Edited by Steven Wills
with a foreword by Admiral James Foggo, USN (Ret)

RETURNING FROM EBB TIDE

Renewing the United States Commercial Maritime Enterprise

RETURNING FROM EBB TIDE

RETURNING FROM EBB TIDE

Renewing the United States Commercial Maritime Enterprise

Edited by Steven Wills, PhD
with a foreword by Admiral James Foggo, USN (Ret)

MCUP
MARINE CORPS UNIVERSITY PRESS

Quantico, VA
2025

LIBRARY OF CONGRESS CATALOGING-IN-PUBLICATION DATA

Names: Wills, Steven T., editor. | Foggo, James G., III, writer of foreword.

Title: Returning from ebb tide : renewing the United States commercial maritime enterprise / edited by Steve Wills, PhD ; with a foreword by Admiral James Foggo, USN (Ret.).

Other titles: Renewing the United States commercial maritime enterprise

Description: Quantico, Virginia : Marine Corps University Press, 2025. | Includes bibliographical references and index. | Summary: "Returning from Ebb Tide highlights the decline in our nation's commercial maritime capability for a variety of reasons-the peace dividend in the post-Cold War era; elimination of subsidies for the commercial maritime sector during the Ronald W. Reagan administration; and globalization whereby we outsourced our maritime lift requirements to foreign carriers, some of whom may not be friendly to us in times of war. It is one thing to lament the inability of our current maritime industrial base to produce aircraft carriers, warships, icebreakers, and submarines on time and on budget, yet policy makers and commentators often ignore the atrophy of our commercial maritime fleet. This is the fleet that supported the Allies to defeat authoritarian regimes in the First and Second World Wars and ferried hundreds of thousands of troops and millions of pounds of equipment in support of Desert Shield and Desert Storm. This fleet is a shadow of its former self, and this book represents a clarion call to action. Failure to revitalize America's once-great merchant fleet will spell sure defeat in the next time the United States finds itself fighting a major conflict. We cannot afford to idly observe the status quo in the commercial maritime sector"— Provided by publisher.

Identifiers: LCCN 2025000560 (print) | LCCN 2025000561 (ebook) | ISBN 9798987336267 (paperback) | ISBN 9798987336274 (epub)

Subjects: LCSH: Military sealift—United States—Evaluation. | Merchant marine—United States—Evaluation. | Shipping—United States—Evaluation. | Logistics, Naval. | Operational readiness (Military science)

Classification: LCC VC533 .R488 2025 (print) | LCC VC533 (ebook) | DDC 387.5/440973—dc23/eng/20250213

LC record available at https://lccn.loc.gov/2025000560

LC ebook record available at https://lccn.loc.gov/2025000561

This project was published in partnership with the Center for Maritime Strategy (CMS) and the Navy League of the United States.

Published by
Marine Corps University Press
2044 Broadway Street
Quantico, VA 22134

1st Printing, 2025
ISBN: 979-8-9873362-6-7
DOI: 10.56686/9798987336267

CONTENTS

PART 3: THE MERCHANT MARINE

FOREWORD

As a "plank owner" and dean of the Center for Maritime Strategy (CMS) of the Navy League of the United States, when we opened for business in January 2022, I needed a mission statement. With the help of my small team, we settled on the following:

> Our mission is to strengthen American national security through its Sea Services by conducting policy-driven research, advocacy, and education on the relationship between maritime power and international security.

In the coming months, I received a lot of unsolicited advice as to our priorities for research, advocacy, and content generation. Some pundits speculated that CMS would be yet another pro-Navy organization that reflexively advocated for more carriers and submarines. Others assumed that we would simply be a voice for the maritime industrial base's prime contractors. However, my thinking was to do something different in our advocacy that would surprise people. Hence, the publication of this edited volume of essays by noted authors that examine the challenges and opportunities facing the once-robust U.S. commercial maritime industry.

This book tells a sad story of decline in our nation's commercial maritime capability for a variety of reasons—the peace dividend in the post–Cold War era; elimination of subsidies for the commercial maritime sector during the Ronald W. Reagan administration; and globalization whereby we outsourced our maritime lift requirements to foreign carriers, some of whom may not be friendly to us in times of war.

It is one thing to lament the inability of our current maritime industrial base to produce aircraft carriers, warships, icebreakers, and submarines on time and on budget; yet, policy makers and commentators often ignore the atrophy of our commercial maritime fleet. This is the fleet that supported the Allies to defeat authoritarian regimes in the First and Second World Wars. This is also the fleet that ferried hundreds of thousands of troops and millions of pounds of equipment in support of Operations Desert Shield and Desert Storm and then brought them home. This fleet is a shadow of its former self, and this book represents a clarion call to action. Failure to revitalize America's once-great merchant fleet will spell sure defeat the next time the United States finds itself fighting a major conflict. We cannot afford to idly observe the status quo in the commercial maritime sector. We have too many enemies and there is too much at stake. We must take drastic measures to meet the shortfalls in U.S.-flagged merchant shipping before it is too late.

This book is divided into three sections: The Current State of America's Commercial Shipping Industry, The Elements of Strategic Sealift, and The Merchant Marine. I can think of no better author than CMS's own nonresident fellow, John D. McCown Jr., to kick off chapter one, entitled "Why a Standalone U.S. Commercial Fleet?" McCown is the author of *Giants of the Sea: Ships & Men Who Changed the World*, which is the story of the magnificent cargo ships and the visionaries who invented them to enable world trade on the high seas. In fact, McCown knew and worked with the legendary Malcolm McLean, who conceived of and operationalized the modern shipping container that revolutionized world trade. It is no wonder, based on McCown's experience in the industry, why he is so passionate about the U.S. commercial maritime fleet. He begins the journey with the Continental Congress's letters of marque authorizing merchant Mariners to harass the vastly superior British Royal Navy. Their success helped cement the independence of our country, and in subsequent wars thereafter the U.S. merchant fleet has always played a critical role in sustaining our combat power overseas. Without Henry Kaiser's *Liberty*- and *Victory*-class ships, World War II would have been prolonged and victory would have come at a much greater cost in terms of American and Allied lives.

McCown cites some sobering statistics: the U.S.-flag fleet carried 60 percent of foreign commerce in 1947, declining to 40 percent by 1951, to 5 percent in 1980, and to a miserly 1 percent today. Part of the reason for the decline is the fact that U.S.-flagged vessels are on average three times more expensive to operate than a similar foreign-flagged vessel, making it extremely difficult for U.S. shipping companies to compete in the international market.

Conversely, the U.S. domestic market is reserved for U.S. owned and flagged ships under the Merchant Marine Act of 1920 (a.k.a. the Jones Act). McCown has been a fervent supporter of the Jones Act and is often asked by CMS to offer an opinion in support of Jones Act legislation. Pundits claim unfair protectionism in U.S. domestic waterways, when in fact they are missing the point. The Jones Act protects the sanctity of American waterways from foreign competitors and potential nefarious actors as well as preserving U.S. commercial shipping and shipbuilding industries. I am with McCown on this.

McCown explains the reasons for our commercial maritime decline in chapter two: "The Late Cold War and Post–Cold War World of Shipping and the Impact on U.S. Commercial Fleet." With the advent of flags of convenience during the Cold War, shippers were given options to put cargo on carriers that could compete at lower cost because they circumvented regulatory limitations in the nation where the carrier is registered. Currently, three of the smallest nations in the world have the largest registries of commercial shipping: Panama, Liberia, and the Marshall Islands. While it is tough for U.S.-flagged vessels to compete against their foreign counterparts on cost, it is absolutely essential to have a fleet of U.S.-flagged carriers in time of war. China recognizes this and McCown portrays the stunning contrast between China and the rest of the commercial maritime world as follows:

> China now builds 50 percent of the world's container ships, 97 percent of container equipment, 70 percent of container cranes, controls 14 percent of container ships by flag, represents 40 percent of worldwide volume, and controls or has investments in 357 international container terminals in 63 different countries.

Statistics like these should be a wake-up call for the American people and our policymakers. The rest of the book provides a variety of solutions that could contribute to the rebuilding of the U.S.-flagged commercial fleet and should be taken under serious consideration.

For example, in chapter three, "A Strategy for the Commercial Maritime Industry," Brent Sadler, prolific writer, friend, former submariner, and Olmsted Scholar, reviews the revolution in shipping that stemmed from Malcolm McLean's containerization of the industry and the rise of intermodalism. Sadler proposes that we invest in a second shipping revolution enabled by a new "multimodalism." Sadler portrays multimodalism in the land, sea, air, space, and cyber domains. The five elements of multimodalism include "distributed production, new cargo containers, cargo-carrying drones and dirigibles, diversified port operations, and massive cargo ships that hardly ever make port calls." By applying blockchain technology to digitize and track the movement of cargo, combined with artificial intelligence to ensure that cargo ends up in the right delivery location, the speed and efficiency realized could once again revolutionize the industry. By also expanding or contracting the size of traditional containers in a scalable way, we could allow greater flexibility and efficiency in the transportation of cargo according to the type of multimodal transport system available. As a trained nuclear engineer, Sadler also explores the potential of next-generation energy solutions and alternate sources of energy in commercial shipping power plants.

This is a perfect segue to chapter 4 entitled, "*Savannah*'s Legacy: Advancing U.S. Commercial Shipping with Small Nuclear Reactors." Thomas Davies and Sanjan Shashkumar of CORE POWER take us back to an earlier era when nuclear propulsion was employed on both military and commercial vessels. As an offshoot of President Dwight D. Eisenhower's "Atoms for Peace" program in the 1960s, this nation produced NS *Savannah* in 1962, the world's first nuclear-powered merchant vessel. Perhaps it is time to revisit this option for the latter.

Davies and Shashkumar make the case that protectionist measures will not bring the U.S.-flagged fleet out of its slump compared to others on the international market. What is required is an "innovative and domestic technological game changer to regain global competitiveness." That game changer is available now in the form of marinized advanced nuclear technology.

NS *Savannah* was a pioneer in the commercial shipping industry with a pressurized water reactor (PWR) unlike its military counterparts. The problem with PWR is the radius around the ship that constitutes an emergency planning zone (EPZ) in the event of a breach of the pressure vessel and subsequent release of fission products because the system is under high pressure.

New technology harnesses the concept of passive safety, whereby without human intervention, the plant renders itself safe such that further analysis can be conducted to resolve any issues. Furthermore, advanced reactor designs, including molten salt reactors, operate at low pressure, thereby reducing the EPZ to a minimal radius, and in most cases contained within the hull of the ship.

Small module reactors (SMR) combined with electric drive onboard commercial ships significantly change the calculations and trade-offs surrounding size, weight, power, and cost that determine a shipboard powerplant's viability. SMRs powering electric drive would also reduce the carbon footprint of this newly designed ship to near zero, a major benefit for an industry that produces three percent of the world's greenhouse gas emissions. As an ancillary benefit to the husbanding agent and the port, unused energy from a ship of this class could in the future be used to reverse power the local community and return additional profits to the owner—a win-win for all concerned. The U.S. commercial shipping industry would be wise to invest in this revolution in commercial ship propulsion before our competitors do. In fact, China is already planning its first-ever nuclear-powered container ship.

Vice Admiral Dee Mewbourne, PhD, USN (Ret), leads off part 2 of this book—"The Elements of Strategic Sealift"—with chapter 5, "The Role of U.S. Transportation Command." Mewbourne is a fellow admiral, a friend, and former commander of Military Sealift Command (MSC) and deputy commander of U.S. Transportation Command (USTRANSCOM) at Scott Air Force Base, Illinois. The fact that Vice Admiral Mewbourne moved from command of MSC, a component command of USTRANSCOM, and then went on to be the deputy commander of USTRANSCOM, makes incredible sense. USTRANSCOM is one of 11 unified combatant commands in the U.S. Joint Force and is responsible for air and maritime lift across the globe.

Air Mobility Command (AMC) is the air component of USTRANSCOM, responsible for airlift of people and materiel in any and all theaters of operation. In fact, USTRANSCOM conducted the largest noncombatant evacuation operation in history from Kabul, Afghanistan, when the Taliban stormed the capital and the government toppled. To their great credit, AMC moved more than 124,000 people and another 6,000 military personnel to safety.[1]

Likewise, USTRANSCOM moved more than 313 million pounds of equipment to Ukraine in support of the war effort in 2022.[2] Going further back to Operations Desert Shield/Desert Storm, USTRANSCOM moved more than 286,000 passengers and 1.2 million short tons of cargo to the theater, 91 percent of which traveled by sea. The ships bearing these personnel or cargo were from the Maritime Administration Ready Reserve Force, Military Sealift Command, U.S-flagged commercial vessels, or foreign-flagged vessels. It is unlikely that we will get that kind of support from foreign-flagged vessels in future conflicts, particularly one taking place in the Western Pacific.

Vice Admiral Mewbourne does a good job of explaining the command relationships that manifest between USTRANSCOM and its component commanders as well as outside contract lift and foreign-flagged vessels. In the final analysis, he concludes that the next war will be won or lost by a belligerent's ability to conduct logistics and sustain supply lines to forward-deployed forces. It is therefore essential that the nation keep and maintain a robust logistics force capable of operating anywhere on the high seas.

In chapter 6, Dr. Bradley Martin dives deeper into this subject in his chapter entitled, "Sealift: Requirements, Capabilities, and Capacity." He is a senior policy researcher at Rand. Dr. Martin retired from the Navy as a surface warfare captain after 30 years of service, including four command tours as well as service on the staff of U.S. Forces Japan, the Office of the Chief of Naval Operations staff as an operations analyst, and most recently as the Navy coordinator for participation in Joint Staff and Office of the Secretary of Defense requirements.

Dr. Martin drills down into the details of strategic and intratheater lift requirements for the Joint Force. While MSC provides for some of the nation's strategic sealift, it also maintains the combat logistics force (CLF) of ships that sustain the requirements for food, fuel, and weapons resupply for afloat ma-

[1] Loyal Auterson, "Looking Back at the Command's Historic Effort that Moved 124K to Safety," USTRANSCOM.mil, 25 August 2022.
[2] Vontrea Hampton, "USTRANSCOM Delivers Hope to Ukraine," USTRANSCOM.mil, 29 December 2022.

jor combatants in the fleet. On the other hand, the Maritime Administration (MARAD) maintains a Ready Reserve Force (RRF) of 41 ships to provide fast sealift when necessary. These ships are on a 5- to 10-day activation window, and it is assumed that when called on, they will be ready to go. However, the majority of the RRF is old, with 23 of the vessels aged between 45–49 years. As Dr. Martin points out, periodic "turbo activations" to evaluate the RRF have produced disappointing results: "Fewer than 70 percent of the ships met the time standard and some could not get underway at all."

The current inventory of MSC and MARAD platforms and their different mission sets presents both strategic and tactical dilemmas for the unified combatant commanders. First, with the loss of Red Hill Underground Fuel Storage Facility as a defense fuel support point in Hawaii, there is now more emphasis on the requirement to refuel from bulk fuel carriers and tankers at sea. Second, with new doctrinal concepts of operation like distributed maritime operations for the Navy and expeditionary advanced base operations for the Marine Corps, sustaining a distributed force in remote areas will require more sealift and sustainment from MARAD and the CLF, which we do not have. As Dr. Martin points out, the Services have not yet articulated a refined set of priorities and requirements against which we should apply our limited resources—is it fuel, replenishment, lift, or prepositioning of assets? The Western Pacific will be the worst-case scenario in the event of a conflict with China. It will certainly not be the unopposed lift of troops, tanks, fuel, equipment, food, and other resources of Operation Desert Shield/Desert Storm. Based on the "Davidson Window" of 2027, the time to address Dr. Martin's concerns is right now.

Part of the answer to Dr. Martin's question on priorities and fulfillment of requirements comes next in chapter 7 by William McDonald, entitled, "The Maritime Security Program and the Tanker Security Program: Force Multipliers for U.S. Sealift." William McDonald is director of Sealift Support for the U.S. Department of Transportation Maritime Administration. A 14-year veteran of MARAD, he has more than 20 years of experience in maritime affairs, including sealift support for U.S. force deployment and sustainment, port and intermodal development, U.S.-flag deep draft vessel operations, and coastal and inland waterways transportation. In his present post, McDonald oversees the Voluntary Intermodal Sealift Agreement and the Maritime Security

Program (MSP) under which U.S.-flag ocean carriers commit vessels and intermodal capacity to meet U.S. Department of Defense sealift requirements in times of war or another national emergency.

To supplement our U.S.-flagged merchant fleet in time of need, MSP retains a fleet of 60 ships, which are actively conducting business worldwide and therefore ready to meet Department of Defense requirements. Each of these ships is on an annual retainer of $5.3 million. About one-half of the MSP fleet are container ships and the other half are roll-on, roll-off (RORO) or heavy lift platforms. MSP not only augments our ability to respond to crisis, but it also employs 2,400 merchant Mariners at a time when we are losing this group of critically skilled individuals due to lack of work. MSP proved its worth during 20 years of war in Afghanistan by transporting billions of dollars in supplies through the northern and southern defense networks.

The Tanker Security Program (TSP) is intended to meet the refueling needs of ground forces, air forces, and the combat fleet at times of heightened tension. The TSP is capped at 10 ships, and when combined with the existing inventory of 50 U.S.-flagged tankers, falls well short of requirements that could exceed 86 tankers needed to support a conflict. Furthermore, what some do not understand is that the TSP is not plug-and-play in the fleet. TSP ships cannot refuel an aircraft carrier or an *Arleigh Burke*-class destroyer. TSP ships are configured with consolidated replenishment stations (a.k.a. console) that allow a TSP ship to pass fuel to a combat logistics force ship and from there to fleet combatants. It is not an elegant solution, but it moves petroleum oil lubricants forward from defense fuel support points and into the fight.

While MSP and TSP offer some relief to the issue of sealift and refueling capacity, our numbers today pale in comparison to the 1960s when the U.S. boasted 700 U.S.-flagged ships—or the 200 ships we mustered during Operations Desert Shield/Desert Storm. Some have proposed that Congress double the MSP and TSP programs to 120 and 20 ships, respectively. While I fully support the increase in numbers, it is uncertain where the money would come from to do so.

There is support in Congress as evidenced by the recent congressional report, *Congressional Guidance for a National Maritime Strategy: Reversing the Decline of America's Maritime Power*, signed by Senator Mark Kelly (D-AZ) and former senator Marco Rubio (R-FL) and former congressman Mike Waltz (R-FL) and Congressman John Garamendi (D-CA). Most importantly, these legislators advocate for a national maritime strategy to address the concerns raised in this book and find solutions in collaboration with a public-private partnership.

In chapter 8, Sabreena Croteau provides a more in-depth analysis in her chapter, "The National Defense Reserve Fleet, the Ready Reserve Force, and Prepositioning Programs." The Ready Reserve Force (RRF) is currently comprised of 46 vessels that include 35 RORO ships, six auxiliary crane ships, two heavy-lift platforms, two aviation repair ships, and one Offshore Petroleum Discharge System (OPDS) tanker. As previously discussed, these ships are required to be ready to deploy within 5–10 days. Accordingly, they are crewed by about 450 Mariners who would need to be augmented with a surge force of Mariners in the event of activation. The RRF has a poor history of readiness during turbo activations. Despite that fact, some have suggested extending the service life of some of these platforms out to 60 years as they have been maintained pier-side for most of their service lives, accruing less wear and tear on the hull and machinery than if they had been underway. This seems like a desperation measure and is characteristic of the decline of the U.S. commercial shipping industry. In response to the shortage of new and affordable hulls, the Navy has experimented with a Common Hull Auxiliary Multimission Platform (CHAMP), but it has been determined that trying to gain efficiencies by designing one hull as a RORO ship, a container ship, a bulk carrier, or a tanker, is incongruent with the particular design needs of each class of ship. In an effort to produce new ships for training that provide a place for future classes of merchant Mariners, MARAD has funded a five-ship class of national security multimission vessels at a price of $380 million each from the Philadelphia shipyard. Unfortunately, engineering problems plagued the maiden voyage of the first ship of the class.

The final section of the book, "The Merchant Marine," offers Captain John Konrad V's presentation of an "Introduction to the Merchant Marine" in chapter 9.

Captain Konrad is one of the most fervent advocates of a strong U.S. Merchant Marine that I know. He is a proud alumnus of the New York Maritime College, a bestselling author, entrepreneur, and a U.S. Merchant Marine officer. He is one of a diminishing few American Mariners who holds a "United States Master of Vessels any gross tons, upon ocean" (Master Unlimited) license. In 2006, Konrad founded *gCaptain*, one of the world's most popular maritime news websites, with a record-breaking 2 million monthly page views. Furthermore, he is not only a Master Unlimited but also a former shipbuilder and shipyard operations manager. One immediately senses his passion for the trade in the opening paragraph of this chapter:

> The story of America's maritime history is not just about ships and sailors; it is a tale of ambition, innovation, and the relentless pursuit of opportunity. Deep dive into the annals of our nation's past, and you will find that free trade and American enterprise are the twin currents that propelled the United States to its position as a global maritime powerhouse.

Konrad immediately reminds us that the American Revolution was not won solely in land battles but also at sea due to the courage of privateers like merchant captain John Paul Jones, who is now revered as the father of the U.S. Navy and buried in the crypt under the Cathedral of the Navy at the Naval Academy in Annapolis, Maryland. Following the American Revolution, Yankee traders sailed the world and stimulated commerce between our "island nation" and distant places on the globe. The age of steam would have a profound impact on the sea lines of communication as it would on the nation's infrastructure and rail lines of communication joining the East and West Coasts of the United States. Alfred Thayer Mahan would underscore the importance of a strong Navy and Merchant Marine to protect sea lines of communication and preserve the American economy through trade in his landmark work *The Influence of Sea Power upon History*. The era of Woodrow Wilson's administration from 1913 to 1921 and the impact of America's entry into World War I changed America from an isolationist nation to one inextricably involved in global affairs. A series of congressionally mandated Merchant Marine Acts (1916, 1920, and 1928) including the Jones Act followed, providing a Maritime Shipping Board (precursor to MARAD), financial resources, and legislation to preserve the commercial maritime industry in perpetuity. Thankfully, this legislative trend continued with the Merchant Marine Act of 1936, which enabled subsidies for ship construction, emphasized a dual use doctrine (preserving commercial maritime capability in time of war), and alleviated labor concerns. The importance of this legislation cannot be understated as it provided the foundation for the "arsenal of democracy" that instantiated itself in America during World War II and produced the Liberty ships and convoys that contributed directly to the defeat of Nazi Germany and Imperial Japan.

Since the end of World War II, many more changes occurred that have contributed to the decline of the American commercial shipping enterprise to include the end of the Cold War, containerization, globalization, and the arrival of "Flags of Convenience," against which the U.S. commercial maritime industry cannot effectively compete. Konrad's fear is that the massive lift of personnel, equipment, and supplies that characterized the Gulf Wars may have been the last hurrah for the U.S. Merchant Marine and our commercial maritime industry. As China has risen, it realized the importance of commercial maritime power, and it has subsidized production of its massive commercial fleet protected by its growing navy. While China expands its influence in the maritime domain, America lags further behind. Konrad concludes with a stark warning:

> The U.S. Merchant Marine often finds itself overshadowed, largely forgotten by all the military branches except the U.S. Coast Guard. The absence is palpable, especially when our nation's leaders routinely extend gratitude to veterans from every other Service, leaving the Merchant Marines conspicuously absent from even the most basic acknowledgments. The question remains: How long can dedication persist in the shadow of abject neglect and near universal apathy toward the U. S. Merchant Marine?

In light of John Konrad's sobering examination of the state of the U.S. Merchant Marine today, it is important to ensure that the Merchant Marine is capable of manning our U.S. commercial maritime fleet in peacetime and wartime. Our maritime academies fulfill an important role and Dr. Christopher Chiego, Dr. Amy Skoll, and Dr. Ryan Wade of California State Maritime University illustrate this in chapter 10, "The Maritime Academies and Maritime Training." The need for civilian mariner trainers manifested in the latter nineteenth century as the U.S. industrial base was undergoing a revolution. Despite the need for civilian Mariners articulated in this and the last chapter during World Wars I and II, attempts to delimit or close the U.S. Merchant Marine Academy and state-run institutions took place many times during the twentieth century. To ward off future attempts to do so, maritime academies were integrated into state university systems.

Today, training and certification of Mariners for our merchant fleet is provided by seven institutions of maritime higher education: The U.S. Merchant Marine Academy, California State University Maritime Academy, Texas A&M University Maritime Academy, Massachusetts Maritime Academy, Maine Maritime Academy, State University of New York Maritime College, and Great Lakes Maritime Academy. After completion of the curriculum and U.S. Coast Guard certification, officers receive a bachelor's degree and a license as a third mate or third assistant engineer. This is a capability that we must both preserve and expand for the benefit of the nation. In fact, the U.S. Merchant Marine is currently short more than 1,800 Mariners. Training opportunities are shrinking on U.S.-flagged commercial vessels. To alleviate this, MARAD commissioned five national security multimission vessels that will enhance training opportunities for American Mariners and serve as dual-use platforms in time of war. Two of the five ships have been completed. The first has been delivered to California State Maritime Academy and the second is earmarked for the Massachusetts Maritime Academy.

Despite MARAD's best efforts, interest in and applications to maritime academies have dropped during the last few years. The industry has also been plagued by serious incidences of sexual harassment and assault, culminating in MARAD's launch of the "Every Mariner Builds a Respectful Culture" or EMBARC program in 2021. Failure to create a safe and secure work environment for women will lead to further declines in the pool of eligible Mariners in the future workforce.

Our maritime academies offer tremendous opportunities to America's youth with the promise of a bachelor's degree, licensed practical skills, and a fulfilling and rewarding job and career. Policy makers must continue to fund these programs and look for avenues to enhance recruitment and retention in the industry.

This brings me to chapter 11, by Geoffrey Brown in collaboration with Lieutenant Commander Eric Bardot, "Mariner Retention: Decades of Neglect." Brown and Bardot start with the essence of the problem:

> The current state of the U.S. Marchant Marine presents a national security problem: the labor force is demonstrably so tight that risks of ship delays in a conflict are a real hazard.

The bottom line is that the inventory of U.S. Mariners is directly linked to available billets on U.S.-flagged merchant ships and with the decline of the Merchant Marine during the last two decades, the labor force has followed with a precipitous drop in numbers. This applies to both officer and ratings; the former having seen a decline of 27 percent and the latter 78 percent in the period between 2001 and 2017. Furthermore, determining the inventory of active and inactive Mariners in the United States is somewhat challenging. Active Mariners must have current accreditation and have sailed on an oceangoing vessel in the last 18 months. Inactive Mariners would require some finite period of time to recertify. There is also a distinction in addition to the category of active and inactive Mariners, and that is the mariner who is in an active status, but unable to get underway due to another commitment or simply unwilling to do so. This creates a statistical problem for MARAD in determining how many Mariners will actually be ready to sail in a crisis or in wartime. To solve this crisis, in partnership with the labor unions, MARAD needs a comprehensive recruitment program to boost the numbers of qualified officers and ratings willing to go to sea. The worse recruitment becomes, the harder it will be to obtain volunteers as quality of service will suffer with longer time at sea, longer hours while underway, and less time off between deployments. Recently, the Transportation Institute has proposed a solution to the problem of mariner inventory in the form of Operation Mariner. The four working groups of Operation Mariner address wages and benefits, quality of life, marketing and outreach, and regulatory barriers. Brown and Bardot provide more details in the chapter, but suffice it to say that Operation Mariner is a good start on addressing the critical shortage of merchant Mariners in America and should be fully supported by labor unions, policy makers, legislators, and shippers. Doing anything less will contribute to future unreadiness of our merchant marine and have grave consequences for U.S. national security.

America is an island nation almost wholly dependent on seaborne commerce to sustain its robust economy. While the U.S. Navy preserves and protects our sea lines of communication, merchant ships move fuel, bulk supplies, and containers to and from our seaports of arrival or departure. Any restrictions on this continuous flow of commerce would have dire consequences for our economy, our way of life, and the health and welfare of our citizenry. For a variety of reasons, we have allowed the American merchant fleet to atrophy during the last few decades. Outsourcing to cheaper and less strident foreign competition has not only reduced the U.S.-flagged fleet's ability to compete but also diminished its numbers in terms of merchant ships and Mariners to staff them. This is a very precarious situation, especially in time of heightened tensions or war, and it must be reversed. Were the United States to find itself in a full-blown conflict overseas today, we would simply not have enough capacity in our merchant fleet to sustain the fight. This is not, however, a lost cause. There are many good ideas in this edited volume on how to reverse this process and make America's merchant fleet a leader once again, including exploration of multimodalism; revitalizing and rebuilding the Ready Reserve Fleet; exploring new and efficient methods of propulsion; increasing training opportunities for merchant Mariners and increasing the size of our state and federal merchant marine academies; and providing subsidies when and where necessary to give the competitive advantage back to American shipping. All this and more will require a holistic effort on the part of the maritime Services, shipping companies, shipbuilders, and our policy makers. It will also require resources necessary to rebuild a force that we all can be proud of. Let the revolution in American merchant shipping start right here.

James G. Foggo
Admiral, USN (Ret)
Dean of the Center for Maritime Strategy

SELECT ABBREVIATIONS, ACRONYMS, AND TERMS

A2/AD	antiaccess/area-denial
ABS	American Bureau of Shipping
AMC	Air Mobility Command
AI	artificial intelligence
CCMD	combatant command
CDS	construction differential subsidy
CGT	compensated gross tonnage
CHAMP	Common Hull Auxiliary Multimission Platform
CIVMAR	civilian mariner
CONSOL	consolidated cargo replenishment at sea
DMO	distributed maritime operations
DWT	deadweight tonnage
EABO	expeditionary advanced base operations
EPZ	emergency planning zone
FEU	40-foot equivalent
FOCs	flags of convenience
GATT	General Agreement on Tariffs and Trade
GDP	gross domestic product

GT	gross tonnage
IMO	International Maritime Organization
JDDE	Joint Deployment and Distribution Enterprise
Jones Act	A federal law that regulates the shipping of goods between U.S. ports (a.k.a. the Merchant Marine Act of 1920)
MARAD	U.S. Maritime Administration
MDO	multidomain operations
MMLD	Merchant Mariner Licensing and Documentation
MPS	Maritime Prepositioning Squadrons
MSC	Military Sealift Command
MSP	Maritime Security Program
MWWG	Mariner Workforce Working Group
NATO	North Atlantic Treaty Organization
NDAA	National Defense Authorization Act
NRC	U.S. Nuclear Regulatory Commission
NSMV	national security multimission vessels
ODS	operating differential subsidy
RORO	roll-on/roll-off
RRF	Ready Reserve Force
SDDC	Military Surface Deployment and Distribution Command
SOE	state-owned enterprise
SOLAS	Safety of Life at Sea Convention
STCW	Standards of Training, Certification and Watch-keeping
TEU	20-foot equivalent
TSP	Tanker Security Program
UNCLOS	United Nations Convention on the Law of the Sea
USMMA	U.S. Merchant Marine Academy
USTRANSCOM	U.S. Transportation Command
VISA	Voluntary Intermodal Sealift Agreement
VTA	Voluntary Tanker Agreement
WTO	World Trade Organization

RETURNING FROM EBB TIDE

INTRODUCTION

Steven Wills, PhD

The American navalist Alfred Thayer Mahan said, "Control of the sea, by maritime commerce and naval supremacy, means predominant influence in the world; because however great the wealth product of the land, nothing facilitates the necessary exchanges as does the sea."[1] This aphorism on the importance of maritime trade in ensuring naval supremacy seems lost on recent U.S. policy and military leaders. Content with pure naval supremacy since the end of the Cold War, they have allowed the American merchant fleet to decay to the point where operations such as the 1990 Desert Shield movement of U.S. military power to the Persian Gulf are not possible in the present without large numbers of merchant ships recruited from non-U.S. flag states.

Even before the 1991 Gulf War in the desert there were concerns that the U.S.-flag merchant feet was too small for great power war. In 1989 testimony, then-defense secretary Dick Cheney stated, "With respect to sealift, I believe we are short there. We would have trouble making our commitment to have

[1] Capt A. T. Mahan, *The Interest of America in Sea Power, Present and Future* (Boston, MA: Little Brown, 1897), 12.

10 divisions in Europe within 10 days of the outbreak of a conflict."[2] Much of the decline in the U.S. commercial maritime enterprise since the Cold War has occurred off stage from current events and away from congressional testimony. From 1990 to 2023, the total number of U.S.-flag merchant ships dropped from 636 to 184 vessels, of which reports show only 167 are deemed "militarily useful."[3]

The gradual reduction in U.S.-flagged merchant ships seemed to go almost unnoticed until the COVID-19 pandemic made clear to many citizens the nation's dependency on imported goods: from important medicines to toilet paper. Nations in Europe and Asia, including Japan and South Korea, have subsidized their domestic shipbuilding enterprises to allow them to stay competitive. The United States ended such subsidies in the early 1980s, confident that a Cold War naval expansion program in the 600 ship Navy would fill the gap in the nation's shipyards caused by fewer commercial ships under construction. That may not have been enough even then as Navy Secretary John F. Lehman argued in a 1983 interview, "No, there is not enough Navy business to hold the shipbuilding base. We need more of a base than we are going to be able to hold on to with purely Navy shipbuilding."[4]

The Cold War, however, ended later that decade, and the naval vessel orders precipitously declined. Subsidies did not return, and the United States was comfortable in allowing its own fleet of relatively expansive ships to decline to the point where significant procurement would be needed to support great power conflict. The rise of the People's Republic of China as an active military competitor to the United States further highlighted the weakness of the domestic U.S. maritime enterprise, not only as an enabler of expeditionary U.S. military operations but also as a reliable mover of vital goods to the nation.

The nation's maritime enterprise and merchant marine decline has been noticed by some in Congress and active attempts to pass a ship's act similar to that of the 2022 CHIPS and Science Act for microchip research and devel-

[2] Allan Cameron, "The U.S. Merchant Marine and the Maritime World in 1989," U.S. Naval Institute *Proceedings* 116, no. 5 (May 1990).
[3] "Data Statistics," U.S. Department of Transportation, Maritime Administration, accessed 31 January 2025; *The Annual Report of the Maritime Administration for Fiscal Year 1990* (Washington, DC: Maritime Administration, 1991); and Robert M. Pouch, "The U.S. Merchant Marine and the Maritime Industry in 1990," U.S. Naval Institute *Proceedings* 117, no. 5 (May 1991).
[4] *Annual Report on the Status of the Shipbuilding and Ship Repair Industry of the United States* (Washington, DC: Department of Defense, 1982).

opment. Even if successful, the nation's maritime industry's ability to return from the very low ebb tide where it now resides will be a costly and prolonged endeavor.

