review for that category. Ms. Sugarman asked if this was a well-known financing option. Mr. Jasper responded that the Office Director is the primary "advertiser" of the program, so it's not clear how well-known it is. Mr. Wetherald said that the major Jones Act shipyards knew about the program. He then asked what the current cargo preference requirement is for Title XI, and the response was 50%. One member asked about MARAD's ability to fund future loans and if USDOT requests more funding. Mr. Jasper said yes. Ms. Ball asked about the program's application-to-approval ratio, and Mr. Jasper responded that it was unknown. Ms. Ball added that the State of Missouri has a fund for boats/barges construction, but sometimes getting a loan from the local bank is cheaper.

Mr. Wellner thanked Mr. Jasper for his presentation and instructed the Sub-Committees to proceed to their respective breakout sessions.

Item 4-Public Comments (if required)

After the Sub-Committees returned from their breakout sessions, Mr. Dorsey advised that there were no requests for public comment. Then Mr. Wellner introduced Ms. Helen Brohl, Executive Director of the Committee on the Marine Transportation System (CMTS) (Appendix C). Ms. Brohl proceeded to brief the group on the CMTS and the work it has been doing.

CMTS was established at the end of 2004. In 2012 it was authorized in statute. Its goal is to bring together all relevant federal agencies to coordinate their efforts in the Marine Transportation System (MTS). The CMTS has a Coordinating Board whose chair rotates between USDOT, DHS, DOD, and DOC. The CMTS provides information to federal agencies and the public. A 1996 Intertanko report first coined the term MTS. It noted that federal agencies responsible and authority for the MTS were working in separate silos.

CMTS works at the request of member agencies. The goal is to add value to what each agency is already doing. There are over 27 federal agencies, including the Office of Management and Budget, the National Security Council, and the White House Office of Science and Technology Policy. Ms. Brohl gave the members a handout, including a Standard Matrix of the Federal Marine Transportation System by Department/Agency. Although the matrix may appear to have many duplications, it merely underscores that many agencies have specific interests and authorities.

Ms. Brohl pointed out that there are currently 37 maritime-focused Federal advisory committees, as is MTSNAC. She then highlighted some of the current areas of interest that CMTS is pursuing:

1) Arctic Integrated Action Team (IAT)
2) Future of Navigation IAT
3) Mariner and MTS Workforce IAT (the newest one). This IAT focuses on middle and high school audiences
4) Maritime Innovative Science and Tech IAT
5) Maritime Data IAT, which focuses on condition and performance issues
6) Maritime Resilience IAT
7) Supply Chain and Infrastructure IAT

In addition to the above areas of interest, CMTS has published a Federal Funding Handbook which enumerates agencies and how they fund specific MTS projects. CMTS has recently initiated an Offshore Energy Facilitation Task Team since there is no Federal jurisdiction beyond 12 miles. This Task Team will address munitions and explosives of concern mitigation beyond the 12- mile perimeter. CMTS has also added an Ad Hoc Security Team and has published an Interagency Directory.

Ms. Brohl emphasized that CMTS is a resource for MTSNAC. Mr. Wellner asked how MTSNAC and CMTS can collaborate to accomplish their common goals. Ms. Brohl replied that CMTS is ready to provide information as appropriate. Mr. Wellner encouraged the Sub-Committee Co-Chairs to reach out to CMTS as needed. Mr. Dorsey reminded the Sub-Committees that they should route any CMTS requests through their MARAD liaisons. Ms. Brohl was asked when the CMTS Offshore Wind Regulatory document would be ready. She replied that, hopefully, by the end of January. Mr. Wellner mentioned that Ms. Brohl will retire in January 2023 and thanked her for her 16 years of public service.

Item 5- Break for Lunch

Item 6- Briefing from the Port and Supply Chain Envoy

Mr. Dorsey announced that General Stephen Lyons, Port and Supply Chain Envoy, would not be available to brief the group since he is testifying before Congress. Mr. Rick Marsh is on detail from DOD to General Lyons and will brief the group instead.

Mr. Marsh told the group he was a career civil servant with the Army. His focus has been surface transportation and logistics planning. He was detailed in September of this year to General Lyons. He noted the shifting consumer patterns over the past few years due to the pandemic. In addition, there has been a great deal of finger-pointing, primarily when 100 ships anchored off the Los Angeles and Long Beach Ports. However, there are now no ships anchored offshore. He is working with the Supply Chain Disruption Task Force to understand better where we have been and what we have learned over the past few years.

There are two main buckets that the Task Force focuses on: What is the private sector doing and understanding their risks, and what is the public sector doing? MTSNAC has a good record of making recommendations to the Secretary of Transportation, going back to Secretary Norm Mineta. Mr. Marsh pointed out that intermodal freight must be a priority. A big challenge is how the government can translate MTSNAC recommendations into action.

Mr. Wellner asked if there were a national strategy, considering how the maritime industry can be integrated into the overall supply chain strategy. Mr. Marsh responded that one goal is to get industry leaders to participate in these efforts. Mr. Jones pointed out that the Port Sub-Committee focuses on exports, particularly agricultural exports. He noted that the focus has been on imports under OSRA, but it is important to keep exports on the radar screen. Mr. Wetherald added that the Starboard Sub-Committee focuses on the U.S. Flag fleet and strategic sealift. He asked if any written documents could provide more background to the group. Mr. Marsh responded that MARAD and U.S. Transportation Command have the most information on these topics. He added that General Lyons keeps reminding everyone that the public and private sectors are missing meaningful opportunities to compete and outcompete China. He is also hammering on the need to preserve the U.S. Flag fleet.

Mr. Paape asked about FLOW data sharing and if it is possible to get the necessary data to support these efforts. Mr. Marsh said we need to get our arms around supply and demand data from shippers, truckers, and terminals. Currently, three or four ocean carriers are providing data. In addition, the current supply chain is opaque, especially as it concerns the origin of the data.

Mr. Libatique thanked Mr. Marsh for his work on the Task Force. He asked what the prospects for collaboration to be codified are. Mr. Marsh responded that the General is objective and knows how to bring people to the table. However, there are many echo chambers within DOD, and to date, efforts to bring the right industry representatives to the table have been unsuccessful. A collaborative effort must be institutionalized with USDOT and establishing a multimodal freight office is an excellent first step. We need to engage well with the industry, or it will stop returning to the table. He added that he is happy that MTSNAC is still working on these issues and sending recommendations to the Secretary. Mr. Wellner noted that the primary focus of the Task Force had been containers. How much focus or interest has been given to other commodities? Mr. Marsh responded that the Task Force is not focused on specific commodities but on the entire transportation network.

Meanwhile, the Task Force needs continued input and support from MTSNAC. Mr. Wellner thanked Mr. Marsh for his presentation and the excellent work of the Task Force. He also noted that General Lyons was a big proponent of the U.S. Flag fleet.

Item 7- Briefing on Workforce Development and Item 8- Chair Guidance and Breakout Sessions

Mr. Wellner explained that the Workforce Development Briefing by Dr. Sashi Kumar (Appendix D) would be given to the Starboard Sub-Committee and directed the members to retire to their respective rooms for the Sub-Committee breakout sessions.

Item 9- Reconvene and Brief Update Report to Chair by Sub-Committee Chairs

When the members reconvened, Mr. Wellner asked each Sub-Committee Chair to brief the entire group. Mr. Brian Jones briefed the Port Sub-Committee. Their priority was an export enhancement. The Sub-Committee also had several action items, including:

1) Title XI Program
2) What is the industry appetite to expand the dry bulk fleet since 30% of the fleet will be scrapped over the next 30 years?
3) Regarding OSRA, the Sub-Committee is to look at containerized agricultural exports.
4) Review of Small Shipyard Grant Program. Only two shipyards build barges, and the program is woefully underfunded (Only $20M per year).
5) Decarbonization and emissions reduction – how will the IMO CII regulations affect ports? CII is based on the calendar year. Regarding the electrification of port vehicles, who will pay for it, and what is the role of labor? Inland vs. ocean ports issues.
6) Identify best practices.

Mr. Wetherald presented for the Starboard Sub-Committee. The Sub-Committee reviewed its priorities, including:

1) RRF recapitalization
2) Increase U.S. Flag fleet
3) Offshore wind development
4) Decarbonization

5) Workforce development

Mr. Daniel Yuska of MARAD briefed the Sub-Committee earlier on decarbonization (Appendix E). Much more is being done in this area than previously thought. Dr. Shashi Kumar also briefed the Sub-Committee on mariner development issues and progress.

The Sub-Committee briefly reviewed RRF recapitalization and why it was important. Congress is placing requirements on MARAD to lead that effort. MARAD has succeeded with the NSMV program so they may use the same model for RRF recapitalization. The Sub-Committee will address the other priorities tomorrow. Mr. Wellner asked if the RRF recapitalization effort would target the actively trading fleet vs. the laid-up fleet. Mr. Wetherald said that this priority would focus on recapitalizing the laid-up fleet. Mr. Paape said there were complex challenges, and asking for dollars may not be the right way. Perhaps the group needs to relook at this issue. Mr. Wellner responded that a reallocation of existing funds might work better.

Item 10: Closing Remarks and Adjournment

Mr. Dorsey reminded the group to keep their escort stickers for building entry tomorrow and adjourned the meeting at 4:07 EST.

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November 30, 2022
9:30 am–2:30 pm EST

Call to Order & Roll Call

Mr. Chad Dorsey, Designated Federal Officer with MARAD, called the meeting to order at 9:30 am EST and took the roll call.

Members Present

Federal Government Employees:

Russell Adise –U.S. Department of Commerce
Michael Moltzen – U.S. Environmental Protection Agency
Shelley Sugarman – U.S. Coast Guard (virtual)
Brian Tetreault – U.S. Army Corps of Engineers

Special Government Employees:

Lauren Beagen – Roger Williams University
Erik Stromberg– University of Memphis

Representative Members:

Aimee Andres – Inland Rivers, Ports and Terminals, Inc.
Cheryl Ball – Missouri Department of Transportation
David Cicalese – International Longshoremen's (virtual)
Brian Clark – North Carolina Ports Authority
Mario Cordero – Port of Long Beach (virtual)
James Dillman – Gateway Terminal
Bill Doyle – Maryland Port Administration
Berit Eriksson – Sailors' Union of the Pacific
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Roger Guenther – Port Houston
Craig Johnson – Flagship Management, LLC
Brian Jones – Nucor Corporation
David Libatique – Port of Los Angeles (Vice-Chair)
Kevin Krick (for Jack Sullivan) – Matson Navigation, Inc
Bethann Rooney – Port Authority of New York/New Jersey (virtual)
Stephen Spoljaric – Bechtel
Glenda Schafer (for Penny Traina) – Columbiana County Port Authority (virtual)
Robert Wellner – Liberty Global Logistics, LLC (Chair)
Tom Wetherald – Global Dynamics – NASSCO (retired)

Members Absent

None

MARAD / USDOT Members Present

Bill Paape – Associate Administrator for the Office of Ports and Waterways, MARAD
Chad Dorsey – DFO / Director, Inland Waterways Gateway Office (Paducah, KY), MARAD
Jeffrey Flumignan – Director, Office of Maritime and Intermodal Outreach, MARAD
Brian Hill – Alternate DFO / Director, Western Gulf Gateway Office (Houston), MARAD
Branden Villalona – Alternate DFO / Director, South Atlantic Gateway Office (Jacksonville, FL) MARAD
Thomas Morkan – Director, North Atlantic Gateway Office (New York), MARAD
Amanda Rutherford – Director, Mid-Atlantic Gateway Office (Washington, D.C.), MARAD

Public Members Present

Adrian Williams, Jr. – Amazon Web Services
Zachary Buss – Amazon Web Services
James M. Haussener – California Marine Affairs & Navigation Conference (CMANC)
Brad Trammell – American Waterways Operators

Item 11- Welcome and Comments from the MTSNAC Chairman

Mr. Wellner welcomed the group back and reminded everyone that he and Mr. Libatique had met with the MARAD Administrator during the last meeting. At that meeting, she shared her priorities for MTSNAC:

1) Supply chain issues
2) Workforce development
3) Growing the U.S. Flag Fleet
4) Port capacity issues
5) Decarbonization
6) Offshore wind development

During today's breakout sessions, Mr. Wellner asked the members to keep these priorities in mind. He then did a quick review of yesterday's Sub-Committee reports. The Port Sub-Committee wants to expand its review of export enhancements beyond agricultural commodities and will focus more on decarbonization and workforce development. The Starboard Sub-Committee will focus on RRF and sealift recapitalization to address the other three priorities – decarbonization, workforce development, and offshore wind development.

He also reminded the group that much work is needed during December and the holidays before the next meeting in March 2023. Mr. Dorsey said the group should focus on draft recommendations at the March meeting.

Item 12- Chairman Guidance and Breakout Sessions

Mr. Wellner advised that the Starboard Sub-Committee have an NSMV briefing (Appendix F) from Ms. Laila Linares, PMP, Senior Program Manager, Office of Associate Administrator for Strategic Sealift.

Item 13 – Reconvene and Update to Chairman

Mr. Jones presented for the Port Sub-Committee.

1) Under the Task of Export Enhancement, the group had more questions concerning Title XI, including using Title XI for inland barges. The Sub-Committee will gauge the interest of the industry on this issue. The revised work plan goes beyond agricultural products, which the Sub-Committee will explore. It will also delve into the issues of creating more efficiencies at ports, including the port area and beyond the gates. There is also a need for a National Freight Policy.
2) Decarbonization – The EPA member mentioned that there would be an MOA between USDOT, EPA, and HUD to address this issue. The group also pointed out that subsidies would be needed to encourage green projects in ports. There is also very little funding directed to vessels in ports. There is also a need for federal Research & Development funds in this area. The Sub-Committee hopes to have its first iteration of draft recommendations by December 15, 2022.

Mr. Wetherald presented for the Starboard Sub-Committee. The group has completed its background of U.S. sealift. Today it received a briefing on the NSMV program. Previously it had received a viewpoint of this program from TOTE. Some draft recommendations in this regard include:

1) MARAD should continue buying used vessels as directed by Congress
2) USDOT/MARAD should develop a lessons-learned report from the NSMV program
3) MARAD should develop a sealift recapitalization program based on the NSMV program
4) USDOT Secretary should support language to provide regular appropriations for RRF acquisition.

Mr. Wellner thanked Messrs. Jones and Wetherald for their reports. He also highlighted that the Port Sub-Committee references a National Freight Policy. This is a recurring theme in the industry, and to make substantive change in this country, we need a national strategy. He also said that if the Sub-Committee feels we need to consider other similar issues, please let the MTSNAC leadership know.

Item 14 – Public Comment (if required)

Mr. Dorsey noted no public comment, but Mr. Paape of MARAD had a few comments for the group. Mr. Paape said that during the Port Sub-Committee breakout session, the dwell time for signing off on port grant applications is currently under review. The average dwell time is 12-18 months, and MARAD is investigating opportunities to shave days off that process. Mr. Wellner asked if MARAD would consider modifications to the grant process. Mr. Paape said that if it is a policy matter, then yes. But if it is a statutory issue, then probably not. Mr. Doyle said that some ports cannot meet the time requirements of the grant program and are forced to turn back grant funds. He asked if MARAD could rank applications so any money turned back could be reallocated. Mr. Paape responded that any unused money goes back to the general fund and is used for the next round of port grant applications. He has asked his staff to look at fast-tracking for some of the smaller grants.

Item 15 – Break for Lunch

Mr. Wellner suggested that the members have a working lunch with their respective Sub-Committees to facilitate draft recommendations expected later today.

Item 16 – Reconvene and Reports from Sub-Committee Chairs

Mr. Jones reported to the Port Sub-Committee. The group discussed what a National Freight Plan might look like and integrated it into the Sub-Committee's work plan. They also discussed state freight plans and what each plan contains concerning ports.

Mr. Wetherald reported for the Starboard Sub-Committee (Appendix G). There was not enough time for the Sub-Committee to address a National Freight Plan. This must include elements for a national maritime strategy and be taken on by MARAD and supported by MTSNAC. MTSNAC is not the lead in this case. Mr. Wellner pointed out that the idea might be to recommend a national freight strategy, not to write it. Mr. Libatique added that MTSNAC is not the group to create a national freight plan, but it needs to bring up the relevant maritime component that could become part of a national freight plan.

The Starboard Sub-Committee looked at RRF/Sealift Recapitalization and recommended that MARAD keep buying used ships, although this is not a permanent solution. MARAD should also use a VCM (Vessel Construction Manager) to build new vessels. VCM approach, of course, has both pros and cons. He noted that MARAD, TOTE, and Philly Shipyard are all unanimous in their support for this approach. In the case of the U.S. Flag and Offshore Wind development, the Sub-Committee needs to have a discussion with SMEs. The same applies to decarbonization and the potential impact on the Jones Act Fleet. The role of maritime labor has not been completely fleshed out. Mr. Wellner suggested that the Sub-Committee might want to share the decarbonization SME information with the entire Committee.

Item 17 – Meeting Schedule and Planning Discussion

Mr. Dorsey announced that the next full MTSNAC meeting would be March 14-15, 2023. At this time, the meeting could be in a location other than Washington. That meeting will be followed by one in June and one in September, which will be virtual. Mr. Wellner asked the Sub-Committee chairs to check with their members on possible locations for the March meeting.

Item 18 – Closing Remarks and Way Ahead

Mr. Libatique congratulated the group for the tremendous work it had accomplished to date. The discussion of a National Freight Strategy will be given to the Port Sub-Committee. Mr. Paape thanked everyone for their attendance and participation. He congratulated the three newly appointed members – Bethann Rooney, Bill Doyle, and Joe Gasperov. He also thanked Messrs. Wellner and Libatique, as well as the Sub-Committee chairs, for their great work moving things forward. He noted that there are still two vacancies on MTSNAC and that a U.S. Customs and Border Protection representative will fill one. He also reminded the group that Ms. Villalona and Mr. Hill will continue to be the MARAD liaisons with MTSNAC.

Item 19 – Closing Remarks and Adjournment

Mr. Wellner noted that this is not an easy task and reminded everyone to stay on the path forward and be aware of timelines. He also asked everyone to be creative and to speak out when needed. The goal is to make a list of recommendations that will have an impact. He has been in the industry for 50 years and is encouraged by what the group has done. He wished everyone a great holiday season and adjourned the meeting at 2:08 pm EST.

Certification and Approval

Robert Weller Chair

6 JAN 2023

Date

MSTNAC Meeting Presentations
Appendix Listing

Appendix A
MTSNAC 2022 Work Plan

U.S. Maritime Transportation System National Advisory Committee
2022-2024 Work Plan

Background

Statutory Authority:

The U.S. Maritime Transportation System National Advisory Committee (MTSNAC or Committee) is a statutory advisory committee responsible for advising the Secretary of Transportation on matters relating to the United States maritime transportation system and its seamless integration with other segments of the transportation system, including the viability of the United States Merchant Marine. The MTSNAC is codified at 46 U.S.C. § 50402 and operated following the Federal Advisory Committee Act and DOT Order 1120.3D. The National Defense Authorization Act for Fiscal Year 2021 (P.L. 116-283) amended the MTSNAC's statutory authorization, including changes to the size and membership composition of the Committee.

Background:

The MTSNAC Charter has been drafted to address themes found in the Goals and Objectives for a Stronger Maritime Nation: A Report to Congress released in 2020, which relate to identifying and seeking solutions to the critical challenges within the Maritime Transportation System. During the term of the charter, MTSNAC shall undertake information-gathering activities, develop technical advice, and present recommendations to the Administrator on the matters identified in the document, including the following goals:

> Goal 1: Strengthen U.S. Maritime Capabilities Essential to National Security and Economic Prosperity
>
> Goal 2: Ensure the Availability of a diverse and inclusive U.S. Maritime Workforce that Will Support the Sealift Resource Needs of the National Security Strategy
>
> Goal 3: Support Enhancement of U.S. Port Infrastructure and Performance
>
> Goal 4: Enable Maritime Industry Innovation in Information, Safety, Environmental Impact, and Other Areas

Objectives and Scope:

The objective of this Committee is to advise the Secretary of Transportation on matters relating to the United States maritime transportation system and its seamless integration with other segments of the transportation system, including the viability of the United States Merchant Marine. The Committee will provide information, advice, and recommendations to the U.S. Secretary of Transportation (Secretary), through the Maritime Administrator (Administrator), on matters stated in the document titled *Goals and Objectives for a Stronger Maritime Nation: A Report to Congress* that are related to identifying and seeking solutions to the important challenges within the Maritime Transportation System. The Committee will not exercise program management responsibilities and will make no decisions directly affecting the programs on which it provides advice; decisions directly affecting the implementation of maritime policy will remain with the Administrator.

The Administrator will use the advice, information, and recommendations generated by MTSNAC to inform an array of policy deliberations and interagency discussions on meeting the Goals and Objectives for a Stronger Maritime Nation: A Report to Congress. The Secretary and Administrator may accept or reject a recommendation made by the MTSNAC and are not bound

to pursue any recommendation from the MTSNAC. In the exercise of his or her discretion, the Secretary, Administrator, or designee may withdraw a task considered by the MTSNAC at any time.

During the term of the charter, MTSNAC shall undertake information-gathering activities, develop technical advice, and present recommendations to the Administrator on ways to achieve or improve on the matters identified in the document titled *Goals and Objectives for a Stronger Maritime Nation: A Report to Congress,* including the following goals:

- Strengthen U.S. maritime capabilities essential to national security and economic prosperity and ensure the availability of a diverse and inclusive U.S. Maritime workforce that will support the sealift resource needs of the national security strategy
- Support enhancement of U.S. Port infrastructure and performance
- Enable maritime industry innovation in information, safety, environmental impact, and other areas.

To perform its duties, the Committee may invite subject matter experts to comment and participate in meetings after consultation with the Designated Federal Officer (DFO).

TASKS

The MTSNAC's work will align with the Agency's mission and guiding principal documents, such as the Maritime Administration Strategic Plan and the *Goals and Objectives for a Stronger Maritime Nation: A Report to Congress*. In addition, tasks could also be assigned based on the needs of the Department, such as the implementation of the National Freight Strategic Plan, legislation, or other opportunities where stakeholder input is critical.

Within the Maritime Administration, the Office of Ports & Waterways will prepare and monitor the MTSNAC. In addition, the Office will be responsible for prioritizing the work of the MTSNAC to ensure that deliverables and timelines are being met.

It is intended that tasks will be addressed through Subcommittees. Subcommittees will be established as needed. The Designated Federal Officer will work with the Chair and Vice-Chair to monitor the Subcommittees' work and guarantee that all recommendations are brought to the full Committee for consensus before going to the Maritime Administrator.

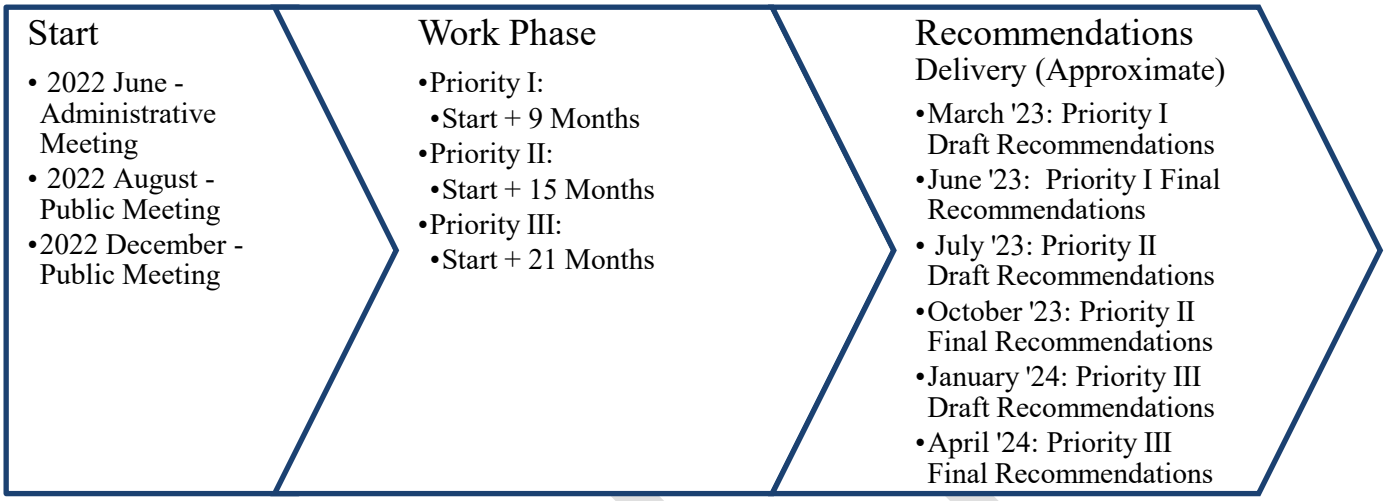
As each Subcommittee completes its specific task, it should consider the fundamentals (legislative, regulatory, budgetary, etc.) of safe, efficient, and environmentally conscious goods and passenger movement.

This work plan is intended to be a guiding document and should be updated as needed.

Deliverables and Timeline

The two-year length of the Work Plan is consistent with the two-year charter. The Maritime Administration will provide a high-level timeline with deliverables to the MTSNAC subcommittees to ensure that subcommittees pace themselves at a similar speed to help the MTSNAC meet deadlines set by the Agency.

Deliverables will be in the form of recommendations to the Secretary. Recommendations will be prepared in the style of the template at the end of the workplan.



Initial Focus Areas for 2022-2024

The Maritime Administration requests the Subcommittees to consider and develop recommendations from a range of problem statements as indicated below. Accordingly, the 2022 - 2024 MTSNAC will have two Subcommittees: the Port Subcommittee, with a general representative concentration on ports; and the Starboard Committee, with a general representative concentration regarding the maritime industry, including vessels, workforce, and how to strengthen U.S. maritime capabilities.

Although the priority sections are prescribed, the problem statements have not been assigned any order of importance. Therefore, it is at the discretion of the Subcommittee (s) to designate the schedule and associated workflow diagrams for each priority section in alignment with the deliverables schedule above.

In general, the **PORT Subcommittee** will address the *Goals and Objectives for a Stronger Maritime Nation: A Report to Congress* in the following areas:

- How to enhance the use of America's Marine Highways;
- Ways to support the enhancement of U.S. port infrastructure and performance; and
- Ways to enable maritime industry innovation in information, safety, environmental sustainability, and other areas.

Likewise, the **STARBOARD Subcommittee** will address the following:

- How to strengthen U.S. Maritime capabilities essential to national security and economic prosperity;
- Ways to ensure the availability of a U.S. maritime workforce that will support the sealift resource needs of the National Security Strategy; and
- Ways to enable maritime industry innovation in information, safety, environmental impact, and other areas.

Prioritization:

The following are Priority I - Requests for Recommendations:

- Export Enhancements – Port Subcommittee
- Decarbonization and Emissions Reduction at Ports– Port Subcommittee
- Recapitalization of the Ready Reserve Force – Starboard Subcommittee
- Decarbonization and the US Fleet – Starboard Subcommittee

The following are Priority II - Requests for Recommendations:

- Removing Impediments to Marine Highway Services – Port Subcommittee
- Workforce Development Initiatives – Port Subcommittee
- Dynamic Capacity Modeling – Port Subcommittee
- Growing the U.S. Flag fleet – Starboard Subcommittee

The following are Priority III - Requests for Recommendations:

- Freight Logistics Optimization – Port Subcommittee
- Helping Communities near Ports – Port Subcommittee
- Disaster Response Framework – Port Subcommittee
- Data-Driven Methods to Identify and Mitigate Risks – Port Subcommittee
- Retaining and Attracting Talent – Starboard Subcommittee
- Selective Service and Mariners – Starboard Subcommittee

Port Subcommittee Problem Statements

Export Enhancements

Increased freight congestion at some ports has obstructed the international supply chain for American agricultural commodities and other goods. Promoting access to shipping trade lanes for nationally and globally significant agricultural commodities and other goods will help to stabilize transportation costs for farmers, processors, retailers, and consumers.

Recommendation Request:

Make recommendations to the Secretary of Transportation on actions that support improved access to international markets, including the use of alternate trade lanes and/or legislation designated specifically for domestic and international shipment of agricultural commodities and other goods. Actions for consideration may include:

- Inventory regulatory policies that impact agricultural trade
- Potential legislative adjustments to existing grant programming

Decarbonization and Emissions Reduction at Ports

Emissions from fossil fuel vehicles, operating equipment, and vessels in and around ports contribute to climate impacts and pose health risks to nearby communities that often comprise low-income and minority populations.