The concept and substance of this volume on the state of the commercial maritime enterprise in the United States is about understanding how it reached ebb tide, and the organizational, business, technical, and personnel changes that might stop the outward flow of ships, the people that crew them and the business that sustains them, and return the maritime enterprise to a rising flood tide. The volume is broken into three sections; history and ideas for change, the military component of U.S. Merchant Marine business, and finally a section of the people that crew and maintain its ships. Few works in recent years have attempted to address all of these issues in one readable volume—a gap this effort seeks to fill.

Part 1 (chapters 1–4) tells both the history of the Merchant Marine and maritime enterprise of the United States, as well as new developments that might help in its recovery. It was first important to tell the story of how the Merchant Marine and maritime enterprise reached a low ebb with a focus on the history of the Merchant Marine from the nation's revolutionary beginnings. New developments such as multimodalism and small nuclear reactors for merchant ships are also explored in the first section, uniting the legacy of the past with the potential for future development that might spark a renaissance in the U.S. commercial maritime enterprise.

Part 2 of the volume (chapters 5–8) is focused on the vital military role played by the U.S. Merchant Marine and commercial maritime enterprise in the movement and support to U.S. forces engaged in overseas operations. Military Sealift Command is dependent on the Maritime Administration (MARAD) to supplement the government force of tankers and other supply ships needed to move troops, ordnance, fuel, and supplies to remotely deployed U.S. forces. Many sources have acknowledged the need for a larger commercial fleet to back the Military Sealift Command's combat logistics force (CLF) and this section of the volume gets into ongoing efforts to accomplish that goal.

Finally, part 3 (chapters 9–11) tells the story of the people that make the American maritime enterprise function on a daily basis. There is a compelling overview of the role of Mariners (people) in the Merchant Marine's history, and accounts of the process to create and retain Mariners in service over time.

The nation's Merchant Marine academies produce quality graduates who need ships in which to serve, and a robust framework of service that supports their continued professional development and personal satisfaction.

In summation, the nation's Merchant Marine and wider maritime enterprise have been in ebb tide for decades with no sign of a flood tide in the offing. No such reversal will commence in the absence of reasoned arguments, and it is hoped that this book inspires others to write in favor of a rising tide that raises all commercial maritime boats.

PART 1

THE CURRENT STATE OF AMERICA'S COMMERCIAL SHIPPING INDUSTRY

CHAPTER 1

WHY A STANDALONE U.S. COMMERCIAL FLEET?

John D. McCown Jr.

On 12 June 1775, less than two months after the battles of Lexington and Concord, a group of men in the coastal town of Machias, Maine (then part of Massachusetts), boarded and captured the British schooner HMS *Margaretta*. The British four-gun warship had been dispatched to escort two cargo ships and oversee the loading of lumber to build barracks in Boston. The citizens refused to load the ships in exchange for critical supplies. Tensions built. A group led by Jeremiah O'Brien attacked and commandeered the HMS *Margaretta*. Word of this victory reached the Massachusetts Provisional Congress, which immediately issued a commission to the ship and named O'Brien as its captain. The ship, renamed the *Machias Liberty*, guarded Machias Bay until the end of the revolution.

Inspired by the action in Machias, the Continental Congress issued letters of marque to privateers. Letters of marque were a government license that authorized a private person, known as a privateer, to attack and capture vessels of a nation at war with the issuer. At the time, most ships sailed with arms and even some cannons to protect themselves and their cargo from pirates. In exchange for capturing a targeted vessel, the privateer was awarded much of the proceeds from the sale of the ship and its cargo. According to an agreed contract, a percentage went to the government issuing the license. The Continental Congress issued 1,700 letters of marque on a voyage-by-voyage basis during the Revolution.[1]

Approximately 800 vessels were commissioned as privateers and are credited with capturing or destroying about 600 British ships.[2] That was no small accomplishment. The British Navy was the world's most powerful. With no formal navy, the only way the colonists could respond to Britain's rule of the sea was to incentivize private citizens to harass British shipping and take risks for financial gain. These privateers were merchant Mariners, licensed to be wartime pirates to support the revolution. The collective actions of these merchant Mariners were responsible for the majority of British ships captured during the Revolution. These commercial vessels in effect became America's first navy. In addition, American merchant vessels provided critical supplies from ports in the Caribbean. The Dutch port of Sint Eustatius in the Leeward Islands was the foremost conduit through which the American colonists obtained guns and gunpowder from Europe required for the Revolution. Nearly one-half of the wartime supplies used by the colonists came via this route. One of the main reasons the British were unable to achieve the quick victory they envisioned was Sint Eustatius and the sealift provided by American merchant vessels. Those ships represented most of U.S. seapower during the Revolution.

In the opening stanza of his 1837 poem "Concord Hymn," Ralph Waldo Emerson celebrated the battles of Lexington and Concord as the "Shot Heard Round the World."[3] Among the first to hear and act on that shot was Jeremiah O'Brien and his group of commercial seamen. Their efforts in 1775 initiated more than 248 years of service that merchant Mariners provided to America. The official United States Merchant Marine flag shows that year under its crest with the motto "In Peace and War" shown above. Its establishment and the actions by the revolutionary privateers actually predate the formation of both the United States Coast Guard in 1790 and the United States Navy in 1797.

It is often said that to understand why we still need a U.S.-flag Merchant Marine; one just needs to remember the sealift capacity it provided in World

---

[1] John Frayler, "Privateers in the American Revolution: A Means to an End," National Park Service, accessed 6 November 2024.

[2] Frayler, "Privateers in the American Revolution."

[3] Ralph Waldo Emerson, "The Concord Hymn," Poetry Foundation website, accessed 29 January 2025.

War II. But as recounted above, its history of service goes back even further. That merchant Mariners have been involved in serving and saving this country from its earliest days is clear and is an important fact to remember. The history of the U.S. flag Merchant Marine in the centuries that preceded today is still relevant as it reminds us of core principles that are still important today. As Spanish philosopher George Santayana famously said, "Those who cannot remember the past are condemned to repeat it."[4]

From the beginning of the establishment of a new government following the Revolutionary War, the strategic importance of a merchant marine was recognized. An early advocate was John Jay, one of three authors of the *Federalist Papers* along with James Madison and Alexander Hamilton. In 1785, as secretary of foreign affairs in the new federal government, he asked, "whether it would be wiser in the United States to withdraw their attention from the sea, and permit foreigners to fetch and carry for them, or to preserve in concerting and pursuing such measures as may conduce to render them a maritime power."[5] There was broad consensus that the latter path was the correct one, but it did not result in any specific legislation to accomplish that, nor was it even needed. With the growth the U.S. economy would experience, its Merchant Marine grew organically.

The apex of trade via sailing ships would occur in the 1800s in the form of clipper ships. There have never been ships so directly and completely associated with cargo movements as the clipper ships. They were so named based on their ability to "clip along" and get as much speed as possible from available wind. This usually translated into speeds of 12 knots or better for ships that typically carried 800–1,000 tons of cargo.

The number of clipper ships crested in 1852 when there was some two hundred in service. American and British shipyards were the dominant builders of clipper ships.[6] Trade routes to and from China involved celebrated clippers like the *Cutty Sark* (1869), *Sea Witch* (1846), *Thermopylae* (1868), and *Pride of*

---

[4] Geroge Santayana, *The Life of Reason or the Phases of Human Progress* (London: Archibald, Constance, 1906), 284.

[5] *The Papers of Thomas Jefferson*, vol. 18, *4 November 1790–24 January 1791*, ed. Julian P. Boyd (Princeton, NJ: Princeton University Press, 1971), 369–416.

[6] Arthur H. Clark, *The Clipper Ship Era: An Epitome of Famous American and British Clipper Ships, Their Owners, Builders, Commanders, and Crews, 1843–1869* (New York: G. P. Putnam's Sons, 1912), chap. 16, 254.

Baltimore. Clipper races were key news items of the day and captivated the public. It was the clipper ships of the Americans that ruled the seas.

In 1849, the *Sea Witch* sailed from Hong Kong to New York in just 74 days. That record would stand for more than 150 years until it was surpassed recently by only a slight margin by a modern sailboat with obvious navigational and communications advantages. The skipper of that modern sailboat was Rich du Moulin, who spent his career in the maritime field where his many accomplishments included his role as chief executive officer of a leading U.S. flag tanker company. His accomplishment in beating the long-standing sailing record is significant, but he also has complete respect for the sailing abilities of the captain and crew of the *Sea Witch* for what they accomplished.

Sailing ships would begin to give way to steamships and here again the United States would be well represented, as were other large economies. American engineer and inventor Robert Fulton built the first commercially successful steamship. At that time, ships flew the flag of where they were based and owned. British owned and operated vessels flew the Union Jack, American owned and operated vessels flew the Stars and Stripes and so forth. The flags of merchant ships were broadly consistent with countries' ranking in the industrial world. Those ships and their owners were subject to the laws and regulations of the country whose flag they flew.

Throughout history, the flag that flew on the stern of a cargo ship has been important and involves various legal principles that go beyond a simple identification of the vessel's home country. Wherever the ship is, the laws of the flag state apply to it, whatever they are. While laws of other countries may also apply when the vessel is in port in their jurisdiction, for all practical matters the vessel is treated as if it is an appendage of the country, much like an embassy on foreign soil is viewed as part of the sponsoring country. The flag state is extending its implicit protection to all ships under its umbrella no matter where they are in the world. For this reason, any attack on a cargo ship has historically been considered an act of war against the country whose flag flies on the vessel.

The organic growth of the U.S. flag Merchant Marine in line with economic growth was sufficient up until the late nineteenth and early twentieth centuries, as events related to national security required additional capacity. The United States learned hard lessons during that period regarding the limitations of projecting seapower when you had to rely on foreign-flag vessels to "fetch and carry." Admiral George Dewey's expedition, the Spanish American War, and Theodore Roosevelt's Great White Fleet were all significantly impeded by reliance on foreign-flag vessels.

The event, however, that most underscored the need for a stronger and larger U.S.-flag Merchant Marine was World War I. In the period leading up to the war, the Allies chartered every vessel that they could, but the Germans sank many of those vessels. The U.S. economy suffered because of a lack of available tonnage to carry U.S. products.

This led to a series of laws, including the Shipping Act of 1916, the Merchant Marine Act of 1920, and a program to build vessels to support both the U.S. economy and the war effort. The latter would include a section that has come to be known as the Jones Act, the requirement that marine trade between U.S. points be handled exclusively with vessels built, owned, and crewed by Americans. It became accepted doctrine that a strong U.S.-flag Merchant Marine was a key element of national security. The policies that came out of that philosophy were evident and played a role in the shipbuilding revolution led by Henry J. Kaiser that would follow. There can be no question that the thousands of *Liberty*- and *Victory*-class vessels that would be built later during World War II had a direct and pronounced impact on the outcome of the war.

Those policies would become embedded in the Merchant Marine Act of 1936, which can be thought of as the beginning of the legislative pursuit of autonomy to ensure that the United States always has sufficient U.S.-flag vessel capacity to meet all of its needs. The author will separately delve into that topic and what it involved as well as the additional aspects that flowed out of it in pages to follow. Prior to getting to that, however, this chapter will continue with an overview of the U.S.-flag commercial fleet and the broad factors that drove its actual and relative size from when this pursuit of autonomy was embraced.

In the postwar period many of those Liberty and Victory ships were sold to allied nations as they developed and rebuilt their own merchant marine fleets, while some of them remained U.S.-flagged ships. The table below shows the total number of privately owned U.S.-flag vessels along with their average deadweight since 1946 and then in five-year increments from 1950 up until the latest available statistics.[7] In addition to the consistent decline in number, the U.S.-flag vessels have not grown in average size as much as most international flag fleets. The latter are more than twice the typical size of the former.

Just after World War II, the U.S.-flag fleet was carrying 60 percent of U.S. foreign commerce in 1947. As the world economy recovered, the U.S. government sold off much of its *Liberty*- and *Victory*-class vessels, which had declined to 40 percent by 1951. It would decline steadily thereafter. By 1980, the U.S.-flag fleet was carrying only 5 percent of U.S. foreign commerce, or around the same amount carried before World War II. Today, that figure is less than 1 percent.

Following the war, the transfer of these military cargo vessels to the world's merchant marine fleet coincided with the development of open registry or flag of convenience vessels. These registries effectively broke the link between vessel ownership and what flag the vessel was to fly along with the traditional link of much of a country's foreign commerce moving on its merchant marine. There is no industry whose hard assets are as easily and readily redeployable as shipping.

The various open registry countries, which required no real link to that country as a condition to registry, sought to be attractive to ship owners by limiting income tax and crewing regulations. There is a direct link between those regulations and the cost to the ship owner.

Not surprisingly, ship owners gravitated to the open registries that resulted in the least cost to operate their vessels. That structural change negatively impacted the United States as well as most other developed countries in terms of their flag registries. Open registries such as Panama, Liberia, and the Marshall Islands took hold. They would become the dominant places where vessels with U.S. owners and owners from other developed nations would be registered. Life at sea has always entailed risks and this too has played a role in the crewing and flagging of cargo vessels. An additional risk for merchant seaman that started in World War I and increased in World War II entailed cargo ships being sunk by submarines. In addition to the effectiveness of submarines in sinking enemy naval ships, they were particularly effective in sinking cargo ships and thereby disrupting supply chains.

[7] "U.S. Department of Transportation, Maritime Administration, U.S. Privately Owned Merchant Fleet, Oceangoing Self-Propelled Vessels of 1,000 Gross Tons and Above," Department of Transportation, accessed 7 November 2024.

Table 1. Total number of privately owned U.S.-flag vessels along with their average deadweight, 1946–2022

Year	Number of vessels	Average deadweight tonnage
1946	644	6,989
1950	1,087	13,197
1955	1,075	13,597
1960	1,008	13,976
1965	948	15,454
1970	793	18,166
1975	580	25,910
1980	578	36,521
1985	477	44,434
1990	408	50,909
1995	316	47,411
2000	282	44,000
2005	231	41,575
2010	221	43,199
2015	170	45,529
2020	182	45,478
2022	188	44,696

Source: "U.S. Department of Transportation, Maritime Administration, U.S. Privately Owned Merchant Fleet, Oceangoing Self-Propelled Vessels of 1,000 Gross Tons and Above," Department of Transportation, accessed 7 November 2024.

During World War II, German U-boats sank thousands of Allied cargo vessels. Each sinking was fraught with danger for the lives of the crewmembers. This was particularly the case during the early part of World War II, when large amounts of supplies were being sent from the United States to Europe. Those convoys did not have the benefit of the better-protected convoys that would follow later in the war. Most of the cargo ships that were sunk by the Germans were U.S.-flagged vessels.

In striking testimony to the dangers American Merchant Marines were exposed to, their mortality rate was twice as high as the sailors on actual naval war ships. In total, 9,497 American Merchant Marines were killed when 733 cargo ships were sunk during World War II.[8] As 243,000 Mariners served during the war, which translates into a 1 in 26 mortality rate—a higher rate of casualties than experienced by any of the armed Services.

The national security benefits of an American Merchant Marine recognized centuries ago by John Jay were certainly demonstrated by World War II. It is incontrovertible that the United States could not have prevailed as it did without the sealift capability provided by the thousands of Liberty ships U.S. shipyards built and the extraordinary sacrifices by the brave seaman that manned those ships. General Dwight D. Eisenhower underscored this in 1944 when he said, "When final victory is ours, there is no organization that will share its credit more deservedly than the Merchant Marine."[9] That is a strong, unequivocal statement by someone who was clearly a subject matter expert.

Today, the U.S.-flag Merchant Marine fleet is primarily centered on vessels serving the domestic Jones Act markets. These include tankers moving petroleum products and crude oil in coastwise routes as well as container vessels serving the noncontiguous markets of Hawaii, Alaska, and Puerto Rico. To serve those markets, these U.S.-flagged vessels must be built in U.S. shipyards and manned and owned by U.S. citizens. The construction and repair of such vessels represents much of the commercial order book of domestic shipyards.

There are a few dozen U.S.-flag vessels that are currently deployed in international trade routes. All of these vessels have contracts with the U.S. government that results in payments that are designed to mitigate the higher operating costs of U.S.-flag vessels. Under the Maritime Security Program, those contracts are offered only to vessels that were deemed to have particularly useful military sealift capabilities that could be utilized in times of national emergencies. Another form of support comes from government impelled cargoes that must move on U.S. flag vessels.

For U.S.-flag vessels operating in foreign trade lanes, there is no requirement that these vessels be built in the United States and as such they are newer vessels. Presently, the daily operating costs of a U.S.-flag vessel are typically three times the costs of a similar foreign-flag vessel. Given the significant dif-

[8] "American Merchant Marine at War," U.S. Merchant Marine, accessed 7 November 2024.
[9] "Supplying Victory: The History of Merchant Marine in World War II," National World War II Museum, 7 February 2022.

ference in operating costs and the hyper competitive nature of the shipping industry, there simply would be no U.S.-flag Merchant Marine presence in international markets in the absence of these government support programs.

Today, the U.S.-flag Merchant Marine fleet is relatively small and ranks 20th among all countries based on total deadweight tonnage in the respective registries.[10] Ship owners based in the United States have many more vessels that are flagged under open registries. Based on total deadweight tonnage ranked by where the owner is domiciled, the U.S.-controlled fleet is the seventh largest worldwide. If you base the rankings on where the owner is domiciled but use vessel value rather than deadweight tonnage as the metric, the U.S.-controlled fleet moves up to fourth worldwide.

The vessels flying the U.S. flag in the Jones Act trades are concentrated in container movements to the noncontiguous areas of Alaska, Hawaii and Puerto Rico as well as coastal movements of petroleum products. The Jones Act and its related cost impact has been a much-discussed topic in the last few years. The law comes with an economic cost, but there is much hyperbole that comes with many claims of what that cost is, particularly in the container sector. In any discussion of this topic, it is always useful to outline all of the facts related to this issue.

It is incontrovertible that cargo ships can be built for much less overseas and that those ships can also be manned by foreign crews which cost much less. This is the case across all labor-intensive industries for the simple reason that wages are higher in the United States.. For example, per capita gross domestic product (GDP) in the United States in 2022 was 6.04 times worldwide per capita GDP.[11]

This is actually higher than the differences in both ship construction and ship manning costs. Based on actual construction contracts and reported crewing costs, the difference in both areas is less than a factor of four.[12] Critics of the Jones Act frequently reference larger differences, up to eight times, but those figures lack credibility. The larger mistake made by those critics, how-

[10] John. D. McCown, *Giants of the Sea: Ships and Men Who Changed the World* (New York: self-published, 2020), chaps. 23 and 25 for all relative rankings in this paragraph.
[11] "GDP Per Capita," World Bank, accessed 7 November 2024.
[12] *Comparisons of U.S. and Foreign-Flag Operating Costs* (Washington, DC: Maritime Administration, 2010), 6; and John McCown and Andrew Hale, "Up for Debate: The Jones Act," Center for Maritime Strategy, 16 November 2023.

ever, is to imply that rates would change in that same proportion if the Jones Act did not exist.

Across most shipping segments, the largest vessel-related cost item is fuel expense. Whether a ship is a U.S.-flag vessel or a flag of convenience ship, the price per ton it pays for fuel will be the same. Even if there were no Jones Act, this large cost item would not change. That fact mitigates the impact of the Jones Act difference related to total vessel costs.

More importantly, in the integrated systems offered by container shipping companies, costs related to the ship are as small as 25 percent of total costs.[13] Cargo handling, terminal, equipment, trucking, inland transportation, maintenance, sales, and general and administrative costs make up the large majority of costs in container shipping. All of these costs are unaffected by flag registry.

When you exclude these costs along with fuel costs, the vessel capital and crewing costs that are affected by the Jones Act amount to some 12 percent of total costs, based on my experience. Applying a 4-to-1 relationship to those costs, the use of foreign-flag vessels would reduce costs by 9 percent. Without minimizing the effect of a 9 percent cost reduction, that difference is a far cry from the 80 percent to 90 percent implied difference that is often bandied about by critics of the Jones Act.[14]

The blue-water Jones Act market is approximately $3.5 billion in total annual revenue. It can be broken down into $2.5 billion represented by the container carriers serving Hawaii, Alaska, and Puerto Rico and $1.0 billion from noncontainer vessels, mostly tankers, in primarily coastwise movements of both petroleum products and crude oil.[15]

The container markets are similar in that they are heavily imbalanced in the outbound direction with consumer staples. The largest tanker lanes are crude moving from Alaska to the West Coast, gasoline, and other refined products moving from the Gulf Coast to Florida and the East Coast and, more recently with shale oil growth, crude moving from the Gulf Coast to Philadelphia area refineries. There are some two dozen container vessels deployed in the noncontiguous trades and approximately 60 tankers, the majority of which are product carriers, in the bulk petroleum trade.

---

[13] McCown, *Giants of the Sea,* chap. 19.
[14] John D. McCown, "Cato's Jones Act Numbers Are Wrong," American Shipper, 23 July 2019.
[15] McCown, *Giants of the Sea*.

Despite the rhetoric, competition within the Jones Act is intense and the sector often operates at breakeven with total costs close to revenue. For the container segment, the 9 percent cost savings would translate into $225 million per year. The cost differences for tankers operating in the smaller Jones Act niche, however, would be higher as almost all of the costs with tankers relate to the vessel. There are no externalities like in container shipping and the cargo handling and terminal function is little more than connecting pipes and vessel capital and crewing costs. Applying a 4-to-1 relationship to 50 percent of total daily tanker costs because the balance is primarily fuel costs that are not affected results in an expected cost reduction of 38 percent. For the tanker segment, this translates into annual savings of $380 million.

In total, these calculations show that the direct cost impact of the Jones Act is $605 million annually, or 17.3 percent of the sector's revenue. While that is a meaningful absolute figure, at just 9/100ths of 1 percent of the involved areas gross domestic products, the Jones Act is hardly the scapegoat it is claimed to be by critics.

An immediate consequence of any repeal of the Jones Act would be the complete withdrawal of U.S.-flag vessels as any profit margins are well below the cost savings percentages. A likely consequence of foreign-flag carriers serving some of these domestic markets is that direct shuttle service will be replaced by en-route service. Because the Jones Act container markets are heavily imbalanced in the outbound direction with consumer staples, the ships return with mostly empty containers. Therefore, the rates on those inbound shipments are extraordinarily low.

In the case of Puerto Rico and Hawaii, it would be very attractive for foreign-flag carriers to make port calls en route to South America and Asia, respectively, as those directions are the weaker legs. However, to move domestic cargo in the inbound direction, customers would now need to pay the equivalent or more than what those carriers presently get with their foreign cargo. Because of the different dynamics, those rates are many times what those shippers now pay. While such stop-by service is less likely for Alaska, it is also possible in that domestic market.

The potential cost increases to shippers in these smaller inbound domestic lanes might not be enough to mitigate the cost savings estimated above, but this is a factor that needs to be considered in any factual analysis of the impact of the Jones Act. It also points out that any repeal of the Jones Act will result in both winners and losers. The latter group would likely include companies that ship to the mainland rum from Puerto Rico, pineapple from Hawaii, and seafood from Alaska.

Before getting to the national security aspects that are the policy underpinnings of the Jones Act, it is worth reflecting on the fact that it involves domestic commerce. As such, many domestic laws and regulations related to labor, taxes, wages, and hours of service apply. Much of the cost differences can be directly linked to these various laws and regulations. The balance of the cost differences can be explained by structural factors such as trade lane size, ship size, trade lane imbalances, and seasonality. Those are just basic economic facts.

It is understandable that there are those who say they do not support laws or regulations that result in increased costs, whatever the level of those costs. That is a basic philosophical view shared by critics of the Jones Act. What is not understandable is that they make the strongest application of that philosophy to the domestic shipping industry. Perhaps because the activity occurs offshore and out of sight, they seem to be willing to accept a suspension of laws and regulations they would never propose for an onshore industry.

Across all industries in the United States, labor cost is many times more than it is in most countries. The three times higher crewing costs on U.S.-flag ships is directly related to those differences and is fueled by a multitude of laws and regulations. The Jones Act critics who readily call for a suspension of those laws and regulations for labor activity occurring on a vessel never promote the same thing for onshore sites. They no doubt recognize that such proposals would go nowhere. Yet, they loudly rail against the Jones Act, not recognizing the basic illogic in a position that rips at the fabric of the economic system. These critics never seem to realize the "what's good for the goose is good for the gander effect" in how the Jones Act benefits the U.S. economy, in the unlikely event they succeed in their quest to dismantle it. How long would it be before a bright entrepreneur would have a floating plant moored most of the time in the United States if activities onboard what was technically a vessel were largely exempt from its laws and regulations?

Legal experts have noted that even if the Jones Act were repealed, foreign-flag ships that engaged in domestic commerce would automatically be covered by some of these laws and regulations. The U.S. Congress would also likely attach new regulations to any repeal of the Jones Act. The impact of existing and new laws and regulations would need to be considered in any factual analysis, as they would result in reductions, likely significant, to existing crewing cost differences.

Despite the criticism the Jones Act gets, it is hardly a unique law. Laws that restrict various marine movements to ships that fly that country's flag are broadly referred to as cabotage laws. In a just released study, some two-thirds of the countries in the world with maritime coastlines were found to have cabotage laws that support their merchant marine.[16]

Most observers see the beneficial national security aspects of a U.S. Merchant Marine. With Jones Act vessels now the majority of the fleet, its continuation is more important than ever. Ships provide sealift, train Mariners, and support the shipyard base, all of which result in clear national security benefits. These components tie together and support each other along with a network of professionals and vendors. Changes that seem to impact just one component, such as the Jones Act, will actually have a ripple effect through a very large supply chain.

While the Jones Act comes with an economic cost, the relatively modest level of that cost is hardly reason enough to unwind a framework that has served this nation so well. Any thorough analysis of all the economic and national security aspects would conclude that the Jones Act continues to serve its purpose today. Even if someone does not believe that a case could even be made to support the Jones Act, they should still honor the legacy of the U.S. Merchant Marine in two World Wars, the Cold War, and since 1990. Selling air rights to build condominiums over Arlington National Cemetery may make economic sense but of course economics are not the only factor that enters into decision-making processes.

It is worth sharing a story involving someone with subject matter expertise in the national security area. The story involves a senior executive at General Dynamics, the largest defense contractor in the United States. In a speech a number of years ago, this executive spoke before a shipping industry group in the United States. Even with this partisan audience, he certainly got folks'

[16] "Cabotage Laws of the World," American Maritime Partnership, 25 September 2018.

attention when he made the statement that, in his view, the Jones Act won the Cold War.

After pausing for effect, the executive said specifically that it was their Electric Boat Division and its development of quiet propulsion technology for nuclear submarines that could not be duplicated by the Soviet Union in the 1980s, which was primarily responsible for winning the Cold War. He then went on to explain that, in his view, the development of that technology would not have been possible without an array of naval architects, engineers, and vendors here who are also supported by the Jones Act. That is why he directly connected the Jones Act with winning the Cold War.

That is certainly a strong statement to say that the Jones Act is not only important from a national security aspect, but that even in recent times and today it continues to play a pivotal role. There is no doubt that the executive was biased given the shipyards his company controlled and there was likely some hyperbole in his statement. However, the gentleman that made the statement is certainly a subject matter expert. Does anyone who is thinking rationally really want to pull on the Jones Act thread, given its interconnection with so many aspects of our national security apparatus?

The U.S. Merchant Marine makes sense for the country and the Jones Act is a key pillar supporting the Merchant Marine. Rather than focusing on cost disadvantages compared to foreign-flag ships, the focus should be on cost advantages that new domestic marine networks can achieve compared to rail and truck modes.

The American Merchant Marine has a proud history, and it has served the country well. Various initiatives that would result in impairing the sector ignore this legacy and make no sense. Instead, the focus should be on initiatives to grow the U.S. Merchant Marine both in domestic and international trade lanes. In the sections that follow, this chapter will examine what has worked and what has not worked as the United States pursued autonomy in the commercial maritime area. Such an examination is particularly important today given the unique risks the United States is facing as it relates to the need for additional sealift capacity and to be more cognizant of the risks across the entire maritime sector. The author will identify those risks and develop recommendations on the paths to remedy them in order to reverse the decline and begin to show more consistent growth in the U.S.-flag Merchant Marine.

America's formal recognition of the strategic importance of a Merchant Marine and the need for federal government programs to allow the country to be autonomous in the maritime sector can be benchmarked to a law that was passed in 1936. This marked the beginning of the pursuit of autonomy in the maritime field. The Merchant Marine Act of 1936 was signed by President Franklin D. Roosevelt on 26 June 1936.[17] The preamble in the final bill reads as follows:

To further the development and maintenance of an adequate and well-balanced American merchant marine, to promote the commerce of the United States, to aid in national defense, to repeal certain legislation, and for other purposes.

It then went on to state a declaration of policy that specifically detailed the intent and goal of the legislation that reads as follows:

> It is necessary for the national defense and development of its foreign and domestic commerce that the United States shall have a merchant marine (a) sufficient to carry its domestic water-borne commerce and a substantial portion of the water-borne export and import foreign commerce of the United States and to provide shipping service on all routes essential for maintaining the flow of such domestic and foreign water-borne commerce at all times, (b) capable of serving as a naval and military auxiliary in time of war or national emergency, (c) owned and operated under the United States flag by citizens of the United States insofar as may be practicable, and (d) composed of the best-equipped, safest, and most suitable types of vessels, constructed in the United States and manned with a trained and efficient citizen personnel. It is hereby declared to be the policy of the United States to foster the development and encourage the maintenance of such a merchant marine.[18]

It was a sweeping piece of legislation that would establish a new federal entity tasked with implementing the law, and it introduced two new federal pro-

[17] Dave Grinder, "Archives and DOT History: A Guide to the History of the US Department of Transportation," Department of Transportation, accessed 31 January 2025.
[18] "The Merchant Marine Act of 1936," United States Merchant Marine Academy, accessed 31 January 2025.

grams in support of shipping that would be the bulwark of government support for the sector for five decades. The new federal agency was the United States Maritime Commission. It replaced the United States Shipping Board and centralized federal involvement related to the maritime industry under this one agency. The growing ultranationalism of Germany and Adolf Hitler, who became the German chancellor in 1933, must have been top of mind with President Roosevelt and key congressional leaders when the legislation was passed. The rearmament of Germany was already underway, and in April 1935 Germany laid down the keels on12 large U-boats.[19]

With these facts, it was not surprising that the core focus of the Merchant Marine Act of 1936 was to develop a more robust shipbuilding industry. At that time, a large portion of the U.S.-flag Merchant Marine consisted of older World War I vessels. After the United States entered World War I in 1917, more than two years after it began in Europe, the United States Shipping Board established the Emergency Fleet Corporation to construct a fleet of merchant ships. That resulted in building what would become the largest shipyard in the world on Hog Island, near Philadelphia. That shipyard would build 122 ships during four years, but none saw service before the end of the war in late 1918.[20] It was actually those vessels that would comprise a majority of the U.S.-flag Merchant Marine when the act was passed in 1936.

Roosevelt had a strong personal frame of reference related to shipbuilding, as he was assistant secretary of the Navy from 1913 to 1919. With the bellicose words and actions coming out of Germany and his direct awareness of the strategic importance of shipbuilding, he believed it made sense for the United States to embark on an initiative that would result in more modern cargo ships. Roosevelt knew they would be needed if actual conflict broke out in Europe.

The key programs to achieve these goals were the establishment of two subsidy programs. One was focused on supporting the building of ships in the United States and was known as the construction differential subsidy (CDS) program. The other was focused on supporting the operation of ships under the U.S. flag in international trade lanes and was known as the operating differential subsidy (ODS) program. To administer these programs and related maritime matters, the Merchant Marine Act of 1936 called for five commis-

[19] "Hitler Builds Submarines! New War Scare," (St. Joseph, MI) *Herald-Press*, 27 April 1935.
[20] "Photograph of Hog Island," National Museum of American History, accessed 18 February 2025.

sioners to sit atop of the United States Maritime Commission, which would have broad authority related to both domestic and international shipping matters. Joseph P. Kennedy was appointed the first chairman of the U.S. Maritime Commission. Kennedy, who previously served as chairman of the Securities and Exchange Commission, had served as assistant general manager of a Bethlehem Steel shipyard in Boston during World War I, when he first became acquainted with Franklin Roosevelt when he was assistant secretary of the Navy.

To carry out the mandate of the new legislation, the commission studied the state of America's aging and obsolete fleet to identify replacement needs and essential trades. It also deliberated on how best to implement subsidy programs to compete with foreign shipbuilding and shipping most effectively. The result of these studies was the establishment by the commission of an ambitious 10-year plan to build 500 new ships.[21] To put into perspective the broad reach and power of the new entity, it combined the functions of the current Maritime Administration and Federal Maritime Commission while being led by a recognized business leader who also had a long term and close personal relationship with President Roosevelt.

It is useful to take a snapshot of what the U.S.-flag shipping industry looked like back then and there is a relevant time capsule in the form of the September 1937 edition of *Fortune* magazine, the preeminent business periodical at the time. That entire 200-page issue, reportedly its largest ever, was dedicated to reviewing the U.S.-flag shipping industry. The cover was emblazoned with the smokestack logos of some 40 U.S.-flag shipping companies. The magazine noted that the annual revenue of the U.S. shipping companies was approximately $210 million, an amount that was similar to the entire soft-drink industry during the period.[22] At that time, the U.S.-flag shipping companies engaged in both domestic and foreign trade with the 953 cargo vessels that the companies collectively operated. Those vessels represented one-fifth of the world's merchant marine fleet. The desire of the Roosevelt administration and Congress to increase the size and capacity of the U.S. Merchant Marine given the age and relatively small size of many of its vessels, as well as many being focused on domestic trade lanes. Policies needed to be and were aligned with a goal of

---

[21] "The Long-Range Shipbuilding Program of the U.S. Maritime Commission," Maritime Administration, 10 February 2023.
[22] *Fortune* 16, no. 3 (September 1937).

building more of a shipbuilding base as well as a more modern merchant marine fleet that would be focused on important international trade lanes.