Recommendation Request:

Make recommendations to the Secretary of Transportation on actions that decarbonize our nation's ports to reduce climate impacts and improve the health of Americans and address the environmental inequities that disadvantaged communities often experience. These efforts may include:

- Overarching coordination amongst departments and agencies to include the Environmental Protection Agency and Department of Energy in efforts to decarbonize ports through efforts such as the introduction of zero-emission equipment and installation of fueling/charging infrastructure, such as shore power services to vessels (in conjunction with the Starboard Subcommittee),
- Development of standard criteria for federal investment in green technologies and alternative fuels equipment and infrastructure both inside and outside of port boundaries
- Identifying best practices for decarbonization at ports, for example, the use of supply chain data to drive visibility and guide cost-effective investment to reduce the carbon intensity of cargo movement,
- Exploring Healthy Port designations for public and private terminals, including supplemental grant funds for innovative projects focused on equity.

Removing Impediments to Marine Highway Services

Movement of containerized and unitized cargo within the inland waterways, the Great Lakes, and other U.S. waterways has been impeded by inaccessibility to containers and by an inability to pivot already-designated Marine Highway projects to align with ever-evolving shifts in the market.

Recommendation Request:

Make recommendations to the Secretary of Transportation on actions that enhance the use of America's Marine Highways. Recommendations may include, but are not limited to:

- Restructuring of the America's Marine Highway program to ease access to, and predictability of, available shipping containers within the inland shipping sector
- Evolution of eligible services to be more inclusive of vital agricultural products that support domestic operations (fertilizer, grain, hemp, etc.)
- Analysis of how the America's Marine Highway designation process, grant agreements, and service implementation phases can provide more opportunity and flexibility to service operators, so they can expeditiously augment and/or take advantage of service change opportunities when needed. This could include adding additional ports, shippers, and commodities to their service, without a lengthy approval process from DOT/MARAD.
- Whether the America's Marine Highway program should be inclusive of international services/projects from U.S. ports to ports in Canada and Mexico
- Actions that can mitigate impediments to the use of America's Marine Highways.

Workforce Development Initiatives

As transportation systems and equipment continue to evolve toward advanced technology and alternative-fueled equipment, equitable distribution of supplemental maritime education and training, and apprenticeship training programs have not been prioritized to ensure a highly trained and qualified workforce.

Recommendation Request:

Make recommendations to the Secretary of Transportation on actions to create workforce development initiatives in neighborhoods and/or regions within a specific proximity of the port operations to advance career and professional opportunities to communities near ports.

Tasks that may contribute to the analysis of such opportunities include:

- Identify gaps in training regimes for the skilled trades sector within the maritime goods movement workforce to ensure that truck drivers, marine electricians, mechanics, equipment operators, et al., are qualified for advanced technologies in cargo handling equipment and/or electrified vessels
- Outreach to and coordination with employers as to actual existing skills needs and vacant positions
- Promote career paths for cybersecurity in the maritime sector
- Improve access to data tools and information that support workforce development programs and MARAD designated Centers of Excellence

Dynamic Capacity Modeling

The U.S. Department of Transportation has not executed dynamic capacity modeling to coincide with Marine Transportation System's (MTS) current or projected vessel volumes. Dynamic capacity modeling will provide decision-makers with an evidence-based framework for the existing MTS and validation of future supply chain performance based on variables and recommendations.

Recommendation Request:

Make recommendations to the Secretary of Transportation on actions to mitigate supply chain, infrastructure or operational inefficiencies within the MTS that hinder the expansion of freight activities associated with the expected population surge. Actions to support the Secretary of Transportation in determination of such capacity computations may include:

- Inventory inefficiencies outlined in historical reports and documentation that are projected to impact future freight flows
- Determine feasibility for a single-system pilot study, where extrapolated cargo volumes are modeled against system constraints
- Analyze throughput capacity and velocity constraints of locks and dams through the utilization of Lock Performance Monitoring System (LPMS) data
- Research River Information System and other digital technologies that impact performance metrics of locks and dams
- Engage private, municipal, state, regional and federal stakeholders to identify procedures, policies, labor solutions and technologies that, if implemented, can augment the freight capacity of the MTS

Identify information products that will characterize efficiencies and capacities gained through the implementation of solutions. In effect, the information products will establish a baseline freight capacity computation for the commercially navigable waterways

Freight Logistics Optimization

The COVID-19 pandemic and subsequent boom in consumer demand have placed enormous strain on the maritime supply chain leading to a loss of system efficiency, reliability and environmental sustainability. However, Maritime, port, and other supply chain stakeholders in the United States have yet to harness the full potential of supply chain digitalization to address this challenge. In 2022, the US Department of Transportation launched Freight Logistics Optimization Works – known as Project FLOW – which serves as a platform to prove the utility of supply chain data-sharing use cases.

Recommendation Request:

Make recommendations to the Secretary of Transportation on actions to alleviate future supply chain crises through development, promotion, and support of a nationwide freight optimization framework. Actions that may assist the Secretary in this endeavor include, but are not limited to:

- Ways the Maritime Administration can promote the Department's FLOW initiative.
- Ways to increase utilization and participation in the FLOW initiative.

Helping Communities near Ports

Minority and low-income populations that live adjacent to port areas and are therefore vulnerable to health and other negative quality of life impacts from nearby vessel, truck, and equipment activity, and frequent local roadway congestion. These communities may merit environmental justice to enhance their quality of life, through emission reductions, congestion mitigation, and other efforts.

Recommendation Request:

Make recommendations to the Secretary of Transportation on actions that when implemented, would provide environmental justice and quality of life improvements to minority and low-income communities near ports, including reducing negative impacts from vessel and truck emissions and frequent nearby roadway congestion. Topics of interest could include:

- Identify best practices to reduce port emissions and/or emission capture opportunities through equipment and technology
- Investigate congestion and port-area emission reduction opportunities to enhance the quality of life for these nearby communities

Disaster Response Framework

Climate change is expected to worsen the frequency, intensity, and impacts of certain extreme weather events and natural disasters, causing property damage and disruption to essential services such as transportation.

Recommendation Request:

Utilizing the *Final Report on Port Resilience: Overcoming Threats to Maritime Infrastructure and Operations from Climate Change*[1] as a basis, make recommendations to the Secretary of Transportation on actions that support development of a national, standardized disaster response framework for port operations. Topics may include issues, such as:

- Develop a catalog of historical activity related to port resiliency, providing access to best practices, asset management practices, resources, and documented outcomes
- Outline the common definition and methodology of a port resiliency index. For the purposes of this request, a resiliency index is a self-assessment tool used to measure the port's ability to maintain operations during and after disasters. In addition, the process will help identify the action items necessary to address system vulnerabilities and maintain long-term viability
- Identify tools and processes whereby ports can execute the risk assessment and needs analysis necessary for calculating their resiliency index
- Prescribe a minimum standard and protocols for port resiliency
- Incentivize utilization of the protocols for reactivation of assets and operations after a natural disaster or event
- Identify viable alliances between port resiliency measures and the Maritime Transportation System Emergency Relief Program

Data-Driven Methods to Identify and Mitigate Risks

Utilization of the National Oceanic and Atmospheric Administration's (NOAA) Digital Coast data and tools, which are based on the International Panel on Climate Change (IPCC) emission scenarios, to identify the number of years a project is likely to be useful before being impacted by flooding or inundation could help the U.S. Department of Transportation (USDOT) and ports evaluate tolerance for risk.

[1] Wakeman, T. H., Miller, J., & Python, G. (2015). *Port Resilience: Overcoming Threats to Maritime Infrastructure and Operations from Climate Change*. New York: University Transportation Research Center, Region II.

Recommendation Request:

Make recommendations to the Secretary of Transportation on ways the Maritime Administration and other modal administrations can use data-driven methods to identify and mitigate risks to those infrastructure investments funded by USDOT discretionary grant programs. Actions that may assist in development of recommendations include:

- Identify risk tolerances that may be considered as part of the grant application evaluation
- Consider implementing a range for sea-level rise impacts, using IPCC Intermediate-Low to Intermediate-High Emission Scenarios
- Identify existing data resources using the NOAA Digital Coast tool to inform risk tolerance measures
- Develop initiative for infrastructure grant applicants to project the number of years a project is likely to be useful before being significantly impacted by sea level rise in which scenarios may be based on risk tolerance where applicable.
- Rural ports – a dedicated rural port collaboration toolkit could be introduced to this group of ports to help them identify equity needs

Starboard Subcommittee Problem Statements

Recapitalization of the Ready Reserve Fleet

The recapitalization of the strategic sealift fleets has reached a critical juncture and has become of increasing interest to Congress. Congress may require MARAD to provide information about how the Vessel Construction Manager (VCM) concept can be leveraged to build U.S. auxiliary sealift ships to support the nation's sealift needs. Additionally, MARAD may need to consider how the domestic U.S. maritime industry, including shipyards, repair facilities, and operators, could be incentivized to support development and adoption of military utility into existing commercial ship designs to better support future non-combatant military requirements. MARAD may also need to consider ways to leverage existing production lines or develop new commercially viable sealift ship production lines to build sealift vessels.

Recommendation Request:

Make recommendations to the Secretary of Transportation on:

- The use of the VCM concept to build auxiliary and sealift ships.
- How the maritime industry could be incentivized to better support military utility in commercial design to support non-combatant military requirements.
- How existing or new commercially viable production lines could be leveraged to recapitalize to build required sealift vessels.
- Ways to enable maritime industry innovation in information, automation, safety, environmental impact, and other areas.
- How MARAD might execute the design and construction program that may be required by the 2023 NDAA.

Decarbonization and the US Fleet

Pending IMO regulations including CII and EEXI may have a significant impact on the U.S. flag shipping, including the Jones Act trades. US policy regarding the implementation of these regulations may have important consequences for the maritime industry and the US supply chain.

Recommendation Request:

Make recommendations to the Secretary of Transportation on:

- Decisions regarding the impact of future IMO regulations on the US flag fleet in:
  - Contiguous services
  - Non-contiguous services
  - International Trade
- Mitigating technologies for IMO compliance and timelines available
- Development of shore-power capabilities needed in the United States.
- The decisions regarding the impact of Energy Efficiency Existing Ship Index and the Carbon Intensity Indicator regulations.

Growing the U.S. Flag fleet

Since World War II, the number of commercial vessels registered under the U.S. Flag have dramatically decreased, providing inadequate support to the economic and defense interests of the U.S. Moreover, this shortage of U.S. registered vessels has generated substantial risk to the U.S., threatening supply in shipping capacity for national security needs and the number of mariners needed in time of national emergency or protracted war.

Recommendation Request:

Make recommendations to the Secretary of Transportation on actions that can increase the number of U.S. flagged vessels specifically large ocean-going vessels. Topics may include issues, such as:

- Current versus optimum fleet subsidization and taxation
- Consideration of barriers to entry for U.S. flag fleet for growth
- Potential enhancements to marine insurance and liability structures
- Removing barriers to America's Marine Highways

Recommendation Request:

Recognizing the significance that offshore wind has on the development of ports and the domestic fleet, make recommendations to the Secretary of Transportation on actions to:

- Promote the use of the domestic US flag fleet
- Promotion of the associated industrial base
- Promote the development of the associated specialized workforce for offshore wind development.
- Research ways that the Maritime Administration can better support the development of offshore wind.

Retaining and Attracting Talent

The 2018 Maritime Workforce Working Group (MWWG) Report to Congress estimated that conflicts lasting greater than 4-5 months would result in a shortage of approximately 1,800 trained, qualified, and available U.S. mariners. As the diminishing number of ships under the U.S. flag has been identified as the key contributor to this shortage of mariners, and has not been adequately addressed.

Recommendation Request:

Make recommendations to the Secretary of Transportation on actions that will support efforts to retain and attract talent in the maritime sector, including recruitment of women, mariners and maritime labor from communities of color, lower-income and underserved communities, and communities that neighbor ports. In addition, recommendations may include increased engagement actions and outreach to enhance racial, gender, and economic diversity within the maritime sector, along with increased opportunities for underrepresented groups. Areas of interest for consideration should include:

- Current programming and funding to enhance future mariner availability
- Strategic solutions to ensure sustained wartime mariner availability
- Increasing the availability of training billets to meet STCW requirements.

Selective Service and Mariners

U.S. citizens who hold an active merchant mariner credential and actively sail on their credentials to support economic security and national defense missions, are not exempt from the Selective Service System. If the wartime draft were reinstated and a call to serve in the Armed Forces were issued, it is unclear how the Selective Service System would view availability of mariners who are currently serving a critical function for the nation.

Recommendation Request:

Make recommendations to the Secretary of Transportation on actions that protect U.S. merchant mariners from military drafts through the Selective Service System. Recommendations could include supporting legislation and other exemption options for merchant mariners holding active mariner credentials.

Template for Recommendations

Recommendation from MTSNAC to the Secretary of Transportation
Date Presented:

Problem Statement:
{Insert the problem statement from the Work Plan. The section should include a brief explanation of how the problems impede efficiency, effectiveness or economic growth of the maritime industry. Consider including a brief statement of consequences of taking no action to correct the problem.}

Recommendation Request:
{Insert the Recommendation Request for the corresponding Problem Statement from the Work Plan State in clear, concise terms, the recommendation being made to the Secretary and include a description of the action that is desired. For example: Encourage State DOTs to designate a Maritime Coordinator.}

Recommended Action:
{This section expands on the Recommendation Request above. Explain action and suggested timeline (if appropriate) needed to correct the problem. Who should take action? What action should be taken? When? Ensure recommendation/request addresses a realistic action that is within the authority of the Secretary of Transportation. For example, "improve policies addressing maritime industries" is too general to be considered actionable. To clarify, if suggested changes to Rulemaking are made, include the exact language that is recommended to be inserted/changed within the text of existing Rules.}

Desired Outcome:
{Describe the outcome desired (and expected) from the recommended action in the previous section. For example, "amending this Rule will allow U.S. flag ship operators to competitively finance new vessel construction in U.S. shipyards, adding 5,000 direct new jobs and 90,000 indirect jobs to the economy within the coming two years.}

Notable Background:
{Insert important background information here that does not fit into the other categories above, or because the information is not directly related to accomplishing the "ASK." Examples of such information include, but are not limited to:

- if there is no consensus within MTSNAC on a recommendation,
- if the suggested "ASK" has been tried in the past but stymied for some reason, or
- if the suggested "ASK" bears high risk to the public.

Adding information in this section is not necessary for every background recommendation paper. This section should be no more than 3-4 bulleted sentences.}

Prepared By: MTSNAC _____ Subcommittee

Date: _____

Appendix B
Title XI Presentation

FUNDING

Recognizing that long-term loans carry varying risks, when MARAD originally guarantees debt, it establishes a loss reserve for the debt, which is initially funded in two ways: the guarantee fee and appropriated subsidy.

- A guarantee fee is the one-time cost for closing the loan that is determined based upon the borrower's financial condition and paid at the time of closing.
- Congress appropriates money for the Title XI Program to use in the Loss Reserve based on the initial estimated risk of default for the project.

NATIONAL AND ECONOMIC SECURITY

The Title XI Program has several national and economic security implications. Generally speaking, the Program helps maintain the United States' ability to keep shipbuilding and vessel maintenance in U.S. shipyards, as opposed to going abroad, which also keeps more jobs in the U.S. In order to effectively transport goods, the U.S. needs mechanisms in place to maintain and build vessels.

Additionally, the shipyards contribute to maintaining and building military ships. Economically stimulating shipyards provides the Nation the insurance it needs to be prepared for crisis because the shipyards build and maintain the vessels that transport cargo around the world, including military cargo into conflict.

FOR MORE INFORMATION:
Visit *www.maritime.dot.gov*
Email *marinefinancing@dot.gov* to apply for a Title XI loan

MARITIME ADMINISTRATION
NAVIGATING A STRONGER FUTURE

TITLE XI PROGRAM

The Maritime Administration (MARAD) supports the U.S. industrial base and the U.S. Merchant Marine by fostering, promoting and developing the maritime industry of the U.S. to meet the nation's economic and security needs through the Federal Ship Financing Program (Title XI Program). The Title XI Program provides shipyards and shipowners longer-term, lower-interest loans in comparison to commercial lenders to modernize facilities and build and reconstruct vessels. Through long-term debt guarantees, the Title XI Program encourages U.S. shipowners to obtain new vessels from U.S. shipyards cost effectively, which supports a strong U.S. Merchant Marine.

BENEFITS OF TITLE XI

The Title XI Program draws the attention of several shipyards and ship owners for several reasons:

- Repayment periods up to 25 years, providing an elongated time to pay back the loan
- Low interest rates comparable to the U.S. Treasury rates
- Up to 87.5% financing of the project cost
- Fixed or floating interest rates determined on a case by case basis

Also, loan guarantees not only benefit the borrowers, but the entire maritime industry because they stimulate the growth and modernization of U.S. shipyards and the U.S. Merchant Marine.

FEDERAL FINANCING BANK

When guaranteeing debt, MARAD uses the Federal Financing Bank, which is a U.S. Government corporation under the supervision of the Secretary of the Treasury, as the purchaser of the debt. In doing so, the debt has a lower interest rate than borrowing from other entities such as commercial banks. Also, using the Federal Financing Bank simplifies the borrowing process because it eliminates the need to market the debt to third-parties and the associated front-end costs, which used to exist with the Title XI Program.

FOR MORE INFORMATION:
Visit *www.maritime.dot.gov*
Email *marinefinancing@dot.gov* to apply for a Title XI loan

MARITIME ADMINISTRATION
NAVIGATING A STRONGER FUTURE

TITLE XI PROGRAM GUARANTEE APPLICATION

ELIGIBLE APPLICANTS

MARAD's Administrator will consider approval of all Federal Ship Financing Program obligation guarantees who meet the following criteria:

- Be an individual, corporation, partnership or other business formation that is U.S. organized and recognized as a U.S. citizen
- Exhibit sufficient operating experience and ability to operate the vessels or employ the new shipyard technology on an economically sound basis
- Exhibit creditworthiness and the ability to repay guaranteed debt according to its terms by keeping a positive working capital balance and an aggregate debt level at no more than two times its net worth

ELIGIBLE PROPOSED PROJECTS

- New construction of commercial vessels such as ferries, bulk, container, cargo, tankers, tugs, towboats, barges, dredges, oceanographic research, floating power barges, offshore oil rigs and support vessels and floating drydocks
- Reconstruction or reconditioning of existing vessels to improve efficiency and extend useful life
- Modernizing privately-owned, general shipyard facilities in the U.S.

APPLICATION

Interested applicants can obtain an application online. MARAD accepts applications on a rolling basis and will evaluate applications as they are submitted. However, prior to filing the application, a pre-application meeting should be set up with the Office of Marine Financing, which may be contacted at *marinefinancing@dot.gov*, to discuss the project and requirements.

PROJECT REQUIREMENTS

When submitting applications for a loan guarantee for a particular project, the prospective borrower has to adhere to financial requirements, economic soundness, technical acceptance, legal and regulatory compliance and insurance requirements.

FINANCIAL REQUIREMENTS

All participants having significant financial or contractual interest in the proposed project must submit GAAP-compliant* audited financial information. **Additionally, applicants must meet the following requirements:**

- Minimum of 12.5% equity funded or committed prior to MARAD approval
- Positive working capital
- Long-term debt to equity ratio of 2:1 or less
- Ability to maintain a minimum net worth

ECONOMIC SOUNDNESS

When determining economic soundness, MARAD analyzes:

- Applicant's ability to repay the debt
- Market potential to determine if the project will succeed
- Need for the project within the maritime industry
- Operating costs
- Proof the project will become self-supporting
- Other information believed to be relevant to the project

TECHNICAL ACCEPTANCE

To be eligible for guarantees, the vessel financed on the project must:

- Be constructed in the U.S.
- Have acceptable costs
- Meet certain construction standards
- Comply with U.S. laws relating to vessel operation
- Demonstrate the work on the vessel was not a result of inadequate maintenance and repair

Additionally, the operator of the vessel must provide detailed information regarding the applicant's:

- Experience
- Qualifications
- Ownership
- Business relationships
- Management personnel
- Ability to successfully operate the financed project

LEGAL AND REGULATORY COMPLIANCE

For all projects being operated in the U.S. coastwise trade, the applicant must demonstrate citizenship of the owner.

INSURANCE REQUIREMENTS

Vessels or technology financed by the Title XI Program must maintain adequate insurance during the entire term of the financing and insurance must be approved by a domestic or foreign underwriter.

**GAAP stands for Generally Accepted Accounting Principles, the federally accepted standards applied to all audits and financial disclosures.*

FOR MORE INFORMATION:
Visit *www.maritime.dot.gov*
Email *marinefinancing@dot.gov* to apply for a Title XI loan

@DOTMARAD *Maritime Administration*

Appendix C
Committee on Marine Transportation System

CMTS AREAS OF INTEREST

CMTS Areas of Interest

The U.S. Committee on the Marine Transportation System (CMTS) is a Federal interdepartmental maritime policy coordinating committee established by Presidential Directive in 2005 and authorized in statute in December 2012. The CMTS is directed to periodically assess the state of the marine transportation system (MTS); promote the integration of the MTS with other modes of transportation and the marine environment; coordinate the 25+ federal MTS-related agencies and directorates with regard to Federal policies that impact the MTS; and report to Congress the roles and responsibilities of the MTS-related agencies. (www.CMTS.gov)

Arctic Maritime Transportation IAT (MARAD/NOAA/USCG)
Purpose: The CMTS, through the work of the integrated action team (IAT), has responded to the call of Congress and the White House to coordinate domestic transportation policies and determine what is needed to improve the U.S. Arctic marine transportation system (MTS). Through its recommendations and member agency actions, maritime transportation in the U.S. Arctic will be better managed and made more safe and secure, resulting in more efficient transits, greater protection of Arctic coastal and ocean resources, maintenance of subsistence uses by native communities, and less risk to loss of cargo and life.
Background: The U.S. geographic area in the Arctic consists of all U.S. territory north of the Arctic Circle and all U.S. territory north and west of the boundary formed by the Porcupine, Yukon, and Kuskokwim Rivers; all contiguous seas including the Arctic Ocean and the Beaufort, Bering, Chukchi Seas and the Aleutian Island chain, as defined in § 112 of the Arctic Research and Policy Act of 1984 (ARPA) Source: U.S. Arctic Research Commission
Value: Warming conditions and reduction in the extent of sea ice cover in the Arctic are creating new opportunities and challenges in the U.S. Arctic region with respect to marine transportation. Ensuring a safe and efficient U.S. MTS in the Arctic is essential to meeting the nation's environmental, economic development and national security objectives.
Key Documents/Links: https://rosap.ntl.bts.gov/view/dot/60574 https://www.cmts.gov/assets/uploads/documents/NSAR_1.1.3_Recommendations_and_Criteria_2017_FINAL.pdf https://www.cmts.gov/assets/uploads/documents/NSAR_1.1.2_10-Year_MTS_Investment_Framework_Final_5_4_16.pdf https://www.cmts.gov/assets/uploads/documents/CMTS_10-Year_Arctic_Vessel_Projection_Report_1.1.15.pdf https://rosap.ntl.bts.gov/view/dot/60576 https://www.cmts.gov/assets/uploads/documents/Final_CMTS_Arctic_Webinar_Brief_2-24-15.pdf

Future of Navigation IAT (NOAA/USACE/USCG)
***Purpose*:** The CMTS Future of Navigation IAT facilitates the modernization and provision of navigation services, including the coordinated and integrated collection, processing, and dissemination of navigation data and information to provide services to stakeholders, eliminate duplication, and enhance the safety, reliability, and efficiency of our waterways and ports.
Background: The FutureNav IAT focuses on enhancing the safety, efficiency, and reliability of navigation through use of technology.
Value: The Federal effort in facilitating the safe and efficient operations of these waters must be an accelerant, rather than a brake, on this economic engine. To this end, the "Future of Navigation" IAT leverages technology, initiates management improvements, redefines levels of service, develops data-driven analysis, and identifies and recommends regulatory changes to improve safety and efficiency on America's waterways.
Activities: Future of Navigation IAT is responsible for implementing the "U.S. Navigation Information Strategic Action Plan 2021-2026" [SAP]. The SAP outlines high-level strategy for U.S. Federal agencies to deliver navigation information to mariners in support of a safer and more secure marine transportation system (MTS), by advancing the evolution and implementation of the e-Navigation concept. Execution of the Plan will guide federal agency coordination in establishing a framework that enables the transfer of actionable navigation information and the use of timely and resilient maritime data for safer, more secure and efficient navigation in U.S. waters.
Key Documents/Links: https://www.cmts.gov/assets/uploads/documents/CMTS_USNavigation2021_SAP_FINAL.pdf https://www.cmts.gov/assets/uploads/documents/FutureNav_Press%20Release_FINAL.pdf

Mariner and MTS Workforce IAT (MARAD) [DEI, Mariner Mental Health, Recruitment and Retention, and M2M
Purpose: To facilitate cross-Federal agency coordination to enhance the well-being and quality of life of mariners and the marine transportation system workforce in the U.S., in the areas of resilience during and after the Covid-19 pandemic, military to mariner initiative, diversity, equity, and inclusion (DEI), mariner mental health, recruitment and retention, and any other areas as evolve from ongoing, new or emerging issues related to the MTS workforce. Members shall: • Represent their federal agency and organization in an open, collaborative forum; • Establish and participate in collaborative projects, technical meetings, webinars/workshops, and demonstrations to advance the purpose and activities of the Workforce IAT, as proposed and executed by the Workforce IAT; • Provide staff assistance to the extent possible to the Workforce IAT;
Background: Advancement of the recruitment, retention, diversification, and well-being of the existing and future workforce within the MTS is critical to ensure a well-functioning domestic and international freight and logistics supply chain. In March 2022, the CMTS Coordinating Board approved the establishment of the *Mariner and Workforce Integrated Action Team*. (Workforce IAT).
Value: The Workforce IAT will act as an umbrella forum to provide guidance and leadership to the various subcommittees addressing specific issue areas.
Key Documents/Links: https://www.cmts.gov/assets/uploads/documents/VETS_101_Military_to_Mariner_Webinar_March_2018.pdf

Maritime Innovative Science and Tech IAT (MARAD/EPA/USACE)
***Purpose*:** The MIST team works to identify, coordinate, develop, and implement innovative research, development, and technology to address challenges to the MTS.
Background: In Spring 2018, this IAT changed its name from the Research and Development (R&D) IAT to the Maritime Innovative Science & Technology (MIST) IAT to encompass broader science and technological advances to the marine transportation system (MTS).
Value: A coordinated "Innovative science and technology" strategy will enable the nation to address marine transportation infrastructure challenges efficiently and effectively, meet increasing freight demand, promote safety and security of the MTS, and address the environmental impacts of the MTS.
Key Documents/Links: https://www.cmts.gov/assets/uploads/documents/CMTS_RD_Strategic_Action_Plan_06-17_Final.pdf https://www.cmts.gov/assets/uploads/documents/CMTS_Executive_Summary_Performance_Measures_Report_FINAL_2015-07-06_PDF.pdf http://navigation.usace.army.mil/MTS/performance/economic https://www.cmts.gov/assets/uploads/documents/MTS_Performance_Framework.pdf https://www.cmts.gov/assets/uploads/documents/CMTS_RD_StrategicActionPlanMTS_%20Jan2011.pdf

Maritime Data IAT (MARAD/USACE)
***Purpose*:** The purpose of the Maritime Data IAT is to serve as the CMTS's body of experts in regard to the discovery, access, and sharing capacity of data related to the operation and governance of the MTS. The work of the Maritime Data IAT includes facilitating the identification, archiving, linking, and integration of authoritative data from agencies with equities in maritime data. Access to interoperable and shareable authoritative data will assist CMTS member agencies in making timely and well-informed decisions that enhance the capabilities of the MTS as well as fulfill strategic analysis and reporting requirements.
Value: Efforts by the Maritime Data IAT will benefit the Nation by (1) improving maritime data discoverability and access through common standards, (2) enhancing informed decision-making through access to authoritative data, and (3) optimizing CMTS member mission effectiveness through shared services and interoperability.
Key Documents/Links: https://www.bts.gov/ports https://www.cmts.gov/assets/uploads/documents/MTS_Performance_Measures_research_2016.pdf https://www.iwr.usace.army.mil/about/technical-centers/wcsc-waterborne-commerce-statistics-center/ https://www.navcen.uscg.gov/?pageName=aismain https://marinecadastre.gov/