There was an extensive article on Joseph Kennedy in the same *Fortune* that included pictures of his family, including his young sons that would make such a mark on American politics later in the century. After first describing Mr. Kennedy's prior successes, the article then went on to discuss his new position. That section of the article is worth repeating here as it underscores the tasks of the new entity:

> This time his field is, of all possible fields for him, ships, and shipping. This time his post is Chairman of the Maritime Commission, and his job is the gigantic one of the creation of an American merchant marine—a job of fantastic difficulties, of unquestionable historical significance, of immediate economic importance. It involves the complex relations of the U.S. in world affairs, the shipbuilding industry, trade routes, the status of marine labor, government subsidies, national defense, inland and seaboard politics, and conflicting regional economic interests—an assortment of problems that stretch far beyond the basic one of lifting a sick industry to its feet. If the U.S. Merchant Marine Act that Commissioner Kennedy is administering happened to be a perfect legal instrument the task would still be tremendous; but Mr. Kennedy describes the Act privately in terms that he would not like to have his five daughters hear. Or if the U.S. shipping industry had no history of scandals, failures, graft, and inertia among the operating companies, if there had never been a Mohawk or a Morro Castle, if the seamen were united in a stable organization, if it did not cost more to build ships in American yards than anywhere else on earth (and more to operate them than any other nation has to pay), if the Shipping Board that the Maritime Commission inherited had been a smoothly functioning organization, and, lastly, if there remained lots of time to get organized—even then the responsibility of Chairman Kennedy and the Commission would be great, and the job of setting up the merchant marine would be hard.[23]

[23] "The Maritime Unions, a Caldron of Labor for Commissioner Kennedy to Stir," *Fortune* 16, no. 3 (September 1937), 140.

What is particularly interesting about that section of the article is that it points to a U.S.-flag shipping industry almost 90 years ago beset with problems and not held in high regard in many quarters. At the time, it cost more to build ships here and it also cost more to operate them as U.S.-flag vessels. In addition to those core competitive cost disadvantages, many adverse events that were apparently widely covered by the press had sullied the reputation of the industry with both policymakers and the public. That even extended to basic safety issues that must have been top of mind as two recent high profile marine tragedies were referenced in the article. The SS *Mohawk* was a U.S.-flag passenger cargo ship built in 1925 and in service between New York and Jacksonville. In January 1935, after leaving New York, it suffered a failure of its steering gear and collided with a Norwegian ship. The *Mohawk* sank with a loss of 31 crew and 16 passengers.[24] However, 89 crew and 37 passengers made it into lifeboats before it sank and were rescued by other ships. The SS *Morro Castle* was a U.S.-flag passenger ship built in 1930 that operated between the United States and Cuba. In September 1934, it caught fire and ran aground off the coast of New Jersey en route from Havana to New York, with the loss of 137 passengers and crew.[25] Survivors totaled 412 passengers and crew.

Against the backdrop of where the industry was as reported contemporaneously in the *Fortune* article, an impressive transition was to unfold in the ensuing years. The clear catalyst for all of this was the Merchant Marine Act of 1936. It was the legislation where the United States firmly put a stake in the ground and recognized that for national security purposes, shipping was an industry that needed to be directly supported by the federal government. It was as if John Jay was whispering in the ears of government leaders. The Merchant Marine Act of 1936 in effect said that the United States would pursue a path that ends with being autonomous in this critical area. As we know from history, the determination of President Roosevelt and the legislative leaders to push the act through Congress was an excellent decision. The chapter will return to the foundational effect that decision had as there are lessons to be learned from it even today. The author will first outline the framework and the key elements that resulted from the act.

---

24 "SS *Mohawk*," Wrecksite.eu, accessed 31 January 2025.
25 "The SS *Castle*—Fire at Sea—137 Dead!," Cruising the Past, accessed 31 January 2025.

An early principle embraced by the commission was that vessel designs should be standardized. The first three designs developed were the C1, C2, and C3 to denote they were cargo ships of increasing capacity and length. The foundational benefits of standardizing designs were important and will become even more so in the future. Those designs involved larger and faster cargo ships and allowed for building vessels in a series, which was much more cost efficient. Indeed, aspects included in these designs for cargo vessels would even be incorporated into actual military vessels built by the Navy. Embracing such standardization would play a constructive role in the efficiency and productivity that would be seen in the years ahead.

The timing of the Merchant Marine Act of 1936 was critical and was of course driven by the growing tensions in Europe and Asia. In addition to those tensions stoking fears that there would be another world war, the United States wanted to avoid the situation it faced in World War I, where the late decision to begin building vessels found it in a shipping crisis. As it would turn out, most of the sealift capacity to move American equipment and supplies during World War I came from ships that flew the British flag and the flag of other Allies. The act was referred to as the "Magna Carta of American Shipping" as it was intended to revitalize merchant shipping and strengthen national defense. A key element of it was the establishment of the CDS program, where the federal government would subsidize and pay up to 50 percent of the cost of building a ship to offset the higher cost in the United States compared to foreign shipbuilding costs. A federal ship financing program referred to as Title XI was also established by the act where a large majority of the shipowner's cost would be financed by utilizing a U.S. government guarantee. This not only made financing readily available but resulted in interest rates lower than otherwise attainable. With those programs to support shipbuilding in place, the commission implemented the long-range shipbuilding program, which started with a goal of 500 new ships built during 10 years but that would be increased as time went on.

The parallel ODS program that was created was intended to pay shipowners that built a ship in the United States the difference between the cost of crewing and operating a U.S.-flag vessel compared to what it would cost if it was foreign flag. This program was made available to ship owners who operated vessels on international trade routes that were deemed important. In exchange for receiving the subsidy, the operators agreed to maintain service on designated trade routes and make vessels available to the government in times of national emergencies. A systematic review had been conducted of the key trade routes involving the United States and a decision was made that there needed to be a U.S.-flag presence on the most important routes. Many of those routes had only one U.S.-flag carrier and for another American carrier to get a subsidy on that route, it had to be approved by the government. This regulation had the effect of reducing competition among U.S.-flag carriers, a sought-after goal as that was viewed as consistent with maximizing the size of the U.S. Merchant Marine.

In addition to the CDS and ODS programs, both of which resulted in an immediate step up in building activity, the act included several provisions focused on the training of seafarers. With the additional U.S. flag ships expected, clearly there would be a need for more seaman and officers to man those vessels. The act created the United States Maritime Service, the organization tasked with mariner training, and it would eventually include the establishment of the U.S. Merchant Marine Academy at Kings Point, New York, as well as other major training facilities throughout the country.

As a result of the framework established with the Merchant Marine Act of 1936, when the United States entered World War II, the production elements were already in place and working and there would be no repeat of the late start with shipbuilding during World War I. The remarkable industrial achievement that would follow in U.S. shipbuilding benefitted immensely from the framework established by the act and the implementation of standardized designs and federal subsidy programs that had already begun to energize shipbuilding even before the United States entered World War II. In other words, the pump was well primed. It just took a unified country and commitment along with an innovative American spirit to have shipbuilding activity ramp up exponentially.

There was nobody who epitomized the innovation the United States brought to shipbuilding during the war more than Henry J. Kaiser. In any accurate historical review, Kaiser must be considered the father of the modern shipbuilding industry, but he came to that in a circuitous way. At that time, Kaiser headed a major construction company most known for building dams and other large civil engineering projects. He had become acquainted with shipping through an initiative to build specialized ships to more efficiently move cement that was used in his projects. During the course of having those ships built, Kaiser met John Reilly, the dynamic president of Todd Shipyards, a company with multiple shipyards whose roots went back to the nineteenth century. In discussions, the two men agreed that looming hostilities would likely be a boon to shipbuilding. Reilly expressed concern that he lacked the men and equipment to address the growth he anticipated.

While Kaiser had no direct experience in the sector, he did have a large well-trained workforce available, as the Grand Coulee Dam project in Washington State was winding down along with much of the heavy equipment that could be put to work. Kaiser and Reilly agreed to explore how they might work together on shipbuilding projects.

In July 1940, a delegation from Britain arrived in the United States with $96 million to spend on 60 cargo vessels.[26] Kaiser was determined to turn his concepts into an action plan to bid for and win that contract. When Kaiser met with U.S. Navy personnel, they gave him 18 minutes to make his presentation on shipbuilding and then promptly turned him down based on his lack of experience. However, through his friend A. P. Giannini, president of California's Bank of America, Kaiser obtained an introduction to President Roosevelt. The presentation to Roosevelt must have gone better as it resulted in Kaiser obtaining a contract to build the first 50 *Liberty*-class ships.[27]

Kaiser established Kaiser Shipyard in Richmond, California. There was no shipyard there before, and he systematically built it from the ground up along with the processes it would follow. He made active use of many of the project construction techniques that had worked so well for him in projects such as the Grand Coulee Dam.

With his well-thought out plan, Kaiser got his Richmond shipyard up and running to produce Liberty ships. His production efficiency in building ships impressed the government and it asked him to establish additional shipyards. All of the processes that worked at the initial shipyard in Richmond were replicated and expanded at other shipyards that Kaiser established and operated.

In addition, shipyards operated by other companies adopted Kaiser's processes and they too began to efficiently produce Liberty ships, which were later supplemented by the larger *Victory*-class general cargo ships. The Kaiser ship-

[26] Antiplanner, "Henry J. Kaiser: The War Years," Thoreau Institute, 23 October 2008.
[27] "Henry Kaiser's Escort Carriers and the Battle of Leyte Gulf," Kaiser Permanente, 4 March 2015.

yards and the other shipyards that adopted its processes also produced T-2 tankers for the war effort. The common thread with all of these ships is that they all resulted from and flowed out of Kaiser's production process genius.

A key innovation of Kaiser's shipyards was the use of prefabrication and modular construction techniques to build ships. Prior to World War II, ships had essentially been built in the same piece by piece method for centuries, starting with the keel and building up. When he built the Grand Coulee Dam, Kaiser made use of a new type of crane known as a whirley crane. It allowed a boom and A-frame to rotate 360 degrees. The mobility of these cranes allowed dam subassemblies and conduits to be built and moved into position to be attached to the dam.

Kaiser reasoned that that the use of whirley cranes at shipyards would allow for prefabrication and modular construction, with large, preassembled components lifted and moved into place. He had six such cranes that were used on the Grand Coulee Dam project disassembled and moved to three of his shipyards.

The whirley cranes proved to increase efficiency just as much as Kaiser expected, and more cranes were built specifically for the shipyards that worked even better. The ability to build multiple sections of a ship at the same time and then move those components via crane so they could be welded to the ship proved to be an extraordinary revolution in both cost efficiency and the time it took to build a ship.

No longer were ships built from the keel up, which was laborious and time consuming, but individual modules and subassemblies were built at the same time and then joined together. This technique of modular construction is fundamentally the same process that shipyards around the world follow to this day.

The extraordinary shipbuilding productivity that resulted from Kaiser's new and different approach to producing ships is dramatically highlighted by the before and after production statistics. During the 10 years before 1940, the United States built a total of 23 cargo ships. In the five years after, the United States built more than 4,600 cargo ships.[28]

The transition from rivets to welding in the construction of ships was another key development pioneered by Kaiser. While rivets were the traditional

[28] "World War II Shipbuilding in the San Francisco Bay Area," National Park Service, 16 September 2020.

method, Kaiser was aware that welding was being used in auto manufacturing and other industries and surmised that it could be utilized in shipbuilding. The productivity increase was at least two-fold, as one man could weld whereas at least two men were always needed for riveting. The overall productivity gain, however, was much more as now unskilled laborers could be taught to weld. Welding was also a sharp step-up in quality because it resulted in more watertight and airtight seams than rivet. Rosie the Riveter actually related to aircraft construction of joining aluminum. Wendy the Welder was used for ship construction, but it never really caught on as much with the public.

The U.S. shipbuilding industry played a direct role in winning World War II with the thousands of cargo ships it built. Many of those ships would go on to populate the merchant marine fleets of the world.

Those ships and the pioneering shipbuilding techniques that were developed to build them became important catalysts for the modern cargo shipping network that exists today. While the United States is no longer a major builder of cargo ships, it remains the most sophisticated shipbuilder of complex naval vessels in the world and later this chapter will discuss the continuing impact of this superiority.

The techniques that Kaiser developed shortened the time it took to build a ship. From the first ship he built in 1940 at his Richmond shipyard, he would rapidly expand the operations of his company to a total of 18 shipyards. In total, his shipyards would build 1,490 ships, mostly general cargo Liberty and Victory ships but also T-2 tankers.

The modular construction and welding techniques that Kaiser pioneered were quickly copied by other U.S. shipyards and the thousands of ships they produced with record efficiency can also be linked directly with Kaiser. Toward the end of the war, it took only several weeks to produce a ship. In one well-publicized case, a Kaiser shipyard produced a 10,500-ton Liberty ship in a total of just 4 days, 15 hours.[29]

The extraordinary efficiency of the shipbuilding revolution that Kaiser created became well known to most Americans and was a major source of pride. In his typical matter-of-fact style, Kaiser eschewed the notoriety that came his way from newsreels and magazine articles. He did, however, understand the

[29] "Ship Is Launched 10 Days from Start," *New York Times*, 24 September 1942.

enormity of what he had accomplished as he said more than once, "When your work speaks for itself, don't interrupt."

In another indication of the high regard Kaiser was held in at the time, President Roosevelt seriously considered picking him to be his vice president in the 1944 election. However, he ended up selecting Harry S. Truman after it was determined that Kaiser might be viewed as too progressive. Kaiser had just been named as the most popular civilian in the United States in a Gallup poll, and another poll shortly thereafter had Kaiser ranked third in terms of a list of people Americans thought should be president, trailing only Generals Douglass MacArthur and Dwight D. Eisenhower.[30]

The wartime effect of the Liberty ships that Kaiser produced is hard to overstate but has been well chronicled by historians. More than one general has said that World War II could not have been won without the Liberty ships. Less known, however, is the impact these ships first had as commercial cargo ships in ushering in the growth in world trade in the postwar era and the impact that the shipbuilding processes and techniques that Kaiser introduced would have in producing today's giant cargo ships.

After the war, the United States had the largest Merchant Marine fleet of any country in the world. The Liberty and Victory ships were now in surplus, and programs were developed to sell them to allied countries to rebuild their own fleets. It was those ships that were built for war that now became the backbone of many merchant fleets around the world. In addition to exporting U.S.-built ships, the very processes that were successfully used in the United States began to appear in other countries.

In the beginning of the postwar era, the benefits of larger ship sizes as well as specialization became more apparent and the United States was driving innovation in these areas. One of the first to make big commercial strides was Daniel K. Ludwig, an American shipowner whose successful and profitable operation of large tankers reconfirmed his view that the scale economies of operating even larger tankers were significant. He established a shipyard in Norfolk, Virginia, that he named the Welding Shipyards because he was utilizing that new process to build tankers that were larger and safer than what

[30] Samuel I. Rosenman Oral History Interview, with Jerry N. Hess, 15 October 1968, Harry S. Truman Library.

could be built using old-fashioned rivets. To run his new shipyard, he hired Elmer Hann, who had reported directly to Henry Kaiser during the war.

There is a direct link between Henry Kaiser, D. K. Ludwig, Elmer Hann, and the development of Japan's large shipbuilding industry. Ludwig wanted to build even larger tankers, but he had already reached the limit in terms of what size tankers could be built at Welding Shipyards. He was now on the lookout for a better shipbuilding platform to expand on his bigger is better thesis.

Scouting for available shipyards, Ludwig became aware of the former Japanese naval shipyard in Kure, Japan, that was controlled by the U.S. government. The Kure shipyard had built the IJN *Yamato* (1940), the largest battleship ever built, and it had building ways large enough to build the mammoth tankers Ludwig envisioned.

Negotiations ensued and Ludwig entered into a 10-year lease of the yard with an option to renew for another 5 years. It became known as National Bulk Carriers Inc., Kure Shipyards division. Ludwig sent Elmer Hann to Japan in 1951 to manage the shipyard. Hann instituted the same type of training program that had worked well in his previous assignments. Japanese workers were taught the same construction methods that the United States had used to revolutionize the shipbuilding industry during the prior decade.

The first vessel built by Ludwig at the Kure shipyard was the *Petrokure*, a 38,021 deadweight tonnage (DWT) tanker that became the biggest tanker in the world when it was launched in 1952.[31] Ludwig would build 43 ships for his various operating companies at the Kure shipyard between 1952 and 1962. Another 32 ships were built for other companies. Most were tankers, but he also built a number of ore carriers, most of which were the largest vessels in the world when they were launched.

Noteworthy tankers that Ludwig built for his own operating company included the 85,515 DWT *Universe Leader* in 1956 and the 104,520 DWT *Universe Apollo* in 1958.[32] Both ships were the first in a class of vessels that were the largest tankers in the world when they were launched. The delivery of the *Universe Apollo*, the first ship in the world to cross the 100,000-ton mark, was a tangible reminder that the age of large tankers was here to stay.

[31] Jerry Shields, *The Invisible Billionaire, Daniel Ludwig* (Boston, MA: Houghton Mifflin Company, 1986).
[32] Shields, *The Invisible Billionaire*.

The epicenter of the international crude oil transport market was now centered on exports from the Middle East. The Suez Crisis of 1956 resulted in the temporary closure of the Suez Canal that proved to be a positive catalyst for the tanker sector by lengthening voyages on the largest routes. Both ship owners and oil companies began to appreciate the superior economics that resulted from larger tankers.

By 1958, Japan had displaced Britain as the largest shipbuilding country in the world. This was achieved as a direct result of the introduction of innovative methods and techniques such as welding and the modular construction of large ships. Ludwig introduced these techniques to Japan at his Kure shipyard. Other shipyards in Japan would utilize those techniques as they hired workers away from the Kure shipyard. Shipbuilding was the first industry where Japan rose to the top in the postwar period. In many ways, the shipbuilding industry became a model for Japan's later success in other industries.

It is ironic to realize that the shipbuilding innovations that played a key role in the Allies World War II victory were recycled to become one of Japan's most important industries. The role of Elmer Hann in developing this industry was acknowledged by the emperor of Japan who honored him with the prestigious Order of the Sacred Treasure, 3d class award. Hann was only the second non-Japanese person in history to receive this award. The success of Ludwig's Kure shipyard was a prime catalyst in the rebuilding of Japan's industry after World War II.

The 1950s saw other major innovations emanating out of the United States. Key among those were the creation of two new vessel categories: container ships and bulk carriers. Malcom P. McLean's invention of container shipping and Ole Skaarup's invention of the modern bulk carrier would result in increased cost efficiencies from specialization, and both of these originated in the United States. Indeed, for the first decade of its existence, container shipping was primarily used only within the Jones Act to move domestic cargoes.

While total trade volume was now consistently growing at higher rates of growth than had ever been experienced, the absolute and relative size of the U.S.-flag Merchant Marine was declining. Given that the United States came out of World War II with the largest Merchant Marine in the world, a level that was not considered necessary for either economic or national security purposes, this was expected and not particularly concerning. Initially, the more pronounced decline occurred in the relative fleet size as other countries grew their shipbuilding industries. Just as the United States had exported the Liberty ships that were built for war to now be used commercially and had in effect exported shipbuilding processes, other countries began to put in place subsidy programs to support their own maritime sector.

The first test of U.S. Merchant Marine and its ability to provide military sealift capacity in the postwar period would come early during the Korean conflict. Unlike World War II, where almost all of the sealift capacity came in the form of new ships, the Korean conflict involved the utilization of existing U.S.-flag ships. This use of the U.S. commercial fleet and other existing U.S.-flag ships during a time of national emergency is the dual use in time of war policy that has fundamentally remained in place to this day.

There were several structural changes that occurred after World War II ended that were made to prepare for potential future sealift needs. In 1946, the National Defense Reserve Fleet was established, with approximately 1,400 *Liberty*- and *Victory*-class ships laid up in ports across the United States. In 1950, the United States Maritime Commission was split into two agencies, with the Maritime Administration established to promote the U.S.-flag Merchant Marine and other maritime activities while the Federal Maritime Board was charged with regulating ocean shipping. The latter would subsequently evolve into the Federal Maritime Commission and be tasked exclusively with regulating international shipping activities. Those two agencies remain today the primary U.S. government entities involved with shipping, but all responsibilities related to promoting a U.S.-flag Merchant Marine reside with the Maritime Administration. Initially part of the Department of Commerce, today it is part of the Department of Transportation. The Military Sea Transportation Service was established in 1949 as part of the Department of Defense to consolidate the shipment of military supplies from the four separate services into a unified command. It would later be renamed the Military Sealift Command.

The United States and its allies responded to North Korea's invasion of South Korea in mid-1950 almost immediately. The amphibious landing of American forces at Inchon in September was accompanied by 26 chartered American cargo ships. They would go on to be involved in what is one of the largest mass evacuations in history as 91,000 Korean refugees were rescued. One U.S.-flag merchant ship, the SS *Meredith Victory* (1945), would carry more than 14,000 refugees in a continuous series of voyages from Hungnam in the north to Pusan in the south.[33]

With China supporting North Korea, the conflict grew, and additional American and allied forces were sent to South Korea and other nearby staging bases. With the nautical miles involved more than the sealift during World War II that primarily involved relatively short Atlantic Ocean crossings, the demand for merchant marine capacity grew significantly. The U.S.-flag commercial fleet formed the backbone of that sea bridge across the Pacific Ocean. Starting with just 6 U.S.-flag ships under charter when the war began, the number would peak at 255 U.S.-flag ships chartered to provide sealift directly related to the Korean conflict.[34] These chartered U.S.-flag commercial vessels provided more than 85 percent of the dry cargo sealift requirements during the conflict. Only 5 percent of the total cargo needed during the war went via airplane. The Maritime Administration authorized that 130 Victory ships laid up in the National Defense Reserve Fleet be broken out and assigned to U.S.-flag shipping companies that then chartered them to the Military Sea Transportation Service. The service would estimate the sealift capacity needed as equivalent to seven tons of supplies for each American soldier in Korea plus an additional ton of supplies for each month he is there.[35]

The use of so many commercial ships to provide sealift related to the Korean conflict resulted in stressing other key maritime trade routes that were exacerbated by factors including the beginning of the Cold War with the Soviet Union. Allies in Europe were rebuilding their economies and there was a need to assist in the movement of much needed coal to Northern Europe and grain to India. To assist with what became a worldwide vessel tonnage shortage, 600 ships were reactivated from the National Defense Reserve Fleet between 1951 and 1953 and effectively put into commercial service.

With the Korean armistice signed in July 1953, the chartered U.S.-flagships returned to commercial activities and trade lanes became more normalized. The strong postwar economies had catapulted overall global trade volume and growth to record levels. This in turn drove a demand for more and larger ships. The advent of container ships, bulk carriers, and other specialized types

[33] "Ship of Miracles: Korea 1950," Wilson Center, 30 June 2015.
[34] "Sealift in the Korean War," Global Security, 22 January 2011.
[35] "Sealift in the Korean War."

would add to cost efficiencies that would be augmented by the scale economies resulting from ever larger vessel sizes.

As shipping became more cost efficient, that in turn would lead to more trade in a virtual circle that has continued since then. While trade had existed prior to World War II, all of these factors translated into it growing well above GDP growth in almost all countries. The heady growth in the demand for shipping during this period can be thought of as the beginning of the modern cargo shipping era. It would be accompanied by a transition that was among the biggest structural changes ever for the shipping industry.

CHAPTER 2

THE LATE COLD WAR AND POST-COLD WAR WORLD OF SHIPPING AND THE IMPACT ON THE U.S. COMMERCIAL FLEET

John D. McCown Jr.

The beginning of the modern cargo shipping era coincided with a shift in the flags ships fly. Up until World War II, ships generally flew the flag of where they were based and owned. British owned and operated vessels flew the Union Jack, American owned and operated vessels flew the Stars and Stripes, and so forth and so on. The flags of merchant ships were broadly consistent with countries' ranking in the industrial world. Those ships and their owners were subject to the laws and regulations of the country whose flag they flew, including ones related to income taxes, vessel inspection, and crew manning. The emergence of what became known as flags of convenience would dramatically change the commercial shipping industry.

Throughout history, the flag that flew on the stern of a cargo ship has been important and involves various legal principles that go beyond a simple identification of the vessel's home country. Wherever the ship is, the laws of the flag state apply to it, whether it relates to crew composition and compensation, vessel inspection and safety rules, income taxes and fees, and even criminal matters. While laws of other countries may also apply when the vessel is in port in their jurisdiction, for all practical matters the vessel is treated as if it is an appendage of the country, much like an embassy on foreign soil is viewed as part of the sponsoring country.

The flag state is extending its implicit protection to all ships under its umbrella no matter where they are in the world. For this reason, any attack on a cargo ship has historically been considered an act of war against the country whose flag flies on the vessel. A core function of any navy is to protect the merchant marine vessels of that country. Likewise, any salute to or respect for a cargo ship is considered doing the same to the flag state.

The very first salute to America by a foreign government occurred on 16 November 1776 when a merchant ship flying the flag of the Continental Congress entered the port of Sint Eustatius, an island in the Caribbean that was the center of Dutch trading in the New World.[1] Wanting solely to trade and engage in commerce with that ship, the Dutch governor ordered the guns of the local garrison to fire a welcoming salvo as the ship entered the port.

The traditional alignment between ship ownership and flag was in part marketing as customers in a particular country, given a choice when they viewed everything else as generally equal, would typically want to use ships that flew their countries' flags.

In large part, this was also influenced by regulations that certain cargoes could only move on vessels that flew their country's flag. For instance, many countries have cabotage laws covering cargo moving between domestic ports. Approximately two-thirds of the countries with maritime coastlines have laws or regulations that are supportive in some manner of ships registered in their own country. In addition, there were often special rules requiring government control of military cargoes moving on ships that fly the flag of that country. All of these cargo preference laws and regulations are rooted in the view that a country's merchant marine is a principal element of national security.

History is filled with examples of important roles played by merchant marine vessels in supporting the military. None are more dramatic than World War II where more than one military leader said America could not have won without the Liberty ships.

In times of war or conflict, the only cargo ships a country can completely rely on are ships that fly their flag because governments have the legal ability

[1] Willem de Bruin, "The First Salute," *John Adams Institute* (blog), accessed 18 February 2025.

to requisition such vessels. Without cargo vessels that can be controlled, there is no way to assure the necessary supply lines that are required for any military to function.

In addition, a robust merchant marine results in large numbers of trained crewmen, including a large population of people who formerly sailed who could man cargo ships held in reserve in the event of a national emergency. An active merchant marine builds ships in domestic shipyards, which makes for a more vibrant shipbuilding industry and those benefits flow over to shipyards building actual naval vessels. Across the board, there has always been a symbiotic relationship between a country's merchant marine and its national security.

Panama was the first country to establish what would become known as a flag of convenience registry in the mid-1930s.[2] The initial reason behind and attraction for registering ships under the Panama flag was to reduce income taxes. Most countries taxed owners of ships flying their flag using their typical corporate tax rate applied to the net income of the ship. In establishing its registry, Panama put in place an income tax rate for international shipping that was significantly lower than any corporate income tax rate and this was attractive to ship owners. With little cost associated with managing a registry of ships that had little or no dealings with Panama, almost all of the fees and taxes collected were viewed as a windfall, which is what makes registries attractive to the host country.

Prominent Greek ship owners such as Aristotle Onassis and Stavros Niarchos were the first to make use of the Panama registry, and reducing income taxes was what drew them initially. While the tax rates appeared attractive to other ship owners, their insurance companies were leery of the vessel inspection regime for Panamanian flag vessels, and it would take several years before participation began to increase.

The catalyst for broader participation in the Panamanian registry in particular and flags of convenience registries in general was actually the U.S. government. President Franklin D. Roosevelt was familiar with the U.S. shipping industry and was a champion for it because he appreciated the need for a strong merchant marine.

[2] "Hiding Behind the Flag—Panama," *Lawless Sea*, January 2004.

Roosevelt's desire to avoid having any shipments from the United States going to Germany or Italy had resulted in the passage of the Neutrality Act, which forbade military supplies moving on U.S.-flag vessels. However, he now recognized that in 1939 this same act would prevent U.S.-flagged ships from moving supplies to Great Britain and France who were now almost at war with Germany.

To get around the Neutrality Act, the government quietly gave certain American ship owners permission to transfer some of their ships to foreign registry. With a foreign flag, these ships would not be subject to that U.S. law and would be free to move military cargo to Great Britain and France. Panama, where the United States owned the Canal Zone and still exerted considerable influence since its separation from Columbia earlier in the century, was chosen as the country to host foreign-registered but U.S.-owned vessels.

To encourage American ship owners to reflag in Panama, the Roosevelt administration exerted its influence to have the Panamanian government impose few restrictions and limited inspection and maintenance standards for the ships it registered. It also pressured Panama to further reduce taxes related to shipping, resulting in ship owners paying only token taxes if they flew Panamanian flags. These incentives made Panama very attractive as a place to register ships.

This behind-the-scenes effort achieved its initial purpose of allowing the United States to provide critical supplies to Great Britain and France without technically violating U.S. neutrality. It was also the catalyst for the cost savings benefits that continued after World War II and to this day for ship owners who choose a flag of convenience registry. The rules and regulations that were adopted by Panama became the model for other countries as they developed their own flag of convenience registry.

In 1948, Edward R. Stettinius founded the Liberian registry in partnership with the Liberian government. Stettinius had served as secretary of state under President Roosevelt from 1944 to 1945 and was then the first U.S. ambassador to the United Nations. The Liberian registry was created at a time when the Panamanian registry was becoming less attractive due to heightened criticism by labor unions, political unrest in Panama, and increases in fees and regulations.

Liberia was founded in the early 1800s as a settlement in Africa for Blacks who relocated from the United States because they believed it offered a better life for them. It became a separate country in 1847 with a constitution and flag modeled after those in the United States. The flag looked exactly like the U.S. flag except that it had one white star instead of stars equal to the number of states. The capital city of Monrovia was named after President James Monroe who was a prominent supporter of the initial settlement.

Liberia consistently aligned with the United States and was an ally during World War II. This historical closeness had much to do with the establishment of the Liberian registry. The first ship registered in Liberia in 1948 was owned by Greek shipowner Stavros Niarchos.[3] The Liberian registry prospered, and by 1967 it had passed the United Kingdom to become the largest flag registry in the world. The fact that the Liberian flag has such a striking similarity to the U.S. flag no doubt played a key role in the success of the Liberian registry, particularly with ship owners who were switching from the U.S. registry.

Driven by the transition of the Liberty ships to commercial service, the peak of the U.S.-flag Merchant Marine in terms of its representation worldwide was 1950. At that time, U.S.-flag vessels represented some 43 percent of worldwide cargo vessel tonnage.[4]

While preferable income tax treatment was an initial catalyst for owners switching to these new registries, the lower operating costs that often resulted from such registries were also very attractive. These new registries were open registries that allowed the ship owner complete flexibility on where to source crewmembers. The regulations were typically less stringent than the regulations ship owners were accustomed to.

As more open registries developed, the competition between them to get ship owners to switch resulted in even more attractive operating cost economics for the ship owner. While operating costs are a relatively small part of the total cost of a ship when fuel costs and capital costs are included, they are an area offering differentiation. If a ship owner wants to develop a competitive cost advantage, operating costs are a main area on which to focus. This dynamic resulted in fairly intense competition among the growing number of

---

[3] Doris Lilly, *Those Fabulous Greeks: Onassis Niachos and Livanos* (New York: Cowles Book Company, 1970).

[4] *Department of Transportation, Statement of the Maritime Administrator David T. Matsuda before the Subcommittee on Coast Guard and Maritime Transportation United States House of Representatives on the State of the United States' Merchant Fleet in Foreign Commerce*, 111th Cong. (20 July 2010).

open registries, which were now being openly referred to more as flag of convenience registries.

With civil war and unrest in Liberia, it would be overtaken by Panama, which regained the title of the largest registry in the world. There was no country that was as focused on the ship registry business as much as Liberia as the sector provided 70 percent of the government's total revenue. With its expertise on the sector and continuing civil unrest in Liberia, the government of Liberia joined with the Republic of the Marshall Islands to develop a new open registry.

The Marshall Islands registry grew quickly and was particularly attractive to ship owners based in the United States. The Marshall Islands is a republic in free association with the United States, which provides defense. In other words, it is as close as you can get to the United States without being the United States. There is a view among some ship owners that a Marshall Islands flag brings with it the implicit protection of the U.S. government due to various defense treaties, but the open registry results in lower, competitive operating costs.

The intense competition among the largest open registries also exerted an effect on the other registries as they took steps to avoid having ships switch out from their registry. While this did not result in any meaningful reduction in their own regulations or standards, in part because the insurance firms and classification societies would act as a check on any wholesale deterioration, they also were not looking to unilaterally add new regulations. Any registry that moved outside of the norm could expect to experience defections.

One area in particular where something initially adopted by the open registries eventually flowed through to all registries relates to income taxes on shipping. The initial lower tax rates at open registries were eventually replaced by a modest fixed annual tax on the vessel based on its deadweight tonnage. Because this was used to attract new ships that would not result in any related government revenue loss or expenditure need, the host country viewed it as a windfall and the amounts kept getting lower at the open registries.

Almost all registries eventually adopted a tonnage tax regime where vessels operating in international commerce that fly their flag pay a fixed annual amount based on deadweight tonnage regardless of the economic earnings of the vessel. One rationale that supported this transition was the view that ships primarily operate in international waters and that results in difficulty in apportioning in whose jurisdiction the earnings actually occur.

The tonnage tax is really more of a license fee in lieu of an income tax than a pure income tax. The reason for this is that it does not vary regardless of how well or how poorly a ship performs in a given year. For example, it is not unusual today for a large modern ship to pay an annual tonnage tax of $25,000 in lieu of all income taxes, whether the vessel operated at a loss or made $1 million or $10 million for the year.

With tonnage tax regimes now prevailing in almost all registries, the shipping industry collectively enjoys a tax benefit unheard of in almost all other industries as it can effectively operate tax free without paying any real income taxes. Ironically, due to the hyper-competitiveness experienced in most shipping sectors, it is not unusual for this unique tax benefit to go unused in many years.

Today, the top three flags of convenience are Panama, Liberia, and the Marshall Islands and collectively almost one-half of the worldwide cargo fleet in terms of deadweight tonnage flies one of those flags.[5] Many of the other large registries are also purely flags of convenience or share similar aspects. This transition to flags of convenience has affected not only the United States but also all of the largest economies to one degree or another. For instance, while the five largest economies in the world represent 60 percent of global GDP, the ships that fly their flags collectively represent only 7 percent of total merchant vessel tonnage. That being said, the underrepresentation by the United States alone is even more striking because while it accounts for 28 percent of worldwide GDP, its flag flies on less than 1 percent of cargo ships. Table 1 lists the top 20 flag registries ranked in terms of overall deadweight tonnage. The table also shows how overall tonnage at each flag registry is broken down in terms of vessel type.

Some 88 percent of the worldwide cargo fleet is registered in one of the top 20 registries, of which the United States is the smallest with only 0.6 percent of the worldwide fleet. While Panama is the largest flag registry overall, it is second in the container category and third in the tanker category. Liberia is the largest flag registry in the container category and the Marshall Islands in the largest flag registry in the tanker category.

The widespread use of flags of convenience by many countries can be seen in comparisons of flag registry to where the vessel owner actually resides.

[5] Rebeca Grynspan, *2024 Review of Maritime Transport Navigating Maritime Chokepoints* (New York: United Nations, 2024), 48, 49.

Table 1. Flag registries

Flag registry	Grand total	Container	Tanker	Dry bulk	Other
Panama	324,589,815	38,288,715	61,794,924	199,822,215	24,683,961
Liberia	198,749,031	45,526,085	71,142,555	74,817,171	7,263,220
Marshall Islands	189,448,831	13,679,649	77,850,684	85,926,693	11,991,805
Hong Kong	163,588,980	29,572,210	35,366,167	91,541,021	7,109,582
Singapore	119,961,433	25,104,975	37,226,565	51,273,472	6,356,421
Malta	95,638,923	14,935,791	30,599,252	44,558,274	5,545,606
Greece	72,000,613	906,957	45,362,228	23,799,082	1,932,346
Bahamas	67,553,798	1,451,407	36,651,959	16,353,965	13,096,467
China	64,962,740	6,727,202	12,679,094	40,774,910	4,781,534
Cyprus	32,520,442	4,748,642	4,745,841	21,269,121	1,756,838
Japan	28,996,541	406,840	6,996,278	18,306,430	3,286,993
Isle of Man	21,948,545	1,312,860	8,276,356	9,840,949	2,518,380
Norway	17,206,155	5,202	7,649,166	4,670,614	4,881,173
Denmark	16,905,673	11,436,515	4,447,803	357,648	663,707
South Korea	16,422,544	1,318,941	1,670,944	10,760,646	2,672,013
Italy	15,734,349	622,861	6,488,625	5,724,207	2,898,656
Indonesia	15,206,755	1,696,554	6,345,482	2,788,033	4,376,686
India	14,717,865	392,049	8,467,110	4,784,868	1,073,838
United Kingdom	13,299,591	7,989,588	2,331,298	1,751,553	1,227,152
United States	10,616,525	3,101,484	3,818,990	1,893,394	1,802,657
Top 20	1,500,069,149	209,224,527	469,911,321	711,014,266	109,919,035
Other	204,443,593	35,326,475	73,359,160	45,756,808	50,001,150
Grand total	1,704,512,742	244,551,002	543,270,481	756,771,074	159,920,185

Source: Grynspan, 2024 *Review of Maritime Transport Navigating Maritime Chokepoints*.

Not surprisingly, ownership is more skewed toward developed countries. Only three countries among the top 10 in terms of flag registry, Singapore, Greece, and China, show up in the top 10 in terms of vessel ownership values. Countries that are not in the former category are high up in the latter category. For instance, the United States is fourth overall in ownership value with 7.3 percent of the total. That is almost 12 times its representation in terms of flag registry.

Collectively, the top 10 countries in terms of vessel ownership represent 78 percent of the value of cargo ships in the world, or almost four times their rep-

Table 2. Flag registry ship percentages by vessel type

Flag registry	Grand total	Container	Tanker	Dry bulk	Other
Panama	19.0%	15.7%	11.4%	26.4%	15.4%
Liberia	11.7%	18.6%	13.1%	9.9%	4.5%
Marshall Islands	11.1%	5.6%	14.3%	11.4%	7.5%
Hong Kong	9.6%	12.1%	6.5%	12.1%	4.4%
Singapore	7.0%	10.3%	6.9%	6.8%	4.0%
Malta	5.6%	6.1%	5.6%	5.9%	3.5%
Greece	4.2%	0.4%	8.3%	3.1%	1.2%
Bahamas	4.0%	0.6%	6.7%	2.2%	8.2%
China	3.8%	2.8%	2.3%	5.4%	3.0%
Cyprus	1.9%	1.9%	0.9%	2.8%	1.1%
Japan	1.7%	0.2%	1.3%	2.4%	2.1%
Isle of Man	1.3%	0.5%	1.5%	1.3%	1.6%
Norway	1.0%	0.0%	1.4%	0.6%	3.1%
Denmark	1.0%	4.7%	0.8%	0.0%	0.4%
South Korea	1.0%	0.5%	0.3%	1.4%	1.7%
Italy	0.9%	0.3%	1.2%	0.8%	1.8%
Indonesia	0.9%	0.7%	1.2%	0.4%	2.7%
India	0.9%	0.2%	1.6%	0.6%	0.7%
United Kingdom	0.8%	3.3%	0.4%	0.2%	0.8%
United States	0.6%	1.3%	0.7%	0.3%	1.1%
Top 20	88.0%	85.6%	86.5%	94.0%	68.7%
Other	12.0%	14.4%	13.5%	6.0%	31.3%
Grand total	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Grynspan, *2024 Review of Maritime Transport Navigating Maritime Chokepoints*, 38–52.

resentation in terms of flag registry. The only country within that group with similar representations in both categories is Singapore. Table 3 shows the top 10 countries in terms of vessel ownership and how they compare to their respective flag registry representations.[6]

Advances have been made in various areas that are broadly related to the topic of autonomous shipping. They come in many forms and further advanc-

[6] Grynspan, *2024 Review of Maritime Transport Navigating Maritime Chokepoints*, 51.

Table 3. Top countries in terms of vessel ownership

Country	Value (bill)	% value	% DWT	Value/DWT
Greece	$93.6	15.3%	4.2%	3.6
Japan	$84.9	13.9%	1.7%	8.2
China	$73.5	12.0%	3.9%	3.2
United States	$44.6	7.3%	0.6%	11.7
Singapore	$42.4	6.9%	7.0%	1.0
Norway	$38.1	6.2%	1.0%	6.2
Germany	$31.6	5.2%	0.5%	10.4
United Kingdom	$23.7	3.9%	0.8%	5.0
Denmark	$22.2	3.6%	1.0%	3.7
South Korea	$21.4	3.5%	1.0%	3.6
Top 10	$476.0	78.0%	21.6%	3.6
Other	$134.5	22.0%	78.4%	0.3
Total	$610.5	100.0%	100.0%	1.0

Source: *Review of Maritime Transport 2024: Navigating Maritime Chokepoints* (Geneva: United Nations, 2024).

es are likely to play a role in the future of commercial shipping and the ramifications will be broad. If autonomous shipping were to become widespread, one ramification would likely be a reduction in the role of flag of convenience registries.

In a completely autonomous vessel, what was operating cost in the form of crew wages and benefits would now be replaced by capital cost in the form of computers, software, and sensors. The ability to differentiate and develop a competitive cost advantage based on the crew selected by the ship owner would disappear. With that gone, much of the reason for flying a Panamanian or Liberian or Marshall Islands flag would also be gone. Ship owners would still want to have the most favorable regulations related to income taxes and inspection requirements and those items would still be very important in determining registries, but the crew wage issue that drives much of the registry decisions today would be off the table with autonomous ships. Almost all countries now have favorable income tax regulations for ships flying their flag in international commerce. Likewise, the impact of insurance companies and classification societies tends to result in similar inspection and technical requirements among registries.

In a future environment with significant autonomous vessels, it is fair to say that the influence of flags of convenience registries will be much less. There will be more of a return to ships flying the flag of the country where their owners reside and in whose commerce they are involved. In other words, the mix of flags would be similar to what it was in the past as it would be more tied to economic interest than to minimizing crew costs.

Against the backdrop of structural change in the shipping industry in the postwar period with many owners switching to flags of convenience, the U.S. Merchant Marine was initially holding up with more than a sufficient number of ships deemed by most to be necessary for national security purposes. The large majority of those ships were deployed internationally, and the construction differential subsidy and operating differential subsidy programs were the apparent reason that the decline was not more pronounced.

The next test the U.S. Merchant Marine would face in terms of achieving its dual use mandate would be the Vietnam War. Similar to the Korean conflict more than a decade earlier, sealift would be provided with U.S.-flag chartered vessels, both ones previously in commercial service and the ones from the National Defense Reserve Fleet. The Maritime Administration would activate 100 *Victory*-class ships that were made available to operators who chartered them to the Military Sea Transportation Service. Those ships were sufficient to move supplies across the Pacific, but a different type of problem developed whose solution would also prove to be a major catalyst for the international expansion of the new type of maritime transport known as container shipping.

Malcom McLean had started container shipping almost a decade earlier with the 26 April 1956 sailing of the SS *Ideal X* from Port Newark, New Jersey, to Houston, Texas. The cost efficiency of moving domestic cargo in containers by water instead of how it previously moved over land became readily apparent and services expanded to many coastal routes and then to offshore routes in Puerto Rico and Alaska. Even as it expanded, however, many existing liner shipping companies viewed it as a niche service that would not have any applicability in other markets, most particularly ones in which they had deployed existing ships. Those ships were all traditional breakbulk ships where cargo in an array of sizes was loaded and unloaded using nets and shipboard winches. It was the use of the same type of ships in Vietnam with all the military supplies going to ports there that was resulting in backups and problems.

The buildup of American soldiers in Vietnam starting in 1965 resulted in significant logistical problems in unloading and dispatching the growing amounts of cargo. By late 1965, there were 45 ships being worked by the military in Vietnam with another 75 ships waiting off the coast or in the Philippines to be unloaded.[7] The problems only got worse as the months went by and this issue was getting attention at the highest levels of government. Changing how supplies were ordered, having ships unload all their cargo at a single port rather than going to multiple ports, and using more Conex boxes mitigated the issue, but major logistical problems remained.

Secretary of Defense Robert S. McNamara invited shipping executives to Washington and sought their input. Malcom McLean immediately saw it as an opportunity to demonstrate what container shipping could do to solve the problem. His company Sea-Land had just initiated a transatlantic route that was being well received by shippers in the first international container service. After meeting with defense department officials, he flew to Vietnam with colleagues to visit various ports and get additional briefings directly from the military on the problems they had along with key freight needs and goals. Convinced more than ever that container shipping could be made to work in Vietnam, he lobbied the Pentagon to give him the opportunity to prove what he could do.

Sea-Land's first foothold was an April 1966 contract to run a trucking operation to distribute cargo from the port of Saigon. While this had nothing to do with containers, Sea-Land managed it well and gained increasing support within the military. McLean had several high-ranking military people championing using containers for Vietnam cargo, but there was still very strong resistance from factions that would be displaced if this occurred.

In May 1966, Sea-Land got a contract to run three container ships between Oakland and Okinawa, a Japanese island that was a large staging point for cargo moving on to Vietnam. In short order, Sea-Land was able to demonstrate that it could move the same amount of cargo with half the number of ships and that they could be loaded and unloaded with one-sixteenth as much labor

[7] "U.S. Merchant Marine, Military Sea Transportation Service, and Military Sealift Command in Vietnam," U.S. Merchant Marines, accessed 21 November 2024.

as traditional breakbulk ships. In July 1966, Sea-Land was awarded a contract to move containers to Subic Bay, a major naval base in the Philippines and another staging area for Vietnam. By this time, there was a general acknowledgment that container service directly to Vietnam should be implemented, but the timetable kept getting pushed back, mainly by the military unit overseeing current port operations.

However, Secretary McNamara's visit to Vietnam in October 1966 where he spent much of his time visiting ports and seeing firsthand the backlog had the effect of moving things into high gear. That same month, a contract was awarded to Sea-Land to not only move containers directly to Vietnam from the West Coast, but to also operate the terminals and provide trucking service under a fixed priced contract. Sea-Land's willingness to provide service under a fixed price contract instead of the usual cost-plus arrangement underscored McLean's confidence in what Sea-Land and its container ships could do.

Sea-Land began direct service to Vietnam in March 1967. Using seven container ships in total, with three large ships and four smaller feeder ships, this network began improving the logistical bottlenecks in Vietnam immediately. The success was well beyond even what Sea-Land had expected. In short order, three linehaul ships would replace more than a dozen general cargo ships.

Because container shipping was solving such a high-profile problem, its success quickly became widely known and written about. Shipping companies and their customers who had been ambivalent were now onboard. An overriding view was that if container shipping could do what it did in Vietnam with its unique challenges, imagine what its potential in other areas and trade lanes without those challenges would be.

Malcom McLean would be the first one to exploit what could be done in one of those other trade lanes. In spite of the significant cost savings the military was getting, Sea-Land was generating a solid profit with its Vietnam service even with his three large ships returning with empty containers to the West Coast. As a trucker at heart, Malcom abhorred empty miles.

Looking at the map, McLean reasoned that they should approach Asian manufacturers to solicit their interest in shipping products back to the United States in containers. In a whirlwind business trip to Japan in 1967, he received commitments from Mitsubishi and several other large shippers. The initial shipments they made met or exceeded expectations. As these manufacturers compared the actual total costs and time of moving products in containers versus in general cargo ships, they wanted to move all of their products by container. Japan's early embrace of container shipping and its cost efficiency in moving finished products it was producing played a key role in its growth in exports that would lead the world for at least two decades. The late 1960s saw Sea-Land grow exponentially in eastbound container shipments in the transpacific trade lane as one shipper after another saw the benefits in moving their manufactured products in containers.

Sea-Land's success with the new international container shipping services was embraced by shippers and this left other liner shipping companies with no choice but to begin their own versions as the effectiveness of this new system spread. Malcom McLean had purposefully chosen not to seek patents on any aspects of his and Sea-Land's container shipping inventions because he did not want to take action that would preclude the standardization he believed was key to broader adaptation. Some dozen years after the advent of container shipping as a domestic conveyance system, it was now rapidly morphing into the international conveyance system that has shown extraordinary growth ever since. The cost efficiency of container shipping is an under recognized catalyst for what would become known as globalization.

Container shipping volume would grow by double-digit annual percentages in many trade lanes as liner shipping companies converted existing cargo onto the new system and efficiencies it brought about generated additional cargo. While all of the scheduled liner companies would convert to containerization, none would be larger than Sea-Land, which would remain the world's largest container shipping company through the early 1980s. While the large majority of its operations would involve international trade routes, Sea-Land would continue to register all of its linehaul vessels under the U.S. flag. In addition, it chose not to seek the ODS payments for which it was eligible. Those decisions both go back to decisions by Malcom McLean. He believed that as an American company its ships should be flagged as such, but not being able to make a route or deployment change without the approval of the Maritime Administration that came with subsidy payments was in his view too much of a commercial constraint.

Sea-Land and its growing U.S.-flag fleet were an exception. While the liner companies continued to maintain U.S.-flag container ships on international routes where they received subsidy payments, their fleet sizes tended to decrease. The reduction in other categories of U.S.-flag ships operating internationally was more prominent. As the total number of U.S.-flag merchant ships continued to shrink, refinements were made to government programs designed to mitigate those declines. For instance, in 1976, a subset of the National Defense Reserve Fleet was established to provide rapid deployment of military equipment and was referred to as the Ready Reserve Force. The 72 vessels in the Ready Reserve Force are partially crewed and are kept available for activation anywhere from 5 to 20 days.[8] The vessels laid up as part of the National Defense Reserve Fleet, currently numbering 91, can be activated within 20–120 days.

The 1980s would be a period of momentous change related to federal government programs that supported the U.S.-flag Merchant Marine. An overriding macro catalyst for this was an embrace of greater free market capitalism and less subsidy and regulation in many sectors. In addition to that, the demise of the Soviet Union contributed to a view that the national security aspects of a merchant marine were becoming less relevant than they were in the past.

The Ronald Reagan administration ended funding for the construction differential subsidy program in 1981. There was an immediate impact on the number of commercial ships being built in U.S. shipyards. In 1987 the phaseout of the operating differential subsidy program began. In addition, the amounts set aside to fund the differences in moving preference cargoes such as grain and agricultural aid were reduced. All of these factors contributed to increase the rate of decline in the number of U.S.-flag commercial vessels, particularly those operating in international trade lanes.

These declines were a sharp contrast to what had happened decades earlier when the U.S.-flag commercial fleet saw the benefits of a bolstering industrial base. The United States had the largest economy prior to World War II, but the war would be a catalyst for a significant increase in production output that was focused on what American and Allied forces needed. Auto assembly plants were converted to manufacture military vehicles and almost every plant in the country was operating on a war footing. To put that accomplishment into perspective, American industry built two-thirds of all the Allied military equip-

[8] "Ready Reserve Force," U.S. Department of Transportation, accessed 21 November 2024.

ment produced during World War II. That included 297,000 aircraft, 193,000 artillery pieces, 86,000 tanks, and two million trucks.[9] The productivity related to shipbuilding was equally impressive and the more than 4,600 cargo vessels built here during the war were the large majority of ships used by the Allies.

While the United States would come out of World War II self-sufficient in almost all manufactured products that were consumed domestically, this would inevitably change as trade increased. The shift would start slowly, with imported cars becoming one of the first areas to in effect have something that was manufactured domestically to be outsourced and manufactured overseas. In April 1956, the same month Malcom McLean invented container shipping with the sailing of the SS *Ideal X* from New York to Houston, the first Toyota was imported into the United States. That car would become the precursor to a growing wave of imported cars that would follow.

As the modern cargo shipping industry improved in cost efficiency through both specialization and increased ship size, trade growth would flourish and generally grow at higher rates in each of the postwar decades. Container shipping in particular would allow for the manufacture of products previously produced domestically to be produced for a lower overall cost even after shipping costs had been considered. This not only affected the United States, as many industrialized economies experienced similar outsourcing.

Even though trade was growing at multiples of GDP growth in the United States, the U.S. Merchant Marine fleet was declining. The industry was also a victim of outsourcing to flags of convenience that offered lower costs, just as manufacturing overseas offered lower costs. Here again, this was also a global phenomenon. While the crewing cost on a large new cargo vessel was typically many times less than the fuel or capital cost of those ships, it was a primary area where owners could differentiate overall costs. Shipping had developed into a highly competitive industry, in no small part due to the increasing direct involvement by governments in owning and operating shipping companies that they viewed as supportive of their largely economic goal of expanding trade and growing their economies. With their involvement and that focus, the shipping industry was not operating within the normal self-correcting parameters of a typical profit-making industry. Put another way, with active government

[9] *The War*, directed and produced by Ken Burns and Lynn Novick, premiered on PBS on 23 September 2007.

involvement, trade and the economy are the dog and the shipping company they are involved with is the tail.

The invasion of Kuwait by Iraq in 1990 and the U.S. response triggered what the Department of Defense called the largest rapid deployment of forces and supplies in history. Ready Reserve Force vessels were immediately activated and utilized along with Military Sealift Command ships and the additional ships they would charter. Eight fast sealift ships, the fastest cargo ships in the world with 33 knot speeds, were quickly deployed and played a key role in getting equipment into a war theater that was 8,700 nautical miles away.[10] At the peak, 220 ships were under the control of the Military Sealift Command related to Operations Desert Shield/Storm.[11] To put that into perspective, at the peak month an average of 84 million pounds of cargo per day was arriving in Saudi Arabia. That was above the 57-million-pound daily average during the 37-month Korean conflict and the 33-million-pound daily average to the Pacific theater during World War II.[12]

Every situation involving the need for military sealift capacity results in lessons learned and adjustments made—and that would certainly be the case with Operations Desert Shield/Storm. Among those was the need for more roll-on, roll-off vessel capacity along with a new program to bolster the number of commercial vessels operating internationally with a U.S. flag. The phaseout of the operating differential subsidy was decimating those numbers.

What resulted from that was the establishment of the Maritime Security Program in 1996. While it had some similarities to the earlier subsidy program, there were crucial differences. Instead of effectively being open to any ship deployed on specific routes, it was only open to ships that were selected, which allowed for a focus on the most militarily useful vessels. Once selected, the owner had flexibility on where to deploy the ship that removed one of the previous criticisms. When the Maritime Security Program was initially established, funding was provided for including 47 ships in the program.[13] Over the years, it was increased to the present level of 60 ships.

---

[10] Ronald F. Rost, John F. Addams, and John J. Nelson, *Sealift in Operation Desert Shield/Desert Storm: 7 August 1990 to 17 February 1991* (Alexandria, VA: CNA, 1991), 3, 4, 11.
[11] *The United States Navy in "Desert Shield" and "Desert Storm"* (Washington, DC: Department of the Navy, 1991).
[12] *The United States Navy in "Desert Shield" and "Desert Storm*," 29.
[13] "Maritime Security Program," Sailors.org, accessed 21 November 2024.

While the Maritime Security Program was a positive catalyst for the number of U.S.-flag merchant vessels operating, it had no effect on domestic commercial shipbuilding that was now focused primarily on the Jones Act. To better understand the economic challenges for America in that area, it is important to have an appreciation for the key factors of production in that industry in the modern era. Commercial shipbuilding fundamentally involves utilizing labor to convert plates of steel into ships. Unfortunately, the factors of hourly labor cost and relative steel production cost per ton put the United States at a noteworthy structural cost disadvantage.

The labor cost difference is well known and at all relevant times U.S. wage cost has been many times that of the rest of the world. While better productivity in some sectors has mitigated that difference, the shipbuilding processes that were primarily exported from the United States have significantly narrowed the effective difference. Given the significant tie between commercial shipbuilding and steel, with three percent of worldwide steel production going into building ships, it also should not be surprising that steel production and shipbuilding go hand in hand. During World War II when the United States produced almost half of the world's steel, it was also producing an even larger percentage of cargo vessels.

With raw steel's weight and its relatively low value as it is an input into more value-added products, any country with a cost-efficient steel production industry has an inherent advantage related to commercial shipbuilding. The simple reason is that such a country avoids the relatively high shipping cost to cargo value involved in moving raw steel products across oceans. Japan's rise as a shipbuilder was not surprisingly occurring as it also became a major steel producer. The same duality would later be evident in Korea. More recently, China would follow in the footsteps of Japan and Korea in both steel production and shipbuilding, but its extraordinary growth in those areas would eclipse both of those countries. Interestingly, today China produces half of the world's steel and more than half of the world's cargo ships, the same relative positions held by the U.S. eight decades ago.

As U.S. commercial shipbuilding waned following World War II, the mantle of innovation and efficiency would pass on to Japan. As discussed earlier, the beginnings of this can be traced to exporting processes that were used in the United States. There is a direct thread flowing from the Liberty ships Henry

Kaiser built to Ludwig's Virginia shipyard and on to the establishment of the Japanese shipbuilding industry.

The modular construction processes and steel welding and cutting techniques that had been developed in the United States were refined in Japan. With these straightforward innovations, the two primary inputs to manufacturing ships of steel and labor became even more important. Japan was increasingly well positioned in both of these areas. Its shipbuilding industry grew even more than its fast-growing steel industry.

The focus on training and quality control by Japan with its labor teams resulted in unprecedented labor productivity when it came to building new ships. Many of the processes Japan used in shipbuilding were then used in other industries where it became successful. The quality circles that played such a key role into developing Toyota into what would be considered the most efficient car manufacturer in the world actually were rooted in processes that came out of Japan's shipbuilding industry. By the early 1960s, Japan had become the largest commercial shipbuilder in the world and would retain that title for decades. While some of the ships Japan built were used to satisfy its own large volume of imports and exports, the majority of the ships it built were exported to owners outside of Japan.

Beginning in the late 1970s, South Korea became more of a factor in worldwide shipbuilding. Just as it followed in Japan's footsteps in developing a steel industry, it followed in developing and growing a shipbuilding industry. By the mid-1980s, South Korea was challenging Japan in many of the shipbuilding segments. The contract that underscored South Korea's arrival was Malcom McLean's contract with a Korean shipyard to build 12 container ships for $570 million.[14] It was the largest shipbuilding contract in history and involved the construction of the largest container ships in the world at that time. The Korean shipyard offered the lowest price that resulted from a rigorous, disciplined approach to managing their labor force. When touring large shipyards in South Korea, visitors often remarked that it was run with the precision of a military facility.

Before China began transitioning in a massive way to a capitalist economy, its impact on the world economy as well the shipping industry was actu-

[14] "Financing Completed for U.S. Lines Containerships Building at Daewoo Yard," *Maritime Reporter* 2, no. 46 (January 1984): 13.

ally quite muted. The economies driving cargo shipping in Asia were Japan, Korea, Taiwan, Hong Kong, and Singapore. As it related to container cargo, what moved to and from China generally went through Hong Kong. The major container ship operators did not even call directly on any ports in China.

But change was already beginning to percolate in China as its leadership took notice of the economic forces that were shaping the world in the postwar era. They may have been socialists, but it turned out that those leaders were incredibly good at studying and learning from what was going on in capitalist economies.

Mao Zedong, the founder of modern China, was an astute observer who closely followed the economic policies of other countries in Asia. Copying individual initiatives that seemed to work in Japan and elsewhere, he began nudging China toward more economic development in the 1950s. In what was a very prescient call in the late 1950s as China's nascent steel industry was beginning to grow, Mao observed that there is no reason China should not one day become the largest steel producer in the world.

Deng Xiaoping succeeded Mao in the late 1970s, and he put in place far-reaching market economy reforms that accelerated China's transition. One of Deng's closest outside advisors was Yue-Kong Pao, a pioneer in the shipping industry and the world's largest shipowner at the time. Indeed, Deng listened to and bonded with Pao's broad worldview and grasp of long-term trends, and this made him a valued and influential adviser at a pivotal time in China's history. One of the subjects that they undoubtedly discussed was shipping and the key role it played in import and export cost efficiency.

With the long-term plans outlined by these leaders, China increasingly transitioned into a capitalist, market-based economy in the 1980s and 1990s. There were two events related to international trade that would prove to be extraordinary events fueling increases in China's growth.

In 1995, China gained membership in the General Agreement on Tariffs and Trade (GATT). With that, its international trade began to expand. This growth turned into a gallop beginning at the turn of the century. The key catalyst that drove this was when China became a member of the World Trade Organization (WTO) in 2001. Economists point to 2001 as the beginning of China's period of extraordinary growth. That began something often referred to as the commodities super cycle and almost no industry was as profoundly impacted as shipping. In 2000, China produced 17.1 percent of the world's steel. As its growth accelerated, Mao Zedong's earlier observation would prove to be accurate, and it would quickly become the world's largest steel producer with half of total global output today. Its impact on the container shipping industry is equally impressive. From almost no representation four decades ago, today seven of the ten largest ports in the world in terms of container volume are in China.

As China's steel industry grew, so did its involvement in shipbuilding. The pattern of Japan being followed by South Korea, which was then followed by China, seen in steel and cars among other industries, was also seen in the shipbuilding industry. In the same way it developed other industries, China focused on the shipbuilding industry through state-owned enterprises (SOEs). In 1990, China represented less than 2 percent of worldwide deliveries of ship tonnage. By 2000, it was up to approximately 7 percent, but almost all of that was for SOE shipping companies with few exports.[15]

China's entry into the WTO in 2001 was a major shot in the arm for its shipbuilding industry. In addition to sharp increases in demand by Chinese shipping companies, it started to become more of a factor in the international export market. However, while China had the steel and wage rates that allowed it to be competitive, the quality of its product was not up to Korean and Japanese standards.

As a result, China's initial focus was on standard size dry-bulk ships, which are the simplest vessels to construct. As their expertise in meeting international quality control standards grew, they migrated into tankers. Finally, they would become a factor in building container ships, which are the most complicated of the major segments to construct owing to more exacting technical standards. For example, the cell guides that align containers in the holds have tolerances measured just in millimeters.

By 2010, China was building almost 30 percent of the world's cargo ships and was competing with South Korea to be the largest shipbuilder. The largest, most sophisticated ships were generally built in South Korea. This included LNG carriers, the most expensive cargo ships, and the ultra large container vessels. South Korea had all but abandoned building ships at the lower end of

[15] Evan S. Medeiros et al., *A New Direction for China's Defense Industry* (Santa Monica, CA: Rand, 2005), chap. 3, https://doi.org/10.7249/MG334.

the quality spectrum, such as standard size dry-bulk ships. While China and South Korea were neck and neck in terms of total tonnage delivered, the composition across segments was different.

China's approach to shipbuilding benefited from the central planning that came from an autocratic government. Most of what were now hundreds of shipyards were controlled by two large SOEs that directed the type of vessels in which each shipyard should specialize. According to one study, China provided $132 billion in subsidies to its shipbuilding industry over the last 10 years.[16] The fact that shipbuilding was such a labor-intensive process also played a key role in governmental support by China and other countries. Recognizing more than a decade earlier that China was lacking in both quantity and quality of naval architects, it established a new university solely focused on that area that quickly grew to 20,000 students.[17] These and other initiatives took hold and allowed China to continue to move up the quality spectrum even as they continued to build ever more cargo vessels.

In 2017, China was the largest shipbuilder in the world and delivered more than 36 percent of total shipbuilding tonnage. The top three producers collectively represented 91 percent of total deliveries in 2017.[18] Table 4 shows shipyard deliveries by country based on gross tonnage, a measure of the volume of cubic meters of total enclosed space on a cargo ship. Gross tonnage is the measure that shipyards have traditionally utilized. The more popular measure of deadweight cargo capacity varies by ship but is typically 150 percent of gross tonnage.

With 91 percent of commercial shipbuilding represented by the same three countries that produce almost that much of the world's steel, coupled with having an inherent cost advantage that also builds on labor cost advantages compared to many countries, there is little mystery in these rankings. Neither the United States nor any of the major economies in Europe that previously had vibrant shipbuilding industries are represented today.

The largest commercial shipbuilding countries will continue to be in Asia based on labor productivity and efficient steel manufacturing. China's domi-

[16] Jude Blanchette et al., "Hidden Harbors: China's State Backed Shipping Industry," Center for Strategic and International Studies, 7 July 2020.
[17] "About DMU," Dalian Maritime University, accessed 18 February 2025.
[18] "Ships Built by Country of Building, Annual," United Nations Conference on Trade and Development, accessed 6 December 2024.

Table 4. Shipbuilding deliveries by country based on gross tonnage, 2017

2017 production	Gross tonnage	% of total
China	23,682,160	36.3%
South Korea	22,616,947	34.7%
Japan	13,113,388	20.1%
United States	225,593	0.3%
United Kingdom	0	0.0%
Other	5,534,349	8.5%
Total	65,172,437	100.0%

Source: Christian Steidl, Laurent Daniel, and Cenk Yildiran, *Shipbuilding Market Developments Q2 2018* (Paris, France: Organisation for Economic Co-operation and Development, 2018), 17–20.

nance will grow as it moves up on the quality spectrum. In addition to its advantages in the core steel and labor factors that go into shipbuilding, its position as the largest user of shipping services will result in further benefits for its shipbuilding sector. Just as China effectively consumes half of the world's shipping services; there is no reason that it will not soon be building half of the world's ships. The symbiotic relationship between shipping and shipbuilding continues to this day.

In many of the individual segments, ships have become a commoditized product based on steel cost and labor cost. While that is the route taken by the largest commercial shipbuilders, a separate and distinct segment of the U.S. shipbuilding industry has taken a different and more high-end route.

Separate from commercial shipbuilding is naval shipbuilding. In this specialized and highly technical area, no country comes anywhere close to the United States today. The United States is the largest naval shipbuilder in the world and is also unmatched in quality. The largest naval vessels are aircraft carriers, and the U.S. Navy crews 11 of the 15 carriers now operating in the world.[19]

[19] "Aircraft Carriers by Country 2024," Worldpopulationreview.com, accessed 18 February 2025.

With the cumulative experience from building 78 aircraft carriers, no country can approach the capability and sophistication of the U.S. in building these complex vessels.[20] The United States has a similar dominance in building nuclear powered submarines, the most important naval vessels for maintaining peace in the world today.

From a technical standpoint, it is undeniable that today the United States has the most advanced shipbuilding capability in the world, but that capability is focused primarily on building vessels for the U.S. Navy. Aspects of that high-end approach can also be seen in some of the commercial vessels built for the Jones Act, but it is primarily in the naval shipbuilding area where U.S. capability continues to reign supreme. It is at the top of the quality spectrum where the competitive advantage of U.S. shipbuilding lies and greater recognition of that can be the basis for charting a better course related to commercial shipbuilding in the future.

While the United States experienced significant absolute and relative increases in its industrial base during World War II that remained strong for decades, those relative measures have been trending down for decades. Much of this simply has to do with the increased industrial base in the rest of the world, most particularly in Asia. Furthermore, this shift was enhanced by the ever-increasing efficiency of shipping, especially container shipping that significantly reduced the frictional costs of trade. When shipping costs to the value of cargo shipped go from 50 percent or more to 5 percent or less, there is going to be an exponential increase in trade. The phenomenon of what became known as globalization, which was building in momentum throughout the 1980s and 1990s, would move into high gear in 2001 when China became a member of the World Trade Organization in 2001. The growth in China's industrial base that would be experienced over the first decade of the new century would be unrivaled by anything that has ever occurred in history.

Few industries were as affected by that as the shipping industry, and that period was referred to as a super cycle with unprecedented growth across most shipping sectors to fuel the growth in China's industrial base. Bulk carriers and tankers brought in raw materials that were needed for production and container ships took out the finished products that China produced. In addition to the

[20] "CVN-78 Gerald R. Ford Class Nuclear Aircraft Carrier," Director of Operation Test and Evaluation, accessed 6 December 2024.

significant growth in China's economy, both its merchant marine and shipbuilding industry saw sharp growth. It has become apparent that China is following a comprehensive maritime policy that recognizes the national security aspects of both of those sectors as well as broader aspects including maritime infrastructure and related equipment.