Maritime Resilience IAT
Purpose: "The MTS Maritime Resilience IAT (RIAT) was established to focus on cross-Federal agency knowledge, co-production and governance to incorporate the concepts of resilience into the operation and management of the U.S. Marine Transportation System. For the purposes of this team, resilience is defined as the ability to prepare and plan for, resist, recover from, and more successfully adapt to the impacts of adverse events", from Presidential Policy Directive 21: Critical Infrastructure Security and Resilience.
Background: The Marine Transportation System operates within multiple other systems that include ecology, the community, and water resource management, each of which can impact the resiliency of the MTS. (Credit K. Chambers/USACE)
Value: The RIAT seeks to affect future resilience policy and aid in delivering enhanced resilience programs through identifying, coordinating, and leveraging complementary Federal investments and activities related to MTS resilience.
Key Documents/Links: *https://youtu.be/OTK7zgUqKvE* *https://rosap.ntl.bts.gov/view/dot/60699* https://www.cmts.gov/assets/uploads/documents/refined%20tool%20matrix.pdf https://www.cmts.gov/assets/uploads/documents/2016-01-05_Resilience_Factors_Matrix_Summary_(Public_Version).pdf https://onlinepubs.trb.org/onlinepubs/conferences/2016/CMTS/Presentations/72.KatherineTouzinsky.pdf http://onlinepubs.trb.org/onlinepubs/conferences/2012/Metrics/presentations/45-Murphy.pdf

Offshore Energy Facilitation Task Team (USCG/BSEE)
Purpose: The CMTS Offshore Energy Facilitation Task Team (OEF TT) will support the Biden Administration's goal of providing 30 GW of power from offshore wind by 2030 by pursuing and facilitating the development of Federal guidance on Munitions and Explosives of Concern (EC) mitigation within offshore wind energy leases and supporting new and emerging issues as agreed upon by the members.
Background: Throughout the last century various munitions and explosives of concern (MECs) have been deposited on the seabed of the United States' outer continental shelf, with a concentration on the Atlantic Seaboard. On September 1, 2021, the CMTS held the first interagency workshop on the topic, resulting in the establishment of the Offshore Energy Facilitation Task Team (OEFTT). The mission of the OEFTT is to support the Biden Administration's goal of providing 30 GW of power from offshore wind by 2030 by pursuing and facilitating the development of Federal guidance on Munitions and Explosives of Concern mitigation within offshore wind energy leases and supporting new and emerging issues as agreed upon by the members.
Value: There is currently no federal guidance or regulations for offshore wind leaseholders on what they should do in the event a munition of concern (MEC) or unexploded ordinance (UXO) is discovered. The OEFTT was stood up in order to address this regulatory uncertainty by brining relevant agencies together to develop a working federal policy to guide the offshore wind industry when a confirmed MEC/UXO that impacts a project is discovered.
Key Documents/Links: www.cmts.gov

Supply Chain & Infrastructure IAT
Purpose: The purpose of the Supply Chain and Infrastructure Integrated Action Team (SCIIAT) is to serve as the CMTS forum for interagency discussion, communication, and recommendations and/or actions in support of the MTS supply chain and to facilitate the development of broad evaluation and decision criteria that are used to inform a whole-of-government approach to Federal infrastructure investment. The team develops tools that are value-added for practitioners at all levels of government, including Federal, State, local and tribal.
Background: The SCIIAT was formed in July 2021 when the Infrastructure Investment IAT (IIIAT) was combined with the Supply Chain Working Group (SCWG). The IIIAT was originally approved by the CMTS Coordinating Board in 2012, and the SCWG was formed in 2020 in response to the COVID-19 public health emergency.
Value: To improve the coordination of the various federal agency responses to challenges posed to the operation of the supply chain by external and internal forces including, but not limited to economics, capacity, marketplace drivers, workforce, pandemic, etc. To communicate actions to support the business needs of the supply chain and the infrastructure needs of the MTS, as appropriate.
Key Documents/Links: https://rosap.ntl.bts.gov/view/dot/61471 https://www.cmts.gov/assets/uploads/documents/InfrastructureInvestmentToolkit.pdf https://www.cmts.gov/assets/uploads/documents/CMTS_Economic_Analysis_of_Spending_on_MTS_Infrastructure_Executive_Summary.pdf https://www.cmts.gov/assets/uploads/documents/Compendium_of_Public-Private-Partnership(P3)_Authorities_for_Infrastructure_Investment.pdf https://www.cmts.gov/assets/uploads/documents/Expanding_the_Market_for_Infrastructure_Public_Private_Partnerships_Alternative_Risk_and_Profit_Sharing_Approaches_to_Align_Sponsor_and_Investor_Interests_APR2015.pdf https://www.cmts.gov/assets/uploads/documents/CMTS_Economic_Analysis_of_Spending_on_MTS_Infrastructure.pdf https://youtu.be/LzgFJpwWn3k

Appendix D
Workforce Development Briefing

Mariner Workforce Development

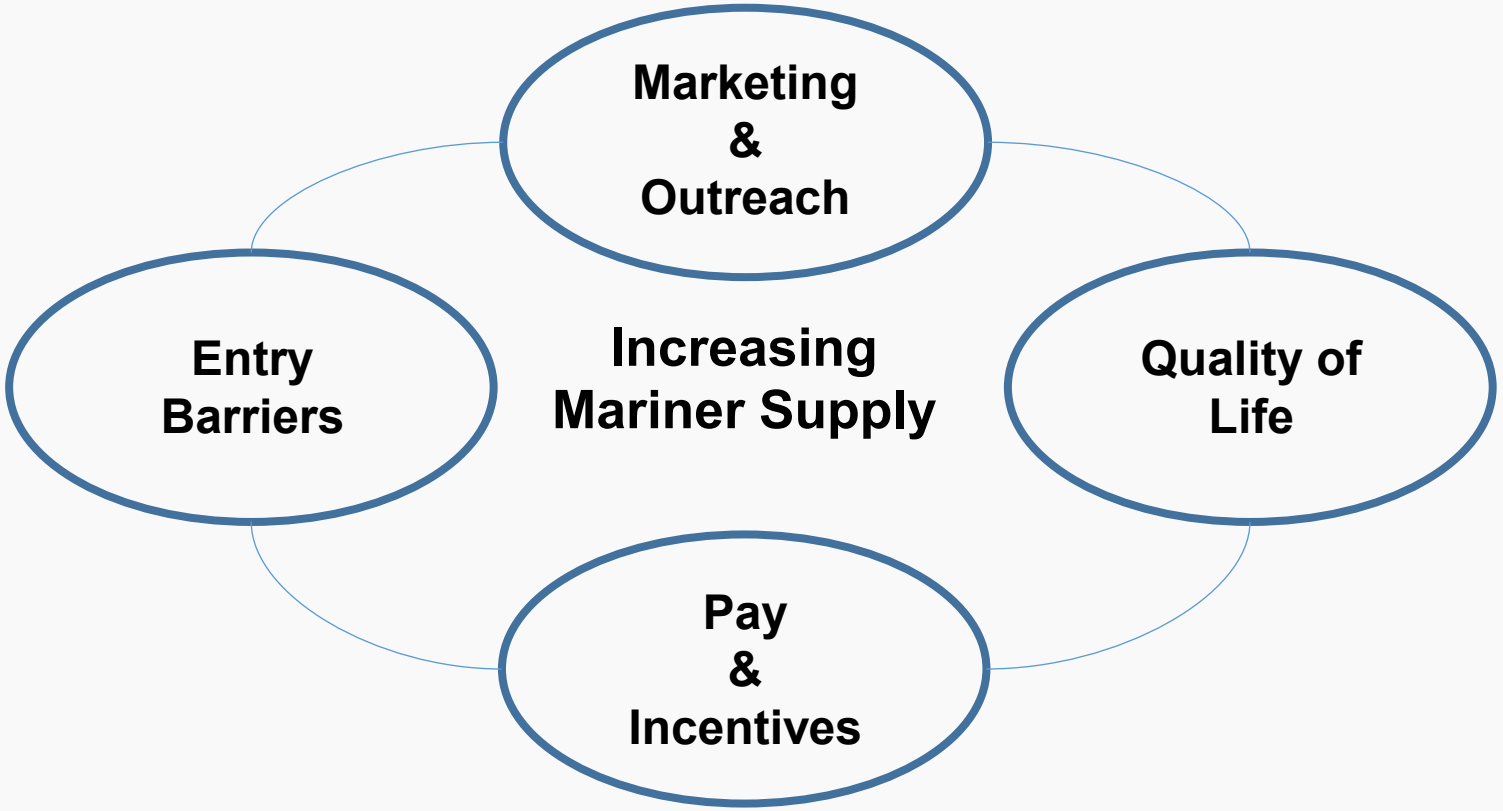
November 29, 2022

Mariner Workforce: Future Course

- Mariner Summit Takeaways
  - Outreach/Marketing
  - Barriers to Entry
  - Pay & Benefits/Incentives
  - Quality of Life
- Mariner Workforce Strategic Plan (MWSP)
- Efforts currently underway, or being planned
- Action Items—Short, Medium and Long Term

Mariner Summit - Takeaways

MARITIME ADMINISTRATION
NAVIGATING A STRONGER FUTURE



Recruit! ***Train!*** ***Retain!***

Future Course: Mariner Workforce Strategic Plan

Mariner Workforce Strategic Plan (MWSP)

Analysis of Mariner Summit takeaways compared to MWSP

- Industry was engaged in development/research
- Many issues addressed in the strategic plan

Align MWSP strategies as necessary

Develop Resource Requirements Review for MWSP

Release MWSP to Congress and Public

MWSP Stakeholder Engagement

Industry Stakeholders

- American Maritime Partnership
- American Waterway Operators
- Chamber of Shipping of America
- Lake Carriers Association
- Offshore Marine Service Association

Maritime Labor

- American Maritime Officers
- International Longshore and Warehouse Union
- International Organization of Masters, Mates, and Pilots
- Marine Engineers' Beneficial Association
- Marine Firemen's Union
- Sailors' Union of the Pacific
- Seafarers International Union

Maritime Education and Training

- Community and Technical College Maritime Workforce Alliance
- Consortium of State Maritime Academies
- U.S. Merchant Marine Academy

Federal Agencies

- Military Sealift Command
- National Oceanic and Atmospheric Association
- U.S. Transportation Command

MARAD Organization

- Associate Administrator for Strategic Sealift
- Associate Administrator for Ports and Waterways
- Deputy Associate Administrator for Maritime Education, Labor, and Training
- Director, Office of Maritime Education, Labor, and Training
- Director, Office of Policy and Plans

Mariner Shortage: Agency Actions

MARAD initiatives that have a bearing on Mariner Recruitment and Retention:

- Tanker Security Program
- Cable Security Fleet Program
- NSMV
- USMMA improvements (CIP)
- Better Understanding of the Problem
  - Information and data – Mariner Survey
  - Exercise Breakout
  - Mission/Turbo Activations
- Mariner Workforce Strategic Plan (MWSP)

What is the Program Office Doing?

MARITIME ADMINISTRATION
NAVIGATING A STRONGER FUTURE

Marketing/Outreach:

- Holistic approach to mariner lifecycle
  - USMMA and State Maritime Academies
  - Centers of Excellence
  - K-12
- Modest Public-Private engagement
- Mariners with Service Obligation
  - Career Services Support
- Promote M2M

Regulatory Barriers:

- Engagement with USCG and Industry
  - STCW and Sea Service Requirements
    - N-MERPAC, IMO HTW, Maritime Standards
    - Credentialing process update
    - MOA w/ USCG

Pay & Benefits/Incentives:

Mariner Compensation

- SIP enhancements
- Awareness of federal financial assistance

Expanded internet access/connectivity

- Cost Vs. Investment?

Encourage favorable rotation for RRF

Quality of Life:

- Shipboard Culture – EMBARC, DEI
- Better connectivity

Future Course – Short Term Targeted Actions

Get Credentialed Mariners to Sea

- Compliance – continued aggressive service obligation enforcement
- Coordinate with MSC, maritime labor, and operators to maximize employment opportunities
  - Consider additional entry level positions
- Coordinated campaign to encourage mariners to "**return to sea**"
- Marketing awareness campaign
  - Coordinated nationally
  - Public-Private Partnership
- Explore mariner federal tax incentives
- Highlight best practices for improved quality of worklife

Future Course – Mid, and Long-Term Action Items

Develop and Maintain	Develop and Maintain Mariner Workforce
Eliminate Barriers	Address barriers to entry through advocacy and participation in various committees
Incentivize	Continue to explore ways to incentivize mariners (federal financial assistance, SIP, etc.)
QWL	Encourage operators to improve work-life balance
Career Planning	Promote pathways and advancement

Pioneer COEs Domestic Maritime Workforce Training and Education

Primary	Catalog listing of full academic programs related to Port and Intermodal Operations
Community Colleges	Maryland—Anne Arundel; Baltimore County Delaware—Delaware County California—Long Beach Texas—San Jacinto
Secondary	Programs (including Certificate offerings) tangentially related to the Port sector, including Ship Repairs and Supply Chain Management
Community Colleges	Alaska, North Carolina (2), Louisiana, Washington, Mississippi, Wisconsin, Bi-State Consortium based in Washington & Oregon)
2022 COEs	Review in progress

Mariner Availability Mantra

MARITIME ADMINISTRATION
NAVIGATING A STRONGER FUTURE

Incentivize	***Invest***	***Include***
Recruit!	***Train!***	***Retain!***

Appendix E
Decarbonization/IMO Briefing

U.S. DOT Maritime Administration

MTSNAC - Maritime Decarbonization

Daniel Yuska – Director, Office of
Environment and Innovation

MARAD
MARITIME ADMINISTRATION

Maritime Decarbonization Challenges

MARAD

What is maritime decarbonization?

- Vessels/ports/supply chain?
- There are many domestic and international efforts but how do they align?

Challenges

Vessels

- What fuel or technology?
- Supply side logistics
- Crew training

Ports

- Supply
- Electrification/grid challenges/demand

Incentives

- BIL and IRA added significant funding for ports/landside infrastructure
- No specific vessel emission reduction grant program

Bottom Line - need for public private partnerships/are existing programs effective?

The Majority of Decarbonization Efforts w/in MARAD Fall Under the Office of Environment and Innovation

Two Primary Functions

- **Manage the Maritime Environmental and Technical Assistance (META) Program**
  - Technical Assistance is broadly interpreted to include needed RD&T (research, technology demonstration, and verification)
  - Main topic areas of focus since inception
    - Port/vessel emissions/multimodal modeling/decarbonization
    - Aquatic nuisance species (ballast water/hull fouling)
    - Vessel-generated underwater noise
    - Safety
- **Support Domestic and International Maritime Environmental Policy**
  - Partnerships with US agencies
  - International engagements (IMO/ISO)

MARAD

More on META…

- Technology and innovation program that performs research, demonstration, and data gathering
- Collaboration w/other government agencies, industry stakeholders, NGOs, academia
  - U.S. Federal partners include: DOE, USCG, EPA, Navy, NOAA, National Labs, DOT Modes
- Focus areas: criteria pollutant and GHG emissions reductions, alternative and renewable fuels, energy efficiency applications, green technologies (fuel cells, batteries), multimodal modeling, control of aquatic nuisance species, vessel-generated underwater noise
- Results: peer-reviewed articles, white papers, industry guidance
  - Informs regulatory/policy actions
  - Informs industry on “what works”
- https://www.maritime.dot.gov/innovation/meta/maritime-environmental-and-technical-assistance-meta-program

META Primary Goals/Outcomes

MARAD

- Validation and verification of technologies/processes
- Provide information to stakeholders to make investment decisions, reduce costs, etc.
- Data collection and dissemination (cost-benefit, operational/functional, and comparative)
- Provide platforms & opportunities for demonstration, validation, data generation and collection
- Identify and assess technology transfer and dual military/commercial use opportunities
- Identify knowledge and standards gaps
- Provide technical assistance to industry in working with regulatory agencies
- Stimulate innovation and technology advances for improved sustainability and competitiveness

Current GHG-focused META Projects

MARAD

- **Vessel Energy Efficiency and Decarbonization Guide**
  - Update of 2016 effort
- **Microgrid Demonstration**
  - Pasha Operations at POLA
- **Smartships GHG Emissions Calculator**
- **Battery Electric Workboat Techno-economic Analysis**
  - LBNL
- **Vessel Carbon Capture and Storage Study**
- **Future Energy Options Studies**
  - Great Lakes
  - California
- **Lifecycle Emissions Analysis**
  - ICE vs Battery Electric
- **Blue Carbon Study**
  - Port of San Diego
- **Low Carbon Fuel Engine Testing**
  - DOE/Oak Ridge National Labs

Maritime Environmental Policy

MARAD

How MARAD Fits - MARAD knows the maritime sector/stands up multiple stakeholder programs/collects and analyzes maritime data/benefit cost analyses

Office of Environment and Innovation Environmental Policy Focus -

Domestic

- Work with regulatory agencies on policy development and guidance that affect the US maritime transportation sector (DOE, EPA, DOS, USCG, etc…)

    - DOE/MARAD-led, Federal interagency maritime energy and decarbonization working group

    - SES-level maritime decarbonization strategy group

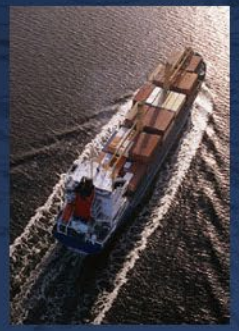
        MARAD/DOE/EPA

International

- Support/advise the US Delegation on several international efforts:
    - International Maritime Organization (IMO)
    - International Organization for Standardization (ISO)
    - Mission Innovation - Zero Emission Shipping Mission
    - Clydebank/Quad
    - COP
    - Arctic (IARPC and PAME)

Appendix F
NSMV Briefing






National Security Multi-Mission (NSMV) Program

U.S. Maritime Transportation System National Advisory Committee Meeting
November 30, 2022

Laila Linares
NSMV Sr. Program Manager

1200 New Jersey Ave., SE | Washington | DC 20590
www.dot.gov

MARAD
U.S. MARITIME ADMINISTRATION

Outline

1. General Overview
2. State Maritime Academies (SMAs)
3. Innovation and Economic Impact
4. Evolution of Design
5. Vessel's Special Capabilities
6. Significant Recent Construction Achievements

Overview of NSMV Program

- **Recapitalize the Maritime Administration's school ship training fleet, using an innovative design that enables enhanced capabilities to support USDOT Emergency Support Function (ESF 1) requirements during National response to humanitarian and natural disasters** (as many of the school ships have been used in this role over the years, hence the name “National Security Multi-Mission Vessel”)
  - Congress has funded all five ships of the State-Class.
  - The ships will be assigned to the following State Maritime Academies:
    - NSMV I *EMPIRE STATE* (State University of New York Maritime College)
    - NSMV II *PATRIOT STATE* (Massachusetts Maritime Academy)
    - NSMV III *STATE OF MAINE* (Maine Maritime Academy)
    - NSMV IV *LONE STAR STATE* (Texas A&M Maritime Academy)
    - NSMV V *GOLDEN STATE* (California Maritime Academy)

- **Congress mandated a commercial shipbuilding contracting model be used**
  - MARAD used an innovative approach with a commercial model and a Vessel Construction Manager (VCM)
    - Tote Services, LLC (“TOTE”) is headquartered in Jacksonville, FL.
  - The VCM held a commercial ship construction contract competition and Philly Shipyard Inc. (PSI) was selected for the contract.
    - Requires maximum possible U.S. components to be used in construction to meet coastwise-eligible (Jones Act) endorsement, as well as use of U.S.-flag commercial shipping for those overseas components.

State Maritime Academies (SMAs)

MARAD

- The NSMV Program supports *Goals and Objectives for a Stronger Maritime Nation: A Report to Congress (#1 & 2).*
- MARAD provides training vessels and limited funding to SMAs in California, Maine, Massachusetts, Michigan, New York and Texas.
- The SMAs provide education for men and women who wish to serve in the American merchant marine.
- The SMAs collectively provide 70% of licensed officers in the U.S. merchant marine.

Vessel	Contract Delivery Date
NSMV I	4/8/2023
NSMV II	1/8/2024
NSMV III	10/8/2024
NSMV IV	7/8/2025
NSMV V	4/8/2026

Innovation and Impact of NSMV Program

MARAD

- **For the first impactful time, the U.S. Government used a commercial shipbuilding business model to contract for the construction of the NSMV's.**
  - This process saved the US Government/taxpayer estimated hundreds of millions of dollars and several years in time.
  - The traditional US Government procurement process normally used to procure ships provided estimates of $750M+ average cost per ships for the NSMV program.
  - This new innovative approach taken by MARAD, using the best commercial ship procurement process has delivered a firm fixed price contract and firm fixed delivery schedule for nearly 1/3 the cost of the normal U.S. Government process.
- **This approach created a highly competitive and streamlined process that can be used in the future by other government entities to procure ships.**
- **This approach reduces risk to the U.S. Government and mitigates the potential for cost overruns and unnecessary delays.**
  - **Cost control is a significant benefit of the fixed-price VCM model over traditional cost-plus Government shipbuilding programs.**
- **This approach has been championed by industry as the best model and collectively improves the U.S. Maritime industrial base, from steel to suppliers, ship managers to ship builders and creates new careers for the American workforce.**

Economic Impacts of NSMV Program

MARAD

- Creates and sustains approximately 1,200 high paying, high skilled manufacturing jobs at PSI in Philadelphia, PA.

- The construction project maximizes the use of US made components to include innovative green GE Transportation main engines manufactured in Grove City, PA.

- **By using GE Transportation main engines:**
  - Total estimated economic impact to the Western Pennsylvania region is anticipated at $160M or more.

  - Total estimated economic job impact for the Western Pennsylvania region, including supplier participation and regional economic benefits, is in the range of 250-300 jobs.

Examples of U.S. Equipment

Top Left: Mooring Winches - Appleton Machinery
Appleton, WI

Bottom Left: Emergency Diesel Generator – Cummins Inc.
Jefferson, LA

Top Right: Main Diesel Engines – Wabtec Corp.
Grove City, PA

Evolution of Design

MARAD

- **Designed to meet Safety of Life at Sea (SOLAS) & Public Nautical School Ship (Subchapter R) requirements, classed as a Special Purpose Ship.**
  - Collaboration with ABS and USCG via the utilization of Design Basis Agreement.
- **NSMV was designed based on requirements that were developed in coordination with the SMAs, other Federal partners, and the regulatory agencies.**
- **In developing the requirements, MARAD also drew from lessons learned during previous missions that used training ships for national response.**
- **This design incorporates core capabilities that are scalable, flexible, and adaptable, through the use of modular design and multi-purpose spaces. This approach also helped to reduce the cost of construction and increase the utility of the ship.**
- **Meets or exceeds latest and future environmental standards (air emissions, ballast water, treated wastewater).**

NSMV Characteristics

- **Principle Dimensions**
  - Length 160.05 m (525’-1”)
  - Beam 27.0 m (88’-7”)
  - Depth 16.8 m (55’-1.5”)
  - Design Draft 6.5 m (21’-4”)

- **Propulsion, Speed & Consumption**
  - Diesel electric
  - Four Engines
  - Total Installed power – 16,800 kW plus 900 kW Emergency Generator
  - Two Sets of electric propulsion motors with an output of 9,000 kW
  - Cruising speed – 12 knots with 15% sea margin

- **Range**
  - 10,000+ miles at 18 knots

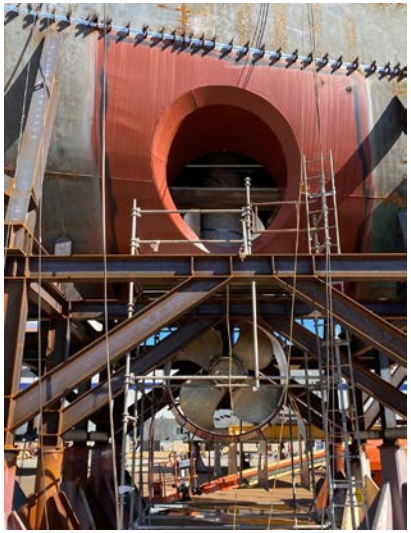
- **Accommodation**
  - Training Ship Mode –600 cadets, 100 officer, faculty, staff & crew
  - 60-person surge capacity for Humanitarian Assistance/Disaster Relief missions
    - Food Storage for 60 days
    - Fresh Water Storage for 14 days

NSMV Special Capabilities

- **Cargo Crane -** Self loading & unloading of containers.
- **Roll-on/Roll-off Space -** storage of wheeled emergency equipment and containerized mission sets (eg: surgical suites).
- **Roll-on/Roll-off ramp -** for self loading and unloading of wheeled emergency equipment.
- **Helo deck -** SOLAS and USCG CFR Compliant landing area that is suitable for specified helicopter size and weight.
- **Robust shipboard medical treatment spaces**
- **Two bridges –** one for training and one for actual navigation.
- **Maneuvering –** Capability to dock/undock without tugs in primitive or damaged port facilities.
- **The most modern environmentally compliant engines**
- **Advanced modern systems for the most up-to-date training**

Significant Recent Construction Achievements

- ✓ **NSMV I Launch - 24 Sept 2022**
- ✓ **NSMV II Keel Laying – 29 Sept 2022**
- ✓ **NSMV III Start of Fabrication – 11 July 2022**



Appendix G
Report out for Starboard Sub-Committee

Maritime Administration

Maritime Transportation System National Advisory Committee

Starboard Subcommittee Work

29-30 Nov 2022

Subcommittee Membership

Maritime Administration

Tom Wetherald – Retired Shipbuilder – Co-chair
Lauren Beagan – Squall Strategies – Co-chair
Berit Erickson – Sailor's Union Pacific
Jack Sullivan – Matson Navigation
Jim Dillman - President, Gateway Terminals
Russell Adise - Intl Trade Admin, U.S. Dept of Commerce
Shelly Sugarman – U.S. Coast Guard
Steve Spoljaric – Bechtel
Craig Johnson – Maine Maritime Academy

Brian Hill - MARAD

MARAD Administrator Priorities

Maritime Administration

- Supply chain issues
- Grow US Flag Fleet
- Work Force Challenges
- Port capabilities
- Offshore Wind
- Decarbonization

(in no particular order)

Tasking 1
Recapitalization of the Ready Reserve Fleet

Maritime Administration

Make recommendations to the Secretary of Transportation on:

- The use of the VCM concept to build auxiliary and sealift ships.
- How MARAD might execute the design and construction program that may be required by the 2023 NDAA.
- How the maritime industry could be incentivized to better support military utility in commercial design to support non-combatant military requirements.
- How existing or new commercially viable production lines could be leveraged to recapitalize to build required sealift vessels.
- Ways to enable maritime industry innovation in information, automation, safety, environmental impact, and other areas.

Tasking 2
Growing the U.S. Flag Fleet

Maritime Administration

Make recommendations to the Secretary of Transportation on actions that can increase the number of U.S. flagged vessels specifically large ocean-going vessels. Topics may include issues, such as:

- Current versus optimum fleet subsidization and taxation
- Consideration of barriers to entry for U.S. flag fleet for growth
- Potential enhancements to marine insurance and liability structures
- Removing barriers to America's Marine Highways

Recognizing the significance that offshore wind has on the development of ports and the domestic fleet, make recommendations to the Secretary of Transportation on actions to:

- Promote the use of the domestic US flag fleet
- Promotion of the associated industrial base
- Promote the development of the associated specialized workforce for offshore wind development.
- Research ways that the Maritime Administration can better support the development of offshore wind.