By its actions, China has embraced a philosophy articulated by Alfred Thayer Mahan, a nineteenth century American naval officer and historian who has been called one of the most important naval strategists in history. Mahan believed that national greatness was inextricably associated with sea power, both with its commercial use in times of peace and its military control in times of war. Nowhere is China's embrace of Mahan's philosophy clearer than the entire supply chain related to moving goods by container. In building the container ships and container equipment, in being the largest customer for container shipping services, and in owning and operating container ports and terminals, China is the key player in each portion of that supply chain.

The national security focus of China's maritime activities is so intertwined with everything they do that it is often difficult to separate commercial interests from strategic interests. The large state-owned enterprises that dominate all these maritime activities receive significant direct subsidies and other government support in the form of preferential rates from banks that are also state-owned enterprises. The central government directs all of these entities based on what is in the best national interest. With effectively no domestic competition among these entities, all efforts are directed outward to the international markets. Container port development is a prime example. Funding for expanding container terminals and building entirely new ones is based on what is in the best economic interest of China. The same approach has been taken with China's investment and expansion of container terminals internationally, except that with those there is also the addition of what is also in China's best strategic interest.

A report by AidData, a research lab at William & Mary University, was issued in July 2023 related to what it believes are China's port ambitions related to future overseas naval bases.[21] Analyzing data on ports and infrastructure

[21] Alexander Wooley et al., *Harboring Global Ambitions: China's Ports Footprint and Implications for Future Overseas Bases* (Williamsburg, VA: AidData, 2023).

financed by Chinese SOEs between 2000 and 2021 and taking into account shipping routes and key geographic factors, the report has developed a list of the top eight locations where China might establish naval bases in the next two to five years. Currently, China has just one overseas naval base in Djibouti that is adjacent to a commercial port funded, constructed, and operated by China. There is an overlap between Chinese commercial maritime interests and naval interests that is not always discernable, but it is reasonable to assume that future naval bases will follow the Djibouti model. With China's continuing increase in the size of its naval fleet and its expanding global interests, the establishment of overseas naval bases is a logical next step.

Based on a combination of factors that the AidData report considered, notably the scale of actual harbor infrastructure development and financing by China, the strategic location of the ports and the relationships with the respective countries, the eight locations were listed in rank order. They are Hambantota, Sri Lanka; Bata, Equatorial Guinea; Gwadar, Pakistan; Kribi, Cameroon; Ream, Cambodia; Vanuatu, Vanuatu; Nacala, Mozambique; and Nouakchott, Mauritania.

The five-year period from 2015 to 2020 saw an actual increase in the number of U.S.-flag Merchant Marine vessels, the first such five-year increase since after World War II. There has been a further increase in the number of such ships since then. Those increases come from a number of areas, including increases in the number of vessels eligible to participate in the Maritime Security Program. This increase can be traced to escalating concerns that the size of our Merchant Marine fleet has reached dangerously low levels. The fewer the number of ships you have, the less sea-going billets for graduates of the maritime academies and schools. Everything is linked and there is a growing realization of this with policymakers in Washington. Indeed, it is fair to say that there has really been a sea change in such views over the last few years, and it has brought with it an increasing awareness to bolster the U.S. Merchant Marine and our related sealift capability. A major reason for that comes down to growing concern about China.

A tangible confirmation of Washington's renewed focus on increasing the number of ships in our merchant marine was the recent passage of the Tanker Security Program. Modeled after the Maritime Security Program, this new tanker program sets aside funding to add 10 product tankers in international service to the U.S.-flag commercial fleet.[22] A systematic analysis and review of potential vessel needs in a national emergency revealed a shortage of these vessels and this new program received broad bipartisan support.

While the United States certainly bolstered its industrial base during World War II and maintained it in the early decades of the postwar period, the opposite has occurred, most particularly in a relative sense, during the last few decades. This shift grew in momentum in the 1980s and 1990s but really accelerated with China's entry into the World Trade Organization in 2001. The U.S. loss of industrial base has translated into a growth of the industrial bases in China as well as other countries with which the United States trades. The United States has certainly not been alone in this, and similar patterns have occurred with Great Britain and many other industrial economies in Europe. The data would show that the shift in the United States and other countries is even more pronounced than what is deemed to be the country of origin for the finished product because even products that are shown to be manufactured domestically typically rely on some components that are imported.

Against this backdrop of a relative reduction in the United States' overall industrial base, we have seen even more pronounced decreases in U.S. representation across the entire maritime supply chain. While that backdrop is a partial explanation, unlike relative reductions in other areas where the initial impact is more than mitigated by the economic benefits of trade, the initial adverse impact from reductions in critical maritime supply chains is augmented and made worse by an increase in national security and strategic risks.

It is undeniable that this shift in where products are manufactured has produced collective economic benefits for both the countries involved and for the entire world. David Riccardo's theory of comparative advantage proves itself with almost every trade transaction that is entered into by the respective parties. One can argue that policy makers have not been as diligent as they should have been in seeing to it that the collective benefits are more equitably distributed, but that is a political issue and not an economic issue.[23]

---

[22] "USDOT Strengthens Economic Supply Chain and Defense Operations," U.S. Department of Transportation, 17 October 2023.

[23] Arnaud Costinot and Dave Donladson, "Ricardo's Theory of Comparative Advantage: Old Idea, New Evidence," *American Economic Review* 102, no. 3 (May 2012): 1, https://doi.org/10.1257/aer.102.3.453.

Whether it is David Riccardo or modern-day economists talking about trade, they are only looking at that aspect with the implicit assumption that people and countries will act rationally in terms of what is in their best economic interests. When potential irrational economic actions but ones that are viewed as being fully consistent with broader strategic goals are included in the equation, David Riccardo and other economists are out of their depth as their expertise is not in national security.

That is the situation that now exists related to a potential invasion of Taiwan by China. While they have coexisted in peace for more than 50 years under the "One China" policy where the United States acknowledges that Taiwan is part of China and only has formal relations with the latter while it has informal relations with Taiwan, tensions have grown dramatically in recent years. China has ramped up its rhetoric and continues to talk of the need for more direct control over Taiwan. Not only has it not ruled out an invasion of Taiwan, but also it has had large military exercises that are directly related to that objective.

According to press reports based on U.S. intelligence, President Xi Jinping of China has instructed his military to be ready to invade Taiwan by 2027. President Xi has become increasingly autocratic over his tenure and has moved China away from a purer capitalistic approach in the recent past and more toward historical socialist goals. Key among those is a full reunification of Taiwan with China. The United States has maintained its policy of strategic ambiguity in not specifically stating what action it would take if such an invasion were to occur.

However, in all likelihood, an invasion of Taiwan by China would not only be responded to by the United States but also by a large coalition of countries led by the United States. In the event that any country acted in support of Taiwan, it should be expected that China would respond with any and all economic tools at its disposal. That would include stopping shipments of goods and parts that were deemed to be critical to those economies. The potential economic damage such actions could take would be significant as supply chains have been built based on economic factors and the likelihood or even thought that economic dependance could be used adversely was never seriously considered. The lack of resilience of most countries maritime supply chain is even more pronounced than their economy as a whole.

China now builds 50 percent of the container ships, 97 percent of the container equipment, 70 percent of the container cranes, controls 14 percent of container ships by flag, represents 40 percent of worldwide volume and controls or has investments in 357 international container terminals in 63 different countries.[24]

All these factors come together to point to a clear need to find ways to stop the declines and build the U.S.-flag commercial fleet. There are two assumptions that played a key role in where we find ourselves today in terms of U.S. involvement with its Merchant Marine and the larger maritime supply chain. The United States is now realizing that both assumptions were not as accurate as we hoped they might have been at the time.

The first assumption was that the era of big conventional wars with major opponents was waning if not over. This was a tailwind that played a role in the U.S. government moving away from subsidizing our Merchant Marine in the 1980s. With the demise of the Soviet Union, the United States' only potential major military rival at the time, there was a view that the massive sealift that military planners thought would be necessary if Russian tanks began rolling westward into NATO countries was a thing of the past. With Russia out of the picture, there was no potential adversary that would require such a massive sealift.

The second assumption was that China's embrace of capitalism and entry into the World Trade Organization would make it even more a part of the world community as it focused more on economics and moved away from authoritarianism and projecting military power. That proved to be wishful thinking. China under President Xi is significantly building up its military and in multiple cases has shown a willingness to project force beyond its border. It will soon have a naval force that rivals that of the United States. President Xi is now China's leader for the rest of his life and his clear desire to have Taiwan completely reunified cannot be ignored.

---

[24] "China's Shipbuilding Industry Sees Marked Growth in Orders in 2023, Leading the World," *Global Times*, 15 January 2024; "10 Unknown Facts About Shipping Containers, Port Technology International," Port Technology, 9 December 2014; "Feds Say Chinese Cranes Used at Port of Va. Could Be Spy Tools," Virginia Business, 8 March 2023; John D. McCown, *Giants of the Sea: Ships and Men Who Changed the World* (n.p.: self-published, 2020), chap. 23, 256; "Review of Maritime Transport," United Nations Conference on Trade and Development, accessed 6 December 2024; and "China's Global Network of Shipping Ports Reveal Beijing's Strategy," VOA News, 13 September 2021.

The noteworthy changes in both of these assumptions that led to the strategic decisions of today need to lead to adjustments based on the newer information the United States has. It is interesting how actual news and events overtake even the most thought-out plans.

Large conventional wars can still happen and in those logistics remains paramount. Those are two key takeaways from Russia's invasion of Ukraine in 2022. The likelihood that the military conflict could go on for some time is a reminder of the continuing importance of logistics. Indeed, the longer a conflict goes on, the more vital all aspects of logistics become. In any conflict the United States has been in and will be involved in, the key and most important part of that supply chain is sealift capability, which can only reliably be provided by U.S.-flag vessels.

More specifically, the need to grow the U.S. Merchant Marine becomes more of an imperative when consideration is given to—China—now the largest potential threat and which should therefore be the focus of U.S. planning. Just as much of our military planning rotated around Russia in the past, today much of our planning rotates around China. Even as Russia's overall conventional military capabilities wane and are not what we thought they were, China's conventional military capabilities are growing by leaps and bounds. In comparison to the relative rankings of the United States, today China has the second largest economy and navy and the third largest merchant marine in the world. Its relative rank in all of those categories has grown significantly in the past two decades. China continues to grow in all those areas and the striking dichotomy in the merchant marine ranking should be alarming. Indeed, if flags of convenience that cannot be counted on for allegiance by either side during a conflict are excluded, China already has the largest merchant marine in the world.

Military planning obviously involves going into detail on potential major conflicts that will hopefully never occur. When those scenarios are played out involving China, one of the major differences is the marine distances that could be involved. By definition, a maritime supply chain that is twice as long will require twice as many ships to deliver the same quantity of supplies. In the case of World War II, the primary maritime supply chain was across the Atlantic where distances were in the 3,500 nautical mile range. To a significant extent, it is likely that was also viewed as the primary supply line in military planning involving Russia.

In planning involving China, however, the various scenarios involve much longer marine differences. From our largest naval base in Norfolk, it is some 10,500 nautical miles to many points in Asia or three times the typical transatlantic distances. Even from the West Coast, the distances are around two-thirds more than typical transatlantic differences. The longer distances translate into the need for proportional increases in sealift capacity. Seventy years ago, the United States had direct experience during the Korean conflict on how a conflict in a faraway land stressed the capability of what was a much larger Merchant Marine then. At its peak, some 255 ships would be used to provide military sealift during that war. The marine distances involved with any sealift related to Taiwan would be even longer than those involved with the Korean conflict.

Related to China, the news is full of reports on rising tensions related to Taiwan and whether China will ultimately launch an invasion to take full control of an island that they already view as a part of their country. For decades, the United States has followed a "One China" policy while maintaining relations with Taiwan. This purposefully ambiguous policy has become more defined by President Joseph R. Biden who has said that the United States would respond if Taiwan were to be invaded, in one response to a question saying he views it as similar to NATO's Article 5. Under that article, members would consider an armed attack on any member as an armed attack on them. Various military experts have said that President Xi of China has probably wondered if an assumption that China could quickly overtake Taiwan may be as overrated as the previous view of Russia's ability to quickly invade Ukraine. In addition, Xi probably realizes that any U.S. response to an invasion of Taiwan would be joined by a coalition of our allies, just as has occurred with Ukraine.

In any potential military conflict, what is abundantly clear is that China significantly outmatches the United States in terms of sealift capability related to any projection of military force. That is obviously the case in anything that may arise near China or throughout Asia. That also however extends to almost any area of the world due to China's significantly larger merchant marine. China has no sealift issue with hundreds of vessels across all category types. The government of China recognizes the important commercial and military role of its merchant marine and actively supports it with direct subsidies to shipping companies and indirectly with support to shipbuilding companies and other arrangements providing support. For instance, just one Chinese shipping company has reported receiving more than $1.8 billion in direct government subsidies in its annual reports over the last 17 years when public shareholders have partially owned it.[25] That works out to an average of $108 million per year during that entire 17-year period. During the last five years, the average was 49 percent higher at $161 million per year. That company and other Chinese shipping companies are also understood to benefit from favorable financing arrangements and from cargo directed to them by Chinese companies.

There is an array of measures the United States can take to reverse the decline and begin to grow its Merchant Marine. Thought leadership in encouraging and promoting new commercial initiatives in both international and domestic markets should be ramped up. In the latter segment, there are several initiatives to move domestic freight in 53-foot containers on our inland waterways and selected coastal lanes that are worthy of serious exploration for the linehaul cost and environmental advantages they offer compared to how that domestic freight now moves. Programs like the operating differential subsidy that existed in the past and allowed any carrier that operated a U.S.-flag vessel in international service to obtain a subsidy should be revisited.

Specific government initiatives directed toward vessels that have been identified as the type most in short supply from a military sealift perspective in particular make lots of sense. For instance, government funded initiatives like the recent Tanker Security Program involving 10 ships to target specific identified shortcomings need to be replicated and funded. The subject of direct government support is controversial with many, but the simple truth is that the withdrawal by the government of previous types of support is the proximate cause for much of the reduction in the number of U.S.-flag vessels operating internationally. At the same time that the United States has withdrawn support, other countries have sharply stepped-up direct support of their merchant marines. The justification for government support in the past has been that the maritime industry is uniquely tied to national defense in a time of emergency. As the Russia-Ukraine war vividly demonstrates, that remains a solid justification today.

[25] Disclosure in annual reports of COSCO Shipping Holdings Company and its predecessors.

The operating cost difference of a U.S.-flag vessel compared to a typical foreign flag vessel is currently $13,689 per day.[26] To put that difference into perspective and highlight what a program that funded it could deliver, assume a new program targeted at the types of vessels most needed for potential military sealift and supply line needs was created involving 10 vessels operating internationally. A program size of 10 ships duplicates the common sense and targeted focus of the Tanker Security Program. The cost of such a program would be equivalent to 0.00664 percent of the current national defense budget.[27] To underscore how small that amount is relative to the entire national defense budget, it is equivalent to 35 minutes of spending. The types of vessels most often needed in any initial deployment are roll-on, roll-off vessels capable of moving a wide array of vehicles and equipment. Using the Tanker Security Program as a template, a group of roll-on, roll-off ships would be high on any list of additional sealift capacity to add. On the benefit side, a group of 10 such vessels could form a transoceanic conveyance system that would deliver the equivalent of some 20,000 tons of cargo each day. Such a supply line would provide everything needed to sustain several divisions of warfighters if that were necessary. A military division generally includes 15,000 soldiers. With that cost to benefit ratio, is there any reasonable number of such programs that military experts say are needed for sealift that should not be supported by rational members of Congress?

Even a group of just 10 U.S.-flag ships could not only play a critical role in any one of a number of situations, but they would provide jobs for hundreds of American Mariners. Having additional seagoing billets for the highly trained seafarers that come out of our maritime academies and schools needs to be a top priority. All U.S. efforts in building back its Merchant Marine need to consider the impact they will have on maintaining a pipeline of trained Mariners as any decline there could have dire consequences. It cannot be emphasized enough that the most critical element is trained Mariners. Ships can be bought. To address this, consideration should be given to legislation and agreements allowing the immediate requisition of any Mar-

[26] "Maritime Security Program," U.S. Department of Transportation Maritime Administration, accessed 6 December 2024.
[27] Anya M. Fink, *Defense Primer: Strategic Nuclear Forces* (Washington, DC: Congressional Research Service, 2024), 1.

shall Islands-flag ship at fair market value under defined national emergency conditions. With the various defense treaties already in place, this is less of a change than it seems and primarily addresses the timing of such acquisitions. No matter the number of cargo ships on hand or that could be acquired or built in an emergency, what value are they without skilled American Mariners to operate them?

With the widely reported disruption in container shipping recently during the pandemic, both policymakers and the public have learned firsthand how much the economy and products they buy are connected to maritime supply chains. As aggravating as that has been for businesses and consumers, the ramifications of an inadequate military maritime supply chain go well beyond empty store shelves during the holidays. Sealift capability in particular needs to be looked at in that light. It is such a critical function that if it is not sufficient, it can literally obviate the ability to use military force.

Given these facts, it is imperative that adequate sealift capability across the wide spectrum of all potential needs be fully covered, like not having enough fuel in a plane, which the consequences of not having enough require never getting anywhere near empty. All of this should have policymakers making the effort to ensure that there are in place whatever multiples of the 10-ship example above to ensure that America will have adequate sealift capability under all scenarios.

Container shipping is the transport mode making the majority of world trade possible. In addition to being a vital segment, the composition of its costs is very different than the other shipping segments. In container shipping, costs related to the ship itself are the minority of the overall costs for which the carrier is responsible. In contrast, in other shipping segments, most of the costs incurred by the owner relate to just the ship. Container shipping is therefore the segment where the crewing cost difference is the smallest percent of total costs. This fact makes the container shipping segment the one that U.S.-flag vessels operating internationally could be the most competitive before considering further differentiating characteristics. A similar observation can be made regarding liquefied natural gas (LNG) tankers. While almost all of its costs relate to the ship, the effective daily capital cost of the most expensive type of vessels to build translates into any U.S. crewing cost difference as being smaller relative to overall costs than in the other bulk segments. These factual characteristics should play a role in what segments should be supported in new government initiatives as they lend themselves to more efficient support.

All of the activities that any detailed review would suggest need to be looked into, starting with plans and what comes out of developing such plans. General Eisenhower, certainly a subject matter expert related to the importance of sealift capability, at a national defense conference in 1957 said, "Plans are worthless, but planning is everything."[28] Achieving any plan to grow our merchant marine starts with the development of a national maritime strategy. Instead of simply an academic exercise long on platitudes and short on specific steps, such a plan should have details and input from individuals with detailed knowledge of commercial shipping. Elements of such a plan should go beyond just the ships and include ports and the entire supply chain. Consideration should be given to organizational changes including ones that allow coordination across all the agencies needed to ensure a sufficient Merchant Marine. We know how to perform such a systematic review, but it cannot start too soon. Among the examples of approaches successfully taken are those by countries in Asia as they developed their own national maritime strategy. Indeed, in many respects they took the baton from us, and the time has come for us to take it back from them.

The United States needs to reverse the decline in the size of its Merchant Marine. For national security reasons, we must be assured that in all circumstances we have sufficient U.S.-flag ships for sealift and adequately trained Mariners to operate those vessels. More ships mean more jobs, and more jobs means we will have trained Mariners if and when we need them. Starting that virtuous circle puts us in the position to be confident that we have the sealift capability to project U.S. military strength anywhere in the world where it is needed.

In doing what makes the most sense for our country today, we will also be honoring the legacy of the American Mariners who made the Murmansk run possible and kept all the maritime supply lines that were critical for victory during World War II open. But it goes well beyond that. The William Faulkner line, "The past isn't dead. It isn't even past" comes to mind to underscore the continuing importance of a strong merchant marine.

---

[28] Dwight D. Eisenhower, "Remarks at the National Defense Executive Reserve Conference, November 14, 1957," American Presidency Project, accessed 6 December 2024.

China's projection of seapower by the active support of its merchant marine and all aspects of its maritime supply chain is straight out of the philosophy articulated by Alfred Thayer Mahan. The United States needs to go back to Mahan's well thought out principles and not allow something invented here to be used against us.

CHAPTER 3

A STRATEGY FOR THE COMMERCIAL MARITIME INDUSTRY

Brent Sadler

During war, a merchant marine fleet plays an invaluable role in moving critical military supplies and troops. Inadequate U.S. shipping during World War I to support a wartime economy and move troops and equipment to Europe led to enacting the Merchant Marine Act of 1920 (a.k.a. the Jones Act). Its aim was to ensure a fiducial merchant fleet would be available for war. Since the end of the Cold War, the focus has overwhelmingly been on adequate sealift to support distant military operations. That goal has not been met, and such a focus is no longer adequate. New thinking is required to overcome critical shortages in the nation's shipping and shipbuilding capacities. In short, the nation needs to focus on improving the global competitiveness of its shipyards and shipping, while doing no harm to the existing domestic maritime sector in the process. Urgency is needed.

At a March 2020 hearing before Congress, then-administrator Rear Admiral Mark H. Buzby of the U.S. Maritime Administration (MARAD), responsible for ensuring commercial sealift for the military, warned that the merchant fleet is likely unable to deliver in a conflict and that, with only one shipyard able to build the needed logistic ships, the capacity to shift to needed production when necessary is questionable.[1] Things have not improved since. Of the more than 80,000 ships arriving at American ports, fewer than 200 are U.S.-flagged, -owned, and -crewed.[2]

Today, the nation must be able to protect and sustain a wartime economy while under direct threat at home and on the seas. At the end of the U.S.-Soviet Cold War, it was assessed the nation would need 650 U.S.-flagged merchant vessels more than its then 530 to sustain a wartime economy.[3] Today, there are less than 200 U.S.-flagged ships to support an economy that has quadrupled in size.[4] The world is in a new era of great power competition, namely with China, in which regaining the nation's maritime prowess is needed to harden the nation to economic coercion and pivotal in deciding the outcome of the next major war. History provides a good starting point for considering overdue course corrections to regain the nation's maritime strength.

Returning to Basic Principles and a Blue Ocean Strategy

On the eve of war in 1914, America's U.S.-flagged merchant fleet carried about 10 percent of trade, with European nations conveying the remainder.[5] Today, the nation is in a similar 1914 dilemma, but the nation lacks urgency in addressing this danger. Just to meet military operational wartime needs, the military relies on a fleet of merchant vessels with an average age of 45 years, well over the industry end-of-life average of 20 years, and there is a gap of approx-

---

[1] Testimony of Mark H. Buzby, Administrator, U.S. Maritime Administration, in video of "Subcommittees on Seapower and Projection Forces and Readiness Joint Hearing: 'Sealift and Mobility Requirements in Support of the National Defense Strategy'," Committee on Armed Services, U.S. House of Representatives, 11 March 2020. See also Mark H. Buzby, Administrator, U.S. Maritime Administration, U.S. Department of Transportation, statement for "Hearing on Sealift and Mobility Requirements in Support of the National Defense Strategy," Subcommittee on Seapower and Projection Forces and Subcommittee on Readiness, Committee on Armed Services, U.S. House of Representatives, 11 March 2020.

[2] Brent Droste Sadler, *U.S. Naval Power in the 21st Century: A New Strategy for Facing the Chinese and Russian Threat* (Annapolis, MD: Naval Institute Press, 2023), 1–2, 239–50.

[3] Andrew Gibson and Arthur Donovan, *The Abandoned Ocean: A History of United States Maritime Policy* (Columbia: University of South Carolina Press, 2000), 265.

[4] "Number and Size of the U.S. Flag Merchant Fleet and Its Share of the World Fleet," Bureau of Transportation Statistics, accessed 12 March 2023.

[5] "The Maritime Administration's First 100 Years: 1916–2016," Maritime Administration, 25 February 2023.

imately 76 fuel tankers.[6] The challenge, however, is far more than sustaining military forward operations but sustaining a wartime economy in what would likely be a yearslong conflict with China. To address this, a return to the basics is called for and the Merchant Marine Act of 1920—the Jones Act—preamble remains the best articulation of what is needed:

> It is necessary for the national defense and for the proper growth of its foreign and domestic commerce that the United States shall have a merchant marine of the best equipped and most suitable types of vessels sufficient to carry the greater portion of its commerce and serve as a naval or military auxiliary in time of war or national emergency.[7]

After 100 years, the last 30 spent cashing in a post–Cold War peace dividend has not ensured the nation has the ships it needs. To regain that edge requires growing the nation's market share in global shipping and shipbuilding; focusing on free market forces can regain American competitiveness without jeopardizing the domestic maritime sector. The primary task is to outperform the principal threat: China's heavily subsidized and government-directed shipbuilding and shipping industries. By changing the paradigm of modern logistics, the nation can regain its maritime prowess in what is a well-known management approach called a "blue ocean strategy."[8] And, yes, the nation's maritime sector has done this before.

Two innovations perfected in the United States during and shortly after World War II still shape global shipping—modular ship construction and containerization of cargo. Modularization proved critical in World War II by rapidly connecting dispersed U.S. factories to produce ships quickly. This is a technique used now at all competitive shipyards and taken to colossal scale in China. The other, containerization, was a novel "intermodalism" approach that offered greater efficiencies and security of cargo, which contributed to the

[6] Bryan Clark, Timothy Walton, and Adam Lemon, *Strengthening the U.S. Defense Maritime Industrial Base: A Plan to Improve Maritime Industry's Contribution to National Security* (Washington, DC: Center for Strategic and Budgetary Assessments, 2020), 9–13, 48.

[7] Merchant Marine Act of 1920, 46 U.S.C. § 861 (1929).

[8] A *blue ocean strategy* refers to a multifaceted approach that creates new market space rather than continuing to compete in a conventional way. See W. Chan Kim and Renee Mauborgne, *Blue Ocean Strategy: How to Create Uncontested Market Space and the Competition Irrelevant* (Boston, MA: Harvard Business Review Press, 2015), 22.

rise of today's just-in-time logistics.[9] But competitors, too, have adopted these methods and perfected them as the United States has since lost market share and its commercial maritime sector withered.

The elements of a new intermodalism, called "multimodalism," are present today and, if brought together in the right way, could spark a revolution in shipping. By conceptualizing shipping with the movement off the pier, container shipping represented an early step into intermodalism—the transfer of cargo across various means of transport. A new era of multimodalism will be made possible as several key technologies emerging are employed in a new global logistic framework. The defining characteristic of this new multimodalism will be transportation that merges air, sea, and overland shipping platforms. Five elements of this potential brave new multimodal world include distributed production, new cargo containers, cargo-carrying drones and dirigibles, diversified port operations, and massive cargo ships that hardly ever make port calls. The initial move toward this has already been made by the Department of Defense—though likely not considered as part of a new multimodalism.

The Rise of a New Multimodalism

In January 2021, the Department of Defense committed all Services to adopt additive manufacturing, a technique also known as three-dimensional printing. That directive identified eight U.S. firms as additive manufacturing innovation institutes to help bring this technology to the military.[10] The implications of having greatly dispersed production centers to global supply chains is immense, opening new markets and centers of production. However, connecting these new centers of production requires a secure method of communication, tracking, and decision assistance, and the modern technology of blockchain offers a solution.

While famous for its application to crypto currencies, blockchains offer dramatic improvements in logistics and manufacturing. They do this by effectively automating the verification and communication of data, while cheaply offering increased security, transparency, and accountability. In simple terms, blockchains are decentralized registers of transaction data that function like a

[9] Gibson and Donovan, *The Abandoned Ocean*, 208–11.
[10] "Department of Defense Additive Manufacturing Strategy," Joint Defense Manufacturing Council, Under Secretary of Defense for Research and Engineering, January 2021, 11–12.

traditional database but can cheaply encompass a massive network to track the movement of cargo. Because blockchains natively operate across borders and languages and can use customizable permissions and rules, when paired with verifiable, immutable data inside smart cargo containers, the combo can ease customs processing and security of sensitive or perishable cargo. These features offer important safeguards against human error, fraud, illicit use, or corruption. Today, blockchains are already being widely researched and implemented in at least 65 industries including shipping, logistics, manufacturing, insurance, and national security applications.[11] Paired with a powerful artificial intelligence (AI) decision assistance program, the potential of adaptive-predictive multimodal logistics chains becomes more possible. To truly unlock new and market-impacting logistic chains will require a reexamination of the simple cargo container.

To realize a new multimodalism that seamlessly moves across more modes of transport, a new family of containers will be needed. Today, container shipping and airfreight rely on common containers such as the 20-foot equivalent (TEU) or the 40-foot equivalent (FEU) containers on shipping, rail, and trucking.[12] U.S. federal regulations stipulate upper truck (80,000 pounds) and rail car cargo (286,000 pounds) limits, which do not consider local bridges, state roads, or environmental constraints. With these in mind, the industry generally recommends TEU not to exceed 44,000 pounds (22 short tons), including varieties with self-contained refrigeration units for moving perishables.[13] Air freight containers come in a wide array of sizes and shapes and are most often made using lightweight aluminum. Conventional steel TEU containers do not lend themselves to multiple shipping modes like airlift, limiting their use in a future featuring increased air transport that potentially alleviates road and rail congestion.

Fortunately, there has been some movement in the direction of new containers. In recent years, the development of so-called "smart rail cars" has been made. Their movement is tracked, with reports sent when freight is accessed along the way with monitors sensing the environmental conditions in the con-

[11] "Industries Disrupted by Blockchain," CB Insights, 9 March 2022.
[12] There is also a larger 53-foot container, also called High Cube, used primarily for road or rail transport, which are reported to often have latent/unused cargo capacity. The dimensions of these larger, heavier containers make them not fit for international container shipping.
[13] "What Are DOT Truck Weight Limits by State?," I.C.E. Transport, 23 May 2024.

tainer.[14] Married with the technology of blockchains, shippers can get real-time data that can inform delivery schedules, prompt customs clearances, optimize transit routes, and ensure perishable cargo arrives without damage. Progress and expanded production of these containers have sadly lagged.

Today, the humble shipping container (i.e., TEU) is overwhelmingly produced by three Chinese companies. In 2021, these companies manufactured 96 percent of the dry cargo containers and 100 percent of refrigerated cargo containers.[15] During the COVID pandemic recovery in 2021 and 2022, China's "zero-COVID" policies saw frequent port disruptions delaying the movement of containers that, without U.S. container manufacturing capacity, meant cargo had to wait for containers to arrive from China, where the cargo was emptied and then delivered to the shippers. The result was significant delays and a doubling of shipping rates between U.S. ports and China between April 2020 and April 2021.[16] The scarcity of containers and the impacts of Chinese policy provide a lesson for why more distributed manufacturing of containers is needed. It should also encourage investment in modern designs that enable multimodal shipping.

In the meantime, any new container concept will need to be backward compatible to be useful in the existing legacy intermodal system. New containers will thus need some level of reverse compatibility so that they can be carried on massive container ships side-by-side with traditional TEUs. To do this, new airfreight-capable containers could conceivably be connected together adhering to a TEU or FEU footprint and broken down for air freight or smaller trucks. Another line of effort would be using new materials in these future containers, like advanced composites that offer greater cargo capacity with less tare weight.[17] Lastly, methods of handling these new containers on container ships will be needed to enable transshipment at sea via support ships and vertical heavy lift air platforms. Think of it as incorporating the deployable logistic warehouse systems being developed for the military by Amazon, onto ultra

[14] "Smart Railroad Giants," Bosch, accessed 8 March 2023; and Clemens Forst, "Smart Freight Solutions for a Stronger Future," Global Railway Review, 5 September 2019.
[15] Greg Miller, "How Three Chinese Companies Cornered Global Container Production," Freight Waves, 24 May 2021.
[16] "Shipping during COVID-19: Why Container Freight Rates Have Surged," UNCTAD, 23 April 2021.
[17] Turkey Yıldız, "Design and Analysis of a Lightweight Composite Shipping Container Made of Carbon Fiber Laminates," MDPI Logistics, 16 July 2019.

large container ships.[18] This will not completely obviate the need for trucking cargo—though it might reduce the need for many long-haul routes.

Rather than utilize its waterways, America relies on trucking, which is facing several challenges. According to the American Trucking Association, in 2022, there was a deficit of 80,000 drivers due in part to accelerated retirements during COVID. The majority of drivers are more than 55 years of age, and with too few new hires given the difficult lifestyle and low pay, sustaining American overland trucking is an open question.[19] Yet, the nation remains reliant on trucking, which carried 72.2 percent of domestic freight tonnage in 2021 on the nation's roads and transported 66.1 percent to Canada and 82.7 percent to Mexico in value of trade that year.[20] Beyond the existing deficit in drivers, meeting demand will require an additional 90,900 new drivers to be hired by 2031; all for jobs that in 2021 paid an average $23.23 an hour.[21] Even if the drivers could be found, it is an open question as to if expensive and disruptive road expansion can support this expected growth in truck transport. That said, trucking will not go away, but it will change and be augmented by more waterborne transport and more dispersed with more points of entry directly from sea for cargo closer to distribution or production hubs.

Military logistic requirements have been mentioned several times and will be a key customer benefiting from early adoption of new multimodal capabilities. Militaries have long had to contend with moving cargo over rough and contested terrain without roads, ports, or airfields. The helicopter proved critical in meeting this need and opened up an entirely new element of naval and amphibious warfare. Helicopters were able to move between warships at sea without large flight decks, fitted with submarine detecting sensors and weapons became a formidable threat to hostile submarines, and acted as combat ambulances moving wounded rapidly from the front line to medical centers. The value of these missions validated the operating costs, ranging from the legacy Boeing CH-47 Chinook heavy-lift helicopter's approximate $4,000 dollars per flight hour cost at the low end to the Bell Boeing V-22 Osprey tilt-rotor craft's

[18] Matthew Humphries, "Amazon Creates a 'Deploy Anywhere' Modular Data Center for the US Military," *PC Magazine*, 15 February 2023.
[19] Andy J. Semotiuk, "Foreign Immigration Could Relieve U.S. Trucker Shortage," *Forbes*, 31 August 2022.
[20] "Economic and Industry Data," American Trucking Associations, 19 February 2023.
[21] "Heavy and Tracker-trailer Truck Drivers," U.S. Bureau of Labor Statistics, 8 September 2022.

almost $80,000 per flight hour cost.[22] Though the range, speed, and access to otherwise inaccessible locations are useful to the military and a great advantage, if the cost cannot be reduced it is unlikely to play a role in expanded commercial applications.