Tasking 3
Decarbonization and the US Fleet

Maritime Administration

Make recommendations to the Secretary of Transportation on:

- Decisions regarding the impact of future IMO regulations on the US flag fleet in:
  - Contiguous services
  - Non-contiguous services
  - International Trade
- Mitigating technologies for IMO compliance and timelines available
- Development of shore-power capabilities needed in the United States.
- The decisions regarding the impact of Energy Efficiency Existing Ship Index and the Carbon Intensity Indicator regulations

Tasking 4

Retaining and Attracting Talent
Selective Service and Mariners

Maritime Administration

- **Make recommendations to the Secretary of Transportation on actions that will support efforts to retain and attract talent in the maritime sector, including recruitment of women, mariners and maritime labor from communities of color, lower-income and underserved communities, and communities that neighbor ports. In addition, recommendations may include increased engagement actions and outreach to enhance racial, gender, and economic diversity within the maritime sector, along with increased opportunities for underrepresented groups. Areas of interest for consideration should include:**
  - Current programming and funding to enhance future mariner availability
  - Strategic solutions to ensure sustained wartime mariner availability
  - Increasing the availability of training billets to meet STCW requirements
- **Make recommendations to the Secretary of Transportation on actions that protect U.S. merchant mariners from military drafts through the Selective Service System. Recommendations could include supporting legislation and other exemption options for merchant mariners holding active mariner credentials.**

Meeting Agenda

Maritime Administration

- **29-30 Nov 2022 Meeting Agenda**
  - Review Strategic Sealift Background information
  - Discuss order of work items
  - Discuss approach to work items
    - Sealift Recap
    - Offshore Wind
    - Decarbonization
    - Maritime Labor
  - Outline of report and recommendations for sealift recap from work to date
  - Timelines of meetings

Summarize First Two Meetings

Review Strategic Sealift and NSMV Program

Maritime Administration

- **Strategic Sealift Fleet Mission and Structure**
  - MSC Surge, RRF, MPF, MSP
- **Coming changes**
- **Deficits**
- **Navy plans to correct shortfall**
- **Congressional Action**
- **NSMV program**
  - VCM contracting methodology
- **Congressional action on VCM**

Summarize First Two Subcommittee Meetings

- **25 October meeting**
  - SMEs – Hershman (NASSCO/former MSC), Graykowski (Philly Shipyard/former MARAD), Divens (former Navy PEO Ships SES/former sealift PM), Strock (former Marine Corps SES)
  - Reviewed:
    - Status of strategic sealift fleets
    - Growing deficit in lift capacity – particularly RO/RO
    - Govt plan for recapitalization including used ships
    - Failure of Navy CHAMP newbuilt program
      - Unconstrained requirements, $1B ships
    - Congressional concern about govt plan
    - Vessel Construction Manager (VCM) program for NSMV
      - MARAD design, TOTE contract, Philly construction
      - Relationship to Buy America provisions – use of Korean supply chain
    - Potential use of VCM for sealift recap
      - MARAD requirements, Continuous build program (1-2 ships per year)
      - Commercial standards, commercial equipment, reduced cost

Summarize First Two Subcommittee Meetings

- **16 November meeting**
  - SMEs – Bond (Philly NSMV PM), Clark (TOTE NSMV PM)
  - Discussed
    - Difference between govt and commercial shipbuilding project
    - How VCM was applied to NSMV project – Congressional mandate
      - Herbert design
      - TOTE manages project ($1.5B contract), interface with MARAD
        - » Firewall btwn Philly and MARAD, Presence in the yard
        - » VCM does tasks that many shipyards are not equipped to do
      - Role of ABS and USCG
      - Minimal change (.3%)
      - $315M per ship, NAVSEA estimated it at $700-$750M per ship)
      - Many fewer meetings/status reports compared to NAVSEA contract
      - Buy American requirements and Cargo Preference
      - Difference between govt specified equipment and commercial OTS equipment
        - » US Commercial ships are high quality
      - Need to change hearts and minds about VCM – particularly in Congress
        - » Develop elevator speech
      - Vulnerabilities of VCM

Sealift Task Background

Maritime Administration

- Need for recapitalization of sealift
- The VCM process
- Ongoing Congressional Action
- Pros and Cons of using the VCM process for acquisition of new ships

Need for Recapitalization

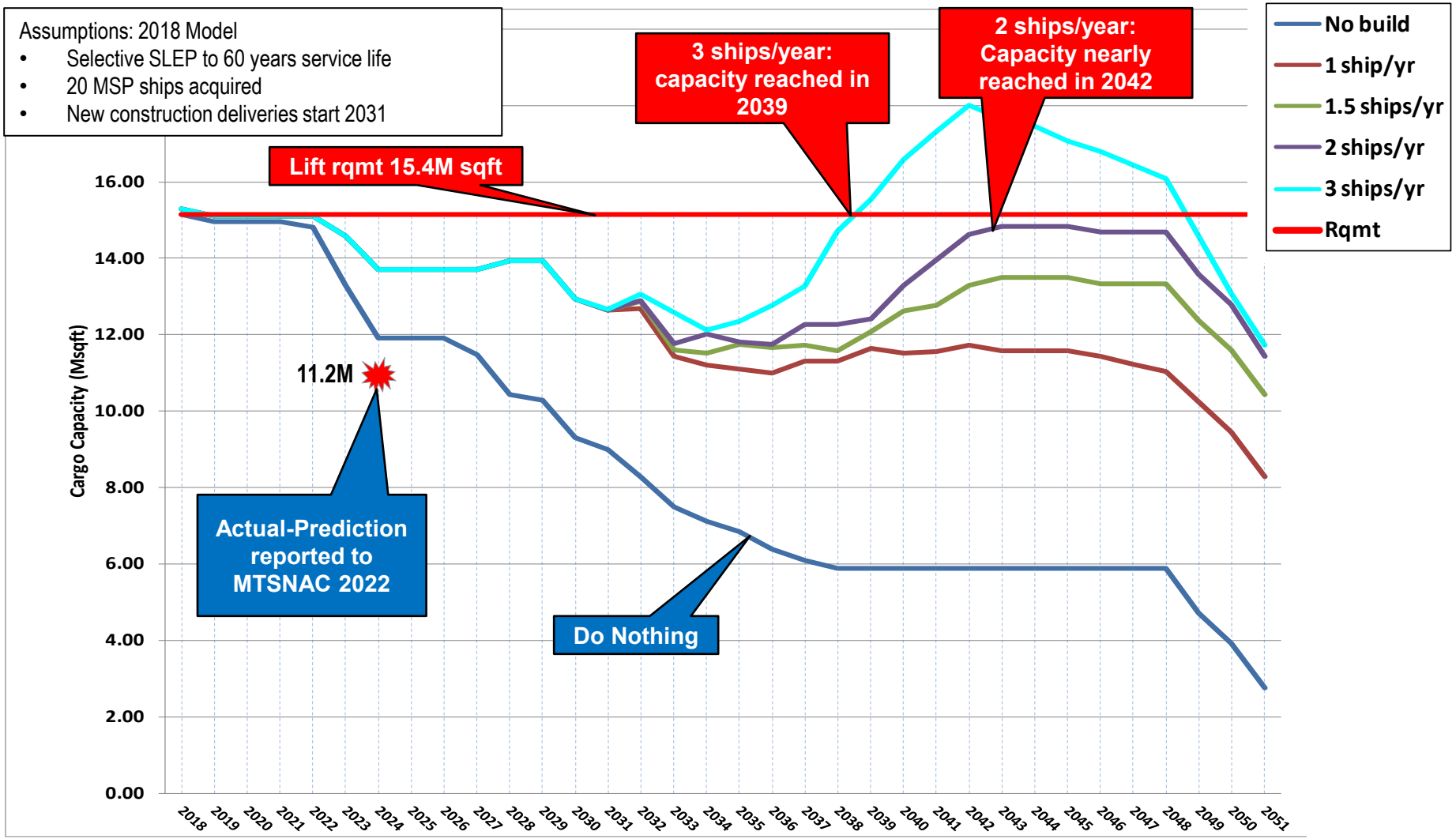
Maritime Administration

- **By end 2023, MSC will transfer all Surge Fleet assets to MARAD/RRF**
- **Sealift deficit by end of 2023**
  - All 90's sealift conversions and former MPF ships will be retired (8 ships – 2.2M sqft)
  - If all ships >50 years old retired (13 ships – 2.0M sqft)
  - Total 4.2M sqft
- **Buying used ships**
  - 2022 bought 2 30-year old used ships (~300k sqft)
  - Used ships provide between 130k and 170k militarily useful UCSA
  - Would required between 25 and 31 more used ships to make up losses

Strategic Sealift Fleet Capacity Study

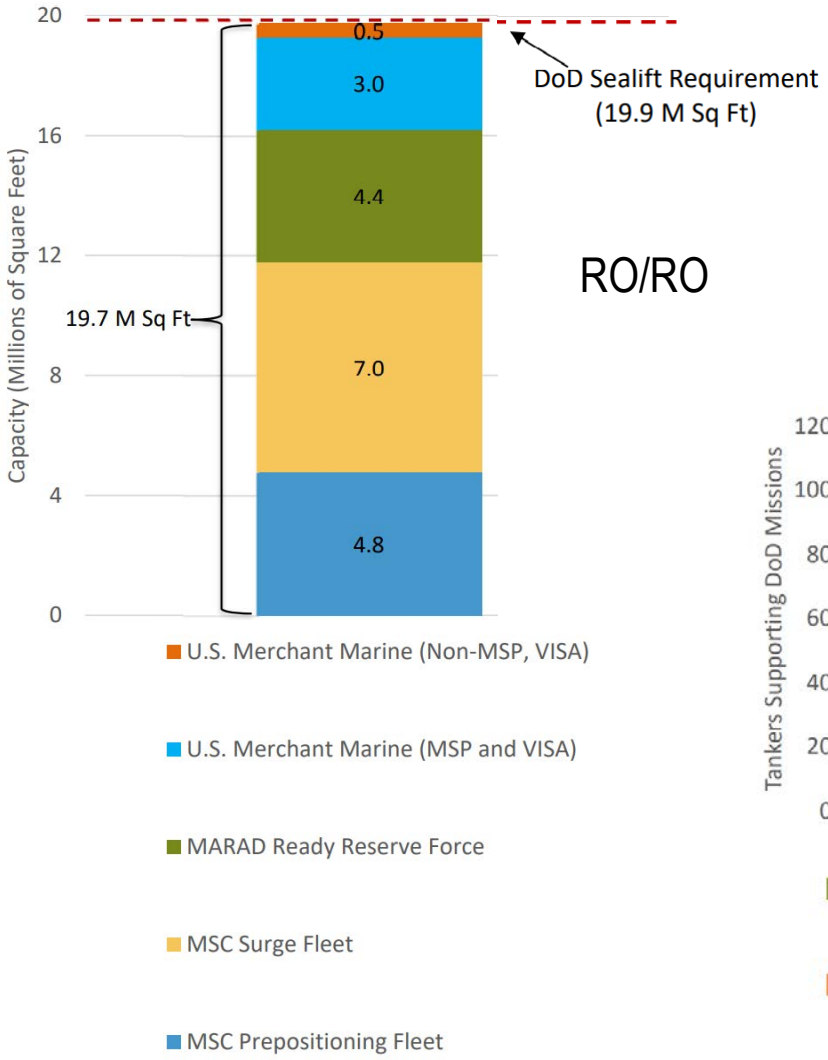
MPF, Surge Force, and RRF New Construction Profiles

Maritime Administration



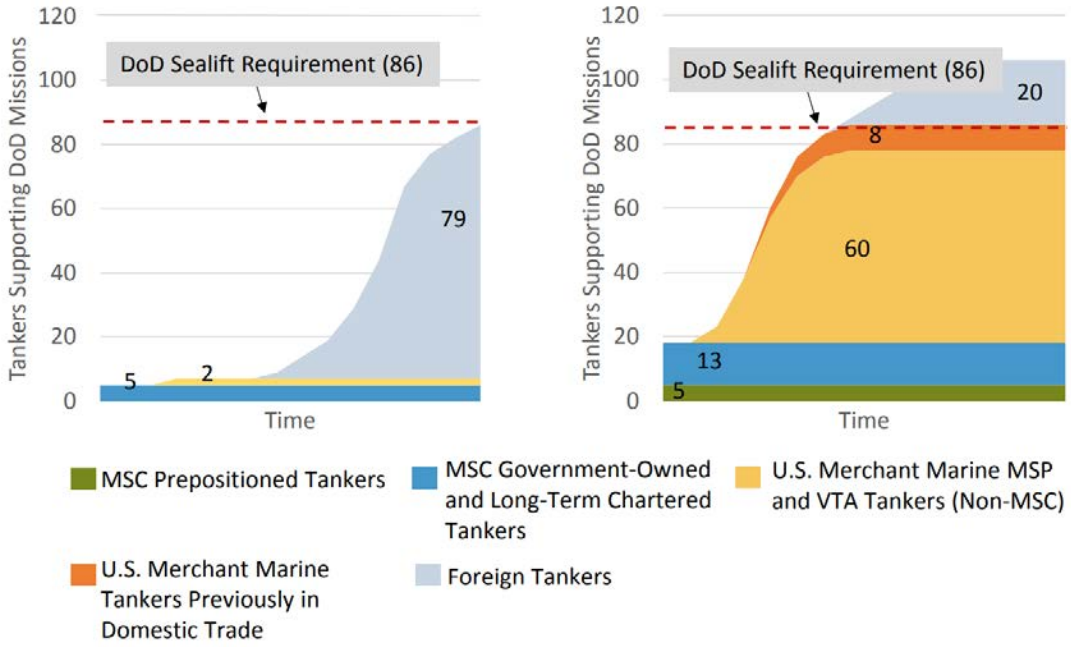
Sealift Requirements

Maritime Administration



RO/RO

Tankers



Vessel Construction Manager (VCM) Process

Maritime Administration

- **Government hires US commercial owner/operator to acquire new build ships**
- **MARAD used to acquire training ships (NSMV)**
- **MARAD (Herbert Engineering) completed indicative design**
- **TOTE Maritime hired**
  - Contracted with Philly Shipyard to build 5 ships
  - Commercial style, fixed price contract
  - Commercial specifications
  - Commercial standard equipment (mixed foreign (45%) and domestic (55%)

National Security Multi-Mission Vessel (NSMV)

Maritime Administration

Training Ship
Length - 524.5 ft
Beam - 88.7 ft
Speed – 18 knots
Accom - 600 cadets, 100 officers, staff, crew (training); 1000 (disaster relief)

Single shaft
All electric drive
Small RO/RO deck
Helo deck

Ongoing Congressional Action

House Passed FY2023 NDAA Language

Maritime Administration

- **SEC. 3523. RECAPITALIZATION OF NATIONAL DEFENSE RESERVE FLEET.**
  - (a) IN GENERAL.—The Secretary of Transportation, in consultation with the Chief of Naval Operations and the Commandant of the Coast Guard, shall direct the **Maritime Administrator** to carry out a program under which the Administrator— (1) shall **complete the design of a roll-on, roll-off cargo vessel** for the National Defense Reserve Fleet to allow for the construction of such vessel to begin in fiscal year 2024; and (2) subject to the availability of appropriations, **shall have an entity enter into a contract for the construction of not more than ten such vessels in accordance with this section.**
  - STANDARDS AND CONSTRUCTION PRACTICES.— …vessel constructed … shall be constructed using **commercial design standards and commercial construction practices** ….
  - (e) CONTRACTING. The Maritime Administrator shall provide for **an entity other than the Maritime Administration** to contract for the construction of the vessel described in subsection (a).

Future Study Plans

Maritime Administration

- **RRF Recapitalization**
  - Initial Recommendations: Mar 2023
  - Final Recommendation: June 2023
- **US Flag/Offshore Wind**
  - Initial Recommendations: Mar 2023
  - Final Recommendation: June 2023
- **Decarbonization**
  - Initial Recommendations: July 2023
  - Final Recommendation: Oct 2023
- **Maritime Labor**
  - Initial Recommendations: Jan 2024
  - Final Recommendation: Apr 2024

Approach
Sealift Recapitalization Task

Maritime Administration

- **Discuss VAM process and acquisition of used ships with MARAD VAM Program Manager**
- **Discuss with SMEs**
  - How MARAD might execute the design and construction program that may be required by the 2023 NDAA.
  - How the maritime industry could be incentivized to better support military utility in commercial design to support non-combatant military requirements.
  - How existing or new commercially viable production lines to recapitalize to build required sealift vessels.

Draft Recommendations
RRF/Sealift Recapitalization

Maritime Administration

- **MARAD Continue used ship buying program to the extent allowed by Congress**
  - Used ship market will provide only a limited number of hulls in the near to mid-term
- **DoT/MARAD Develop formal NSMV/VCM lessons learned process**
  - Provide to Congress
- **Significant efforts to extend the life of 50 year old RRF assets will not be cost effective – particularly the FSS/steam ships**
- **Develop sealift (RRF-RO/RO) recapitalization program based on NSMV/VCM program and lessons learned with the following essential elements**
  - MARAD as Program Manager
  - US Jones Act owner operator as VCM
  - Develop ship requirements with min necessary military features
    - MARAD has essentially done this already
  - Develop well vetted Sealift RO/RO design from 3rd party design group
    - ABS approval in concept/ ABS and USCG Design Basis Agreement
  - Ensure maximum use of commercial OTS equipment, commercial ship specifications and construction processes
  - Provide maximum supply chain flexibility within the law
  - Ensure 100% Cargo Preference
  - Ensure virtually complete firewall between MARAD and the shipyard
    - Communications charter between all parties
  - Pursue approach that could result in multiple shipyard participation
  - Enhanced MARAD program office
- **Support this approach within DoT, the Administration, and Congress**

Draft Recommendations
VCM Pros and Cons

Maritime Administration

- **Pros or positive attributes of VCM program**
  - Projects are delivered on time and on budget. This has been proved through the NSMV program
    - Program had flexibility to survive unprecedented economic situation caused by COVID-19
  - Effective Management of risk at contract award. Good foundational design and the companies know what they were selling
  - These are fairly simple ships to begin with. Not appropriate for combatant ships.
  - NSMVs are $315M, NAVSEA says it would have cost ~$750M
  - Builds and maintains shipyard industrial base and workforce
  - Will open up govt shipbuilding to yards that currently don't/can't do it
  - With common design ships could be built at multiple yards

Draft Recommendations
VCM Pros and Cons

Maritime Administration

- **Cons or Challenges**
  - Supply chain disruptions and inflation can disrupt a fixed price contract and should be anticipated in the contract.
  - The ship design needs to be well vetted and settled prior to contract so the shipyard can conduct a detailed design and get immediately into construction. Normal government contracts don't work this way
  - The firewall between the shipyard and government provided by the VCM contract holder must be sacrosanct.
  - Skilled labor at shipyards is an industry wide problem that can disrupt this style of contract.
  - Building new ships is more expensive than buying used – IF you can find the used ships.

Approach
US Flag/Offshore Wind

Maritime Administration

- **Discuss with MARAD lead (offshore wind)**
- **Discuss with USCG lead (offshore wind, security zones, credentialling)**
- **Orsted (Jim D knows), Crowley (Evan Mathews), Blue Water Offshore**
- **Offshore wind labor relations?**
- **K&L Gates Wind/Jones Act report**
- **Discuss with following SMEs**
  - Art Divens & Jim Strock (wind SMEs)
  - Discuss with shipyards
- **Recommendation ideas**
  - Commercially viable/operated RRF vessels
  - TSP/CSP/
  - Active RRF
  - Survey vessels, support vessels, crew vessels, etc.
  - MARAD defense of the Jones Act equities
  - Crosswalk with ports on port utilization
  - Grant availability of port grants

Approach
Decarbonization

Maritime Administration

- **Discuss with MARAD lead – Dan Yuska**
- **Discuss with following SMEs**
  - Jeff Lantz (USCG rep to IMO) - Engine Manufacturer reps
  - John Nadeau (RADM Ret (USCG)) - Matson
  - Scott Clapham (President APT) - Shipbuilders
  - EPA - Dan Yuska
  - Marine Energy and Decarbonization Working Group
  - Brian Jones - Chamber shipping (Kathy Metcalf)
  - World Shipping (John Butler/Bryan Wood-Thomas)
  - Joint Committee (SHC) Envir/Safety (Tom Keenan)
- **Recommendation subjects**
  - Focus on Jones Act impacts/DoT policy wrt decarb
  - Grant money for ship decarb – needs to be public private partnership
  - Government funding for RDT&E
  - Crosswalk with ports/cold ironing/carbon capture

Approach
Maritime Labor

Maritime Administration

- **We need draft of Work Force Strategic Plan**
- **Berrit has the lead**
  - NMERMAPC (Lantz)
  - NMC – Capt Kirt Martin
  - Matt Mueller K-12 outreach (MARAD)
  - Todd Mitchel – Metal trades PACNORWEST
- **Recommendation subjects**
  - Need to understand the available workforce – better data
  - Need more Maritime officer positions
  - Need more non-licensed
  - Enhance shipbuilding-ship repair industrial base work force

    - Linked to increases in US Flag
    - Complete Mariner Survey
    - Enforce obligation/campaign to “return to sea”
    - No grant program to support WF
    - RRF rotation/QOL issues at sea/tax incentives
    - Increase in entry positions on ships
    - Public/private maritime awareness campaign

Draft Recommendations
Sealift Recap Task

Maritime Administration

- **As sealift construction program should reach a steady state of 1 or more ships a year forever**
- **Industry recommendations**
  - Use of commercially viable production lines

Schedule

Maritime Administration

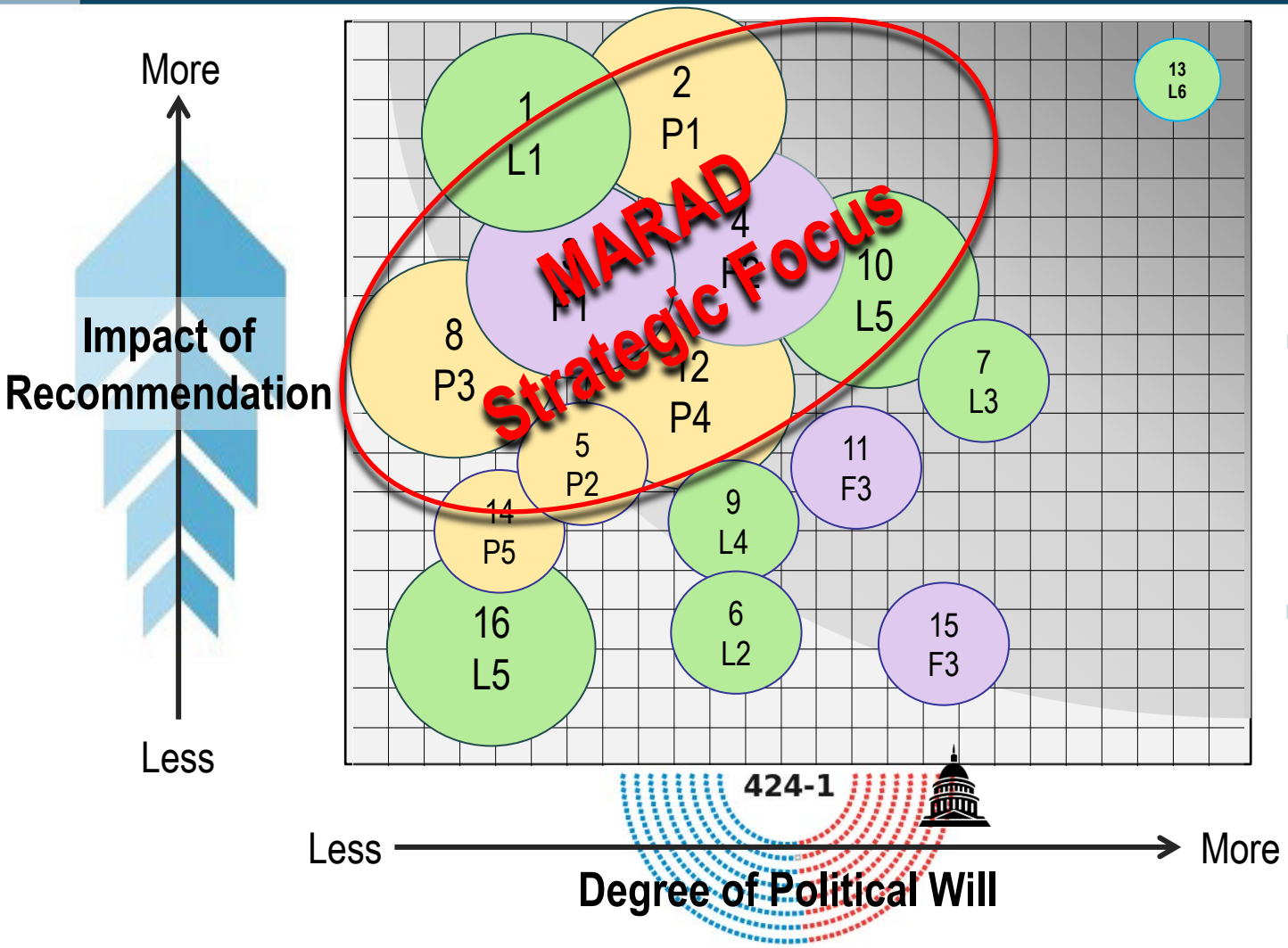
- 2nd Tuesday of the month, 1400 EST
- Jan 10, 14 Feb
- 14-15 March MTSNAC meeting

Backup

Maritime Administration

Subcommittee Recommendation Integrated Landscape

Maritime Administration

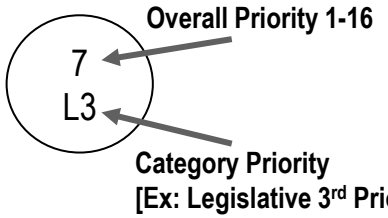


Circle Size = Time Required to Fully Implement

Small: Will take > 5yrs
Medium: Will take > 2 yrs
Large: Can be accomplished quickly

Color Code

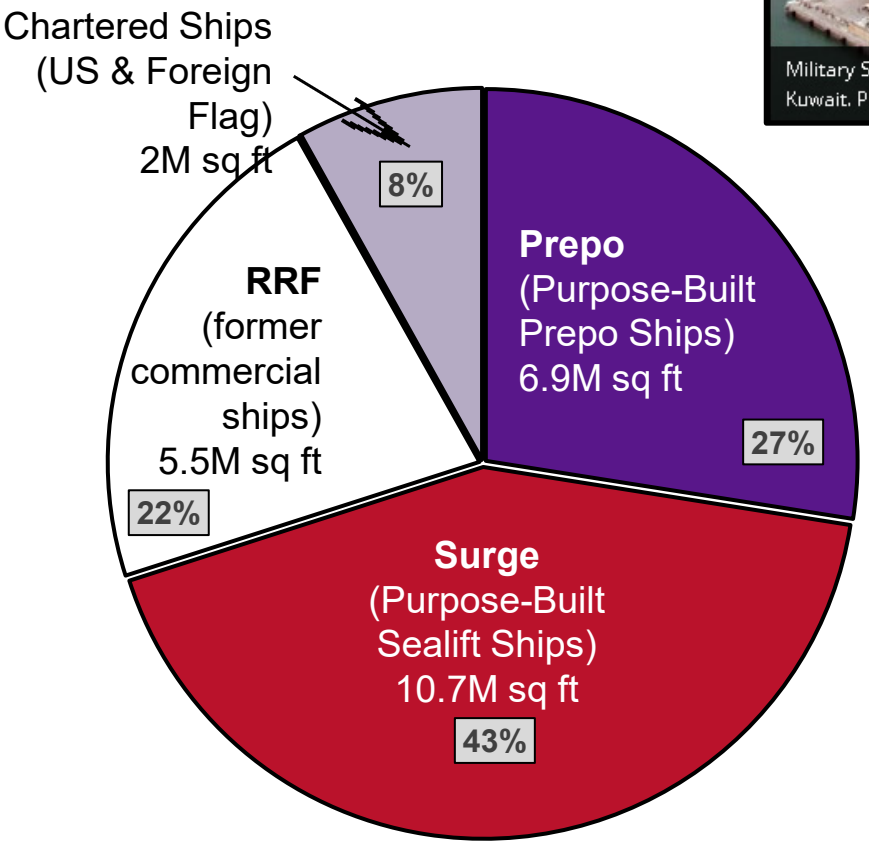
- Programmatic (P)
- Fiscal (F)
- Legislative (L)



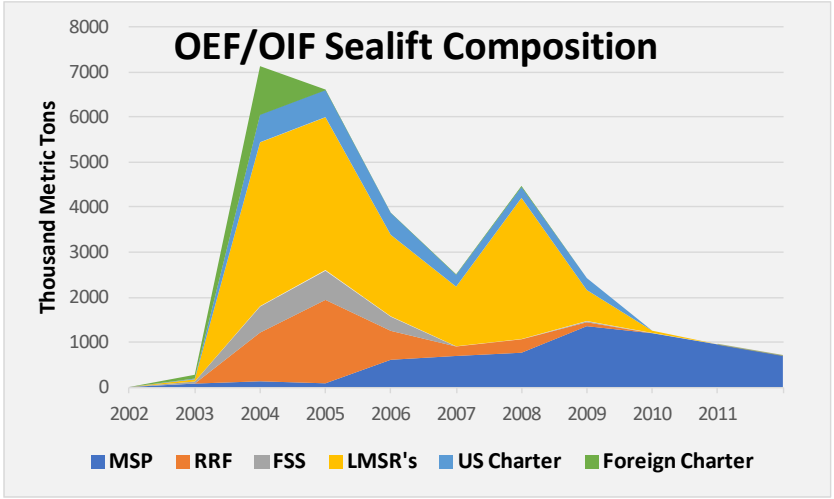
Operation Iraqi Freedom

2004 OIF Strategic Sealift Cargo

Over 25M sqft of cargo delivered in theatre, 70% with Purpose-Built Ships



Military Sealift Command ships unload cargo for Operation Iraqi Freedom in the port of Ash Shuaybah, Kuwait. Photo by JO3 Eric L. Beauregard, USN.