Air freight today is overwhelmingly conducted on fixed-wing aircraft and is the most expensive commercial means to move cargo. As such, it is relegated to moving the highest value and time-sensitive cargoes. According to several case studies carried out by the World Bank, air freight is 4 to 5 times more expensive than trucking, and 12 to 16 times more expensive than sea transport.[23] Comparing truck to rail transport, analysis of the American market points to a cost advantage to rail by a factor of three (or one-third the cost per ton on rail versus trucking).[24] Lastly, detention and demurrage fees for cargo waiting for movement out of the port holding area can average $100 per day per TEU.[25] If the cost per ton per mile of air freight could be reduced by half it would become competitive with trucking, especially over congested roadways or destinations not currently connected by rail. Short-haul air freight could then unlock potential savings by shortening the time cargo waits in port for movement and circumventing overland road and rail bottlenecks near ports of entry.

Relative Shipping Unit Cost = 16*(miles via air freight) +9*(miles via truck) +3*(miles via rail) +(miles via ship) +100*(days in port)[26]
Cheaper to operate, high-productivity unmanned helicopter drones (e.g., K-MAX) and modern dirigibles present potential solutions to otherwise untenable air freight costs. There is promise as prototype dirigibles are being developed with the capacity to carry up to 66 metric tons at 120 miles per hour for 3,100 miles.[27] However, in recent years, the more interesting developments

---

[22] Diana Maurer, *Weapon System Sustainment: Aircraft Mission Capable Goals Were Generally Not Met and Sustainment Costs Varied by Aircraft* (Washington, DC: Government Accountability Office, 2022), 255, 313.
[23] Air Freight: A Market Study with Implications for Landlocked Countries (Washington, DC: World Bank Group, 2009), 1, 3–6,
[24] "Comparing the Costs of Rail Shipping vs Truck," RSI Logistics, 20 April 2020.
[25] "Average Rates for Detention & Demurrage Fees in 2022 for Yard Management," Yard View Pro, 3 October 2022.
[26] Brent Sadler and Peter St. Onge, *Regaining U.S. Maritime Power Requires a Revolution in Shipping* (Washington, DC: Heritage Foundation, 2023), 35–36.
[27] "Aeroscraft," AEROS, accessed 23 November 2022.

have been with piloted and autonomously piloted so-called "air-taxis."[28] For example, widely available heavy-lift drones carrying up to 500 pounds are now price-competitive with low-end helicopters, with ongoing improvements making this even more so.[29] Moreover, the Navy has already demonstrated the ability to deliver a 50-pound cargo 200 miles to a ship at sea using a blue-water prototype drone in 2019.[30] For the Navy, this capability is just what is needed with the vast majority (90 percent) of its shore-to-ship cargo weighing less than 50 pounds. Commercially, however, these drones would have to be substantially scaled up to be useful. Just as important to moving cargo are new methods of managing those movements across new multimodal logistic networks.

To manage today's shipping, companies like Flexport are streamlining the existing supply chain and transport networks. It is a lucrative business line but not revolutionary. When a container ship carrying thousands of TEU arrives in port, it is usually days before the cargo is on its way and then longer still to reach its destination.[31] The actual time it takes is a function of crane and ground transport availability for onward delivery. If the cargo within a TEU container must be further broken down for onward delivery, that adds still more time and requires warehousing, which can be in short supply. All this handling takes time and money, and reducing the need for these movements is where the next revolution in shipping resides. The key feature of Flexport's approach is getting cargo on and off the dock quickly. Expanding this concept of cargo and container management to ships while at sea, and not warehouses, will enable the movement of cargo to more dispersed transit hubs without coming into port. Another facet of this diversified approach to port operations is at-sea transfers. For example, conducting cargo transfers to smaller feeder vessels from ultra-large container ships. Doing this opens shallow water ports often without pier space or cranes to service large volume modern container shipment activity.

[28] Woodrow Bellamy III, "10 eVTOL Development Programs to Watch in 2021," Avionics International, February/March 2021.
[29] "Top 3 Drones You Can Actually Fly in (Weight Capacity, Range & Price)," Hobby Henry, June 2020.
[30] "Navy Successfully Demonstrated Unmanned Cargo Delivery Systems for Ship at Sea," Naval Air Systems Command, 21 December 2022.
[31] "How Long Does It Take to Pick up a Container from Port?," Flexport, accessed 22 November 2022.

Adopting offshore transfer of cargo could be especially promising for small coastal and inland towns of the U.S. Western states. A review of nautical charts, rail, and road maps between Los Angeles, California, and the Straits of Juan de Fuca to Port Angeles, Washington, suggests there are at least 16 ports that could achieve greater global trade connectivity by applying the concepts of multimodalism. These waterfront communities could thus expand commerce using feeder vessels and vertical lift without investing in expensive and disruptive infrastructure projects. Today, only three geographic locales service the vast majority of West Coast American container traffic: San Francisco Bay (Oakland and San Francisco), Puget Sound (Seattle and Tacoma), and Los Angeles-Long Beach. Diversifying ports of entry would ease existing bottlenecks while increasing trade connectivity that would benefit more Americans.

Lastly, as ever more stringent rules are put in place regulating carbon emissions, shippers and shipbuilders are having to look to green energy solutions. At the same time, the International Energy Agency has emphasized nuclear power as a viable, cost-effective green energy production method.[32] Promising recent developments in small commercial reactors could usher in a renaissance of nuclear power at sea. This has been tried before, most notably in President Dwight D. Eisenhower's 1955 Atoms for Peace program and the related launching of a nuclear-powered commercial ship the NS *Savannah*. The ship has been anchored since 1970 and today rests in Baltimore harbor. The cost of operating and maintaining the earlier nuclear power plant and limited cargo-carrying capacity proved cost prohibitive and the idea failed to become profitable. That could be changing with new advanced small modular reactors and ultra-large container ships.

On 29 July 2022, the U.S. Nuclear Regulatory Commission (NRC) approved NuScale's small modular reactor design.[33] NuScale's reactor uses passive means to cool its pressurized power plant by submerging it in water. It can produce 600 megawatts of electricity in a 12-reactor module grouping. At 50 megawatts each, one or two of these cores could potentially power ultra-large container ships using already proven electric drive methods of propulsion.

[32] Fatih Birol, *Nuclear Power in a Clean Energy System* (Paris: International Energy Agency, 2019), 2–3, 8–9, 44–45, 84–89.

[33] Scott Burnell, "NRC to Issue Rule Certifying NuScale Small Modular Reactor," NRC Public Affairs, 29 July 2022.

Other small nuclear reactor designs potentially suitable for shipping are in the works, like TerraPower's molten salt reactor and a 15-megawatt heat pipe reactor (HPR) being developed at the Los Alamos National Laboratory.[34] All these designs will drive electric generating turbines. For ship propulsion, electric drives avoid the need for heavy and expensive reduction gears, instead using an electric motor to turn the propeller directly and with far less penalty to cargo capacity. An added benefit is that it allows for flexible ship designs, as engine rooms can be placed wherever it makes sense and not fixed to be physically connected to a large shaft to drive the ship's propeller.

Moreover, electric drives are a proven design, having been used on various warships starting in the 1930s like aircraft carriers USS *Langley* (CV 1), USS *Lexington* (CV 2), and USS *Saratoga* (CV 3), and five battleships like the USS *New Mexico* (BB 40).[35] Based on this track record and technological advances, the latest U.S. Navy warships, like the destroyer USS *Truxtun* (DDG 103) in 2018, have employed these systems with favorable results, like reduced fuel costs and ease of operations by the crew.[36] The more advanced *Zumwalt*-class destroyers have an integrated power system (IPS) that also uses electric motors rather than large and very heavy reduction gears to reduce the high speed of turbines used for generating electricity into motive force directly. The *Zumwalt*'s IPS can generate 78 megawatts of power, using only 17 of that to propel the ship at a speed of 20 knots.[37] Electric propulsion has likewise matured in the commercial setting with recent newbuild cruise ships providing up to 20 percent fuel savings.[38]

While still in development, the recent movement to prototype of several small modular reactor designs holds promise for future maritime use. These contemporary designs' modularity could enable its early use in back-fitted container ships that already have electric drive propulsion. Such designed accessibility could likely ease future nuclear refueling if needed. Ideally, a commercial

[34] "Nuclear for a Changing Energy Sector," TerraPower, accessed 13 March 2023; and "Advanced Manufacturing of Embedded Heat Pipe Nuclear Hybrid Reactor," Los Alamos National Laboratory, 15 November 2018.

[35] Bobby Bassham, "An Evaluation of Electric Motors for Ship Propulsion" (thesis, Naval Post Graduate School, June 2003), 2.

[36] Shelby S. Oakley et al., *Arleigh Burke Class Destroyers: Observations on the Navy's Hybrid Electric Drive Program* (Washington, DC: Government Accountability Office, 2020), 3, 5.

[37] Sam LaGrone, "Zumwalt Brings Mix of Challenges, Opportunities to Fleet," USNI News, 23 May 2016.

[38] Carrier Hampel, "ABB provides Azipod Drives for Five Italian Cruise Ships," Electrive, 19 November 2020.

small modular reactor purpose-built for powering a large container ship would be designed for the life of the ship—approximately 20 years. All of this requires reviews of existing regulations while not disrupting the existing domestic maritime sector.

Harmonizing a Jones Act Sector with a Novel Multimodalism

Clever ideas are insufficient if regulators stand in their way. The global and domestic maritime marketplace is already difficult for new entrants, and any innovator facing hostile regulators in the United States may look elsewhere. Overcoming these challenges with leadership is just the first step, and attracting new talent into the maritime sector and creating market space for an even rudimentary concept of multimodalism will be critical. At the same time, for more than 100 years, the Jones Act has shaped the domestic maritime sector and focused it domestically and not on retaining global competitiveness. Because of this domestic focus, the existing U.S. maritime sector would not come under added pressure as the new multimodalism focused on international competitiveness matures and opens new logistic hubs.

The Jones Act, as intended in its updates since 1920, is designed to ensure U.S. shipping remained competitive carrying a majority of American seaborne commerce. At a minimum, the act attempts this by requiring shipping between U.S. ports be conducted on domestically flagged, crewed, and built ships.

The fleet produced by the Jones Act in deadweight tonnage composition largely services domestic supply chains that have no alternatives. For example, much of this fleet capacity is dedicated to domestic petroleum movements that do not have pipeline alternatives such as in New England. For this reason, a new focus on developing multimodal options can grow domestic shipping and shipbuilding focused on global markets and not displace existing legacy Jones Act ships. Achieving this developmental leap will require another novel concept: market bridges.

Market bridges will play a role in kickstarting a revolution in shipping, especially in overcoming prohibitive developmental costs, regulatory constraints, and capital investments for shipbuilding. A market bridge can also provide a regulatory bubble to prove key innovations for the Navy with commercial utility for multimodalism. This complementarity between commercial shipping and naval operations can accelerate the development of key capabilities while addressing urgent military needs. This relationship between military logistics and commercial shipping is not new; it was after all the need to move cargo quickly during the Vietnam War that gave the novel container shipping the revenue bump needed to mature and eventually dominate shipping today.[39]

One path forward is solving contemporary military problems like missile reloads of warships at sea and the need to sustain expeditionary forces far from logistic hubs. These are just some of the key operational problems the military is confronting as it thinks through what a war with China entails using concepts like multidomain operations (MDO), distributed maritime operations (DMO), or expeditionary advanced base operations (EABO).[40] All these concepts rely on independent maneuvers with coordinated effects across dispersed groups of Marines, soldiers, aircraft, and ships. Solving these key operational problems was one focus of the Navy's *Navigation Plan 2022*, which lays out six force design imperatives; three germane to sealift: providing logistics support to a more widely distributed fleet, extended weapons and sensors range, and resilient logistics.[41] To achieve the synergy of a market bridge, it must have a home to incubate into developed capabilities that can be manufactured at scale.

For years, the commercial sector has used business incubators to spur innovation by bringing together—in close proximity—various enterprises and associated business services. The geographic proximity of such business support services like financing and groups of small enterprises involved in developing various elements of multimodalism will be critical. It enables communication across groups focused on engineering and technical developments, such as between nuclear-powered massive container ships with another group developing feeder vessel stability systems. This approach could also accelerate the development of shared technologies, and reduce developmental costs with access to common resources such as machinery shops, welders, etc. The organizing principle for this innovation incubator would be multimodalism.

Given ongoing tensions and the imperative the military be prepared should war with China occur, this incubator first focuses on developing several key

---

[39] Andrew Gibson and Arthur Donovan, *The Abandoned Ocean: A History of United States Maritime Policy* (Columbia: University of South Carolina, 2000), 180–81.
[40] Dakota L. Wood, *2023 Index of Military Strength* (Washington, DC: Heritage Foundation, 2022), 332, 339–40, 361–62, 374, 436–37.
[41] Michael Gilday, *Navigation Plan 2022* (Washington, DC: Chief of Naval Operations, Department of the Navy, 2022), 8.

dual-use capabilities. For example, the incubator teams would focus on developing solutions to Vertical Launch System (VLS) reloads at sea, while applying such developed technologies to moving cargo ship-to-ship, which in turn would inform future ship designs. Then as prototypes are developed and operated, the lessons learned inform the training at colocated centers of the workforce that builds, operates, and maintains a new multimodal fleet. Having training centers colocated with developers creates a rapid feedback loop, informing the training of associated workforces necessary for implementing and sustaining a new multimodalism.

An additional task of such an incubator is to encourage personnel to enter the maritime sector. This will require attracting a younger population with offers of meaningful work advancing exciting new fields with lucrative careers. This cannot be a ground-up approach, and leveraging the workforce of today will be needed to benefit from decades of collective experience in shipyards and operating ships at sea. To do this, an additional colocated advanced techniques training center would be needed. Its focus would be on advanced naval architecture education, training in modern shipyard industrial techniques, and operational mariner proficiencies such as drone operations. However, getting shipyard workers and naval architects to leave their jobs temporarily for the prospect of improved skills will require arrangements that benefit them as well as their employers. One way to do this is to create a program modeled on the *Fulbright* and Mansfield Scholarship programs that focuses on exposing U.S. participants to international institutions and new ways of doing business.[42] A new maritime fellowship for aspiring maritime professionals and skilled industrial workers could be offered. This would bring together experts and skilled shipyard workers from around the nation and some allied nations to share best practices, study, and advance relevant new processes and technologies like unmanned ships or dirigibles able to move cargo to and from ships at sea. Ideally, this investment in people can help address another nagging challenge—growing the maritime workforce.

The United States currently has a deficit in able merchant Mariners, and growing their numbers means providing options for pursuing lucrative careers

[42] "What Is the Fulbright U.S. Student Program," Fulbright U.S. Student Program, accessed 20 February 2023; and "Program Objective and Benefits," Mike Mansfield Fellowship Program, accessed 20 February 2023.

at sea. If a sustained crisis were to occur, the number of required U.S. Mariners (many approaching retirement age) would fall short. Addressing this shortfall is the duty of the Maritime Administration, which has tried to use student incentive payments to pay for college with associated obligations to serve in the Merchant Marine. However, without a viable industry to work in many potential takers have forgone the $12,000 per year stipend. While more is needed to entice people to become Merchant Marine officers, without opportunities for a viable career path there will be too few takers. Attracting and retaining more shipyard workers and the crews of modern merchant ships means growing the job market.

In addition to increased scholarships for colleges with longer associated service obligations (currently only three years), new stipends targeting skilled laborers are also needed. Such skilled labor stipends would need to entice the next generation of shipyard workers with offers of innovative technical skills. Unfortunately, until American shipping regains its competitiveness and grows its market share globally, domestic career options will remain limited. This discourages people from becoming merchant Mariners and it hurts career options eventually, resulting in not enough American Merchant Marines retaining the skills and certifications required for operating at sea. One way of addressing this is to offer salary offsets to those working for allied nations' shipping companies. The stipulation being that they retain mariner certifications while accepting competitive but lower wages from accredited foreign shipping companies. This would come with an obligation to be recalled serving as U.S. Merchant Mariners in wartime. Nonetheless, such Mariners provide a pool of competent personnel who eventually would take over the ships of a future American intermodal shipping fleet. All of this assumes a degree of investment and synchronicity across many technical fields; multimodalism's broad applicability without massive infrastructure investment may be the key element to achieve this.

An advantage of multimodalism as envisioned here is that many waterfront and inland communities can participate with little new construction. That is not to say "no" investment will be needed. To help spur the development and revitalization of many of America's waterfront communities and well-located transit hubs inland, a relook is needed at the 2017 federal opportunity zones program. This program attracted investment to economically distressed neighborhoods by providing investors a way to invest profits while avoiding capital gains taxes.[43] Such incentives could also spur more projects like the $2 million effort ongoing in Ponce, Puerto Rico to develop smart port technologies and techniques.[44]

Overall, the pursuit of multimodalism to regain American global competitiveness in shipping and shipbuilding is not in conflict with the Jones Act. The focus on growing the number of U.S. Merchant Mariners, providing current shipyard workers with innovative skills, and expanding coastal shipping such as feeder vessels will in fact grow the existing domestic maritime sector. However, this is not enough as the nation's maritime sector must grow to meet the demands of a growing economy that is too reliant on unfriendly nations' shipping. Attracting more people to enter America's maritime sector requires providing a vision for the future, which is also lucrative. This requires investing in new methods of shipping and shipbuilding that realize multimodalism as the nation regains its global maritime competitiveness.

Conclusion

A stronger and globally competitive U.S. maritime sector serves as a deterrent against Chinese economic coercion and military adventurism. With it, American trade can proceed unimpeded by dependency on others, and with confidence that the U.S. military can sustain combat operations on U.S.-flagged vessels. Getting underway on this project toward a renaissance of America's maritime sector serves American security needs and triggers a revolution in shipping with the potential to mitigate environmental degradation, promote domestic production, and expand American exports to global markets. In turn, this can spur wider job growth and advance technological innovation in the United States.

To deliver on the complex goal of achieving a globally competitive multimodalism requires creating an environment conducive to creating the technologies and workforce needed. A national maritime strategy could provide the roadmap, but key will be establishing a maritime innovation incubator to begin kickstarting needed innovations. With that, early developmental successes

[43] "The White House Opportunity and Revitalization Council," U.S. Department of Housing and Urban Development, accessed 20 February 2023.
[44] Anna Franko, "Scale AI, Port of Ponce Partner to Transform FEMA-Designated Disaster Site into a Smart Port Lab," Business Wire, 16 February 2023.

become more likely, which validate the viability of a new and revitalized maritime sector and the offer of lucrative new jobs. But this must also proceed apace with developing the nodes of this new multimodal network. For this, reformulated opportunity zone incentives can help more communities become connected and benefit from increased commerce. In time, attracting more investments to underserved communities that would form the backbone of a new, more dispersed logistics network benefiting more Americans. This need not come at the expense of today's domestic maritime market. A blue ocean strategy centered on developing a new multimodalism is the best way forward to regaining maritime market share while bolstering our defense and prosperity.

CHAPTER 4

SAVANNAH'S LEGACY

ADVANCING U.S. COMMERCIAL SHIPPING WITH SMALL NUCLEAR REACTORS

Thomas Davies and Sanjana Shashikumar

Shipping's Role in Global Trade

Maritime transport serves as the fundamental infrastructure of global commerce, facilitating the movement of more than 80 percent of internationally traded goods. This equates to approximately 11 billion tons of cargo annually, with projections indicating the industry will reach 16 billion tons by 2030.[1] Consequently, the commercial shipping sector's economic significance is profound, currently valued at $14 trillion, a figure comparable to the combined GDPs of Japan, Germany, India, and the United Kingdom.

The industry's prominence in global trade stems from its unparalleled capacity to transport substantial volumes of goods across vast distances cost effectively.[2] This competitive advantage is attributable to the economies of scale inherent in maritime logistics. The continuous expansion of ship sizes and the widespread adoption of containerization have resulted in significant reductions in per-unit transport costs. This trend has not only solidified the shipping industry's dominant position in global trade but has also contributed to the broader

[1] *Annual Review, 2019* (London: International Chamber of Shipping, 2019).
[2] Virginia Heffernan, "The World's Most Important Industry Has a New Captain, and She's Piloting It into the 21st Century," *Wired*, 14 February 2024.

phenomenon of globalization by enabling more extensive and complex international supply chains.

As markets within the global economy continue to integrate, maritime transport's role in international trade becomes increasingly crucial. This underscores the strategic importance of maintaining a robust and competitive merchant marine fleet, particularly for nations seeking to assert their economic influence on the global stage. Therefore, the United States must ensure it remains at the forefront of emerging technologies in this sector, positioning itself to effectively leverage these advancements.

The International Landscape and Shifts in Maritime Power

The global maritime market has undergone a significant transformation in recent decades, with a notable pivot toward Asia, led by economic powerhouses such as China, Japan, and South Korea. This change has largely been driven by the region's dramatic economic growth and the rise in demand for both horizontal and vertical division of labor.[3] Consequently, the region is now the epicenter of global manufacturing and consumption, leading to a dramatic increase in maritime traffic along its trade routes.

This shift toward Asia has profoundly impacted maritime trade patterns and underscored the growing importance of maintaining a robust maritime presence in the region. This change has been exemplified by the shipbuilding market, where together, these three economies accounted for 94 percent of shipbuilding in 2021 (in gross tonnage, or GT) and have increased capacity by 20 percent during the last year.[4] Notably, China's shipyards dominate the market, building close to 50 percent of all vessels worldwide (in GT).[5]

China's emergence as a maritime power is particularly prominent in this context. The nation has rapidly expanded its merchant fleet, port infrastructure and shipbuilding capacity, positioning itself as a dominant force in global shipping. This ascent has significant implications for U.S. interests, both economically and strategically. Furthermore, China's Belt and Road Initiative, with its

[3] Dongxu Chen, Meifeng Luo, and Zhongzhen Yang, "Manufacturing Relocation and Port/Shipping Development along the Maritime Silk Road," *International Journal of Shipping and Transport Logistics* 10, no. 3 (2018): 316, https://doi.org/10.1504/ijstl.2018.091676.

[4] "Shipbuilding Industry Worldwide," Statista, article no: did-22067-1, 2022.

[5] Stephen Gordon, "2022: Shipbuilding Review," *Clarksons Research*, 12 January 2023.

emphasis on maritime connectivity, further demonstrates its ambitions to reshape global trade networks in its favor.[6]

In stark contrast, the U.S. Merchant Marine fleet has experienced a prolonged period of decline. Once a symbol of American economic might, the U.S.-flagged commercial fleet has dwindled in size and global market share despite maintaining global leadership in several other sectors. For example, America's shipyards are currently facing a myriad of challenges, including shrinking domestic demand, deteriorating industrial capacity, labor shortages, and high inflation.[7] Due to their increasingly uncompetitive prices, U.S. commercial shipyards have relied increasingly on the domestic market over the years, supplying just 0.05 percent of the world fleet in 2021 (figure 1). This decline not only impacts the nation's economic competitiveness but also raises concerns about strategic sealift capabilities crucial for national security.

Despite this, the private U.S. shipbuilding and repair industry directly added $12.2 billion to the nation's GDP in 2019, so its value cannot be understated.[8] The Philadelphia Shipyard—one of the largest yards in the United States—stated in its fourth quarter 2022 report that its economic forecast "continues to be negatively impacted by . . . productivity loss," among other factors. It has now been bought by the Hanwha group based in South Korea.[9]

Efforts to revitalize the industry have been undertaken, with traditional methods focusing on policy interventions and financial support mechanisms. These approaches have often promoted protectionism in an effort to maintain the U.S. Merchant Marine's position in the global market.

Examples include:

> **Jones Act:** formally known as the Merchant Marine Act of 1920, it requires that all goods transported by water between U.S. ports be carried on U.S.-flag ships, constructed in the United States, owned by U.S. citizens, and crewed by U.S. citizens and U.S. permanent residents.[10]

---

[6] Weifeng Zhou and Mario Esteban, "Beyond Balancing: China's Approach towards the Belt and Road Initiative," *Journal of Contemporary China* 27, no. 112 (2018): 487–501, https://doi.org/10.1080/10670564.2018.1433476.

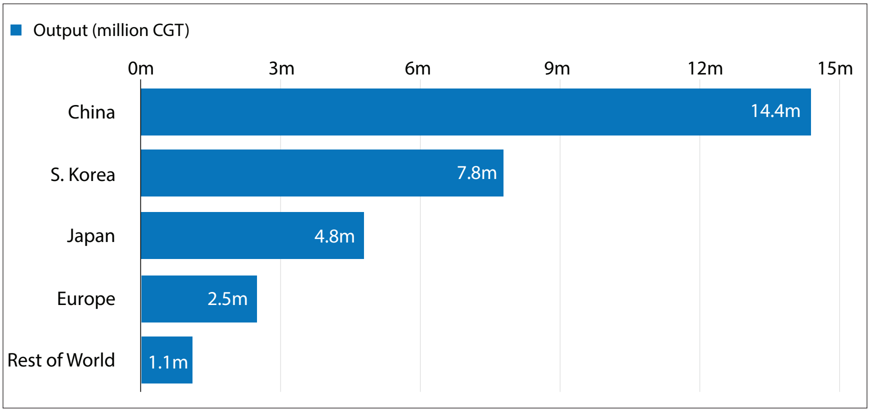
[7] Tristan Pinzon, *The Sinking Ship: The American Shipbuilding Industry* (Vallejo: California State University Maritime Academy, 2019).

[8] *The Economic Importance of the U.S. Private Shipbuilding and Repairing Industry* (Washington, DC: Maritime Administration, 2021).

[9] Eric Haun, "2023 U.S. Shipbuilding Report," MarineLink, 17 April 2023.

[10] John F. Frittelli, *The Jones Act: An Overview* (Washington, DC: Congressional Research Service, 2003).

Figure 1. Global shipbuilding capacity, million compensated gross tonnage (CGT)



Source: Gordon, "2022 Shipbuilding Review."

Cargo preference laws: these laws require a certain percentage of government-impelled cargo to be carried on U.S.-flag vessels, aiming to provide a stable source of cargo for American ships.[11]

Title XI loan guarantees: this program provides government guarantees on private sector loans for shipbuilding, aiding U.S. shipyards and operators in financing new vessel construction.

Tax incentives.

However, the effectiveness of these traditional methods has been limited by high labor costs, more stringent regulations, and increasing competitiveness of foreign maritime nations. Protectionist measures, while potentially offering short-term relief, risk isolating the U.S. fleet, while subsidies have not sufficiently addressed the cost disparity with international competitors.

Given these limitations, the U.S. maritime industry requires an innovative and domestic technological game-changer to regain its global competitiveness. Such an innovation must offer a substantial leap in operational efficiency, cost

[11] "Cargo Preference," United States Maritime Administration, 31 March 2023.

effectiveness, and environmental performance to overcome the entrenched advantages of established maritime technologies.

In this multifaceted landscape of challenges, marinization of advanced nuclear technology offers a compelling solution that can reshape the trajectory of American leadership at sea. Advanced nuclear technology can be a transformative force, bolstering the U.S. merchant maritime sector while strengthening national security and economic competitiveness. Through the production, operation, and export of nuclear-powered vessels, the United States can place itself at the center/forefront of two of the global economy's most important sectors.

Historical Precedent

To fully evaluate this technology's potential, it is crucial to examine its historical context, for which the United States led the way—and the valuable lessons learned from past examples.

The concept of nuclear propulsion in commercial maritime applications emerged as part of President Dwight D. Eisenhower's "Atoms for Peace" program, which aimed to harness nuclear energy for peaceful purposes. This initiative led to the development of the NS *Savannah* (figure 2), commissioned in 1962 as the world's first nuclear-powered merchant vessel.

The ship operated as a passenger-cargo liner until 1965, when passenger service was discontinued. During her active career, *Savannah* travelled 450,000 nautical miles (830,000 km), visiting 45 foreign and 32 domestic ports and being visited by 1.4 million people.[12] The vessel was designed not for commercial competitiveness but as a demonstration of technical feasibility and a showcase for luxury and innovation, resembling a high-end yacht more than a bulk cargo vessel. As a second purpose, the Maritime Administration also intended the NS *Savannah* to serve as a laboratory to study the design, operation, and manning of a nuclear merchant without financial considerations.

These proposed objectives of the vessel were achieved, and the operation of a low-enrichment uranium core in a naval reactor was successful. However, despite these accomplishments, commercial follow-ups to the NS *Savannah* were not pursued for several reasons.

[12] Robie S. Lange, "Maritime Heritage of the United States NHL Theme Study—Large Vessels: N.S. *Savannah* Theme Study," National Park Service, August 1990.

Figure 2. NS *Savannah*. The project was completely civil and was executed by Westinghouse. *Savannah* was a 21,800-ton ship with a cargo capacity of 10,000 tons and 60 passengers

Source: photo by Elton Lord, courtesy of the Atomic Energy Commission.

First, the economic landscape at the time, characterized by low oil prices and a lack of immediate climate change concern, meant there was little incentive for private industry to pursue this new technology. Another substantial hurdle that prevented wider deployment was the uncertainty regarding the liability and insurance of nuclear-powered merchant vessels, and the issue surrounding very large emergency planning zones (EPZs). The EPZ delineates an area where contingency plans must be in place to address potential results from an accident scenario. For pressurized water reactor (PWR) installations, the EPZ can extend over considerable distances, potentially up to tens of kilometers, due to the dispersal characteristics of radioactive material under pressurized conditions. Large EPZs and the associated liabilities for vessel operators create incompatibility with nearshore commercial maritime operations, as the associated liabilities can exceed the capacity of commercial insurance markets. It is noteworthy that these liabilities are typically underwritten by government entities for naval and state-owned vessels (such as the NS *Savannah*). Clearly, this is not feasible for a commercial operation.

The issue lies in the spatial extent of the EPZ, a factor inherent to the reactor technology employed. Therefore, the predominantly used PWR was not deployed more widely in merchant marine vessels.

Interestingly, while commercial nuclear propulsion struggled to gain traction, nuclear power has become a mainstay of powerful navies since 1950. The military sector has successfully demonstrated that operating nuclear reactors at sea is perfectly feasible, tolerating pitching, rolling, and heaving motions and extended operations without refueling. This dichotomy between military success and commercial difficulties can be readily attributed to the factors previously discussed.

Nevertheless, the lessons learned from the NS *Savannah* and subsequent developments in naval nuclear propulsion have paved the way for a renaissance in maritime nuclear technology. As the maritime industry grapples with stringent environmental regulations, high alternative fuel prices, and the need for operational efficiency, advanced nuclear propulsion presents a compelling alternative. By leveraging the benefits of this technology, the U.S. maritime industry can reclaim its position as a global leader in innovative and sustainable shipping technologies.

Advanced Nuclear Technologies

Advanced nuclear reactors encompass a diverse range of designs, each tailored to address specific challenges while capitalizing on novel technological advancements. These advanced reactors differ significantly from traditional PWRs utilized in terrestrial power plants and military vessels for propulsion, making them more suitable for commercial maritime application. The development of a new generation of advanced small modular reactors (SMRs), in particular, opens up the potential for deployments in this industry and addresses many of the outlined historical challenges. This is because the combination of smaller reactor sizes and modular design, along with enhanced safety measures such as passive safety systems, unpressurised cores, and advanced materials, allow for increased operational safety, efficiency, and economic viability.

Technological development, coupled with the growing recognition of nuclear power's role in decarbonization efforts, has reignited the industry's interest in this technology, driving a shift in public perception.

Passive Safety

Various advanced reactor designs are currently under development, and many are being designed with the concept of passive safety in mind. Passive nuclear safety involves incorporating features into the reactor that do not require active intervention on the part of the operator or electrical/electronic feedback to bring the reactor to a safe shutdown state in the event of an emergency. This is a highly desirable feature for operation in a commercial maritime environment, as it enhances the overall safety of the reactor by reducing the risk of human error and system failure, especially in environments with relatively more unpredictable conditions.

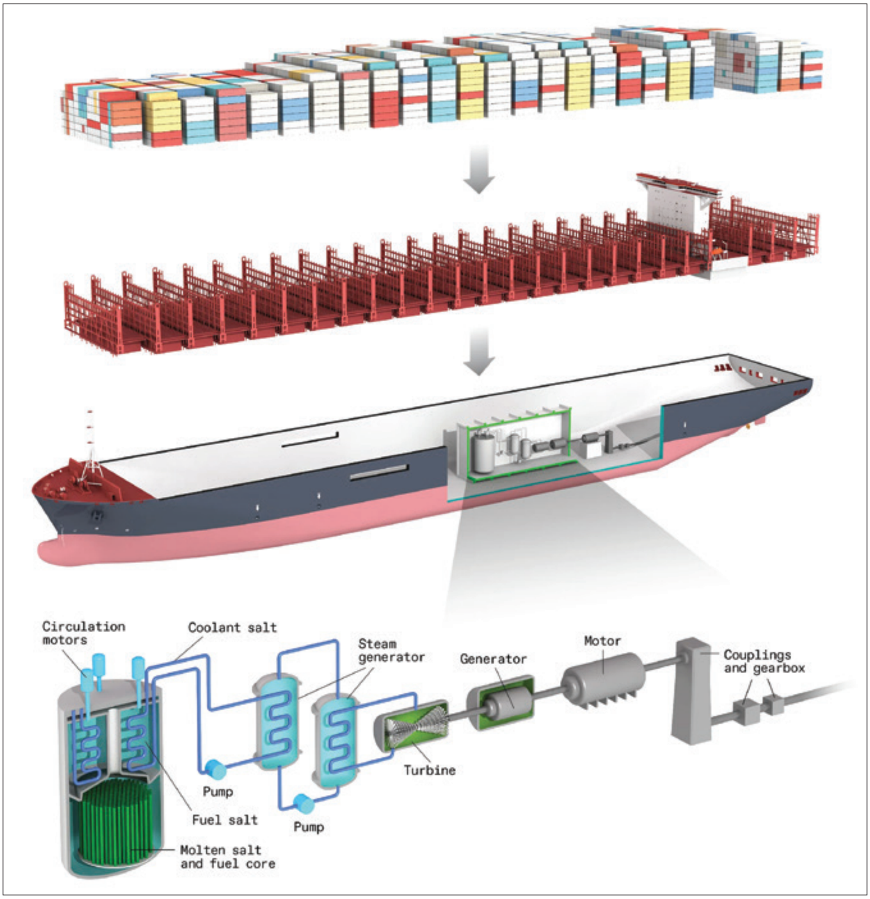
Low Pressure

One advantage of some advanced reactor designs is the use of low-pressure systems, including the reactor core, meaning that the risk of radioactive particles traveling significant distances in the case of a breach or accident is largely decreased. In other words, the EPZ requirements, which can extend beyond a 10-mile radius surrounding pressurized reactors, could be significantly reduced. A decreased EPZ opens up many opportunities for diverse siting, allowing for deployment in locations that otherwise would not be considered for nuclear power, including in nearshore marine environments (figure 3). In addition to these benefits, these low-pressure advanced reactors are also designed with online refueling and high fuel utilization, meaning the quantity of energy extracted from the fuel source is higher than traditional reactors.

While several groupings of the advanced reactor types have been proposed, the suitability of each technology for maritime applications can differ. Table 1 provides an overview of trade-offs and suitability of the different reactor technologies (based on reactor specifications) against the maritime applications considered in the American Bureau of Shipping report published in 2024 as part of a Department of Energy-funded effort.[13] Specifically, molten

[13] *Beyond the Horizon: Carbon-Neutral Fuel Pathways and Transformative Technologies* (Spring, TX: American Bureau of Shipping, 2024).

Figure 3. An illustrative representation of a small EPZ on a nuclear-powered vessel, highlighting its critical importance for commercially viable nearshore operations as neither the shore nor port must prepare



Source: IEEE Spectrum, adapted by MCUP.

salt reactors (MSRs), fluoride high-temperature reactors (FHR), and heat pipe reactors (HPR) demonstrate suitability for marine propulsion/nuclear electric propulsion (table 1).[14]

[14] Abdalla Abou-Jaoude and Levi Morin Larsen, *Configurations of Commercial Advanced Nuclear-Maritime Applications* (Idaho Falls: Idaho National Laboratory, 2024).

Table 1. Technological suitability ranking for each reactor type versus the maritime application

Reactor type	Fixed land/ coast	Fixed offshore, independent only	Fixed offshore w/ onshore grid coupling	Self-propelled vessel, local	Self-propelled vessel, international
Light water reactor (LWR)	Already exists on land	Low temperature limits efficiencies for synthetic fuel production	Will need heat augmentation	Already exists for naval/ government applications	Already exists for naval/ government applications
Sodium fast reactor (SFR)	Under development	Sodium-water interactions	Sodium-water interactions	Sodium-water interactions	Sodium-water interactions
Lead fast reactor (LFR)	Least mature technology in the West	High temperature, lead (Pb) shielding	High temperature, lead (Pb) shielding	Least pursued technology	Least pursued technology
High-temperature gas reactor (HTGR)	Under development	High temperature improves efficiencies for synthetic fuel production	High temperature improves efficiencies for synthetic fuel production	High efficiency but high pressure and low power density	High efficiency but high pressure and low power density
Fluoride high-temperature reactor (FHR)	Under development	High temperatures and thermal delivery	High temperatures and thermal delivery	High temperature and low pressure	High temperature and low pressure
Molten salt reactor (MSR)	Under development	High temperature and thermal delivery	High temperature and thermal delivery	High temperature and low pressure	High temperature and low pressure
Heat pipe reactor (HPR)	Under d evelopment	Limited output as single unit, potential to scale	Limited output as single unit, potential to scale	High temperature and low pressure	High temperature and low pressure

Note: red corresponds to low suitability, yellow to medium, and green to high.
Source: Abdalla Abou-Jaoude and Levi Morin Larsen, *Configurations of Commercial Advanced Nuclear-Maritime Applications* (Idaho Falls: Idaho National Laboratory, 2024).

In addition to design choices, the prioritization of safety and security throughout the entire design and operation process for nuclear power plants increases its applicability for commercial use. A key example of this is the multi-layered defense in depth approach, which has been gradually refined over years of use to prevent accidents and mitigate their consequences. At a basic level, this involves implementing multiple barriers or layers of protection to ensure that even if one fails, additional layers are in place to prevent or minimize the impact of a potential accident or security incident. For example, strict operating procedures and protocols are implemented to ensure safe operation, including regular inspections, maintenance, and testing of equipment to detect any issues before they escalate.

Bridging Maritime and Nuclear Industries

The U.S. nuclear and maritime industries face distinct yet complementary challenges that necessitate mutual collaboration. By integrating their strengths, both sectors can address their individual limitations and drive significant advancements.

Traditionally, the nuclear energy sector has pursued economies of scale through large-scale construction projects. The rationale was that building a single, very large station would be more efficient in significantly increasing net power capacity compared to constructing multiple smaller ones. This approach was driven by extensive site requirements such as preparation, workforce hiring, and licensing. However, over time, it has led to nuclear power plants becoming increasingly larger and more complex, with few instances of serial construction.

The substantial time intervals between constructions and geographically dispersed sites have also hindered the accumulation of site- and reactor-specific expertise. In the United States alone, labor productivity has fallen by as much as 13 times below industry expectations for new nuclear construction.[15] This situation has perpetuated the construction of first-of-a-kind (FOAK) plants, often plagued by cost overruns and delays, limiting the industry's ability to realize benefits from increased deployment.

Today, the nuclear industry faces the significant challenge of overcoming the high costs associated with building and deploying nuclear technologies. Around 80 percent of the costs associated with constructing a nuclear reactor can be considered non-nuclear costs, such as site preparation, civil construction, labor work, cooling systems, and interest costs on debt financing.[16] These challenges are not inherent to nuclear technology but in the way that it

[15] Philip Eash-Gates et al., "Sources of Cost Overrun in Nuclear Power Plant Construction Call for a New Approach to Engineering Design," *Joule* 4, no. 11 (2020): 2348–73, https://doi.org/10.1016/j.joule.2020.10.001.
[16] "Economics of Nuclear Power," World Nuclear Association, 29 September 2023.

is being scaled. To achieve affordability, nuclear construction must be modular and serialized.

The advent of advanced nuclear technologies, particularly small modular reactors (SMRs), presents a potential solution. With power capacities of up to 300 megawatts of electricity (MWe) per unit, small modular reactors are significantly smaller than grid-scale pressure water reactors, and, most importantly, are being designed for modular factory assembly. Modular construction has been a key focus for the nuclear industry. This method of off-site construction involves prepackaging systems or components into modules for assembly and delivery to the construction site. This means modules can be manufactured in a central location before being transported to their specific sites for installation and operation. This approach promotes the mass production of entire nuclear power plants with a central workforce that can be fostered and developed. Importantly, it mirrors practices successfully employed in the maritime industry, such as those in shipyards, which have significantly reduced construction time and costs for vessel fabrication.

Simultaneously, the maritime industry is under increasing pressure to minimize its environmental footprint. Responsible for ~3 percent of global greenhouse gas emissions, the Marine Environment Protection Committee (MEPC) of the International Maritime Organization (IMO) has adopted the 2023 IMO Strategy on Reduction of GHG Emissions from Ships.[17] This strategy aims to achieve net-zero emissions from international shipping by or around 2050 and encourages the widespread adoption of zero-to-low-emission fuels. Facing requirements to dramatically reduce and eventually eliminate its emissions, the shipping industry is considering greener fuels such as ammonia or hydrogen, but these alternatives have their own challenges of scalability and high cost. Incorporating nuclear power and SMRs into the fleet is the most viable and cost-effective pathway to meet these stringent emissions goals.

The nuclear and maritime industries face challenges that can be mutually addressed. Repurposing and specializing U.S. shipyards for constructing SMRs and floating nuclear facilities presents an opportunity to tackle high costs while invigorating the American shipbuilding sector. Transitioning to shipyard-based construction for nuclear power plants would significantly reduce civil engineer-

[17] Jasper Faber et al., *Fourth IMO Greenhouse Gas Study 2020* (London: International Maritime Organization, 2021).

ing costs while capitalizing on and further developing a skilled domestic workforce. Achieving this mutual relationship would enable the United States to significantly advance in addressing the modern challenges facing these two industries, establishing them as a global leader in both fields.

Commercial Regulatory Framework

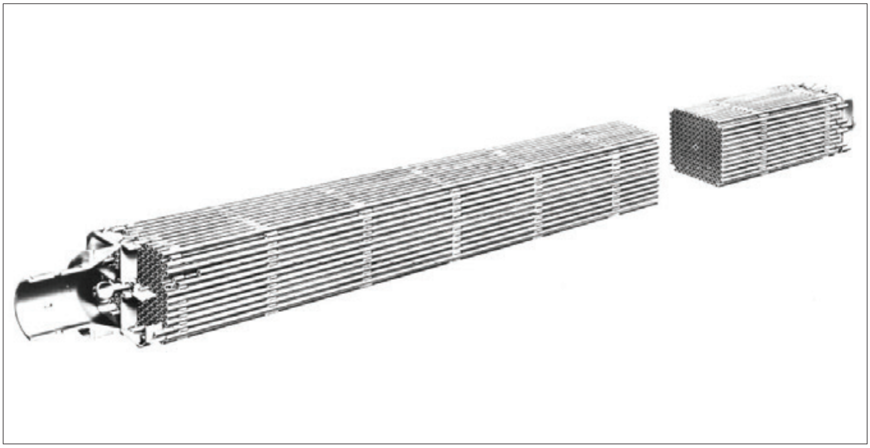
To successfully bridge these industries and deploy ship-based nuclear vessels, it will be crucial to develop a regulatory framework that facilitates the operations of nuclear reactor operations in commercial spaces.

Internationally, the regulation of floating nuclear power will involve two key intergovernmental organizations: the International Atomic Energy Agency (IAEA) and the IMO. There are already significant efforts within both to bring about the necessary developments, focused on accommodating emerging technologies and ensuring that such technologies can be commercially insured. At the IMO, the Safety of Life at Sea Convention (SOLAS) chapter VIII provides the safety regulations for nuclear merchant ships. SOLAS chapter VIII is supplemented by the Code of Safety for Nuclear Merchant Ships, which was adopted in 1981, and which exclusively applies to pressurized water reactors (PWRs).[18] That code will need to be modernized to accommodate the development of advanced reactors and these applications. Similarly, at the IAEA, there is ongoing technical work underway to consider safety and security requirements for mobile reactors.

Nuclear liability conventions, in particular the Paris and Vienna Conventions, currently exclude nuclear propelled ships. Without liability frameworks, these vessels cannot be commercially insured, which would then prevent them from calling in ports. While the Brussels Convention of 1962 attempted to solve this problem, it was never ratified due to a series of diplomatic rifts between the United States and the Soviet Union in the wake of the Cuban missile crisis. A revised and modern liability convention that accommodates nuclear-propelled ships using advanced technologies is vital to commercial insurability and the successful deployment of new nuclear in marine environments.

[18] *The Internation Convention for the Safety of Life at Sea, 1974* (London: United Nations Maritime Organization, 2020), 415–19.

Figure 4. A nuclear fuel element for the cargo ship NS *Savannah*. The element contains four bundles of 41 fuel rods. The uranium oxide is enriched to 4.2 and 4.6 percent of U-235. The reactor is found at the center of the ship along with PCSs. The output electrical power then powers the motor, which turns the propellers



Source: U.S. Maritime Administration.

Applications

Maritime Civil Nuclear Propulsion

The nuclear propulsion of large merchant vessels, or maritime civil nuclear propulsion, which is codified in U.S. law under 15CFR 744.5, presents an opportunity for a paradigm shift in maritime propulsion technology.[19] Maritime civil nuclear propulsion can theoretically be achieved through both direct nuclear and nuclear-electric propulsion. The former uses heat from the nuclear reactor to turn a turbine and then the ship's propeller, whereas the latter (figure 4), nuclear-electric propulsion, generates electricity, which is used to power electrical motors that turn propellers.

[19] "744.5 Restrictions on certain maritime nuclear propulsion end-uses," Title 15—Subtitle B—Regulations Relating to Commerce and Foreign Trade, Chapter VII—Bureau of Industry and Security, Department of Commerce, Subchapter C—Export Administration Regulations, Part 744—Control Policy: End-User and End-Use Base, last amended 24 January 2025.

This means that all power, both for propulsion and auxiliary services, is generated by the reactor and power conversion system as electricity, which is then distributed to all onboard loads. While this approach does result in electrical conversion losses, it significantly improves flexibility in power deployment and allows the reactor to be positioned anywhere within the hull, not just at the stern. Additionally, it can meet the auxiliary power demands of the vessel, which opens opportunities not limited to the vessel alone. During periods of low power demand, such as when the vessel is at berth, surplus electricity can be transmitted to shore to power port operations, offering further benefits to operators and ports beyond operational performance.

The adoption of nuclear-electric propulsion represents critical technological advancements. It can enhance the sustainability and operational capabilities of the U.S. Merchant Marine fleet, ensuring its competitiveness within the global market.

Nuclear-electric vessels can be fueled for their entire operational life, which can offer a significant advantage in terms of immunity from fuel price volatility and fuel supply chain constraints. By eliminating the need for periodic refueling, vessel owners and charterers may instead enter into long-term agreements with greater certainty regarding operational costs. This stability renders financial planning more predictable and less susceptible to volatile fuel market fluctuations, limiting the risk of such agreements and potentially streamlining negotiation practices.

Lifelong fueling will also fundamentally shift the economic landscape of commercial shipping. Traditionally, the industry has tended toward large vessels operating at slow or very slow speeds to reduce fuel consumption, a practice known as slow steaming.

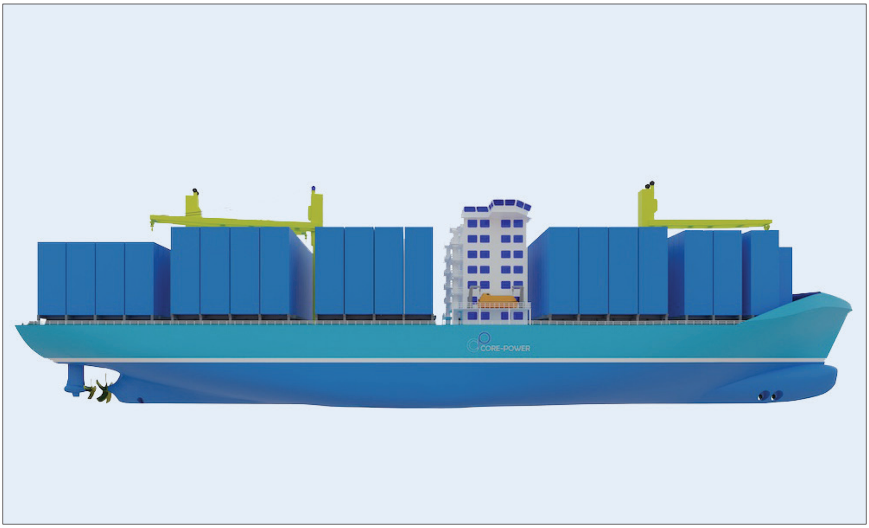
While cost and emission-effective, this strategy has meant vessels now often operate at below half of their design speed, leading to extended transit times and reduced operational efficiency. Nuclear-powered vessels, however, are freed from the constraints of fuel costs, allowing them to operate at higher speeds without economic or emission penalties. In principle, pre-2008 speeds could be considered, with container ships possibly featuring design speeds of up to 30 knots. This shift can facilitate greater productivity, efficiency, and economic value by reducing transiting times and increasing the frequency of voyages. For instance, higher operating speeds mean that an equivalent volume of cargo can be transported using fewer vessels, or the same volume can be transported in a shorter period, thereby boosting revenue for ship owners and reducing costs for the global consumer market. This development provides the U.S. Merchant Marine with the capacity to deploy a more advanced and efficient fleet, thereby enhancing its ability to reestablish a competitive position in the global maritime industry.

This transition marks a significant departure from recent economic norms in the maritime industry, steering it toward higher-quality vessels operating with best-practice standards and under nuclear nation flags, such as the United States. In addition to economic and operational advantages, nuclear-powered vessels would also reduce the logistical and financial burdens associated with refueling infrastructure for alternative fuels such as ammonia and methanol. Conventional ships require regular refueling at multiple ports during their voyages, incurring high logistical and financial costs.

It also marks a departure from the trajectory of the industry's energy transition. Green fuels feature heavily in all current maritime decarbonization plans. These fuels provide a possible pathway to comply with emissions regulations, but several factors could severely hamper their widespread deployment. Firstly, their production is energy intensive and inefficient, resulting in the production of fuels containing less energy than was used to make them. The low volumetric energy density of these fuels, when compared to their traditional counterparts, will also require larger fuel storage tanks that will occupy space previously used for cargo. In contrast, nuclear electric shipping can leverage a fuel with immense energy density, providing zero emission propulsion, higher operating speeds, and additional cargo space. This represents a promising avenue for economic advantages in comparison not only to alternative fuels but also to traditional shipping fuels.

Despite large initial investment costs and regulatory hurdles, maritime civil nuclear propulsion quickly becomes a compelling application for advanced nuclear technology due to the economic and environmental benefits it brings. Partnerships between shipbuilding practices and small modular reactor construction, the U.S. shipbuilding industry's need for revitalization, and the benefit of high-quality nuclear-electric vessels further drive the necessity of this use case. The ongoing work to bridge the gap between the two industries is, therefore, more important than ever.

Figure 5. Mockup of TEU nuclear electric containership



Splash247, adapted by MCUP.

Power to Port

Reverse Cold Ironing and the Nuclear-electric Advantage

As environmental regulations continue to tighten, many ports now require conventional ships to connect to shore power while at berth, a practice known as cold ironing. This requirement aims to reduce emissions from ships' auxiliary engines, which typically run on fossil fuels to provide onboard electricity when docked. However, implementing cold ironing presents significant challenges and costs for both ports and vessel operators.

Ports must invest in substantial shoreside infrastructure, including frequency converters, transformers, and cable management systems. Vessel operators, in turn, must retrofit their ships with compatible systems, including switchboards and transformers, to connect to shore power. This represents a considerable expense and potential downtime for fleet upgrades while exposing operators to ongoing electricity costs while docked.

Nuclear-electric vessels, by contrast, offer a compelling alternative. These vessels will generate ample onboard electricity without producing emissions, eliminating the need to connect to shore power. This self-sufficiency not only reduces port infrastructure demands (vessel reliance on ports) but also lowers operational costs for vessel operators, who avoid paying for shoreside electricity. Moreover, nuclear-electric ships present an opportunity to reverse the traditional cold ironing process. With their surplus power generation capacity, these vessels could supply electricity to the shore grid while docked.

The ability to sell excess power back to the grid could serve as a significant incentive for adopting nuclear propulsion in the U.S. Merchant Marine. This feature, combined with previously discussed benefits, further enhances the economics case, overcoming the hurdles demonstrated by historical examples.

**Transforming Maritime Propulsion:
American Economic Opportunities**

The integration of SMRs and maritime engineering practices offers a scalable energy solution. This application of a reliable energy supply to revitalize the American maritime industry will have the added benefit of fostering high-skilled job growth in coastal communities. There can be new opportunities for American workers in the growing energy sector, as these reactors necessitate specialized engineering and operational expertise. By leveraging SMRs, the U.S. commercial fleet can modernize its infrastructure while fostering economic growth through innovation and international collaboration.

Strategic International Importance

The international demand for reliably built and operational advanced nuclear reactors will continue to grow, and other nations are beginning to take the lead in developing and exporting this technology abroad. Marine applications are not only being considered within the United States. In 2023, China unveiled plans to build the first-ever nuclear-powered container ship. Named KUN-24AP, the ship will utilize a Generation IV molten salt reactor, a cost-effective and low-carbon fuel alternative.

The ship, designed by Jiangnan Shipyard, part of China State Shipbuilding Corporation (CSSC), would boast a capacity of 24,000 standard 20-foot containers and aims for zero operating emissions.[20] With this FOAK vessel expected to be completed within this decade, and Russia already utilizing float-

[20] David David, "Maritime/China Unveils Plans For 'Largest Ever' Container Ship, Powered by Thorium Reactor," NucNet, 5 January 2024.

ing nuclear propulsion for domestic applications in the cargo vessel *Sevmorput*, it is inevitable that these applications will be exported and utilized to strengthen their influence abroad.

In looking to the future and maintaining its international position, the United States should embrace the catalyst of advanced nuclear, a technology that can disrupt the status quo and allow for the revitalization of the American shipping industry. The United States is uniquely positioned to fulfill this role, in part because of their internationally respected regulator the Nuclear Regulatory Commission (NRC). Setting the gold standard for the safe operation of nuclear power, the NRC-regulated SMRs maintain the reputation within nuclear nations to plausibly be the leading exporter of ship-based nuclear technologies to friendly nations. Collaborating with allies in the development and export of American-regulated technology could enable access to a large, growing market in global shipping while also furthering long-lasting relationships surrounding the delivery of reliable and clean energy.

Ongoing Efforts and Looking Ahead

There are significant efforts within the United States pursuing the idea of advanced nuclear for maritime. The U.S. Department of Energy (DOE) has funded research through various venues to develop our understanding of the feasibility of this use case. The National Reactor Innovation Center out of Idaho National Laboratory has formed the Maritime Nuclear Application Group, a research hub that brings together experts from the maritime and nuclear energy sectors. They have produced strategic studies that assess the opportunities and challenges of potential maritime applications, and further work is focused on economic and regulatory feasibility. Additionally, the American Bureau of Shipping (ABS) successfully conducted a technology qualification of the Molten Salt Reactor (MSR) in marine environments. Their evaluation has confirmed the feasibility of MSRs in the design process. This conclusion is one of the many factors that has ignited interest within the industry to pursue this application.

The Nuclear Energy Maritime Organization (NEMO) was formed in 2024 to advance these efforts. As an industry member organization, its objective is to assist nuclear and maritime regulators in the development of appropriate future-oriented standards and rules for the deployment, operation, and decommissioning of floating nuclear power.

Given the positive momentum in developing a new generation of American nuclear technology development, now is the ideal time to embrace this integration. With robust government funding supporting ongoing initiatives, American companies are spearheading the production of cutting-edge, revolutionary technologies. These innovations are not only poised to meet domestic energy demands but also can address the needs of U.S. international allies.

PART 2

THE ELEMENTS OF STRATEGIC SEALIFT

CHAPTER 5

THE ROLE OF U.S. TRANSPORTATION COMMAND

Vice Admiral Dee Mewbourne, USN (Ret), PhD

> These sealift ships play a critical role in ensuring the rapid deployment and sustainment of our forces across strategic distances.
>
> ~ General Stephen R. Lyons[1]

Introduction

Alexander the Great noted with dark humor the importance and complexity of logistics during his campaigns of conquest from 336 to 323 BCE: "My logisticians are a humorless lot . . . they know if my campaign fails, they are the first ones I will slay."[2] About 2,300 years later, Admiral Raymond A. Spruance wrote the following in his introduction to *Beans, Bullets, and Black Oil: The Story of Fleet Logistics Afloat in the Pacific During World War II* based on the lessons he observed in World War II:

> A sound logistics plan is the foundation upon which a war operation should be based. If the necessary minimum of logistics support can-

---

[1] *Statement before the House Armed Services Committee Readiness Subcommittee and the Seapower and Projection Forces Subcommittee on the State of the Command* (statement by Gen Stephen R. Lyons, USA, 7 March 2019).
[2] Bill Kobren, "A Logistics Quote for All Occasions," Defense Acquisition University, 5 September 2019.

> not be given to the combatant forces involved, the operation may fail, or at best be only partially successful.[3]

This comparison illustrates the premise that the essential *nature* of military logistics is timeless. That is, the fundamental need for logistics to underpin any military operation is as true today as it was thousands of years ago. In his book *On War*, Prussian general Carl von Clausewitz emphasized the importance of logistics in military operations by stating that the purpose for which a soldier is recruited, clothed, armed, and trained, and the whole objective of his sleeping, eating, drinking, and marching is simply to fight at the right place and the right time.

This observation of Clausewitz underscores the critical role of logistics in ensuring that military forces are effectively deployed and prepared for combat. The reason that logistics operations have timeless value is they enable flexibility and capacity to pursue the *best* national strategy, not just the one that is most possible. In this regard, General Stephen Lyons, the 13th commander of U.S. Transportation Command (USTRANSCOM), often said that the purpose of military logistics was to deploy and sustain the Joint Force globally at the time and place of the nation's choosing.[4]

However, the *character* of logistics, like warfare, must adapt to the changing operational environment to remain relevant. To get a sense of this essential evolution, juxtapose the character of logistics needed to support Napoléon's relatively slow advancing horse-based ground army in the Battle of Austerlitz in December 1805 with the vehicle-based ground force that U.S. Army general Norman Schwarzkopf commanded in Operation Desert Storm from 17 January to 28 February 1991.[5] Both battles showcase the importance of speed, strategic planning, and effective troop movement in achieving victory. However, they also highlight the evolution of warfare, from horseback-led charges to vehicle-based ground offensives. While the nature of logistics was the same—

---

[3] RAdm Worrall Reed Carter, *Beans, Bullets, and Black Oil: The Story of Fleet Logistics Afloat in the Pacific During World War II* (Newport, RI: Naval War College Press, 1953), viii.

[4] *Statement of General Stephen R. Lyons, United States Army Commander, United States Transportation Command, before the Senate Armed Services Committee, on the State of the Command*, 116th Cong. (2019) (testimony of Gen Stephen R. Lyons, U.S. Army).

[5] *War in the Persian Gulf: Operations Desert Shield and Desert Storm, August 1990–March 1991* (Washington, DC: Center for Military History, 2010), 1.

to support an army at war—it is easy to see how the character of logistics necessarily evolved with warfighting.

There are three basic modes of transporting goods in use today: surface lift (rail and road), airlift, and sealift. As one might expect, each mode has its advantages and disadvantages, and mode selection depends on multiple factors such as geography, type of cargo, shipping constraints, schedule, and cost. In addition, each mode evolved throughout the history of warfare to enable—as Clausewitz said—fighting at the right place and at the right time. The surface mode evolved from the earliest horse-drawn wagons and wooden rails to the 18-wheelers and diesel locomotives employed today. The airlift mode grew from biplanes carrying U.S. mail in the early twentieth century to modern large capacity jet airliners and cargo airplanes with global reach. The sealift mode changed in equally dramatic ways. Propulsion systems evolved from oars to sail to steam to diesel and are currently advancing toward nuclear. Meanwhile, sealift freight carrying shifted from hand-loaded break bulk cargo to metallic stackable standard-size intermodal containers (20-foot equivalent units) and sophisticated ship-mounted cranes and ramps that facilitate wheeled cargo rolling on and off the ship.

To fully appreciate the role of USTRANSCOM in the U.S. maritime industry, one must first appreciate the relative importance of sealift. Surface lift is commonly used for domestic or continental freight transport and is ideal for door-to-door delivery. Airlift is the most expensive mode of shipping and is typically reserved for cargos that need to move quickly over long distances, are of high value, or are perishable. By comparison, approximately 80–90 percent of global trade moves by sealift.[6] This is because ships can carry large volumes of cargo across oceanic distances at comparatively low incremental costs. For example, the global average price to ship a 40-foot container on a maritime vessel on 25 April 2024 was $2,706 according to the Drewry World Container Index.[7] By comparison, U.S. Transportation Command would charge $2,174

[6] Anna Nagurney, "Our Economy Relies on Shipping Containers. This Is What Happens When They're Stuck in the Mud," World Economic Forum, 1 October 2021.
[7] "International Container Shipping Rates Chart: May 2024," MoverDB.com, accessed 1 May 2024.

during the same timeframe to airlift a 400-pound box of parts on a channel flight in a 50-inch x 50-inch x 50-inch container.[8]

In a future major regional conflict, USTRANSCOM will move about 90 percent of U.S. military equipment by ship.[9] For example, the Operation Desert Shield sealift delivered more than 95 percent of the tonnage required.[10]

This chapter will provide an overview of USTRANSCOM's responsibilities, stakeholders, and operations that enable effective military logistics using the maritime modality in peace and war. The first section will present an overview of USTRANSCOM against the backdrop of the six responsibilities it has been assigned. Framing USTRANSCOM, a functional combatant command, in this way fosters understanding of both the depth and breadth of its land, air, and maritime capabilities. The framing also supports the second section, which describes the relationships between Transportation Command and key stakeholders in the U.S. maritime ecosystem as related to its missions. Finally, the third section describes how USTRANSCOM uses the maritime today as a modality for joint logistics in support of the Department of Defense (DOD). Using government owned and commercially available maritime vessels, as well as the vast networks and nodes enabled by commercial partners serving as maritime service providers, USTRANSCOM delivers military and nonmilitary cargo across the global commons in peace and war.

U.S. Transportation Command

Overview

Headquartered at Scott Air Force Base in southern Illinois, USTRANSCOM is one of 11 unified combatant commands within the Department of Defense. Transportation Command's enduring purpose is to project and sustain U.S. military forces anywhere on the globe at the time and place of the nation's choosing in support of the full spectrum of military operations, from human-

[8] *Air Mobility Command, FY 2024: U.S. Government Department of Defense Channel Passenger and Cargo Airlift Customer Billing Rates and Guidance for the Transportation Working Capital Fund*, Version 2 (Scott Air Force Base, IL: Air Mobility Command, 2023).

[9] *Communication Playbook: Fall Meeting Special Edition* (Scott AFB, IL: U.S. Transportation Command, 2024).

[10] Joseph Mason, *Commemorating 30th Anniversary of Operation Desert Storm* (Scott Air Force Base, IL: U.S. Transportation Command, 2021); and James K. Matthews and Cora Holt, *So Many, So Much, So Far, So Fast: United States Transportation Command and Strategic Deployment for Operation Desert Shield/Desert Storm* (Scott Air Force Base, IL: U.S. Transportation Command, 1996).

itarian assistance to full combat operations. Purpose built to deliver combat power, USTRANSCOM was formed in 1987 to preserve the strategic comparative advantage of the United States to rapidly move military forces transoceanic distances to advance national security interests, deter adversaries, assure allies, and respond to crisis.[11] Based on historical averages, on any given day, the command is responsible for complex global movements or operations, including more than 200 railcars, 1,500 freight shipments, 30 ships, 1,200 personal vehicles and property shipments, 40 aerial refueling sorties, 400 airlift sorties, and 10 patients in aerial evacuation.[12]

Mission Areas

The mission of USTRANSCOM is to conduct globally integrated mobility operations, lead the Joint Deployment and Distribution Enterprise (JDDE), and provide enabling capabilities to project and sustain the Joint Force in support of national objectives. The responsibilities for each of the 11 combatant commands are prescribed in an executive branch document signed by the president called the *Unified Command Plan* (UCP). This classified document is usually reviewed and updated every two years.[13] The latest UCP signed on 25 April 2022 by President Joseph R. Biden listed the following six responsibilities for USTRANSCOM.[14] For each, an unclassified summary is provided:

- **Single manager for transportation** (assigned 1992): USTRANSCOM is the single manager for air, land, and sea transportation, terminal management, and aerial refueling to support the global deployment, employment, sustainment, and redeployment of U.S. forces. This also includes planning, allocating, routing, scheduling, and tracking assets to meet validated deployment and distribution requirements.
- **Single manager for global patient movement** (assigned 1993): USTRANSCOM is responsible to manage a global patient movement capability and arrange timely and safe movement for ill and injured servicemembers.

[11] Tyler F. Hacker and G. James Herrera, *Defense Primer: United States Transportation Command* (Washington, DC: Congressional Research Service, 2020).
[12] "United States Transportation Command Factbook," U.S. Transportation Command, PowerPoint slide, October 2023.
[13] "Unified Command Plan," Britannica, accessed 26 December 2024.
[14] Joseph R. Biden, "Memorandum on 2022 Unified Command Plan," White House, 25 April 2023.

- **Mobility Joint Force provider** (assigned 2006): USTRANSCOM is responsible for recommending global joint sourcing solutions to the Chairman of the Joint Chiefs of Staff, in coordination with the Services and all mobility forces.
- **Joint enabling capabilities provider** (assigned 2011): The Joint Enabling Capabilities Command, a subordinate unit of USTRANSCOM, provides mission-tailored, Joint capability packages including communications, planning, and public affairs to accelerate the formation and operation of a Joint Force Headquarters.
- **Joint Deployment and Distribution Enterprise** (JDDE) (assigned 2020): This responsibility merges and expands USTRANSCOM's previous roles as distribution process owner and global distribution synchronizer. Specifically, the command is responsible to provide JDDE-wide analysis; advocate for global capabilities; develop/implement process improvements for systems that provide key capabilities of distribution-related activities; and integrate theater security cooperation activities supporting global distribution, in coordination with geographic combatant commands.
- **Single manager for global bulk fuel management and delivery** (assigned 2023): With this latest responsibility, USTRANSCOM is responsible to synchronize global bulk fuel planning, posture, and execution to meet combatant command requirements and assure distribution for the entire enterprise by closely coordinating with combatant commands, the Services, and the Defense Logistics Agency.[15]

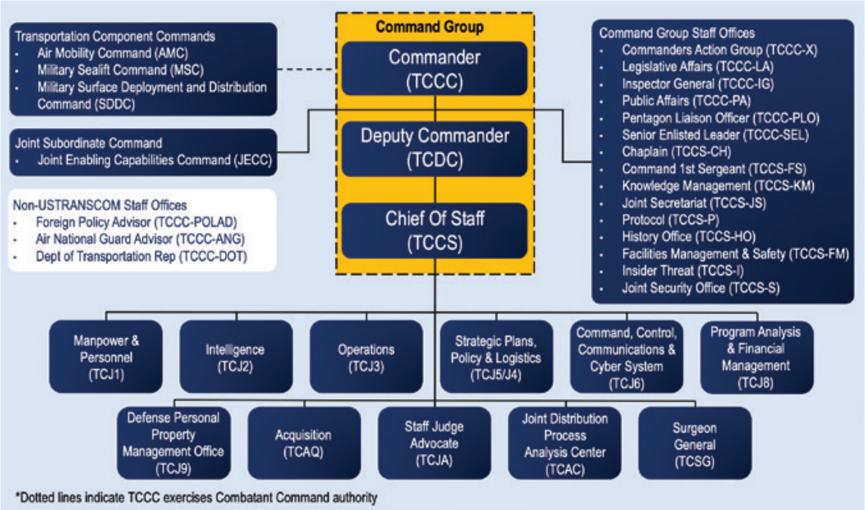
Components and Subordinate Commands

To fulfill the six responsibilities assigned in the UCP, USTRANSCOM uses the expertise of its three components, one subordinate command, and internal directorates, as shown in figure 1, plus manifold strategic partnerships within the JDDE.