Both surges were larger than ODS

Source: MSC 2004 Year in Review: http://www.msc.navy.mil/annualreport/2004/pm5.htm

Appendix H
Final Report – Port Resilience

University Transportation Research Center - Region 2

Final Report

Port Resilience: Overcoming Threats to Maritime Infrastructure and Operations From Climate Change

Performing Organization: Stevens Institute of Technology

December 2015

Sponsor:
University Transportation Research Center - Region 2

University Transportation Research Center - Region 2

The Region 2 University Transportation Research Center (UTRC) is one of ten original University Transportation Centers established in 1987 by the U.S. Congress. These Centers were established with the recognition that transportation plays a key role in the nation's economy and the quality of life of its citizens. University faculty members provide a critical link in resolving our national and regional transportation problems while training the professionals who address our transportation systems and their customers on a daily basis.

The UTRC was established in order to support research, education and the transfer of technology in the field of transportation. The theme of the Center is "Planning and Managing Regional Transportation Systems in a Changing World." Presently, under the direction of Dr. Camille Kamga, the UTRC represents USDOT Region II, including New York, New Jersey, Puerto Rico and the U.S. Virgin Islands. Functioning as a consortium of twelve major Universities throughout the region, UTRC is located at the CUNY Institute for Transportation Systems at The City College of New York, the lead institution of the consortium. The Center, through its consortium, an Agency-Industry Council and its Director and Staff, supports research, education, and technology transfer under its theme. UTRC's three main goals are:

Research

The research program objectives are (1) to develop a theme based transportation research program that is responsive to the needs of regional transportation organizations and stakehold-ers, and (2) to conduct that program in cooperation with the partners. The program includes both studies that are identified with research partners of projects targeted to the theme, and targeted, short-term projects. The program develops competitive proposals, which are evaluated to insure the most responsive UTRC team conducts the work. The research program is responsive to the UTRC theme: "Planning and Managing Regional Transportation Systems in a Changing World." The complex transportation system of transit and infrastructure, and the rapidly changing environ-ment impacts the nation's largest city and metropolitan area. The New York/New Jersey Metropolitan has over 19 million people, 600,000 businesses and 9 million workers. The Region's intermodal and multimodal systems must serve all customers and stakeholders within the region and globally. Under the current grant, the new research projects and the ongoing research projects concentrate the program efforts on the categories of Transportation Systems Performance and Information Infrastructure to provide needed services to the New Jersey Department of Transpor-tation, New York City Department of Transportation, New York Metropolitan Transportation Council , New York State Department of Transportation, and the New York State Energy and Research Development Authority and others, all while enhancing the center's theme.

Education and Workforce Development

The modern professional must combine the technical skills of engineering and planning with knowledge of economics, environmental science, management, finance, and law as well as negotiation skills, psychology and sociology. And, she/he must be computer literate, wired to the web, and knowledgeable about advances in information technology. UTRC's education and training efforts provide a multidisciplinary program of course work and experiential learning to train students and provide advanced training or retraining of practitioners to plan and manage regional transportation systems. UTRC must meet the need to educate the undergraduate and graduate student with a foundation of transportation fundamentals that allows for solving complex problems in a world much more dynamic than even a decade ago. Simultaneously, the demand for continuing education is growing – either because of professional license requirements or because the workplace demands it – and provides the opportunity to combine State of Practice education with tailored ways of delivering content.

Technology Transfer

UTRC's Technology Transfer Program goes beyond what might be considered "traditional" technology transfer activities. Its main objectives are (1) to increase the awareness and level of information concerning transportation issues facing Region 2; (2) to improve the knowledge base and approach to problem solving of the region's transportation workforce, from those operating the systems to those at the most senior level of managing the system; and by doing so, to improve the overall professional capability of the transportation workforce; (3) to stimulate discussion and debate concerning the integration of new technologies into our culture, our work and our transportation systems; (4) to provide the more traditional but extremely important job of disseminating research and project reports, studies, analysis and use of tools to the education, research and practicing community both nationally and internationally; and (5) to provide unbiased information and testimony to decision-makers concerning regional transportation issues consistent with the UTRC theme.

Project No(s):
UTRC/RF Grant No: 49997-47-25

Project Date: December 2015

Project Title: Port Resilience: Overcoming Threats to Maritime Infrastructure and Operations From Climate Change

Project's Website:
http://www.utrc2.org/research/projects/port-resilience-overcoming-threats

Principal Investigator(s):
Dr. Thomas Wakeman III
Research Professor
Davidson Laboratory
Stevens Institute of Technology
Hoboken, NJ 07030
Tel: (201) 216-5669
Email: twakeman@stevens.edu

Co. Principal Investigator(s):
Dr. Jon Miller
Research Associate Professor
Davidson Laboratory
Stevens Institute of Technology
Hoboken, NJ 07030
Tel: (201) 216-8591
Email: Jon.Miller@stevens.edu

Grace Python
Research Assistant
Stevens Institute of Technology
Hoboken, NJ 07030

Performing Organization:
Stevens Institute of Technology

Sponsor(s):
University Transportation Research Center (UTRC)

To request a hard copy of our final reports, please send us an email at utrc@utrc2.org

Mailing Address:

University Transportation Reserch Center
The City College of New York
Marshak Hall, Suite 910
160 Convent Avenue
New York, NY 10031
Tel: 212-650-8051
Fax: 212-650-8374
Web: www.utrc2.org

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State University of New York (SUNY)
Stevens Institute of Technology (Stevens)
Syracuse University (SU)
The College of New Jersey (TCNJ)
University of Puerto Rico - Mayagüez (UPRM)

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Dr. Robert E. Paaswell: *Director Emeritus of UTRC and Distin*guished Professor of Civil Engineering, The City College of New York

Herbert Levinson: *UTRC Icon Mentor, Transportation Consultant and Professor Emeritus of Transportation*

Dr. Ellen Thorson: *Senior Research Fellow, University Transportation Research Center*

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Dr. Alison Conway: *Associate Director for Education*

Nadia Aslam: *Assistant Director for Technology Transfer*

Nathalie Martinez: *Research Associate/Budget Analyst*

Tierra Fisher*: Office Assistant*

Bahman Moghimi*: Research Assistant; Ph.D. Student, Transportation Program*

Wei Hao*: Research Fellow*

Andriy Blagay: *Graphic Intern*

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2.Government Accession No.	3. Recipient's Catalog No.
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16. Abstract

In the coastal zone, seaports and their intermodal connectors are key types of infrastructure that support the global supply chain, provide regional economic activity, local transportation system services, and community jobs. The protection of coastal communities and their ports has been taken for granted during a prolonged period of climate stability. Recently there are growing concerns that a new period of climate change and severe weather events is emerging. Communities and their waterfront facilities are vulnerable to disruptions. Enhancing coastal resilience has become an important response to these events.

The objective of this research is to move from the aspirational concept of resilience to a standardized framework for creation of resilience in ports and transportation systems by integrating physical infrastructure and social systems. It takes a fully functioning maritime and shore-side distribution system for successful supply chain operations. A combination of stakeholder interviews and workshops provided insights into the resilience processes. It was discovered that every coastal community is unique and typically has its own plans. The same can be said of their coastal ports as well as the individual supply chain service providers associated with those ports. On the physical infrastructure side, it was found that a more resilient coastline can be achieved through the adoption of consistent, coordinated, and forward thinking building codes. One of the challenges to adopting more stringent design standards was the uncertainty surrounding future conditions. Another recommendation of the study involves the suggestion for port regions to organize along the entire supply chain including transport and distribution activities beyond local marine terminals. A suggested organizational scheme is proposed with coordinating bodies at the regional and state level that would interact with local port waterside and landside logistics teams prior to, during, and after a supply chain disruption.

Resiliency processes and approaches used to reduce consequences of sea level rise, coastal flooding or other disruptions at ports and coastal communities cannot be fully treated with a single comprehensive framework or guidelines because of the unique characteristics of each situation and the involved community and their port facilities. However stakeholder organizations can build social capital by working and training together, ultimately improving port and supply chain resilience.

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1. Introduction

The United States (U.S.) is served by the global freight transportation system; a system that is a demand-derived service for people and goods seeking to move from one point to another for business and pleasure purposes (MARAD, 2015). Since approximately 70 percent of the planet is covered by water, waterborne transport is an important component of the overall system. Although global economic growth was weak in 2013, today's maritime transportation is a significant contributor to the prospects for continued improvement in the world economy (UNCTAD, 2014). The U.S. economy, measured by gross domestic product (GDP), increased by ~68 percent in real terms (inflation adjusted), while household income, another indicator of economic growth, remained the same between 1990 and 2011. Nevertheless, foreign trade grew faster than the overall economy, doubling in real value over the same period, reflecting unprecedented global interconnectivity (Strocko, Sprung *et al.*, 2014). The backbone of this growth was the enormous expansion of global trade and transportation services, particularly maritime carriage (IMO, 2015).

In the coastal zone, seaports and their intermodal connectors are key types of infrastructure that provide transportation system services, community jobs, and regional economic activity. They are a foundational part of many coastal communities, which depend on their port infrastructure to connect them with other global destinations (AAPA, 2015). Ports were historically thought only of as locations where vessels could load and discharge cargo; they were not considered as transportation providers but only as the interface between the land and the sea. The focus was on the cargo vessel and the local navigation infrastructure, i.e., jetty, quay, pier, berth, and so forth. The cargo was another matter, being owned by some independent shipper with only a mind to getting their goods to market and making a profit. Today's ports are a critical part of a global freight pipeline that annually moves billions of dollars of cargo from one location to another or, as it is more commonly known, the global supply chain (Notteboom and Rodrigue, 2010).

1.1 **Growing Concerns over Climate Change**

Protection of coastal communities and the working waterfront has been taken for granted during a prolonged period of climate stability. Recently there are growing concerns that a new period of rapid, even abrupt, climate change is emerging with anticipated global increase in greenhouse gases (NRC, 2013). There were eleven weather and climate disasters in the United States in 2012 that caused more than $1 billion in damages each (National Climate Data Center, 2013). The most damaging event was Hurricane Sandy, which caused approximately $65 billion in damages and claimed 159 lives. Hurricane Sandy's large size, with tropical storm force winds extending nearly 500 miles from the center, led to record storm surge, large-scale flooding, wind damage, and mass power outages along much of the East Coast. But Hurricane Sandy, or as it was later called Super Storm Sandy after it made landfall, was not the only recent natural disaster causing significant physical and economic harm. There appears to be a statistically significant trend of about 5 percent per year growth in the frequency of weather-related billion-dollar disasters (Smith and Katz, 2013).

Guaranteeing the vitality and sustainability of the coastal zone environment as well as the maintenance of commercial services requires an understanding of human populations and their

behaviors, adequacy of protective infrastructure, and decision-making processes in stressed situations. Increasingly the coastal environment is being modified by the built environment including ports, residential areas, and shoreline facilities – particularly as the urban density increases along the shoreline (Becker, Inoue *et al.*, 2011;USACE, 2015). Furthermore the evidence for increasing sea level rise, even accelerating sea level rise, is appearing more frequently in the literature (Jevrejev, Moore *et al.*, 2014).

Recently both natural and human systems are being severely impacted by extreme coastal events including sudden flooding, coastal erosion, economic damages, and loss of life (Rhodium Group, 2014). Recent examples of these catastrophic events include Hurricane Sandy in the United States and Typhoon Haiyan in the Philippines. Coastal populations have depended on coastal infrastructure systems to protect their assets (USACE, 2015). Seawalls and other fortification measures have been used for centuries to hold back the water and protect coastal communities. But more recently the frequency of overtopping events has increased (NRC, 2014). The seemingly increasing occurrence of extreme events (from all-hazards) has further sharpened the public's desire to be able to understand and to predict decision-makers behavior in these stressful situations and occasionally life threatening situations. For example, many of the Port of New York and New Jersey's facilities were significantly damaged, and the entire port was closed for a week costing billions of dollars (Sturgis, Smythe *et al.*, 2014). The storm was anticipated for many days. How did this magnitude of damage occur and what can be done to make the port and its supportive intermodal infrastructure more resilient prior to another major storm?

Resiliency is an important capability of natural and human communities to endure (NRC, 2011). Recent studies of lessons learned following Super Storm Sandy (henceforth referred to as "Sandy") for port resilience highlighted the essential nature of social linkages and shared culture between the impacted individuals in enabling their successful restoration of maritime services in the Port of New York and New Jersey (Smythe, 2013;Sturgis, Smythe *et al.*, 2014;Wakeman and Miller, 2013).

1.2 **Defining Resilience**

The term resiliency comes from the Latin word "*resilire*" meaning "to leap back". Resiliency in common usage is often extended to mean the ability of a system or enterprise to "bounce back" after a disturbance (Omer, 2010). In Merriam-Webster's on-line dictionary (Merriam-Webster, 2015), "resilience" is defined as 1) the capability of a strained body to recover its size and shape after deformation caused especially by compressive stress, and 2) an ability to recover from or adjust easily to misfortune or change. Both definitions are in use but often in different disciplines. For example, in material science, resiliency is the ability of a material to absorb energy when deformed elastically and return to its original shape when it's unloaded. On the other hand, in psychiatry, it is the ability of an individual to withstand stresses and to recover from a traumatic life situation. This definition reflects the thinking of Canadian ecologist C.S. Holling, who described the difference in how engineers define the term and how scientists think of resilience in the mid-1990s (NRC, 1996). For engineers, resilience is the time to recover following a disturbance to some prior state or condition whereas ecological (or psychological as above) relates to the amount of disruption (or stress) a system (or person) can absorb before it (or they) changes state.

According to the National Research Council, resilience is the ability to absorb, adapt to, and/or rapidly recover from a potentially disruptive event (NRC, 2012). With respect to transportation infrastructure it is generally quantified as a dimensionless quantity representing the rapidity of the system to revive from a damaged condition to the pre-damaged functionality level (Banerjee, 2014). For the purposes of this document, disaster resilience is defined as "the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events," and that "enhanced resilience allows better anticipation of disasters and better planning to reduce disaster losses – rather than waiting for an event to occur and paying for it afterward" (Cutter, Ahearn *et al.*, 2013;NRC, 2014). Banerjee states that system performance during a natural disaster (commonly referred to as system vulnerability), resulting losses, and post-event system recovery are the three major components used to quantify the disaster resilience of a civil infrastructure system (Banerjee, 2014).

There is a great deal of literature on the subject of resiliency that comes out of the security activities that have been underway since the attacks of 9/11 and before (Davis, 2008). In port security, the definition is extended to include the ability of a port to return to its normal mode of operation after a disruption caused by a natural or man-made attack (Mansouri, Nilchiani *et al.*, 2010). However, the literature is somewhat limited regarding specific resiliency processes for ports and requires additional investigations, new case studies, and multi-discipline analyses (Madhusudan and Ganapathy, 2011;Southworth, Hayes *et al.*, 2014).

Some authors propose that the answer is partly a matter of applying risk assessment and management protocols (Hollnagel, Woods *et al.*, 2007). There are three fundamental characteristics of the risk assessment as described by the Department of Homeland Security (NRC, 2010):

- Risk is a product of threat, vulnerability and consequence.
- Probability (or likelihood) is a function of threat and vulnerability.
- Vulnerability is a function of accessibility, ability to detect and deter an incident, and the degree of 'hardness' or ability to withstand an attack.

Resilience engineering, as defined by Hollnagel, Woods *et al.* (2007), is one engineering response to desires for risk assessment and management. But risk and resilience can be defined in many different ways depending upon the system being addressed (Brooks, 2003;Omer, 2010). Resilience in business terms can be defined as the ability of an organization, resource or structure to sustain the impact of a business interruption and to recover, resume its operations and provide at least minimal services (SANS Institute, 2002;Sheffi, 2007). In terms of infrastructure resilience, it is the ability to reduce the magnitude, impact, or duration of a disruption (Olsen, 2015)**.**

1.3 **Port/Supply Chain Resiliency**

Today's port is no longer an isolated node but instead is an integral part of the global logistics system or supply chain (Notteboom and Rodrigue, 2010). The global supply chain is the mechanism that enables international trade and is typically a crucial component of most nations' economic security. The global supply chain is actually a network of individual supply chains that follow specific trade routes. Each component of the supply chain, including the oceangoing

vessels, ports and their terminals, and intermodal service providers, are equally responsible for the success of the international product being delivered (Mansouri, Nilchiani *et al.*, 2010). To protect the nation's economic security, it is important to know how the global marine transport system operates and sources of competitive capacity improvements in both public and private enterprises (DHS, 2013;FMC, 2015). Importantly, it is also essential to consider mechanisms for the enhanced business recovery post disruption and how to organize efforts across the system to restore commerce continuity quickly and effectively (Barnes and Oloruntoba, 2005).

The objective of supply chain resiliency is to maintain the business continuity of the supply-chain network. Business continuity refers to the activities required to keep an organization running during an interruption of normal operations; whereas, disaster recovery is the process of rebuilding an operation or infrastructure after the disaster has passed (SANS Institute, 2002). Business continuity depends on a management process for developing a set of advance procedures that when activated will enable the organization to restore its operational capacity after a disruption or series of disruptions. These procedures must allow critical business areas to function as soon as possible after the disruptive incident(s). Hence it becomes important to first identify critical infrastructure elements that are crucial and establish the key activities or resources needed to recover these infrastructure services immediately after a disruption and to regain business operations. In this context, the intention of business continuity activities is nearly identical to the intention for pre-event resilience activities.

2. Research Context

In engineering management, it was found that the modification of design and construction codes for coastal infrastructure and to protection of ecological assets must evolve from interagency agreements and collaborative behaviors among the coastal communities (USACE, 2015;Wakeman, 1997a;Wakeman, 1997b). Engineers, physical scientists, and social scientists must work together to create new physical infrastructure and social asset pairings that will enhance collaborative and cooperative behaviors before and after disruptive events (Olsen, 2015;Wakeman, 1997b). How can these disciplines work together to build a new and more effective approach to disruptive events at coastal ports?

The objective of this research project is to move from the aspirational concept of resilience to a standardized framework that has a normative protocol for creation of resilience in communities and transportation systems, particularly maritime systems. The strong human relationships were key to recovery following Sandy as well as other disruptive events, as has been reported (Klinenberg, 2013). Recent studies of the Port of New York and New Jersey demonstrated the important of human behavior in the success of resilience and restoration of marine services (Smythe, 2013).

2.1 **Risk of Climate Impacts**

Climate change is an increasing concern (NCDC, 2013; NRC, 2013). The questions of how to frame climate-related risk assessment and management processes to fully address resiliency strategies and to prepare for climate disaster response at urban communities and ports as well as the supply chains are important. Unfortunately, as mentioned earlier, there are a limited number

of research publications on this topic probably because of lack of funding. Research can be expensive, and research programs to investigate future risks (such as climate change) are often postponed because of higher priorities. However the potential economic consequences of climate change are being estimated and business and community impacts forecasted. As the former Mayor of New York City, Michael Bloomberg said:

> ”Damages from storms, flooding, and heat waves are already costing local economies billions of dollars—we saw that firsthand in New York City with Hurricane Sandy. With the oceans rising and the climate changing, the Risky Business report details the costs of inaction in ways that are easy to understand in dollars and cents—and impossible to ignore.”
>
> — Risky Business Project Co-Chair Michael R. Bloomberg (Rhodium Group, 2014)

Fortunately the University Transportation Research Center, Region 2, felt that the issue deserved examination, particularly after Sandy closed the port to maritime activity, and provided funding to support this investigation.

2.2 **Test Hypothesis**

To help focus the investigation, a test hypothesis was developed, assumptions were listed as were research questions to consider during the conduct of the study. These are presented below:

Test Hypothesis:
There is an integrated framework/guideline integrating physical infrastructure and social capital that can be universally followed to help create urban coastal resilience, specifically in the coastal port setting, and to support business continuity and supply chain functions following a disruptive event. Further, there is the ability to use this framework/guideline to development resilience enhancing protocols and tools that are generally applicable to all port decision makers.

Assumptions:

1. Physical and non-structural infrastructure (e.g., wetlands, oyster beds, etc.) are essential to the protection of the urban coastal zone.
2. Human capacity to respond to disruptive changes in the environment and to react constructively and collaboratively are foundational for community resilience.
3. A synthesis of these two characteristics can lead to a conceptual framework that is implementable by application of a normative protocol.

Research Questions:
First, are there specific physical/social resilience assets that are essential underpinnings for infrastructure resilience and business/community continuity following a disruption? If so, what are these elements in the context of a physical/social framework/guideline, and how do we proceed with their development and implementation? Second, if a framework/guideline can be described, how should decision makers prioritize their activities and resources to best address community concerns as well as port services restoration under this framework/guideline?

2.3 **Research Approach**

There are many case studies in the literature, mainly describing the concept of resilience and the specific *ad hoc* activities of their particular case (Amoaning-Yankson, 2013;NIST, 2015;NRC, 2012). It is important to move from descriptive concept of resilience to a normative agenda to make decisions more consistent and universal (Weichselgartner and Kelman, 2014). This project's intention is to examine processes for enhancing resilience and recovery and to expand the understanding of the social contributions (such as collaboration and cooperation) with respect to resilience practices. The results may also help illuminate emerging issues regarding coastal infrastructure-social linkages in the face of changing environmental conditions, natural and human-caused hazards, and urban coastal sustainability. Also these results may be applied to modifying design and building code standards for coastal infrastructure and network industry organizational factors to enhance coastal zone adaption to sea level rise and ecosystem sustainability, particularly in coastal urban environments.

The issue of the interdependencies of network industries and the cascading failures that occurred during Sandy (i.e., loss of communications and power failures) is a phenomena that has been reported before with Hurricane Katrina and other major disruptions (NRC, 2009). The questions that emerge include: what are the interrelationships between sectors, how are the interdependencies manifested, and what are the characteristics of their vulnerabilities that contribute to the phenomena of cascading failures? Further, warnings of increased vulnerability of these lifeline systems to communities cause unintended consequences including runs on stores, hoarding, and in the extreme, general panic among residents. Clearly there are interdependencies between network industries and failures that must be further investigated. This study seeks to identify linkages and contribute to that body of knowledge.

In addition to research on network infrastructure systems, the project also attempted to address the need for more research that is cross-cutting and attempts to align engineering methodologies and social science findings to enhance resilience practices. The limited body of work (Wakeman and Miller, 2013; Smythe, 2013) on the importance of social capital in recovery of the Port of New York and New Jersey following Sandy needs augmentation to allow identification of mechanisms to build resilience and ultimately sustainability in communities. Further attention to this area is also warranted. This attempted to build on the earlier work in New York Harbor.

3. Infrastructure Systems

3.1 **Physical Infrastructure**

The high value and volume of commercial goods moved into and out of the United States on the water make maritime ports indispensable (MARAD, 2015). Ports inherently have some level of vulnerability to a disruptions because of their location (adjacent to waterways), the physical state of their facilities (new, old, etc.), and their interdependencies with their specific industrial and societal counterparts. Typically the impacts from a port disruption have been managed with minor consequences. However, it appears that with Sandy and other recent storms on the Eastern seaboard, combined with future trends of sea-level rise and increasing storm severity, are making activities to reduce the impact of port flooding and facility damages an economic necessity.

One of the issues that has made urban waterfronts in general, and ports specifically, more vulnerable is the lack of consistent engineering design guidance. Perhaps the best example is the lack of a clearly articulated design storm. In the Netherlands, most structures are designed to withstand a 1 in 10,000 year storm, and provision that structures must be upgraded as the threat evolves are common. In the U.S. waterfront structures are typically designed to much lower standards, and perhaps more importantly the standards are not consistent. It is quite common to find bulkheads designed to protect from a 1 in 50 year storm alongside rock revetments designed to the 1 in 100 year standard, with neither having a plan for adaptation for an evolving threat such as sea level rise. The first step in creating more secure and resilient waterfronts is providing guidance to the engineering community in the form of codes that define consistent requirements for waterfront design.

3.2 **Social Capital**

Part of the post-Sandy study findings from the earlier investigations were that not only is physical infrastructure important to resiliency and recovery but also social interactions and relationships (Smythe, 2013; Wakeman and Miller, 2013). For the purposes of this report, the human factors that can create a network of cooperating individuals will be referred to as "social capital". Lessons learned from public and private stakeholders in the port post-Sandy strongly suggest that understanding social capital could assist in more quickly returning the port to full service following future disruptions (Wakeman and Miller, 2013). What are the mechanisms (e.g., collaboration, common culture, and so forth)? How would physical infrastructure and social capital work together to optimize service restoration in network industries following a disruption? Are there new engineering and social science tools for assisting decision-makers and the general public to be more resilient following a significant disruption?

The ability to recover following a disruptive event depends on many factors. However from several post-event studies, it appears that it is the human factors are among the most influential (Carpenter, 2013). As reported by Smythe (2013), the successful restorative effort following Sandy was due, to a large extent, to the local expertise and coordination activities within the port community and the supportive local state and federal agencies. Specifically, she found that that it was the port partners' shared common culture and commitment that was the basis of a shared goal of getting the port open. Previous experiences with other catastrophic events (such as the attack of September 11th, Hurricane Irene, and the downed US Airways flight in the Hudson River) gave these port stakeholders prior experiences in acting together and helped other individuals to also work together in an efficient fashion to limit the time delay in re-opening the port. Beyond their collaboration, another key to their success was their ability to improvise before, during, and after the storm (Smythe, 2013).

3.3 **Interdependencies**

During a disruptive event there are often cascading failures among the lifeline sectors, which include power, communications, water/wastewater, and transportation (NRC, 2009). The storm's winds knockdown electrical power-lines and saltwater flooding damaged impacted electrical equipment; the result was the loss of power. No power impacted communications and

transportation sectors. The loss of these services resulted in some areas having no clean water to drink. A National Research Council's report, entitled "*Sustainable Critical Infrastructure Systems*" (NRC, 2009, pg. 26), notes that:

> "Because these systems share rights-of-way and conduits above- and belowground, they are also geographically interdependent. These functional and geographical interdependencies have resulted in complex systems that regularly interact with one another, sometimes in unexpected and unwelcome ways. Because these interdependencies were achieved by default, not by plan, they create vulnerabilities *whereby a failure in one system can cascade into other systems* (emphasis added), creating more widespread consequences than those resulting from the one system originally experiencing the failure. For example, the failure to repair or replace a deteriorating water main could lead to a break in the main; the flooding of adjacent roads, homes, and businesses; the shutting off of water for drinking and fire suppression; the short-circuiting of underground cables; and the loss of power for a larger community. On a much larger scale, the failure of the levees in New Orleans in the aftermath of Hurricane Katrina in 2005 led to the flooding of large portions of the city, knocking out power, water supply, transportation, and wastewater systems for months and even years."

The maritime logistics sector's water-side (e.g., vessels and waterways) and land-side (e.g., terminal and multi-modal transport) activities are supported by physical infrastructure and social capital that are part of the power, communications and transportation network industries. Once Sandy and its associated surge made landfall, there was significant damage to physical infrastructure of all the network industries and to a lesser degree the region's social capital (Python and Wakeman, 2015).

Previously established policies and practices that were utilized during Sandy allowed for the rapid restoration of water-side maritime operations -- led by the U.S. Coast Guard. (Following Hurricane Katrina, the USCG organized a new unit to oversee preparation and recovery activities in their areas of responsibility called the Marine Transportation System-Recovery Unit or MTS-RU). The restoration of land-side operations to full functionality was less effective. The principle breakdowns were cascading failures among the power, communication and transportation sectors. Decisions as to responses had to be balanced between many competing demands at the state and regional levels. For the supply chain, without a clear course of action at the regional level and little political priority, these cascading failures delayed the container terminals' ability to re-open. For example, because of pressing need for power throughout the metropolitan region including hospitals, electric utility companies were drawn in many directions causing delays in their industrial and port responses. It also resulted in intermodal and multimodal cargo movements being delayed for several weeks while they re-organized their business operations (Wakeman and Miller, 2013).

3.4 **Developing Guidelines and Tools**

A new understandings of physical infrastructure and social capital, their relationships and capabilities to enhance resilience of communities and particularly ports and their supply chains is

at the center of this investigation. Development of new engineering tools and socio-technical guidelines are a focus and end-game but are not necessary to be successful in expanding our understanding of these issues (Mansouri, Nilchiani *et al.*, 2010; Omer, 2010). The research focused on the principles that worked to allow disrupted operations to be restored to their fully-functioning status. It also attempts to formulate resilience approaches that are practical and ready for implementation in the field. Part of the overall study purpose is to develop guidelines and tools for enhancing resilience in design and engineering practice as well as for developing instructional frameworks. Finally these guidelines and tools developed from lessons learned from prior disasters and are meant to assist in decision-making to reduce the impact of disruptive events in their communities.

New socio-technical guidelines must attempt to incorporate both physical infrastructure and social capital characteristics. Engineering tools (such as risk assessment, adaptive management, sensor technologies, asset management, agent-based models, and whole life cost analyses) should consider the tools' utility for enhancing not only resilience but also fostering greater sustainability. Such methods are often prescriptive and direct participants without providing sufficient flexibility. Methods that focus on outcomes while also allowing emergency personnel to use best professional judgment for any particular event are more adaptive.

Since there is a paucity of tools that can be utilized to construct greater resilience (Bach, Bouchon *et al.*, 2013), this research seeks to incorporate lessons learned from prior disruptions, including Sandy, into a composite set of guidelines to help direct decision makers to prepare and recover when faced with devastating port flooding and system damage due to climate change related events. During earlier work in the Port Of New York and New Jersey (Wakeman and Miller, 2013), Ms. G. Python, then a Master of Science student at Stevens Institute of Technology, began the process of conceptualizing a set of guidelines that could be a foundation for constructing an organization framework in the port environment to promote resilience in the port recovery and supply chain business continuity following a disruptive event (Python, 2013). This research furthers and builds on that earlier work.

4. Resiliency Frameworks

4.1 **Gathering Input**

The review of the literature on resilience, particularly port and supply chain resilience, included related literature on port security and emergency management during major disruptive events. Differences in type and also physical extent of disruptions were examined and key physical, logistical, and institutional (including communication) issues were noted and use to identify potential impacts of maritime sector failures. For example, the characterization of disruptions to part of a large port (e.g. a loss of one terminal among many) versus loss of an entire port's operational activities (e.g., the closure of New York Harbor or the Port of Los Angeles labor event) or the difference between planned disruption (e.g., lock maintenance) and unplanned closure of a waterway (e.g., lock failure) needed to be considered differently (Southworth, Hayes *et al.*, 2014).

In the face of increasingly extreme disruptive events in the urban coastal zone, decision-makers are concerned with the resilience capacity of existing physical infrastructure to natural or human-caused shocks. The National Infrastructure Advisory Council (NIAC), which provides the President of the United States with advice on the security and resilience of the critical infrastructure sectors, found that the resilience of four network infrastructure sectors – energy, communication, transportation, and water – are particularly critical to nation's regions. These four have been designated lifeline sectors by an earlier National Research Council report (NRC, 2009). These infrastructure sectors underpin the key functions of regional government and commerce. In the Council's final report (NIAC, 2013), they provided six recommendations to the President that are repeated in Table 1.

TABLE 1: Key Recommendations to Improve Resilience
(Source: NIAC, 2013)

	Recommendations to the U.S. President - National Infrastructure Advisory Council
1	Form partnerships with senior executives from the lifeline sectors, based on the Federal government's successful executive engagement with the electricity sector.
2	Identify or develop regional, public-private, cross-sector partnerships, led by senior executives, to coordinate lifeline sector resilience efforts within a given region.
3	Designate the energy, communications, water, and transportation sectors as lifeline sectors and direct all agencies to recognize the priority of the lifeline sectors and the individuality of regions.
4	Integrate social media into public alert and warning systems and work with state and local government partners to develop social media information sharing capabilities to inform response.
5	Launch a cross-agency team to develop solutions to site access, waiver, and permit barriers during disaster response.
6	Create a strong value proposition for investment in resilient lifeline infrastructures and accelerate the adoption of innovative technologies in major infrastructure projects.

These are national recommendations that have merit and are foundational. They begin with greater efforts at communication and end with acceleration of innovative technologies. How can they be constructed into implementable practices for communities and specifically the transportation sector?

4.2 **Earlier Findings**

In 2012, the University Transportation Research Center (UTRC), Region 2, supported a study of post-Sandy lessons learned from a variety of stakeholders in the Port of New York and New Jersey (Wakeman and Miller, 2013). These discussions with stakeholders followed quickly, within the first several months after Sandy, and they helped expose the underpinnings of the recovery activities – it was not just the mechanical or structured emergency management systems, but it was also the human systems that counted in maritime system recovery. There were several generalized principles that emerged from the stakeholder interviews; these included considerations from decision makers and practitioners (Wakeman and Miller, 2013). Several executive level leaders that were interviewed during the 2013 study repeatedly stated similar principal lessons. These were:

(1) Safety and protection of life is their prime consideration.
(2) Communications among decision-makers and with staff is critical. Make plans before hand to provide leadership across organizations with strong and redundant communication systems between the leadership entire team and with the staff.
(3) The number and severity of natural disasters and terrorist attacks have increased in recent years. The current designs and procedures must be re-evaluated given the new conditions.
(4) Conduct drills and tabletop exercises. Exercises are needed to practice predetermined courses of action to be used in an emergency situation.

While most of the waterside structures made it through the storm relatively unscathed, there were many instances of wave and surge related damage to ancillary structures, equipment, and cargo throughout the port. Most of the major damage within the port was related to the inundation associated with the storm surge plus an extreme high tide. Storms such as Sandy are relatively rare; however sea level rise is known (NRC, 2013), and the likelihood that storms capable of having similar impacts will occur in the future is increasing. Hence, it is prudent to consider potential upgrades to current guidelines and codes for coastal infrastructure.

4.3 **Data Collection**

The supply chain depends on the efficient movement of freight in a multimodal context. In general, however, there is a paucity of multimodal studies on the resilience of transportation infrastructure in this context. An attempt to specifically identify port resiliency principles from the literature had limited success due to the lack of available after-action accounts in seaports (Madhusudan and Ganapathy, 2011). Given what was available from the open literature, particularly the port security literature (Barnes and Oloruntoba, 2005), generalized procedures from the literature were distilled to obtain a conceptual resilience enhancement process. Categorization of activities by time, i.e., before, during and after an event, was the simplest initial breakdown. This approach, which is taken from Department of Homeland Security definitions (NRC, 2010), considers resilience as part of a temporal risk management framework for planning activities that must occur before a disruptive event occurs. A continuum model is present in Table 2 and suggests that what is currently lacking is the front-end or pre-event planning for creating resiliency. Given the work untaken since 9/11, the model suggest that the majority of planning work for response and recovery is complete.

TABLE 2: Risk Management Continuum for Infrastructure Systems*

Pre-Event	***Event or Shock***	***Post-Event***
Resiliency	Response	Recovery
(Planning limited or missing)	(Planning complete)	(Planning complete)
Preparations require months to years	Practically instantaneous or very rapid (hours to days)	Trade resumption, business continuity, etc. can have durations from days to months to years

(*Note: Recovery duration is inversely proportional to completeness or maturity of resiliency planning activities prior to the event, which are assumed to be limited.)

The outcome of the synthesis gives two pathways or processes to achieve increased resilience that are grounded in the physical environment (i.e., infrastructure and technical procedures) and the human participants and their activities. These activities that can take place prior to a disruption (i.e., pre-event) or they can take place following the occurrence of an incident (post-event). These two timeframes are further divided into those issues that are: (1) primarily defined by institutional policies and mandates and (2) those issues that are characterized by individual or non-institutional group behavior.

4.3a. *National Conference*

The Transportation Research Board (TRB) and the Committee on the Maritime Transportation System (CMTS) organized the 3rd Biennial Research & Development Conference, held on June 24-26, 2014 at the National Academy of Science Building in Washington, D.C. The conference was entitled: Innovative Technologies for a Resilient Marine Transportation System (MTS). It was organized to examine the use of innovative technologies and practices in marine transportation and waterways management (CMTS, 2014). TRB has been active in assisting state transportation agencies in assessing their emergency management and resilience requirements as well as providing guidance regarding areas where resilience capabilities are needed as shown in Table 3.

TABLE 3: Transportation Agency Resilience: Fundamental Capabilities
(Source: Transportation Research Board, 2015)

Prevention	***Protection***	***Mitigation***	***Response***	***Recovery***
Planning				
Public Information and Warning				
Operational Coordination				
Intelligence & Information Sharing	Access Control	Long-Term Vulnerability Reduction	Critical Transportation	Infrastructure Systems
	Physical Protective Measures			
Screening, Search, & Detection		Risk & Disaster Resilience Assessment	Operational Communications	
	Risk Management			
	Supply Chain Integrity & Security	Threat & Hazard Identification	Situational Assessment	
Cybersecurity				
Training and Exercises				

At the TRB-CMTS conference, two sessions dealt with MTS resilience. At the invitation of the organizers, two papers were presented: one paper on the morning of the first day on port resilience (June 24th) and the second was scheduled on the second day (June 25th). Wakeman moderated the second session and gave a paper on the University Transportation Research Center work from 2012-

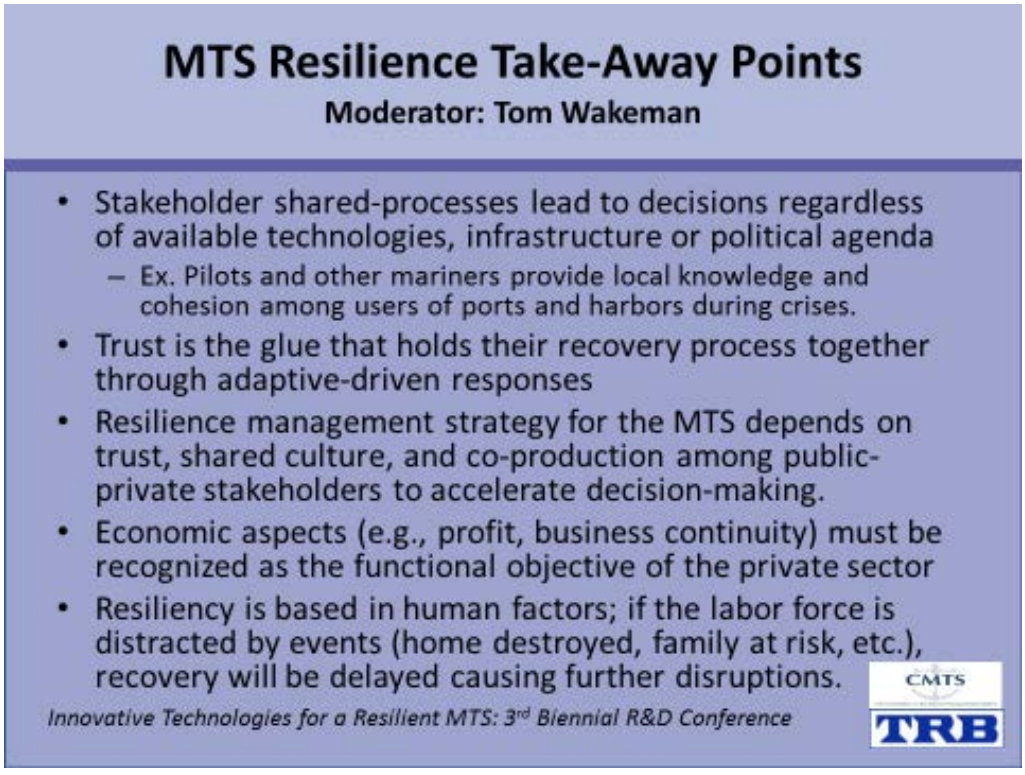
2013 on the lessons learned at the Port of New York and New Jersey post-Sandy. The panel included four speakers with individual papers addressing difference issues regarding resilience (see Table 4).

TABLE 4: Second Session Speakers, Affiliation, and Topic

Speaker	*Affiliation*	*Topic*
Jennifer Wozencraft	USACE Coastal Program Airborne Lidar Bath Tech Ctr	USACE National Coastal Mapping Program
Austin Becker	University of Rhode Island, Dept Marine Affairs & Land Arch	Stakeholder vulnerability assessment of maritime infrastructure Case Study
Thomas Wakeman	Stevens Institute of Technology	Port Resilience and Super Storm Sandy
Jesse Feyen	NOS Office of Coast Survey/Development Laboratory	Preparing for the Storm: NOS Predictions of High and Low Water Levels

The four speakers addressed specific aspects of climate change and particularly focused on technical aspects. Two papers (Becker and Wakeman) also considered community and social influences on resilience. A discussion followed the panel's presentations that included comments from the audience. A summary slide for the resilience sessions was prepared and presented in the closing session. The slide is presented at Figure 1.

FIGURE 1: Summary Slide for TRB-CMTS Resilience Sessions



Many of the points that were raised during the panel's presentations and subsequent discussion were also captured for the closing plenary session held the last day of the TRB-CMTS conference. Several keys points were about resilience and technological enhancements to maritime practices in the MTS sector. Interestingly, although it was a conference that sought technical solutions to resilience achievement, the summary points, which were gathered during the post-panel discussions, primarily addressed issues that dealt with personal stories about human factors and individual contributions to resilience and incident recovery activities following a post-disruptive event.

4.3b. *Regional Workshop*

The TRB-CMTS conference presentations and discussions were used to develop a conceptual framework that includes both physical infrastructure and social capital inputs. It was intended that it would assist in the set-up of the workshop, and where these ideas on resilience will be further explored. The workshop was organized in concert with the DHS Center for Secure Maritime Commerce at Stevens Institute of Technology to further explore the relationship between physical infrastructure and social capital examined during the TRB-CMTS conference. The objective of the workshop was to discuss the resiliency of physical and social assets and to work on documenting activities that strengthen their relationship and increase decision-makers effectiveness during incident response and recovery from natural and human-caused disruptions.

The workshop focused on the urban coastal zone with two expert-led sessions (see the agenda at Appendix A) and included specifically invited participants from both the public and private sectors (see Appendix B). In addition to the experts, approximately 8 students joined the workshop to take notes and learn from the discussions. Figure 2 shows the participants at work during the workshop.

FIGURE 2: Resilience Workshop, November 14, 2014

The morning session consisted of two panel discussions to set the stage for the afternoon session. The first panel included experts on options for physical infrastructure (structural and non-structural) construction in port and urban environments and was titled "Tomorrow's Coastal Infrastructure Systems". The panel examined the typical and innovative infrastructure systems to stabilize the urban coastline. It considered the potential role of non-traditional green infrastructure (also frequently referred to as living shorelines, ecologically enhanced shorelines, and natural/nature based features, among other epithets) in enhancing the resilience of urban coastal communities.

The second panel was composed of experts in organizational consistency, collaboration, and business continuity strategies. They discussed the principles necessary for social capital to develop at the community level including the necessary contributions of the private sector.

The objective of the afternoon session was to conceptualize an implementation process that could provide a systematic approach to protection and resilience in the urban coastal environment, particularly with respect to transportation (e.g., port and supply chains sectors). Two facilitated discussions with small groups of about ten people were used to define specific steps and response and recovery activities and to document findings and best practices.

Discussions were organized to have the participants discuss and consider both traditional institutional and public agency-driven approaches and non-traditional private individual and group approaches for enhancing resiliency. The separate discussions focused on how stakeholder qualities are valued within the existing social capital and what incentives are needed to enhance processes. The outcome of the participants' discussions developed unique lists of options and implementation processes following disruptive events for public and private actors to consider. The principal findings are listed at Table 5.

TABLE 5: List of Final Session Principal Findings

	Resilience Workshop Findings
1	Broader range of communications is needed among the community of stakeholders including types of vulnerabilities, risks to local physical infrastructure and social capital, range of potential civil preparations, and sources of information.
2	Must seek public-private partnerships among stakeholder community, particularly when the private sector has control over assets including finances.
3	Cost sharing will be necessary and should be based on who is the beneficiary.
4	Greater emphasis is need for collaboration among public and private stakeholders and to identify economic and social incentives for private parties to participate in resilience planning.
5	Educational activities should present case studies where communities were engaged and the protocols they develop proved useful and were successfully implemented.
6	Develop constituencies to provide long-term support for elected officials championing resilience and to promote and carry out resiliency plan implementation within their community.

The participants also listed their proposed directions for future research that they felt could be beneficial. These research areas are listed at Table 6.

TABLE 6: List of Proposed Research Areas

	Research Questions Generated during Workshop Discussions
1	How do you identify physical infrastructure and social infrastructure attributes and how can they be monetized in order to quantify the value of investments?
2	How do we develop risk-based metrics?
3	How do you identify best management practices for disruption recovery and business continuity?
4	How could a resiliency framework and index be developed?

5. Formulating a Resiliency Framework

As stated earlier, the objective of this research project is to move the aspirational concept of resilience to a standardized framework, guideline or protocol that is a normative process for creation of resilience in transportation systems, particularly maritime systems. The next section considers both the area of building codes and the area of social networks and suggests methods to integrate the two in a structured fashion that is easily repeatable and specifically tailored for the freight transportation portion of the supply chain.

5.1 **Physical Infrastructure Guidelines**

Once Sandy and its associated surge made landfall, there was widespread damage to maritime terminals and infrastructure throughout the region. The first UTRC study was conducted to identify lessons learned that could assist in returning the port to full service more rapidly (Wakeman and Miller, 2013). The specific objective of that study was to identify guidance that could enhance port resilience. The project reviewed the existing design codes for infrastructure and attempted to identify how building codes could be improved to protect maritime to protect infrastructure integrity. It was found that Sandy had a relatively minimal impact on waterside structures at shoreline including port facilities at container, passenger, and oil terminals. Piers and wharves in large ports are typically designed to withstand horizontal impact loads from fully loaded ships and vertical loads associated with cargo handling equipment. However, there was damage to many facilities and equipment and to passenger cars because of flooding. For example, tanks at petroleum terminals were washed off of their foundations by the storm surge.

While most of the waterside structures made it through the storm mostly unscathed, there were many instances of wave and surge related damage to ancillary port structures. Most of the major damage was related to the inundation associated with the storm surge plus a high tide, which led to water levels in excess of 12 feet above normal tide levels. Hence the 2013 study identified flooding as a key issue to resolve in an effort to enhance resilience. The current study moved from simply examining structural integrity to a broader approach for using building codes and operational activities to enhance supply chain resilience.

5.2 **Building Codes**

Based on a review of existing building codes and the lessons learned port stakeholders during the earlier study, modifications (shown in Table 7) to the currently applied local uniform building codes for the urban waterfront were recommended for consideration (Wakeman and Miller, 2013).

TABLE 7: Recommended Modifications to Port's Building Codes

	Code Recommendations for Port of New York and New Jersey
1	The building codes of the states of New York and New Jersey should be updated to include port specific sections, which are uniform for the entire harbor region.
2	The states should adopt and directly reference the American Society of Civil Engineer's Flood Resistant Design and Construction Standards (ASCE 24-05) for siting of critical utility and mechanical equipment for all port facilities.
3	The Port Authority of New York and New Jersey should add a section to their lease agreements devoted to port specific structural design and construction considerations.
4	All facility owners in the harbor should adopt a reasonable and consistent methodology for incorporating sea level rise into their planned facility upgrades.

As discussed earlier, an expert panel was convened to examine coastal infrastructure systems as a part of the Physical and Social Infrastructure Resilience Workshop. The panel was comprised of representatives from engineering consulting firms, the U.S. Army Corps of Engineers, and local governmental agencies. During the presentations and subsequent discussions, communication at all levels and between all parties was one of the main issues that was emphasized. This included communication between public and private entities with a stake in improving port and community resiliency, as well as communication of the residual risk to private citizens. One of the common themes was that engineering projects designed to enhance infrastructure resiliency and reduce risk typically do not eliminate the risk entirely. Moving forward, the panel felt it was essential to be able to communicate this residual risk, so that informed decisions could be made with regards to future infrastructure investment.

5.3 **Social Capital and Recovery**

The high value and volume of commercial goods moved into and out of the United States on the water make maritime ports indispensable, not only for the economy but also for the citizens that depend on these goods and material resources to maintain their way of life. However, the location and nature of ports make them susceptible to both natural and human-caused disruptions and occasionally disasters. Ports inherently have some level of vulnerability to disruptive events because of their location (adjacent to waterways) and their interdependencies (societal and commercial), but typically the resulting impacts from disruptions can be managed and business continuity maintained including supply chain mobility.

Sandy and other significant weather-related event combined with future trends of sea-level rise and increasing storm severity have demonstrated that reducing the impact of coastal flooding on communities and to the maritime supply chain is an economic imperative. It was evident from the earlier Sandy investigation that many stakeholders felt that one of the keys to their success in reopening the port quickly was their ability to improvise and establish processes that drew on their prior relationships, their shared experiences, and their trust in one another's professional

expertise. These relationship stem primarily from existing organization with communication and coordination responsibilities that were either within government, the private sector, or some combination of parties (Southworth, Hayes *et al.*, 2014). There are several regional and state coordinating bodies that are responsible for emergency response and recovery efforts in the New York metropolitan region -- multiple states and within their boundaries. The primary organization on the waterside of the harbor is the Maritime Transportation System-Recovery Unit (MTS-RU). The MTS-RU was established following Hurricane Katrina by the United States Coast Guard. In the wake of a port disruption, the MTS-RU is responsible for coordinating the recovery of the affected port and its waterways.

As reported in the post-Sandy interviews, the port partners' relationships were defined as having shared values (Smythe, 2013). Because of their shared values and institutional framework the MTS-RU was able to provide each other mutual access to information and resources. It is these relationships within the MTS-RU that encouraged action in the face of uncertainty. Additionally, the community spirit demonstrated by the MTS-RU seemed to create a magnetic attract to others that also volunteered their assistance to the cause of port recovery. This shared spirit of community responsibility spread. Interviewees reported that their collaborations and shared commitment seemed to spawn outside interest, resource contributions, and personal time contributions by third-parties (Wakeman and Miller, 2013).

The maritime logistics sector's water-side (e.g., vessels and waterways) and land-side (e.g., terminal and multi-modal transport) activities are supported by physical and social assets. Once Sandy and associated surge made landfall, there was significant damage to physical infrastructure and to a lesser degree social capital. Current policies and practices were successful in restoring water-side marine operations, led by the Coast Guard through the MTS-RU; restoration of land-side operations are less successful. The principal breakdowns were cascading failures among the power, communication and transportation sectors. For the supply chain, without a clear course of action on the landside, terminals were able to open and intermodal and multimodal cargo movements were delayed for several weeks. Hence, a proposed land-side organizational guideline to aid decision making to reduce the impact of flood events was developed using lessons learned during the post-Sandy interview (Python, 2013) and this study.

6. Integrated Framework/Guidelines

Transportation security demands a role for resilience. Measures to evaluate the potential resilience of a transportation system can be based on the vulnerability, flexibility, and resource availability to cope with a terrorist attack or natural disaster (Cox, Prager *et al.*, 2011). Is it possible using such metric in a universal manner to formulate an integrate framework that is comprehensive in its treatment of the physical and social assets for ports, which supports both the community and operational environment of the supply chain? What are the components of this framework, guideline or protocol?

For United States' ports, the waterside of the supply chain has a hierarchical organization in the USCG's MTS-RU to lead and support resilience activities primarily on the waterways and terminal quays. On the landside, there is not similar command structure or organizational corollary. During Sandy, although the Port Authority of New York and New Jersey's incident

management team worked hard to coordinate terminal elements, the transportation components often acted unilaterally. In her Masters' thesis, based on research conducted during the 2013 study, Python (2013) proposed a new organizational structure to help facilitate the recovery of terminals and intermodal connections, and to address flood mitigation and service restoration. The organizational guidelines describe possible approaches and methods for restoring normal port supply chain operations through collaborative principles by establishing a land-based logistics team that includes all multimodal connectors (Python, 2013).

The US Coast Guard opened the port to maritime activity after about a week -- but the landside continued to be crippled and provided only partial transport and other logistical services. There was a limited coordination for landside activities -- mainly provided by individuals at the Port Authority of New York and New Jersey (Southworth, Hayes *et al.*, 2014). Otherwise there was little on the off terminal activities that directly corresponded to the effectiveness of the MTS-RU's collaborative activities on the waterside. What was missing was the same organizing principles that were working for the MTS-RU on the marine portion of the port did not seem to work in congealing the transportation stakeholders for the terminal facilities and other intermodal portions of the supply chain. Further this sector seemed to be cut-off from other network industry sectors (including power) and their recovery activities by political priorities. In fact State and New York City government emergency operations did not seem to view the port and the supply chain as a whole – 186 facilities – nor recognized their essential contributions to the region's recovery.

If ports throughout the country were to use a similar organizational standard and implement the recommended cooperative practices initially presented by Python, they could assist one another during periods of distress. The routine application of standard practices could help create more resilient ports and logistic practices, and enhance regional and national economic resilience by increasing redundancy. Clearly, the relevance of transportation, social capital and other decision influencing factors in the achievement of system resilience deserves considerably more attention from academia and the public sector.

6.1 **Universal vs. Unique**

Regarding the question of creating a universal resilience framework for all ports, this is only possible if all ports and their surrounding urban communities are somewhat uniform. Reviewing the annual report of the American Association of Port Authorities (AAPA, 2015) demonstrates the wide differences between ports from difference regions of the country. The public interests in a limited area of the country is often uniform with respect to public infrastructure like ports; furthermore, their communities are typically uniform. An example are the Ports of Los Angeles and Long Beach have many characteristics that they share so that a framework that works for one should be able to work for both. The Port of Houston in Texas and the Port of New York and New Jersey, on the other hand, are significantly different in their cargos, their layouts and their services – a common framework would probably not work if too detailed or prescriptive.

Not only ports but also every coastal community has its own personality. Citizens can be from the same region but have significantly different values and desires and demand to control their individual destiny political and social. For example, the restoration of the Jersey shore post-

Sandy demonstrates this home rule philosophy (Gurian, 2013). Each community along the shore wants to dictate their own response to the call for greater shoreline protection – some want berms, others seawalls, others boardwalks and others nothing blocking their view of the ocean.

Home rule also applies to ports. There is a common saying among maritime folks: "When you have seen a port, you have seen a port." The idea behind this saying is that each and every port is unique because of the enormous diversity and variety of parameters involved in characterizing a port – everything from the types of cargo to the types of governmental oversight. With such a broad spectrum, is a uniform protocol for communities and ports achievable? In fact, is it possible with their competitive attitudes, is it even desired by this fiercely independent parties? This section attempts to tackle describing physical infrastructure and social capital resilience separately but seeks to integrate them, looking for a nominal resilience framework/guidelines.

6.2 **Evolving Physical Standards**

On the physical infrastructure side, a more resilient coastline can be achieved through the adoption of consistent, coordinated, and forward thinking building codes that reflect the most recent state of the science. Wakeman and Miller (2013) reviewed the impacts of Hurricane Sandy on the Port of New York and New Jersey and identified several lessons that in the context of the present work help define a path forward. Two of the messages from that earlier work were the need for consistent design guidance on the coastal engineering aspects of facility design and the adoption of regionally consistent and conservative design flood elevations. Two challenges that were identified in implementing these measures in an urban setting were the uncertainty of future conditions and the need for maintaining service/use while in the process of adapting. Of course the elephant in the room, is finances. Who pays? Especially once federally funded storm relief programs end.

A related issue is the need for regionally consistent and conservative design flood elevations. The current system is inadequate in that it is based on static Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMS), which are developed in support of the National Flood Insurance Program (NFIP). The NFIP is tasked with reducing the impact of flooding on public and private structures by providing affordable insurance to property owners and encouraging communities to adopt and enforce sound, risk-based floodplain management regulations (FEMA, 2015). Risk is established through a technical process that uses detailed modeling to establish the areas at risk from storm surge and wave attack. In coastal areas, zones (designated as A, Coastal A, and V) are used to delineate areas of low (<1.5 feet), moderate (1.5-3.0 feet), and high (>3.0 feet) wave activity (FEMA, 2005). Building code requirements are typically linked to the zone designation identified on the FIRM. An issue identified by Wakeman and Miller (2013), is that because of their size, ports often span one or more flood zones, which can result in the application of different design standards within the same port facility. It was recommended that states, communities, and port authorities adopting a consistent standard across zones and jurisdictional boundaries within a port region.

As mentioned earlier and brought up during the Resilience Workshop is that the flood zone delineations are static and do not take into account the impact of sea level rise. As such they establish a baseline threat that does not increase within real-time. Revising the baseline must

wait until the maps are updated, sometimes decades later. Many communities use freeboard requirements as a way of overcoming these shortcomings, but the prevalence of home rule in many places results in neighboring communities with widely varying design elevations.

Wave resistant design is a consideration that is rarely addressed at the community level. The Federal Emergency Management Agency's flood maps define the areas in which more rigorous wave resistant design and construction practices must be used (V-zones). However this line is also static and based on the understanding of the threat at the time the maps were created. While most local building codes adopt more stringent standards in these wave impacted areas, they generally do not include any means of adapting to the threat as it evolves. An approach that has gained traction in New Jersey since Hurricane Sandy is the official adoption of more stringent design and construction standards for Coastal A zones (FEMA, 2005;Mikle, 2015).

One of the challenges to adopting more stringent design standards is the general uncertainty surrounding future conditions. On a philosophical level, most rational people agree that conditions are changing and it makes sense to adapt; however for the people responsible for investing in adaptation measures, the concept of change is often not enough to justify the significant expenditures required. This is even truer in an economic climate where there is often intense competition for a shrinking amount of financial resources. Another challenge identified during the workshop relates to the difficulty of undertaking measures to enhance resiliency in urban settings without significant disruptions to the community. This problem is particularly true of climate change's long term impacts. Perhaps in the short term, the clearest example is the common flood hazard mitigation response of elevating vulnerable structures. In urban residential settings, where row houses are common, or in industrial port settings where operational constraints are an issue, the standard approach of elevating structures is more difficult to apply.

One of the clearest messages that came out of the coastal resilience workshop was the need for incentive programs, which most likely will have to rely on public private partnerships. In order to enhance structural resilience the first step will be defining "the standard". Once the standard is agreed upon incentives can be defined based on achieving and/or exceeding the standard. The example identified during the resilience workshop was the Community Ratings System (CRS), which provides reduced flood insurance premiums for communities which take steps to reduce their flood risk (FEMA, 2015). A similar or expanded program which offers incentives for undertaking resilient design practices that goes above and beyond what the CRS offers and is more applicable to urban environments would be one possible framework.

6.3 **Emerging Social Assets**

Building social capital has been accomplished where there are existing social networks, and when there is sense of belonging to a stakeholder group (NRC, 2011). Typically it is achievable when there are public-private partnerships between parties that share common values and have a clear mandate to stabilize their actions (International and Corporation, 2014). Supply chain disruptions have demonstrated that there is potentially a limiting factor in a port's resilience capacity; it is the coordination of waterway activities with the terminal side activities including the land side operations and intermodal connections (Wakeman and Miller, 2013). A key result

of this finding involves the suggestion for port regions to form a land-based logistics team to enhance coordination (Python and Wakeman, 2015). In order to fill the communication gaps of the current system, a new or enhance organization is needed to bridge the observed disconnect in the supply chain between the waterside and the landside operations. It is recommended that an independent landside team be organized to strengthen terminal and intermodal connector communications if local service provider associations are present -- as in some ports -- and in ports without such service provider associations, should be created. These teams become the social groups that will create social capital with the surrounding communities to enhance resilience if there is a supply chain disruption – separate from the activities of the MTS-RU in the harbor.

Beyond the establishment of a landside logistics team, the port region must establish a tiered decision making structure and guidelines for policies and pre- and post-disruption activities. Python (2013) listed pre-event activities to prepare for port disruptions from flooding. She identified a series of specific actions that should be undertaken, and then organized these into a standardized framework that depends on the collaboration of four organizations. The first tier of decision making is focused in two coordinating bodies: a regional coordinating body and a state coordinating body. This tier works with federal coordinating units. In addition, there is a second tier that is primarily concerned with on-the-ground activities during and following the disruption. In the port area, these coordinating bodies would be responsible for the recovery of the waterside and landside transportation activities respectively. Figure 3 shows the relationships of these proposed coordinating bodies and teams.

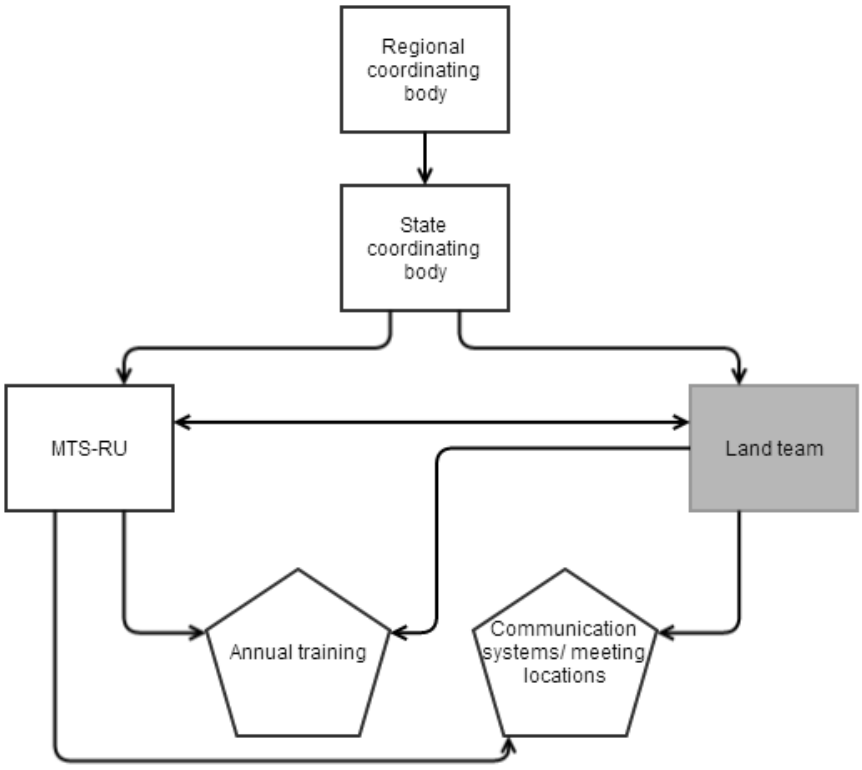


FIGURE 3: Coordinating Bodies and Joint Efforts

For example in the Port of New York and New Jersey, the regional coordinating body could be the Port Authority's Emergency Management Office (OEM) and the OEM of the states of New York and New Jersey could be the state level organizations. The local coordinating bodies in the port domain are the MTS-RU (waterside team) and a landside logistics team (still to be formed). There would be joint efforts among the organizations to enhance communication and collaboration by holding training sessions and working to enhance shared emergency communication systems and meeting locations. Other regions could have a different arrangement as long as the four main coordinating bodies are represented.

This suggested organizational framework is consistent with the findings and recommendations from the National Infrastructure Advisory Council (Section 4.1), the prior post-Sandy interviews (Section 4.2), the National TRB-CMTS Washington D.C. conference (Section 4.3a), and the November Resiliency Workshop (section 4.3b). All of these sources point to a need for greater collaboration among impacted stakeholders. Collaboration among supply chain players over the last year in combating congestions at the nations' ports has demonstrated that cooperation among multiple business adversaries is possible (Kulisch, 2015). An effort to share information and best practices among members of the supply chain resulted in the breaking the gridlock that had plagued the container traffic on both coasts. This same high degree of cooperation and collaboration is needed for supply chain resiliency enhancement during disruptions.

7. Supply Chain Collaboration

When a disruption occurs to the supply chain, there are rapidly spreading business consequences that go beyond the impacted region. Establishing cooperative relationships among ports provides redundancy. The first concern is to ensure that the flow of goods continues as close to normal as possible, which may require goods to be rerouted for a certain amount of time. Of course, port authorities and other governmental agencies do not dictate the routes that cargo flows – that is the responsibility and prerogative of the cargo owner. However, development of cooperative relationships are important steps to enhancing resilience as discussed by the participants in the previously described TRB-CMTS Conference and Resilience Workshop.

Python (2013) also proposed other measures to enhance current port resilience. These additional actions are broken into four over-arching guidelines: contingency port, partnership port, contingency plans, and pre-storm preparations. The relationships among these components are displayed in Figure 4. *Contingency Ports* are ports in the same region of the country that will be able to handle an over flow of goods from a disrupted port. Identifying contingency ports, and providing them with relevant data when disruptions occur, allows for all ports to be aware and prepared to aid each other. Another concern is getting the damaged port back to full functionality. Ideally each port is able to get their own port fully functional on their own. What happens, however, when key personnel are unable to complete their duties following a disruption? Having redundancy for key personnel is necessary. Identifying a *Partnership Port* could allow ports to share personnel in the event of disruption that results in key personnel being unable to complete their job. *Contingency Plans* provide port personnel common knowledge of equipment, where emergency equipment not used during normal operations comes from, and locations or methods for housing personnel, equipment and vehicles to be pressed into service during an emergency.

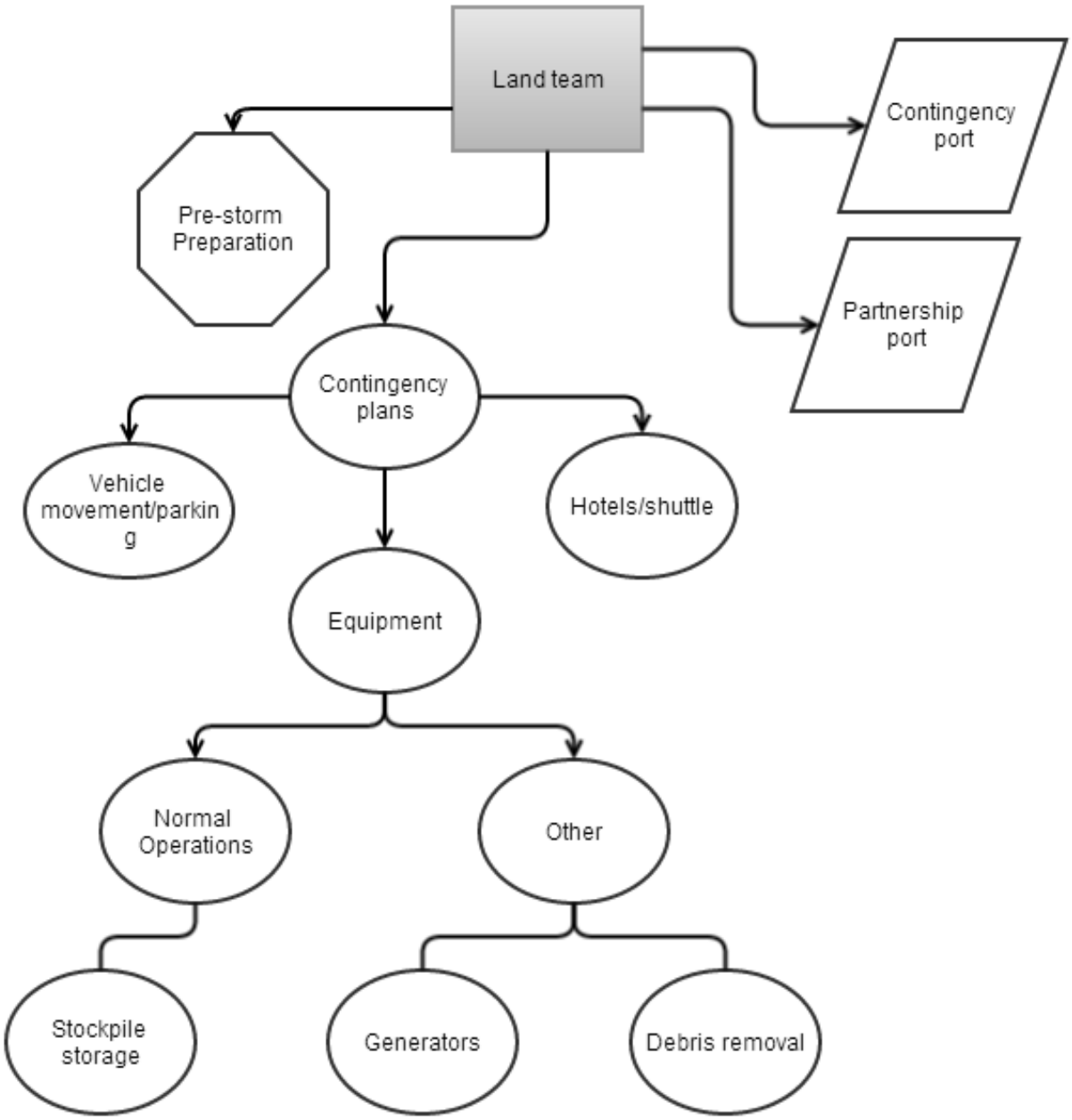


FIGURE 4: Flowchart Depicting Requirements of Proposed Land-based Team

Protecting personnel following a disruption is a top concern for the port (Southworth, Hayes, *et al.*, 2014; Python and Wakeman, 2015). By creating plans for hotel rooms, key personnel, and their families when necessary, can be housed and remain safe throughout the course of the disruption. Such assistance could allow personnel to be free of worry about their families and therefore be able to work more effectively.

Similarly, *Pre-storm Preparations* are important for equipment and supplies. Protection of vehicles helps to ensure that mobile security measures and intermodal connections remain functional and can be used as soon as the port is again operational. These vehicles would require

an off-site high elevation location that is removed from the impacts of potential flooding or debris damage. When a location has been selected and is approved for use prior to and during a disruption, the parking area can also be used to ensure that stockpiled equipment remains safe and useable.

As a physical consideration, rather than continuing to stockpile normal operations equipment on the first floor of port buildings, where they are susceptible to the same damage as the equipment that is currently in use at ground level, other storage options should be considered. Retrofitting an empty TEU (twenty-foot equivalent unit) container could serve as a storage location for equipment. During normal operations the storage TEUs could be stacked like other TEUs, reducing the space required, but during a disruption could be picked up and moved to the same parking area as the vehicles.

The storage of equipment used during normal operations provides only one aspect of the equipment used during a disruption. The other aspect is to gain an understanding of how and where emergency equipment, not used during normal operations, will arrive at the port for use in the event of a disruption. Understanding aspects of normal equipment and emergency equipment usage is necessary for effective use in the wake of a disruption.

Taken together, the organizational addition of the landside logistics team and the additional guidelines including contingency port, partnership port, contingency plans, and pre-storm preparations make-up a suggested framework for enhancing port resilience. Figure 5 presents an aggregation of the framework and guideline components described previously and presented in Figures 3 and 4.

8. Findings

This project sought to identify the best developmental practices and interdisciplinary linkages of physical infrastructure and social capital assets to provide for rapid recovery in the coastal zone from the consequences of climate change or extreme events. It sought to answer: How can complimentary physical infrastructure and social capital best be created? How should the construction of these two types of infrastructures be formulated to gain support of waterfront businesses and the acceptance of their neighboring communities? Findings from literature reviews, federal/state agency and industry stakeholder interviews, national and regional meetings as well as analyses of past disruptive events were utilized to describe coastal vulnerabilities, resiliency gaps, and resiliency challenges. A conceptual framework/guideline has been developed to describe building codes and collaborative guidelines for linking waterside supply chain activities and organizing new independent land-based logistics teams with recommendations for their activities to enhance supply chain resilience.

The marine supply chain includes waterside and landside logistics players. The landside logistics team would consist of, among others, specific port authority personnel, customs and border protection, terminal operators, labor unions, truck and freight train operators and distribution centers and warehouse operators. The land team could be its own coordinating body, or a subsidiary of the MTS-RU, but it must create a seamless business connection between these

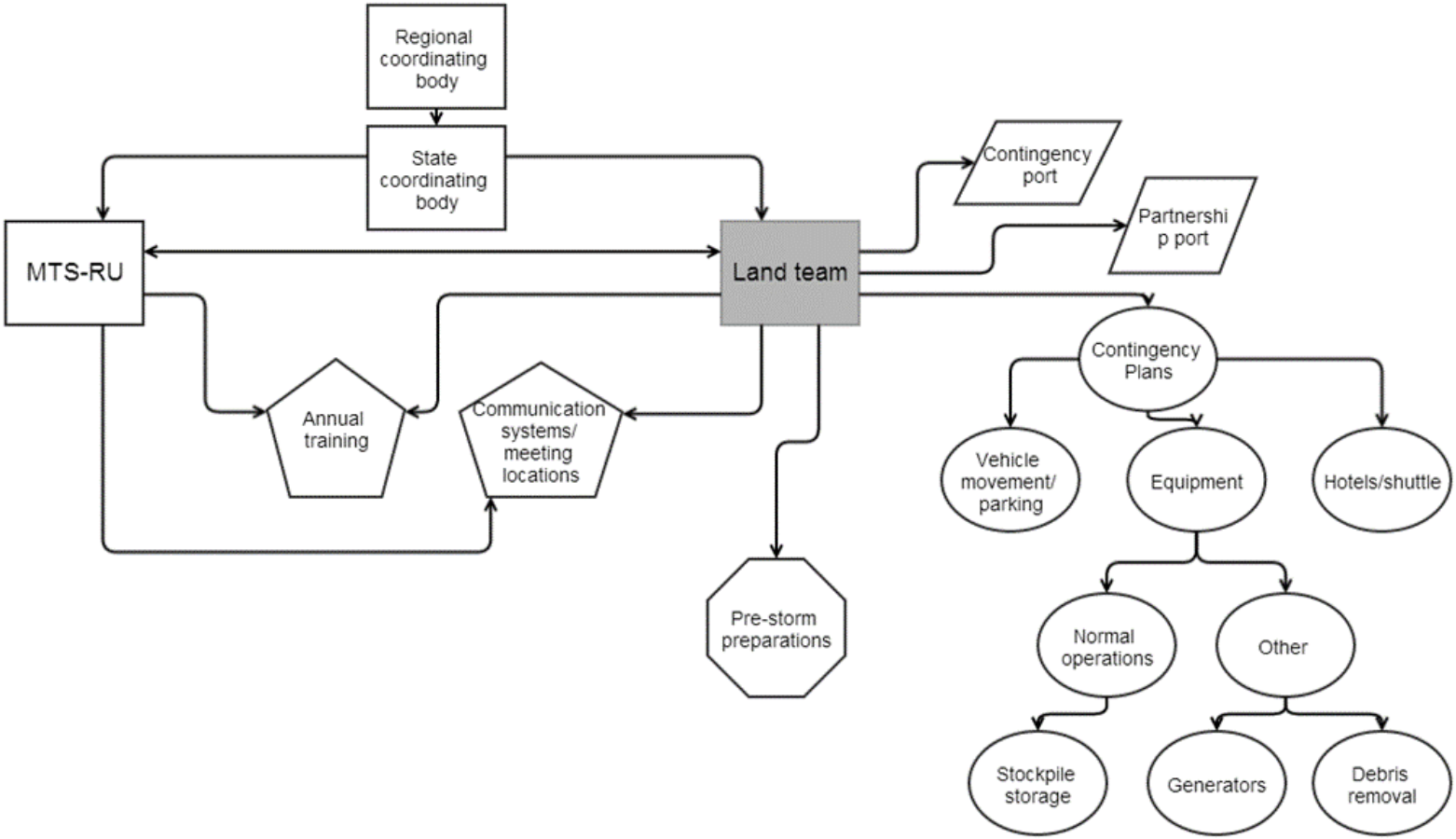


FIGURE 5: Flowchart Depicting Regional Bodies and Actions of Land-based Team

two bodies. The land-based team would be responsible for handling resilience measures for land side operations including loading and unloading of cargo, security measures, and intermodal connections as well as interfacing with the local MTS-RU. Both the MTS-RU and the land team must work closely with each other to help improve port performance and resilience. Effective communication and current training are necessary for every member to perform their jobs properly in a coordinated effort.

These resiliency processes and approaches proposed may be used to reduce consequences of sea level rise and coastal flooding or other disruptions at ports and coastal communities. However, the uniqueness of each coastal community and seaport limits the uniform application of the proposed framework and guidelines because it seems that of the non-uniform characteristics of each situation and the involved community as well as their port facilities inhibits cooperation. (However this assumption has not been tested.) Decision makers will implement plans according to their own needs, policies, and resources. Hence the project developed separate guidelines for the physical infrastructure (i.e., building codes) and another set of guidelines for social capital enhancement (i.e., the land-based logistics team development).

Questions still remain: What are the principles that allow disrupted environments and coastal communities to recover? How can physical and social asset best be used to hasten both environmental and community resources to recover? How can planning be used to avoid cascading system failures? How can we use findings from prior storms to formulate lessons learned that will assist in decision-making to reduce the impact of future disruptive events? New socio-technical guidelines are needed that will attempt to incorporate empirical-based protocols for both physical infrastructure and social capital development in coastal areas.

Finally development is still wanting for an integrated framework and tools for enhancing resilience in design and engineering practice as well as for developing instructional frameworks and practitioner's toolbox for interdisciplinary education.

9. Conclusions

There are growing concerns that a new period of rapid climate change is emerging with anticipated sea level rise. Increasingly the coastal environment is being modified by the built environment including ports, residential areas, and shoreline facilities – particularly as the urban density increases along the shoreline. Guaranteeing the sustainability of the coastal zone built environment and the maintenance of commercial services requires an understanding of local human populations and their behaviors, the adequacy of protective infrastructure, the impact of these on the coastal urban environment, and the decision-making processes that will govern in stressed situations.

Ports are critical element in the global supply chain and any disruption in that transportation system can have significant impacts on the U.S. economy. Climate change and associated sea level rise have the potential to cause significant and frequent damage to the coastal environment if precautions are not taken. The location and nature of a port makes it susceptible to both natural and human-made disasters. Ports will inherently have some level of vulnerability to disruptions because of their location (adjacent to waterways) and their interdependencies (industrial and

societal) with their associated communities. Sandy and other recent storms on the Eastern seaboard, combined with trends of sea-level rise and storm severity, have demonstrated that reducing the impact of port damages and community disruptions is an economic necessity. Maritime commerce and ports must have business continuity plans. Actions that can be taken in coastal communities and along the working waterfront that need to include installation of protective physical infrastructure (structural and non-structural) as well as establishment of social capital that will increase resilience.

The primary objective of this research was to make port facilities and associated supply chain transportation operations, and more broadly coastal community facilities, more resilient in the future when impacted by significant storm events like Sandy. It was hoped that if the findings for ports are homogenous across all ports, then their application would also have applicability to other forms of disruptions including terrorism and labor disputes.

A conceptual organizational framework and general operational guidelines were presented to aid and enhance resilient processes, including decision making tiers, were developed to promote better linkages among the waterside and landside component of the supply chain. The guidelines include the establishment of a land-based logistics team to help coordinate and facilitate the recovery of the supply chain components: intermodal connections, warehousing and distribution center activities. Further the guidelines were proposed to ensure understanding of actions that are necessary to respond to flooding, disaster impacts, and system failures across all sectors and supply chain personnel. If ports throughout the country use the same basic guidelines and work to overcome the normal competitive nature associated with the maritime industry, it is proposed that guidelines would allow ports to come to each other's aid in the event of a disruption. This helps create a more resilient port system, further enhancing regional and national resilience.

An overriding focus for this project has been to create uniform multi-disciplinary methodologies that will enable engineers, social scientists and decision-makers to create resilient physical/social assets in coastal environments using a nominative template. The uniqueness of ports and supply chains seems to obstruct application of one formulation for all marine facilities in ports and regional supply chain resilience. The application of this research indicates that coastal communities, and particularly their port facilities, waterfront industries, and associated supply chain transportation operations, will have to individually formulate their unique local circumstances to achieve s more resilient infrastructure to enable both physical and social characteristics to bounce back from disruptions resulting from climate change or other causes.

The one theme that was repeated from expert panels to practitioner interviews was that there must be a communication plan for all stakeholders during and after a disruptive event in order for decision makers to function and for recovery activities to proceed. This is an essential asset that opens the possibilities for communities, ports, and supply chains to be resilient and rebound from disruptive events.

10. Research Recommendations

In summary, there remain several major gaps in the research on the pairing of physical infrastructure and social capital influence on resilience in the coastal zone. It is hoped that any

future research on these areas including port assets will garner increased consideration of social science implications for successful integration of physical and social measures.

New interdisciplinary research is needed to understand how social capital and other human factors play into enhancing resilience in the maritime sector and other supply chain systems, to siting of coastal protective infrastructures and the influence of home-rule attitudes, and to gauge community support, particularly with respect to marine transportation systems investments in resiliency given their mix of public and private stakeholders and community concerns.

It would be useful to survey coastal seaports and/or supply chain businesses to determine what activities they have undertaken to enhance resilience. It would be particularly valuable to seek situations where this framework or something similar has been implemented and sub-sequentially a disruption has occurred. The results could be examined to test the validity of the conceptual organizational and operational guidelines presented in this study. Alternatively a group stakeholder could be convened to vet the suggested protocols.

Finally, the results of this study indicate that work is needed particularly with respect to two issues: 1) the enhancement of social capital and social networks in contributing to community resilience and 2) the tendency for network industries to experience cascading failures of services when stressed.

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Appendix A

Physical and Social Infrastructure Resiliency Workshop Agenda

Date: Friday, November 14, 2014

Time: 9:30am to 2:30pm

Location: Stevens Institute of Technology

Babbio Center, 6th Floor, Room 607, 525 River Street, Hoboken, NJ 07030

Workshop Objective: *The objective of the workshop is to discuss the resiliency of physical and social infrastructure and to work on documenting activities that strengthen their relationship and increase decision-makers effectiveness during incident response and recovery from natural and human-caused disruptions.*

AGENDA

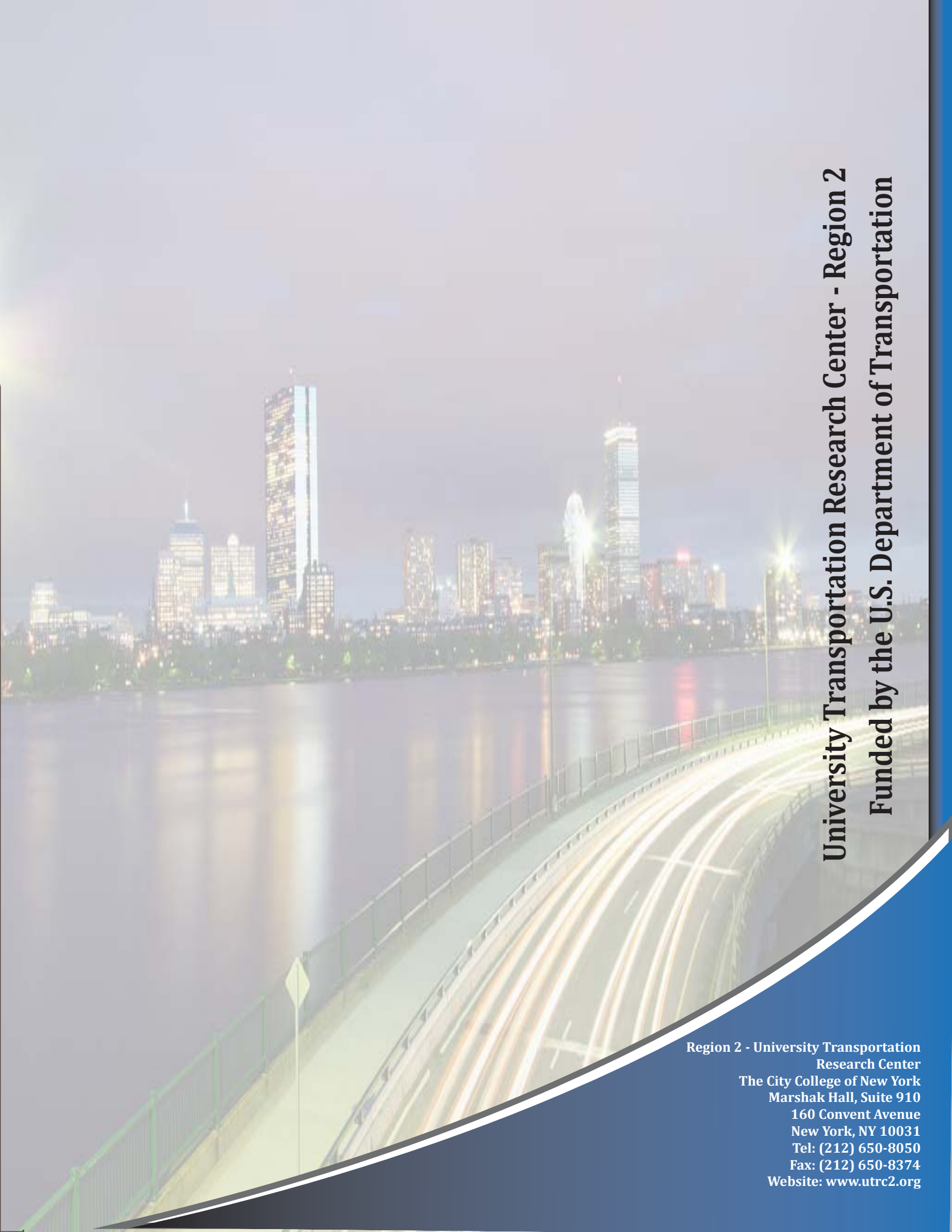
Time	Topic	Presenter
09:30	Introductions & Workshop Overview	Wakeman & Miller
10:00	Panel One – *Tomorrow's Coastal Infrastructure Systems*	Miller
	Speakers: John Headland (Headland & Associates); Roy Messaros (USACE); Greg Biesiadecki (Langan); Michael Marrella *(invited)* (NYC Planning)	
11:00	Panel Two – *Decision-making during Periods of Crisis*	Wakeman
	Speakers: Joseph Picciano (NJ OHS&P); Naomi Fraenkel (USACE NAD); Vicky Cross Kelly (Parsons Brinkerhoff); Roland Lewis (Waterfront Alliance)	
12:00	Working Lunch – *Getting Past Individual Fixes to Systematic Adaption*	
12:30	Work Group Discussions	
	a. Moderator A – William Rousse (Alexander Crombie Humphreys Professor, School of Systems & Enterprises, Stevens Institute of Technology) b. Moderator B – Alex Washburn (Industry Professor for Design, School of Systems & Enterprises, Stevens Institute of Technology)	
13:30	Work Group Report-outs by Moderators	
14:00	Recap and Next Steps	Miller & Wakeman
14:30	Adjourn	

Appendix B

Physical and Social Infrastructure Resiliency Workshop
November 14, 12014

Participants List

Gregory	Biesiadecki	gbiesiadecki@Langan.com	Langan Engineers
Caleb	Stratton	cstratton.cityof hoboken@gmail.com	City of Hoboken
Steve	Eberbach	seberbach@mbakerintl.com	Baker
Naomi	Fraenkel	Naomi.R.Fraekel@usace.army.mil	USACE
John	Headland	jheadland@headland-associates.com	Headland & Associates
Jack	Hobson	jhobson@panynj.gov	USCG
Vicky Cross	Kelly	kellyvc@pbworld.com	Parsons Brinckerhoff
Roland	Lewis	rlewis@waterfrontalliance.org	Waterfront Alliance
Michael	Marrella	mmarrel@planning.nyc.gov	NYC Planning
Bradford	Mason	bradford.mason@ohsp.state.nj.us	NJ OHS&P
Roy	Messaros	Roy.C.Messaros@usace.army.mil	USACE
Jon	Miller	jmiller@stevens.edu	Stevens - convener
Werner	Mueller	Werner.Mueller@hdrinc.com	HDR
Philip	Orton	philip.orton@stevens.edu	Stevens
Joe	Picciano	Joseph.Picciano@ohsp.state.nj.us	NJ OHS&P
Michael	Porto	mporto@waterfrontalliance.org	Waterfront Alliance
William	Rouse	William.Rouse@stevens.edu	Stevens - facilitator
Bill	Slezak	bill.slezak@urs.com	URS Corp.
Anne	Strauss-Wieder	asw@as-w.com	ASW, Inc.
Tom	Wakeman	twakeman@stevens.edu	Stevens - convener
Katy	Walling	kwalling@stevens.edu	Stevens - recorder
Alex	Washburn	Alexandros.Washburn@stevens.edu	Stevens - facilitator
Edgar	Westerhof	edgar.westerhof@arcadis-us.com	ArCadis



University Transportation Research Center - Region 2

Funded by the U.S. Department of Transportation

Region 2 - University Transportation Research Center
The City College of New York
Marshak Hall, Suite 910
160 Convent Avenue
New York, NY 10031
Tel: (212) 650-8050
Fax: (212) 650-8374
Website: www.utrc2.org

Appendix I
Charter of the U.S. Maritime Transportation System National Advisory Committee

Charter of the U.S. Maritime Transportation System National Advisory Committee
U.S. Department of Transportation

1. **Committee's Official Designation.** The Committee shall be known as the U.S. Maritime Transportation System National Advisory Committee (MTSNAC or Committee).

2. **Authority.** The Committee is established pursuant to 46 U.S.C. § 50402 and operated in accordance with the Federal Advisory Committee Act (FACA), 5 U.S.C. App. 2. The MTSNAC is in the public interest and supports the Maritime Administration (MARAD) in performing its duties and responsibilities.

3. **Objectives and Scope of Activities.** The objective of this Committee is to advise the Secretary of Transportation on matters relating to the United States maritime transportation system and its seamless integration with other segments of the transportation system, including the viability of the United States Merchant Marine. The Committee will provide information, advice, and recommendations to the U.S. Secretary of Transportation (Secretary), through the Maritime Administrator (Administrator), on matters stated in the document *Goals and Objectives for a Stronger Maritime Nation: A Report to Congress* that are related to identifying and seeking solutions to the important challenges within the Maritime Transportation System. The Committee will not exercise program management responsibilities and will make no decisions directly affecting the programs on which it provides advice; decisions directly affecting implementation of maritime policy will remain with the Administrator.

   The Administrator will use the advice, information and recommendations generated by MTSNAC for an array of policy deliberations and for interagency discussions on meeting the *Goals and Objectives for a Stronger Maritime Nation: A Report to Congress*. The Secretary and Administrator may accept or reject a recommendation made by the MTSNAC and are not bound to pursue any recommendation from the MTSNAC. In the exercise of his or her discretion, the Secretary, Administrator, or his or her designee, may withdraw a task being considered by the MTSNAC at any time.

4. **Description of Duties.** During the term of the charter, MTSNAC shall undertake information-gathering activities, develop technical advice, and present recommendations to the Administrator on matters relating to the U.S. maritime transportation system and its seamless integration with other segments of transportation, which includes considerations identified in the document *Goals and Objectives for a Stronger Maritime Nation: A Report to Congress* relating to the following goals:

    1. Strengthen U.S. Maritime capabilities essential to national security, economic prosperity and to optimize supply chain performance;

    2. Ensure the availability of a diverse and inclusive U.S. maritime workforce that will support the sealift resource needs of the National Security Strategy;

    3. Support enhancement of U.S. port infrastructure and performance; and

    4. Enable maritime industry innovation in information, safety, environmental impact and other areas

5. **Agency or Official to Whom the Committee Reports.** The Committee reports to the Secretary through the Administrator.

6. **Support.** MARAD will provide administrative and technical support to the Committee.

7. **Estimated Annual Operating Costs and Staff Years.** Annual administrative operating costs are estimated at $220,000, including the equivalent of one Federal full-time equivalent (FTE).

8. **Designated Federal Officer (DFO).** The Administrator shall designate a full-time or permanent part-time MARAD employee to serve as the DFO for the MTSNAC, as well as any alternate DFOs to support the Committee. The DFO (or designee) will:

    a. Ensure compliance with FACA and any other applicable laws and regulations;

    b. Approve or call all of the Board meetings;

    c. Attend all Board and subcommittee meetings;

    d. Formulate and approve all meeting agendas;

    e. Maintain all Board records, files, and membership records;

    f. Adjourn any meetings when doing so would be in the public interest; and

    g. Chair meetings when directed to do so by the Administrator.

9. **Estimated Number and Frequency of Meetings.** The Committee will be expected to meet at least three times per fiscal year.

10. **Duration.** Continuing.

11. **Termination.** This charter shall terminate two (2) years after its effective date unless renewed in accordance with FACA and other applicable requirements.

12. **Membership and Designation.** The Committee will comprise 27 members who have particular expertise, knowledge, and experience in matters relating to the function of the Committee. Individual members, and not their organizations, are appointed to the Committee. The Maritime Administrator will seek a membership that is fairly balanced in terms of points of view of the affected interests.

    Pursuant to 46 U.S.C. § 50402, MTSNAC membership will include at least one representative from each of the following: the Environmental Protection Agency, the Department of Commerce, the Corps of Engineers, the Coast Guard, the Customs and Border Protection, and State and local governmental entities. Additional members shall represent private sector entities that reflect a cross-section of maritime industries, including port and water stakeholders, academia and labor. The Secretary may appoint additional representatives from other Federal Agencies as deemed appropriate but may not comprise more than one-third of the total membership of the committee.

    Non-Federal members will serve as Special Government Employees or Representative members. Members appointed solely for their personal expertise will serve as Special Government Employees. The Committee shall include representatives of State and local governmental entities as well as private sector entities that reflect a cross-section of maritime industries, including port and water stakeholders, in addition to representatives from academia and labor.

    All members are appointed by, and serve at the pleasure of, the Secretary of Transportation. Terms may be staggered by the Secretary to establish continuity among the membership in

subsequent years. Members shall continue to serve until their replacement has been appointed. Completion of terms is contingent upon the renewal of the Committee's charter. A Federal Register Notice may be published from time to time to solicit applications for new Committee members.

13. **Subcommittees.** The Administrator may create subcommittees or work groups. All subcommittees and work groups shall report their recommendations and advice to the full MTSNAC for deliberation and discussion and not directly to MARAD.

14. **Recordkeeping.** The records of the Committee, formally and informally established subcommittees, or other subgroups of the Committee, shall be handled in accordance with General Records Schedule 6.2 or other approved agency records disposition schedule. Subject to the Freedom of Information Act, 5 U.S.C. § 552, the Committee's documents shall be available for public inspection and copying at a single location in the offices of the Committee sponsor until the Committee ceases to exist.

15. **Filing Date.** The filing date of this charter is September 16, 2022. If not renewed, this charter will expire on September 16, 2024.

Federal Advisory Committee (F.A.C.) Membership Balance Plan

Please read the Federal Advisory Committee Membership Balance Plan Guidance prior to completing this form

(1) FEDERAL ADVISORY COMMITTEE NAME:

Maritime Transportation System National Advisory Committee (MTSNAC)

(2) Authority:

a. The Committee is constituted pursuant to section 50402 of Title 46 U.S.C., and in accordance with the Federal Advisory Committee Act (FACA), as amended, 5 U.S.C. App 2.

b. The Secretary of Transportation delegated to the Maritime Administrator authority under 49 C.F.R. § 1.93(a).

(3) Mission/Function:

The Committee shall advise the Secretary of Transportation on matters relating to the United States maritime transportation system and its seamless integration with other segments of the transportation system, including the viability of the United States Merchant Marine. The Committee will provide information, advice, and recommendations to the U.S. Secretary of Transportation (Secretary), through the Maritime Administrator (Administrator), on matters stated in the document *Goals and Objectives for a Stronger Maritime Nation: A Report to Congress*. The Committee will not exercise program management responsibilities and will make no decisions directly affecting the programs on which it provides advice; decisions directly affecting implementation of maritime policy will remain with the Administrator.

(4) Points of View:

The committee will have 27 voting members who reflect various perspectives of the maritime transportation system. Each member of the Committee shall have particular expertise, knowledge, and experience in matters relating to the function of the Committee.

Consistent with 46 U.S.C. § 50402, MTSNAC membership will include at least one representative from each of the following: the Environmental Protection

Agency, the Department of Commerce, the Corps of Engineers, the Coast Guard, the Customs and Border Protection, and State and local governmental entities. Additional members shall represent private sector entities that reflect a cross-section of maritime industries, including port and water stakeholders, academia and labor. The Secretary may appoint additional representatives from other Federal Agencies as deemed appropriate but may not comprise more than one-third of the total membership of the committee.

(5) Other balance Factors

To the extent practicable, MARAD will seek to ensure balance by appointing a membership that is diverse, equitable and inclusive who represent the primary areas of the maritime transportation system to include: (1) industry, such as ship-owners and operators, ports and terminals, shipyards, freight forwarders, beneficial cargo owners, etc.; (2) regional representation across the Nation; (3) relevant policy areas such as supply chain, goods movement, infrastructure financing; and (4) customers, stakeholders, and providers.

(6) Candidate Identification Process:

A nomination review team comprised of representatives from MARAD will review applications received. The nomination review team will make recommendations regarding membership to the Administrator based on the following criteria: (1) Professional or academic expertise, experience, and knowledge; (2) stakeholder representation; (3) availability and willingness to serve; and (4) relevant experience in working in committees and advisory panels. Nominations are open to all individuals without regard to race, color, religion, sex, national origin, age, mental or physical disability, marital status, or sexual orientation. The Maritime Administrator will recommend nominee for appointment with various kinds of expertise, experience, and perspectives on the maritime transportation system. Potential members of the Committee are reviewed by the staff of the Office of Ports & Waterways and the Office of Chief Counsel and other agency representatives when necessary. The candidate's biographical information is assessed with regard to the criteria noted in sections 4 and 5 above. Staff recommendations are forwarded to the Administrator and ultimately the Secretary for selection. Each applicant's information is retained in case a mid-term vacancy should arise.

(7) Subcommittee Balance:

Once subcommittees are formed, the agency will apply the criteria appropriate to the responsibilities of each subcommittee. Subcommittee membership will not exceed one-third Federal representation on any subcommittee.

(8) Other:

N/A

(9) Date prepared/updated:
16 September 2022

Appendix J
Maritime Transportation System National Advisory Committee Committee Bylaws

Effective Date: August 31, 2022

Maritime Transportation System National Advisory Committee Committee Bylaws

Section I: Purpose

The Maritime Transportation System National Advisory Committee (MTSNAC or Committee) was established by charter on May 19, 2010, pursuant to the Energy Independence and Security Act of 2007 (P.L. 110-140) and the Federal Advisory Committee Act, as amended (5 U.S.C., App. 2). In addition, Section 8332 of the National Defense Authorization Act for Fiscal Year 2021 (P.L. 116-283) broadened the scope of the MTSNAC to require that the Committee shall advise the Secretary of Transportation on matters relating to the United States maritime transportation system and its seamless integration with other segments of the transportation system, including the viability of the United States Merchant Marine.

The MTSNAC shall undertake information-gathering activities, develop technical advice, and present recommendations to the Administrator on matters including, but not limited to, the following:

a. How to address impediments hindering effective use of marine highway transportation, including the expansion of America's Marine Highways, as directed in 46 U.S.C. § 55601;

b. How to strengthen U.S. Maritime capabilities essential to national security and economic prosperity;

c. Ways to ensure the availability of a U.S. maritime workforce that will support the sealift resource needs of the National Security Strategy;

d. Ways to support enhancement of U.S. port infrastructure and performance; and,

e. Ways to enable maritime industry innovation in information, automation, safety, environmental impact, and other areas.

The Committee's work will be aligned to the Agency's mission and guiding principle documents, such as the *Goals and Objectives for a Stronger Maritime Nation: A Report to Congress*. The Committee will not exercise program management responsibilities and will make no decisions directly affecting the programs on which it provides advice; decisions directly affecting implementation of maritime policy will remain with the Administrator.

Section II: Authority

The Committee is established pursuant to 46 U.S.C. § 55502, and is subject to the Federal Advisory Committee Act (FACA), as outlined in its Charter. The Secretary delegated to the Administrator authority to carry out functions related to the MTSNAC under 49 CFR § 1.93(a). The MTSNAC is in the public interest and supports the Maritime Administration (MARAD) in performing its duties and responsibilities.

Section III: Meeting Procedures

A. **Scheduling Meetings**: The Committee will be expected to meet publicly at least three times per fiscal year. Meetings may be conducted via teleconference, with adequate public access, if necessary. The agenda for each meeting shall be developed and approved in advance by the DFO.

The following procedures shall govern the conduct of MTSNAC public meetings:

1. MARAD will publish notice of meetings in the *Federal Register* at least 15 calendar days prior to the date of the meeting. The Notice shall include the agenda, date, time, location, purpose of the meeting, and an opportunity for public comments.
2. Each meeting will be held at a reasonable time, in a place reasonably accessible to the public, and in a room large enough to accommodate MTSNAC members, staff, and interested members of the public.

B. **Prepare an Agenda**: For each public MTSNAC (or subcommittee) meeting, the DFO, in consultation with the Chair and Vice Chair will prepare the agenda. Any MTSNAC member may submit items for the agenda to the DFO, Chair or Vice-Chair. Agendas will be outlined in the *Federal Register* notice announcing the public MTSNAC meeting and the DFO will distribute the agenda to MTSNAC members before each meeting. Items for the agenda may also be suggested by non-members, including members of the public. Administrative or preparatory meetings do not require notice in the Federal Register.

C. **Recommendations:** All advice and recommendations from subcommittees must be presented to the full MTSNAC for deliberation, discussion, and achievement of consensus. On behalf of the committee, the Chair in consultation with the Vice-Chair must submit advice and consensus recommendations through the DFO to the Administrator.

D. **Consensus**: The MTSNAC will use a consensus process to make recommendations to the Secretary through the Administrator.

1. **Definitions**: Consensus is a process, an attitude, and an outcome. Consensus processes have the potential of producing better quality; more informed and better-supported outcomes. As a process, consensus is a problem-solving approach in which all members:
    i. Jointly share, clarify, and distinguish their concerns;
    ii. Educate each other on substantive issues;
    iii. Jointly develop alternatives to address concerns; and then
    iv. Seek to adopt recommendations everyone can embrace or at least live with.

    In a consensus process, members should be able to honestly say:
    i. I believe that other members understand my point of view;
    ii. I believe I understand other members' points of view; and

iii. Whether or not I prefer this decision, I support it because it was arrived at openly and fairly and because it is the best solution we can achieve at this time.

Consensus as an attitude means that each member commits to working toward agreements that meet their own and other member needs and interests so that all can support the outcome.

Consensus as an outcome means that agreement on decisions is reached by all members or by a significant majority of members after a process of active problem solving. In a consensus outcome, the level of enthusiasm for the agreement may not be the same among all members on any issue, but on balance, all should be able to live with the overall package.

Levels of consensus on a committee outcome can include a mix of:

i. Participants who strongly support the solution

ii. Participants who can "live with" the solution

iii. Some participants do not support the solution but agree not to veto it.

2. **Consensus Guidelines:** The MTSNAC will seek consensus decisions on their recommendations. Achieving consensus is a participatory process whereby, on matters of substance, the members strive for agreements which all the members can accept, support, live with or agree not to oppose.

   In instances where, after vigorously exploring possible ways to enhance the members' support for the final decision on a package of recommendations, and the Committee finds that 100% acceptance or support is not achievable, final decisions will require at least 67% favorable vote of all members present and voting. This supermajority decision rule underscores the importance of actively developing consensus throughout the process on substantive issues with the participation of all members and which all can live with.

   The MTSNAC, Subcommittees or Working Groups will develop their recommendations and report using consensus building techniques with the assistance of facilitators. Techniques such as the use of brainstorming, ranking and prioritizing approaches will be utilized. Where differences exist that prevent the MTSNAC or a Subcommittee from reaching a final consensus decision (i.e. with the support of at least 67% of the members) on a key issue or group of issues, the committee will outline the differences on the issue in its report.

   To enhance the possibility of constructive discussions as members educate themselves on the issues and engage in consensus building, members agree to refrain from public statements which may prejudge the outcome of the Advisory Committee's consensus process. In discussing the Committee process with the media, members agree to be careful to present only their own views and not the views or statements of other participants.

3. **Consensus Draft Development:** The Chair or Subcommittee Chair, as appropriate, may appoint drafting Work Groups, to be chaired by an MTSNAC member, to seek consensus recommendations for the Committee's consideration utilizing the Committee's consensus procedures and guidelines. Committee members may be asked to individually rank each initial draft recommendations from a Committee drafting Work Group using a consensus testing scale. Plenary review and discussion of the ranked recommendations will follow. MTSNAC Committee members in plenary and drafting Work Group sessions will be asked to address concerns and suggestions in redrafting and refining the recommendations. Redrafted recommendations will ultimately be compiled into a single text for the Advisory Committee's review, refinement, and adoption.

E. Minutes and Records: For each MTSNAC or Subcommittee meeting, the DFO will keep minutes and records of all meetings. Minutes of all MTSNAC and subcommittee meetings must be prepared and include:

1. Time, date, and place of the meeting.
2. List of the attendees at the meeting, including members of the public if available.
3. Complete and accurate description of matters discussed, and conclusions reached with a description of public participation, including the members of the public who presented oral or written statements.
4. Copies of all materials received, issued, or approved.

The Chair of the MTSNAC (or a subcommittee) will certify the accuracy of the minutes within 90 days of the meeting. Once approved, minutes will be published on the MTSNAC website and made available to the public.

F. Public Procedures: Unless otherwise determined in advance, each meeting of the MTSNAC will be open to the public. Once an open meeting has begun, it will not be closed for any reason. All materials brought before or presented to the MTSNAC during an open meeting will be made available to the public. Interested persons may attend meetings, appear before the Committee as time permits, and provide oral or written comments to the committee. Persons wishing to appear before the MTSNAC must notify the DFO at the beginning of the meeting. Written materials may be submitted to the MTSNAC at any time by notifying the DFO.

Members of the public may attend MTSNAC meetings or portions of an open meeting and may offer oral comment at a time provided in the meeting agenda. The Chair may decide in advance to exclude oral public comment during a meeting, in which case the meeting announcement published in the *Federal Register* will note that oral comment from the public is excluded and will invite written comment as an alternative.

Materials brought before or presented to the MTSNAC during the conduct of a meeting, including the minutes of the proceedings of a meeting, will be available to the public for review or copying at the time of the next scheduled meeting.

Meetings of the MTSNAC will be closed only in limited circumstances and according to applicable law and DOT policies. Where the DFO has determined in advance that discussions during an MTSNAC meeting will involve matters about which public disclosure would be harmful to the interests of the Government, industry, or others, an advance notice of a closed meeting, citing the applicable exemptions of the Government in Sunshine Act, will be published in the Federal Register. The notice will announce the closing of all or a portion of a meeting. If during an open meeting, matters inappropriate for public discussion arise, the Chairman will order such discussion to cease and will schedule it for closed session. Notice of closed meetings will be published in the Federal Register at least 15 calendar days in advance. Requests for closed meetings must be approved by the Office of Chief Counsel.

Section IV: Role of the MTSNAC Officials

A. **Chair:** The Chair shall be designated by the Secretary, and works with the DFO in establishing priorities, identifying issues to be addressed, determining support required, facilitating open and fair discussions, determining when a vote is required, and serving as the principal for the MTSNAC's membership. In addition, the Chair is responsible for certifying the accuracy of minutes. Members of the committee representing federal agencies may not serve as the Chair.

B. **Vice-Chair:** The Vice-Chair shall be a member of the Committee designated by the Secretary and works closely with the Chair. If the Chair is unavailable, the Vice-Chair shall serve in his or her place. Members of the committee representing federal agencies may not serve as the Vice-Chair.

C. **Designated Federal Officer (DFO):** The Maritime Administrator designates an agency representative to serve as the DFO for the MTSNAC and shall serve as DOT's representative for all matters related to the MTSNAC's activities. The Maritime Administrator may also designate Alternate DFOs to support the administrative and operational requirements of the MTSNAC.

In addition, the DFO is responsible for providing adequate staff support for the MTSNAC administrative functions, namely:

a. Provide tasks or specific requests for recommendations, advice or analysis concerning marine transportation;

b. Assist in developing plans for the activities of the Committee and its subcommittees;

c. Serve as liaison between the Committee and other relevant Department of Transportation offices and Federal entities;

d. Coordinate invitations for subject matter experts to comment and participate in meetings in accordance with Department of Transportation policy and the Federal Advisory Committee Act;

e. Call meetings of the Committee after consultation with the Chair and determine the date, time, and location where they will be held;

f. Formulate an agenda, in consultation with the Chair, for each meeting;

g. Notify all Committee members of the date, time, place, and agenda for any meeting;

h. Provide administrative support for all meetings of the Committee, including the designation of an Agency liaison or alternate DFO;

i. Attend each Committee meeting and ensure compliance with the FACA;

j. Maintain all MTSNAC files and disseminating information in accordance with applicable statutes, resolutions, and instructions;

k. Adjourn any meeting when it is determined to be in the public interest; and,

l. Chair meetings when directed to do so by the Administrator.

D. Subcommittee Chairs: When subcommittees are formed, the Maritime Administrator will designate MTSNAC members to serve as the Subcommittee Chairs. Members of the committee representing federal agencies may not serve as Subcommittee Chairs. The Chairs of the subcommittees shall be members of the Committee. The Chairs may establish working groups to address issues for the subcommittee. The Subcommittee Chairs, in coordination with the DFO, are responsible for leading subcommittee meetings, setting the agenda, overseeing issues assigned to the subcommittee, supervising the subcommittee or working groups, notifying all subcommittee members of the agenda, time and place for any meeting, and reporting all recommendations and advice to the full MTSNAC for consideration and adoption.

E. Working Group Team Lead: When working groups are formed, the Chair will designate one MTSNAC member to serve as the Working Group Team Lead (Team Lead). The Team Lead is responsible for leading working group meetings, setting the agenda, overseeing issues assigned to the working group, supervising the working groups, notifying all working group members of the agenda, time and place for any meeting, and reporting all recommendations and advice to the subcommittee and full MTSNAC for consideration and adoption, as appropriate.

Section V: Role of MTSNAC Members

MTSNAC members are expected to:

a. Attend MTSNAC meetings in person or by an alternative means provided. If a member is unable to attend, the member may designate an alternate to attend on his or her behalf and shall notify the DFO of the substitution.

b. Use available resources to seek information, opinions, and data from members of the community, public or industry represented, so it may represent the interests of their segment of the marine transportation industry as well as the industry in general.

c. Join or otherwise actively support one or more of the subcommittees and/or working groups.

d. Make a motion to vote and vote as required.

Section VI: Subcommittees

Subcommittees may be established by the MARAD. Establishment of a subcommittee will be considered when MARAD, in consultation with the Chair, Vice-Chair, and DFO, deem it in the best interest in completing specific tasks. Subcommittee membership shall be established by the Chair, in consultation with the Vice-Chair and the DFO. In addition to MTSNAC members, subcommittees may also include persons who are not members of the Committee. MTSNAC members may call upon subject matter experts to provide input, advice, or subject matter expertise. Only Committee members, however, may vote on subcommittee issues and recommendations. For the purpose of carrying out its duties, the Committee, Subcommittee or Working Group may invite subject matter experts to comment and participate in meetings after consultation with the Designated Federal Officer (DFO).

Each subcommittee meeting must have a MARAD staff member in attendance, who may also serve as the DFO's representative.

All advice and recommendations from subcommittees must be presented to the full MTSNAC for deliberation and discussion.

Section VII: Working Groups

Working groups are *ad hoc* and therefore temporary in nature; they are used to address a specific task and will be dissolved upon completion of the assignment. MARAD, in coordination with MTSNAC Subcommittee Chairs, the DFO, and Chair and Vice-Chair, may designate working groups, determine the issues they are to address and determine the length of their existence. Non-MTSNAC members may only be allowed to join a working group upon approval from the DFO, and Chair, Vice-Chair, and specific Subcommittee's Chairs with the understanding that balance would be achieved or maintained with the addition of any non-MTSNAC members. In addition, MTSNAC members on the working group may call upon subject matter experts to act in an advisory capacity.

All advice recommendations from the working group must be presented to the Subcommittee and the full MTSNAC for deliberation and discussion, as appropriate.

Section VIII: Reimbursement

While engaged in the work of the Committee, all members may be allowed reasonable travel, subsistence, and other necessary expenses, including per diem in lieu of subsistence, in accordance with the rates and rules set under the Federal Travel Regulations. Eligible reimbursement expenses are subject to the availability of appropriations.

Section IX: Additional Information

The General Services Administration's Committee Management Secretariat is responsible for Government-wide oversight of advisory committees. The Secretariat will provide advice to the DFO as needed to ensure compliance with all Federal advisory committee statutes and regulations.