Transportation Command has a number of subordinate, functional components that advance its mission. One subordinate command, the Joint Enabling Capabilities Command (JECC), was purposely omitted because its functionality is unrelated to understanding this chapter.

[15] "United States Transportation Command Factbook."

Figure 1. U.S. Transportation Command organizational diagram



Source: courtesy of U.S. Transportation Command (2024b) TCJ8 Directorate, adapted by MCUP.

Air Mobility Command (AMC) is one of nine major commands of the U.S. Air Force and the air component of USTRANSCOM.[16] As the air component, AMC is responsible for executing four core mission areas: airlift; aerial refueling; aeromedical evacuation; and global air mobility support. To accomplish these missions, AMC operates multiple types of aircraft including, the Lockheed C-5 Galaxy, McDonnell Douglas C-17 Globemaster III, Lockheed C-130 Hercules, Boeing KC-46 Pegasus, and Boeing KC-135 Stratotanker. AMC executes air mobility missions for USTRANSCOM through the Global Air Mobility Support System consisting of fixed en route support locations, infrastructure, equipment, and deployable contingency response forces.[17]

The Military Surface Deployment and Distribution Command (SDDC) is both the Army component to USTRANSCOM and a subordinate command to Army Materiel Command. SDDC plans, coordinates, and synchronizes global surface movements through vast distribution networks (e.g., warehous-

[16] "United States Air Force Institutional and Component Commands," Airandspaceforces.com, accessed 26 December 2024.
[17] "United States Transportation Command Factbook."

ing, railways, and roadways), modes (e.g., truck and railcar) and nodes (e.g., airports, seaports, military bases, and supply centers) to the point of need.[18]

Military Sealift Command (MSC, or NAVTRANS,) the maritime component to USTRANSCOM deploys and sustains the Joint Force through a combination of government-owned and commercially available sealift ships in addition to meeting the maritime logistics needs of the U.S. Navy and providing specialized services to other government agencies. MSC crews, trains, equips, and operates more than 130 government and commercially owned and chartered vessels. The MSC fleet includes sealift vessels, tankers, naval auxiliaries, and a variety of special mission and support ships.[19]

Examples of USTRANSCOM in Action

It is difficult to fully comprehend the multifarious nature of Transportation Command's global responsibilities through descriptions alone. Therefore, selected recent examples are offered below to showcase the range and depth of USTRANSCOM's operational reach and vital contribution to national security.

Ongoing Support to Allies and Partners in Europe

USTRANSCOM continues to provide lethal and nonlethal support to allies and partners in Europe in response to Russia's invasion of Ukraine. The command began delivering security assistance cargo for Ukraine in early 2022. As of December 2022, USTRANSCOM delivered more than 313 million pounds of equipment to Ukraine.[20] An unclassified publicly available graphic depicting the cumulative total of the command's support efforts as of 28 May 2024, is presented in figure 2.[21] It is worth noting in the diagram the employment of more than 95 vessels, further illustrating how USTRANSCOM relies on the maritime ecosystem to transport military useful cargo transoceanic distances.

[18] "United States Transportation Command Factbook."
[19] *The U.S. Navy's Military Sealift Command: 2023 in Review* (Norfolk, VA: Military Sealift Command, 2023).
[20] Sgt Vontrae Hampton, "USTRANSCOM Delivers Hope to Ukraine," U.S. Transportation Command, 29 December 2022.
[21] "Support to Allies and Partners in Europe," U.S. Transportation Command, accessed 10 June 2024.

Figure 2. Summary of USTRANSCOM's cumulative support to Europe

Source: "Support to Allies and Partners in Europe," U.S. Transportation Command, 27 January 2025.

Afghanistan Noncombatant Evacuation Operations (NEO)

USTRANSCOM played pivotal roles during the largest noncombatant evacuation operation airlift in history in August 2021. By using a combination of assigned forces, commercial partners, and global networks, USTRANSCOM enabled the security and operation of Hamad Karzai International Airport in Kabul, Afghanistan; the air evacuation of approximately 124,000 people to safety; the transport of approximately 6,000 U.S. military members; and the air transport of evacuees to temporary safe havens in other countries and then to and within the United States. Air Mobility Command, as the air component of USTRANSCOM, planned and directed 2,627 total sorties from 11 August to 9 September, involving 1,927 military aircraft and 700 commercial aircraft. More than 250 military aircraft contributed to the airlift, including C-17 Globemaster III, Lockheed C-5M Super Galaxy, C-130 Hercules, and all three aerial refueling variants (KC-135 Stratotanker, McDonnell Douglas KC-10 Extender, and the Boeing KC-46 Pegasus). At one point, more than one-half of the U.S. Air Force's fleet of 222 C-17s were committed to this operation. [22] The iconic photograph shown in figure 3 of one C-17 mission illus-

[22] *Afghanistan Non-Combatant Evacuation Fact Sheet* (Scott Air Force Base, IL: U.S. Transportation Command, 2021).

trates USTRANSCOM's commitment to the aerial evacuation mission. On 15 August 2021, the crew of Reach 871, a C-17 aircraft that transported 823 Afghanistan evacuees from Afghanistan to Qatar.[23]

Maritime Support for Operation Iraqi Freedom (OIF)

The OIF deployment was the largest for the U.S. military since Operations Desert Shield and Desert Storm. Altogether, USTRANSCOM's components moved 286,715 passengers (including 1,656 by sea) and 1,197,443 short tons of unit cargo (110,003 by air and 1,087,440 by sea). While most troops flew to the war, 91 percent of deployment cargo traveled by sea. This figure is consistent with the first Gulf War, when sealift accounted for 88 percent of total dry cargo. Between 1 January and 23 June 2003, 126 ships completed 184 downloads, delivering 1,087,440 short tons (21,769,360 square feet) of unit cargo.[24]

Of the 126 ships used, 41 belonged to the Military Sealift Command, 31 to the Ready Reserve Fleet (RRF), 12 were U.S.-flagged commercial ships, and 42 were foreign-flagged commercial vessels. Most ships (105) were roll-on/roll-off (RORO) ships: 37 of those came from MSC, 30 from the RRF, and 38 from the commercial sector (7 U.S.-flag and 31 foreign-flag). No ships were activated under the Voluntary Intermodal Sealift Agreement (VISA), but MSC chartered 11 VISA ships.[25] SDDC (called Military Traffic Management Command at the time) used 37 ships in liner service.[26]

On the busiest day of maritime transport operations, there were 167 ships (25 Naval Fleet Auxiliary Force, 3 special mission, 33 cargo-carrying prepositioning, 49 surge sealift, and 57 chartered ships) extending from the East Coast of the United States to Kuwait as shown in figure 4. This equated to an average of one ship every seventy-two nautical miles.[27] From this graphical representation, it is easy to see USTRANSCOM's dependency on the maritime modality

[23] Greg Hadley, "C-17 Crew that Rescued 823 from Afghanistan Awarded Distinguished Flying Crosses," *Air & Space Forces Magazine*, 4 November 2022.

[24] J. Smith and M. Nigra, eds., *The Force Behind the Force: U.S. Transportation Command and Strategic Deployment for Operation Iraqi Freedom* (Washington, DC: U.S. Transportation Command, 2015).

[25] Administered by MARAD, the VISA program exchanges priority access to DOD cargo during peacetime for guaranteed wartime commercial sealift capacity, if activated (Maritime Administration, 2020); and "Voluntary Intermodal Sealift Agreement," U.S. Department of Transportation, accessed 7 February 2025.

[26] "Voluntary Intermodal Sealift Agreement."

[27] "At War Today and Transforming for Tomorrow," presentation, Surface Deployment and Distribution Command, Scott Air Force Base, IL.

Figure 3. Evacuees inside Reach 871 during their C-17 flight from Kabul to Qatar

Source: official U.S. Air Force photo.

Figure 4. Busiest day of OIF maritime transport operations, 24 March 2003

Source: Harold Kennedy, "Navy's Sealift Command Picks Up the Pace," *National Defense Magazine*,1 July 2003.

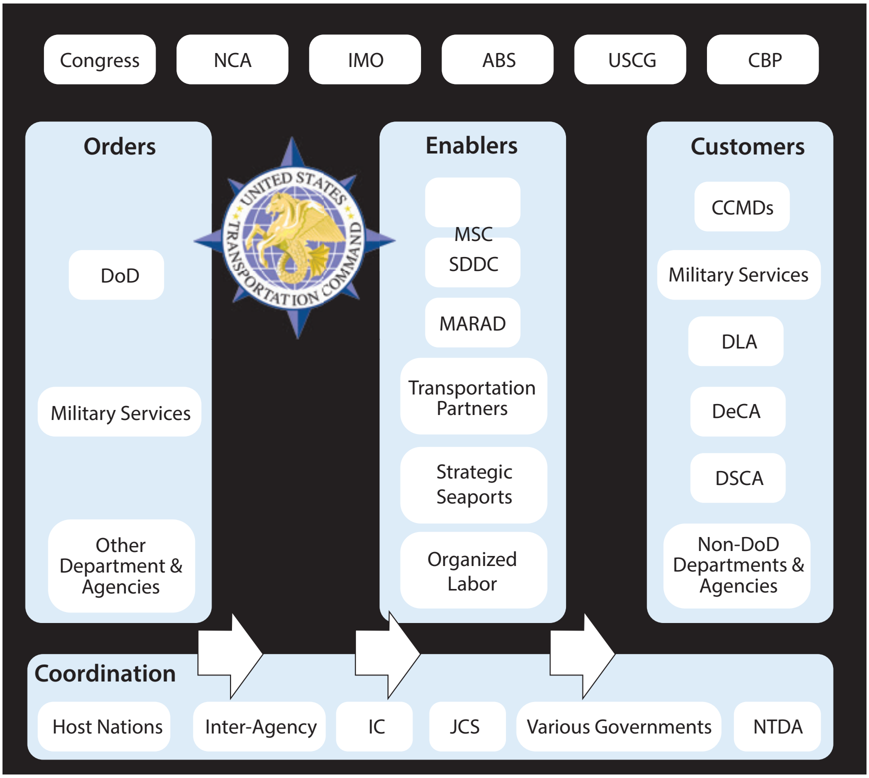
to transport combat power across transoceanic distances during OIF. In sum, sealift enabled the rapid buildup of combat power to achieve positional, temporal, and strategic advantages in support of national objectives.

Relationship between USTRANSCOM and Key Maritime Stakeholders

Relational Overview

As illustrated in the preceding examples, USTRANSCOM relies heavily on the use of the shipping modality and access to the maritime global commons to transport bulk military-useful cargo in peace and war. To reliably accomplish these important DOD maritime missions, while overcoming all barriers (e.g., COVID-19, labor shortages, materiel or navigational challenges, restricted access to ports, etc.), USTRANSCOM uses a vast network of carefully cultivated and maintained relationships with key stakeholders. The vastness of these relationships is depicted in figure 5 and includes elements of the U.S. federal

Figure 5. Key maritime relationships of USTRANSCOM



Source: U.S. Transportation Command, adapted by MCUP.

government, other governmental bodies, organized labor, and the JDDE arranged functionally as shown.

In most cases, USTRANSCOM receives orders for oceanic movement from the secretary of defense or one of the Services, coordinated through the Joint Chiefs of Staff, or from another department or agency (e.g., Department of State, USAID). Using the statutory and regulatory authorities established by Congress, the UCP, and DOD, Transportation Command follows established business processes to leverage key enablers that execute the assigned mission. Among the enablers, the Maritime Administration (MARAD), MSC, or SDDC carry the overall responsibilities for delivering the sealift cargo to the customer.

During mission execution, USTRANSCOM, the enablers, and the customers coordinate as required with stakeholder organizations while complying with all national and international regulations.

Commercial and Government-owned Sealift

USTRANSCOM uses four types of sealifts to move transoceanic cargo: commercial vessel time charter, commercial vessel voyage charter, commercial vessel liner service, and U.S. government-owned (a.k.a. *organic*) vessel activation. The distinguishing characteristics of each type of sealift are described in table 1.

Metaphors are often used to help differentiate the types of sealift available for USTRANSCOM selection. The command has *operational control* (OPCON) of the vessel for the mission, which is always delegated to MSC/NAVTRANS as the maritime component commander. The vessel exercises *sovereign immunity* for the completion of the mission. The vessel is *U.S.-flagged* and is crewed by U.S. citizens. The vessel has cargo from a non-U.S. government customer onboard.

As table 1 illustrates, there are key distinctions in the four types of sealift. Three of the four types use commercially owned ships. Maintaining an adequate fleet of seaworthy ships is critical to USTRANSCOM's ability to deploy forces in a major conflict, as nearly 90 percent of U.S. military equipment would move by ship.[28]

Ships that are owned by the U.S. government (a.k.a. organic) are assigned to MARAD for maintenance, crewing, and upkeep purposes as part of its Ready Reserve Fleet (RRF). MARAD maintains the RRF, which is a fleet of 53 militarily useful ships (47 RORO, 4 cranes, and 2 aviation repair vessels).[29] The ships of the RRF are berthed in East Coast, West Coast, and Gulf of Mexico ports. They are maintained in a reserve operating status and capable of getting underway within five days, in the event the DOD needs these ships to support the rapid movement of military cargo. The ships are managed by commercial companies and crewed by civilian merchant Mariners.[30]

The third column of table 1 presents useful metaphors to promote a distinctive understanding of the four types of sealift through a frame that every

[28] *Communication Playbook*.

[29] Maritime Administration website updated 23 April 2024, reported 42 RORO ships. This number was emended on 24 May 2024, by USTRANSCOM's TCAC Directorate email to 47 RORO ships, noting that USNS *Watson* (T-AKR 310) will be added to the RRF in fiscal year 2025.

[30] "The Ready Reserve Force (RRF)," U.S. Department of Transportation, 23 April 2024.

Table 1. Sealift types and characteristics

Type sealift	Vessel owner	Ride metaphor (1)	OPCON? (2)	Sovereign immunity? (3)	U.S.-flagged? (4)	U.S.-crewed? (5)	Mixed cargo? (6)
Time charter	Commercial company	Rental vehicle	Yes	Yes	Yes	Mostly	No
Voyage charter	Commercial company	Ride-share	No	No	Yes	Mostly	Maybe
Liner service	Commercial company	City bus	No	No	Yes	Mostly	Yes
Organic activation	MARAD	Personal vehicle	Yes	Yes	Yes	Yes	No

Source: courtesy of the author, adapted by MCUP.

reader understands: passenger transportation. Metaphorically, the time charter is like a rental car. Although the driver is not the owner of the vehicle, they are free, within bounds prescribed by law and the owner, to load and navigate the car as desired. The voyage charter is akin to a ride-share service, like Uber or Lyft. While the rider establishes the destination and the cargo, the driver determines the navigational details. One can think of a liner service like a city bus that follows an established route and timetable. The rider pays for a seat on the bus but has no control over the navigational details. Finally, activating an organic vessel for a sealift mission is like driving one's personal vehicle. Although this form of passenger transport yields the most freedoms for operation within applicable laws, it also comes with the total cost of vehicle ownership.[31]

As shown in the fourth column of table 1, two types of sealift, time charter and organic activation, enable operational control (OPCON) of a sealift vessel. According to Joint military doctrine, OPCON is the level of authority delegated by a CCMD (USTRANSCOM in this case) to a subordinate com-

[31] "Linear and Charter Ship, Types, Arrangements, and Routes," International Forwarding Association, 4 March 2021; and "Types of Charter Agreements: Time, Voyage, and Bareboat," Marinersgalaxy.com, 9 September 2023.

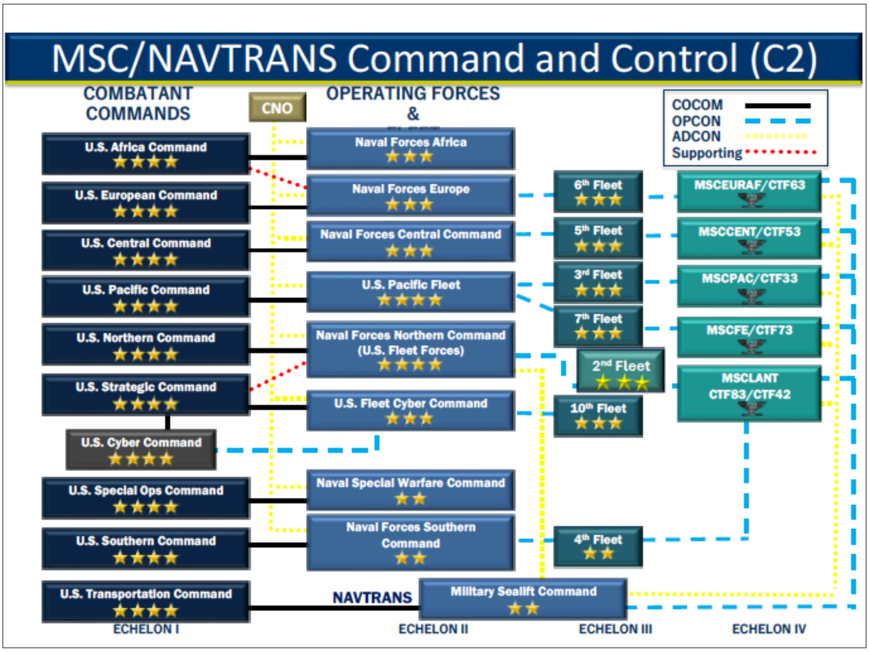
mander to perform functions involving "organizing and employing forces, assigning tasks, designating objectives, and giving authoritative direction over all aspects of military operations and joint training necessary to accomplish the mission."[32] From a practical perspective, having OPCON of a vessel maximizes usage flexibility since it can control all aspects of a vessel's mission profile (e.g., loading, routing, destination, timing, etc.). Transportation Command delegates OPCON of time chartered or government-owned ships to NAVTRANS. By comparison, SDDC executes sealift missions on liner ships through contracts with the shipping company or a third-party freight forwarding company.[33]

Figure 6 depicts the command and control (C2) arrangement for time charter and organic sealift ships. As shown in the graphic, USTRANSCOM exercises combatant command authority combatant commander (black solid line) over MSC, which is called NAVTRANS in its maritime component role. NAVTRANS exercises OPCON (blue dashed line) of five area commands (shown in blue green), which are geographically aligned OPCON to their respective U.S. Navy numbered fleets (shown in dark green). This dual-hatted OPCON arrangement of the area commanders enables these U.S. Navy captains (O-6) to assume tactical control of ships from either NAVTRANS or their respective numbered fleet commander.[34]

As an example, assume an organic sealift ship from a lay berth in Norfolk, Virginia (Second Fleet), is activated for a mission that entails onloading cargo in Florida (Second Fleet) and offloading at a port in the Mediterranean Sea (Sixth Fleet). USTRANSCOM will designate which ship within the RRF for MARAD to activate. Once the ship is ready (a.k.a. tendered) for the mission, NAVTRANS will assume OPCON of the vessel and then assign tactical control of it to Military Sealift Command Atlantic (MSCLANT). MSCLANT will direct the transit of the ship to Florida for onload and the beginning of its transatlantic passage. At the appropriate longitude, NAVTRANS will direct Military Sealift Command Europe and Africa to take tactical control of the ship and direct the terminal phase of its mission. The C2 flow reverses when the offload is complete, and the ship returns to the United States.

[32] *Doctrine for the Armed Forces of the United States*, Joint Publication 1 (Washington, DC: Joint Chiefs of Staff, 2017).
[33] "Sealift," U.S. Transportation Command, accessed 18 April 2024.
[34] MSC/NAVTRANS C2 infographic amended to reflect the establishment of Second Fleet in 2018.

Figure 6. Command and control of sealift vessels assigned to MSC/NAVTRANS



Source: U.S. Transportation Command, adapted by MCUP.

The fifth column of table 1 reflects the types of sealift vessels that must exercise sovereign immunity. As shown, the two types of sealift that exercise sovereign immunity are commercial time charter and organic vessels. Under customary international law, all vessels owned or operated by a nation-state and used—for the time being—only for government, noncommercial service are entitled to sovereign immunity. It is the policy of the U.S. Navy to assert full sovereign immunity for all U.S. government-owned and U.S.-flagged commercial vessels under time charter. This means that these types of vessels on sealift missions—and the cargo they carry—are immune from seizure, searches, and inspections. Additionally, the identities of the crew, passengers, riding gang members, and cargo are protected.[35] Not having to disclose specifics

[35] *NAVADMIN 165/21*, *Sovereign Immunity Policy* (Washington, DC: Chief of Naval Operations, 4 August 2021).

of the cargo and crew, or be subject to inspection, is a clear benefit of having sovereign immunity when carrying sensitive military-useful cargo or when the movement of that cargo should be protected to enhance operational security. Therefore, it is understandable why sovereign immunity is an important criterion when the type of sealift for a mission is being considered.

The sixth and seventh columns of table 1 reflect that all four types of sealift require the vessels to be U.S.-flagged with crews who are U.S. citizens and credentialed by the U.S. Coast Guard. By their nature, all U.S. government-owned sealift ships are registered in the United States, sail under the U.S. flag, and employ U.S. citizens who are Coat Guard-credentialed Mariners. Additionally, the Military Cargo Preference Act of 1904 requires 100 percent of cargos purchased for the Armed Services of the United States to be carried on U.S.-flagged ships.[36] Therefore, commercial ships operating under the U.S. flag on USTRANSCOM-directed sealift missions must be registered in the United States. Ships registered in the United States must meet Coast Guard requirements for safety, to include carrying a certificate of inspection.[37] The requirements in Title 46 U.S.C. (section 8103) for sealift-size vessels to attain Coast Guard certificates of inspection stipulate that only a citizen of the United States may serve as master, chief engineer, radio officer, or officer in charge of a deck watch or engineering watch.[38] Additionally, each unlicensed seaman must be either a citizen of the United States, an alien lawfully admitted to the United States for permanent residence, or a foreign national who is enrolled in the U.S. Merchant Marine Academy. Not more than 25 percent of the total number of unlicensed seamen on the vessel may be aliens lawfully admitted to the United States for permanent residence.[39]

The last column indicates whether the cargo-carrying capacity of the sealift ship will be shared with commercial customers during a sealift mission. As table 1 reflects, commercial time-chartered and organic sealift vessels do not mix government-impelled cargo with commercial cargo. This is intuitive for government owned and operated ships that exist to carry DOD cargo. In the contract of a time-chartered vessel, the charterer is responsible for choosing

[36] "Cargo Preference," U.S. Department of Transportation, accessed 12 June 2024.
[37] "Frequently Asked Questions: What Does It Mean to Say a Ship Is U.S. Flag?," Maritime Administration, 12 June 2024.
[38] Title 46 U.S.C. § 8103.
[39] Title 46 U.S.C. § 8103.

the cargo, routes, and ports. The ship's owner provides for the crew and is responsible for the vessel's safe operation, navigation, seaworthiness, and materiel condition.[40]

Vessel Selection

To select which of the four types of sealift transportation to employ for a particular mission, the USTRANSCOM Operations and Plans Directorate (TCJ3) follows a process that is codified within an unclassified restricted instruction. As one can imagine, it is within the financially motivated competitive interest by carriers and shippers in terms of which mode of sealift is selected for every mission. For this reason, the specifics of Transportation Command's 24/7 process, as it is called, are proprietary. However, the process adheres to the following overarching policy statement that is quoted from the opening of the instruction:

> Processes and procedures will follow established laws, policies, and regulations. When selecting the best COA [course of action] to transport ocean-going cargo, the appropriate USTRANSCOM Operations and Plans Directorate (TCJ3) Division will resolve each real-world scenario based upon the facts of the particular requirement. Nothing in this instruction shall be construed to bind the ultimate decision maker in any way and does not relieve the decision maker's obligation to exercise independent professional judgment. This instruction does not create any rights or entitlements for any commercial carrier or shipper and is only meant to document internal USTRANSCOM procedures, which may be deviated from when and as appropriate. If there is a discrepancy between the provisions of this instruction and the applicable law, Executive Order or Department of Defense (DOD)/Federal regulation, then the law, Executive Order or regulation shall prevail.[41]

Further guidance regarding vessel selection is available on the USTRANSCOM website. Selected highlights from the website are contained below to further elucidate vessel selection considerations.[42]

---

[40] "Time Charter: Everything You Need to Know," Mascot Maritime, 10 May 2022.
[41] *OPNAV Instruction 4500.03*, *Policy for Strategic Sealift Vessel Selection, Activation and the 24-7 Process* (Scott Air Force Base, IL: U.S. Transportation Command, 1 August 2024), 2.
[42] "Sealift."

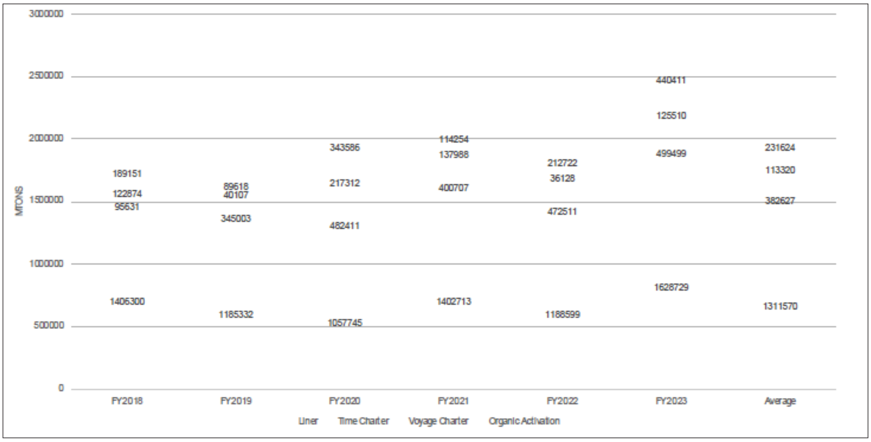
Liner versus charter versus organic: By policy, USTRANSCOM must consider using commercial charter or liner vessels before organic sealift vessels. Liner service vessels are commercial oceanic carriers that charge by piece or by volume operating on fixed routes that visit the same ports on a regularly scheduled basis. Vessel loading and unloading is arranged by the carrier at commercial terminals globally. Liner service is executed by USTRANSCOM contracts, such as the Universal Services Contract (USC), which are managed by SDDC and usually best suited for smaller shipments not requiring operational control (OPCON) of the vessel or its sovereign immunity. Examples of the types of DOD cargo moved by liner service include the shipment of servicemembers' household goods and personal automobiles; resupply stocks to overseas bases for the Army and Air Force Exchange Service; and transoceanic transport of a limited number and type of DOD equipment.

Charter vessels typically carry DOD cargo that is ill-suited for liner service for any number of factors, including its size, description, national security sensitivity, destination, or need for operational control or sovereign immunity of the vessel. Examples of the types of DOD cargo moved by charter vessels include U.S. Army brigade combat team rotations; transport of maritime vessels; routine weapons and ammunition movements; and annual resupply missions to McMurdo Station on Antarctica. On behalf of Transportation Command, MSC has the authority to time charter or voyage charter commercial vessels to move DOD cargo.

MARAD also manages organic ships in its Ready Reserve Fleet in reduced operating status that can be activated (fully manned and made ready) to support a DOD mission. Once activated, MSC/NAVTRANS takes operational control of the vessel on behalf of USTRANSCOM and executes the mission. Each vessel has sovereign immunity inherently. Since policy requires commercial liner and charter sealift to be considered first, these vessels are usually used when suitable commercial lift is unavailable or there are unique military or geopolitical considerations. Examples of the types of DOD cargo moved by organic sealift vessels include supporting Army Joint-logistics over-the-shore operations; high interest weapons or ammunition movements; and deployment of U.S. combat power to dangerously contested or hostile areas.

The relative annual apportionment between liner, charter (voyage and time), and organic sealift voyages for fiscal years 2018 through 2023 is shown

Figure 7. Annual allocation of unit cargo missions by sealift type



Source: U.S. Transportation Command, adapted by MCUP.

in figure 7, as measured by cargo volume in measurement tons (MTONS). The unpublished raw data for this chart was provided by Transportation Command's TCAC Directorate.[43] As shown for fiscal years 2018–23, nearly all DOD cargo was carried by commercial sealift, either liner or charter. On average, only 11 percent of cargo was carried by organic sealift vessels, demonstrating USTRANSCOM's adherence to the commercial-first policy. The preponderance of cargo volume (64 percent of 2,039,140 MTONS) was carried by liner service. It is important to note that this apportionment is reflective of largely peacetime maritime conditions. For obvious reasons, transoceanic shipments of military-useful cargo supporting wartime efforts, particularly when delivered to contested or hostile areas, would not travel by a scheduled liner service. Finally, the data indicates that on average more cargo moved by time charter (19 percent) than voyage charter (6 percent), with the largest difference between charter types occurring in recent years. While speculative on the author's part, this biased allocation was likely influenced by unique mili-

[43] Unpublished raw data provided by TCAQ Directorate (JDPAC), U.S. Transportation Command, Scott Air Force Base, IL, 23 January 2024.

tary or geopolitical requirements, such as the need for vessel OPCON or the nature of military cargo being transported.

Summary

This chapter had the following three purposes: to provide an overview of USTRANSCOM and its UCP missions as a functional CCMD, to describe the relationship between USTRANSCOM and key stakeholders in the U.S. maritime ecosystem in the context of sealift missions, and to describe how USTRANSCOM used the maritime as a modality for joint logistical support to DOD.

In a 1944 report to the secretary of the Navy, Fleet Admiral Ernest J. King wrote: "The war has been variously termed a war of production and a war of machines. Whatever else it is, so far as the United States is concerned, it is a war of logistics." Future wars, regardless of where they are fought, will be no less dependent upon logistics. And while the nature of warfare and military logistics will remain constant, their character will continue to evolve with technology and changes in the operational environment.[44]

Amid this technology-driven evolution, which is occurring too rapidly to accurately predict, there are a few indisputable assumptions. First, it is unlikely that any future major regional conflict will be fought within the continental United States. This means that U.S. Joint Forces will need to be deployed transoceanic distances to fight and then be sustained in place.

Second, most of that force (by volume) will travel by sealift. Recall that in peacetime 80–90 percent of the world's commerce travels by sea. During Operation Desert Shield, sealift delivered more than 95 percent of the tonnage required. And during OIF, 91 percent of deployment cargo traveled by sea. For these reasons, it is reasonable to predict that in a future major regional conflict about 90 percent of the U.S. military equipment will deploy by ship.

Third, USTRANSCOM will remain the CCMD responsible for executing the vitally important missions associated with deploying and sustaining U.S. Joint Forces, in peace and war. Therefore, the U.S. maritime ecosystem—and Transportation Command's role within it—will remain vital to our national

---

[44] Adm Ernest J. King, *First Report to the Secretary of the Navy: Covering Our Peacetime Navy and Our Wartime Navy and Including Combat Operations up to 1 March 1944* (Washington, DC: Department of the Navy, 1944), 34.

security. Air Force general Jacqueline D. Van Ovost, the 14th commander of USTRANSCOM, emphasized the importance of this relationship in her video address to the Maritime Trades Department Executive Board on 25 April 2024:

> America's economic prosperity is delivered on the oceans, and America's national security is rooted in it. All of you in the Maritime Trades Department and your organizations and affiliates are key to maintaining our collective prosperity. Your unwavering commitment and unquestionable expertise in maritime trades, anchored by your professionalism and patriotism, are the reasons why we continue to prosper today in a free and open world. It is these qualities that make you such an important part of the TRANSCOM team. We rest assured knowing that when we are called, our partners in the maritime industry will be right there along with us to ensure the defense of our nation.[45]

In summary, our nation's ability to deploy its massive Joint Force across transoceanic distances remains a strategic comparative advantage of the United States, unmatched by any nation on Earth. At the center of this uniquely incredible capability are the four types of sealift that enable the rapid buildup and sustainment of combat power in support of national objectives. As the leader of the JDDE, USTRANSCOM is purposely designed and empowered by the UCP to manage sealift operations on behalf of DOD, backed by a robust ecosystem with a distinguished history of serving American interests in peace and war.

[45] "Gen. Van Ovost Emphasizes Maritime's Vital Importance," Maritime Trades Department, 30 April 2024.

CHAPTER 6

SEALIFT

REQUIREMENTS, CAPABILITIES, AND CAPACITY

Bradley Martin, PhD

U.S. Joint Force power projection requires the ability to move and sustain the force worldwide. Moving military equipment and personnel around the world is the mission of U.S. Transportation Command (USTRANSCOM), which has Service components from the Air Force (Air Mobility Command), Navy (Military Sealift Command, or MSC), and the Army (Military Surface Deployment and Distribution Command).[1] Images of the U.S. Joint Force power projection often feature U.S. Air Force Air Mobility Command aircraft discharging equipment and personnel at distant airfields. Air mobility is indeed a key part of Transportation Command's mission to support the movement of people and materiel. But, in fact, the bulk of materiel—90 percent depending on the plan—moves by sea.[2]

Besides being a USTRANSCOM service component, MSC is an echelon 2 Navy command with seven other mission areas besides strategic sealift, ranging from a combat logistics force whose mission is to provide fuel and re-

[1] Luke A. Nicastro and Cameron M. Keys, *Defense Primer: United States Transportation Command* (Washington, DC: Congressional Research Service, 2022).

[2] David Sloane, "Strategic Sealift Is Broken: Which Direction Are We Headed?," CIMSEC.org, 30 June 2021.

supply to the operating Navy, to afloat prepositioning, to various auxiliary support missions.[3]

All these missions are important and are in some sense *sealift*. Indeed, MSC's public affairs publication is called *Sealift*. But the MSC mission that is most directly in support of Joint requirements are the strategic sealift programs (labeled PM5), where it operates 10 large medium speed roll-on/roll-off vessels (LMSR) and six dry cargo and tanker ships. These government-owned vessels are made available for peacetime sealift missions if U.S.-flagged commercial vessels are not available for those missions. They also form the basis of military movement, pending the arrival of surge capability.[4]

MSC and the Maritime Administration

Wartime sealift surge resides in the Department of Transportation's Maritime Administration's (MARAD) Ready Reserve Force (RRF). MARAD's broad mission is "to foster, promote and develop the maritime industry of the United States to meet the nation's economic and security needs."[5] It carries this out in multiple ways However, a major way it advances this is through maintenance of the Ready Reserve Force of 41 ships. The RRF is a subset of the National Defense Reserve Fleet and is characterized by being on either 5- or 10-day activation windows, within which a ship is expected to be able to activate and get underway to perform sealift missions as required.[6]

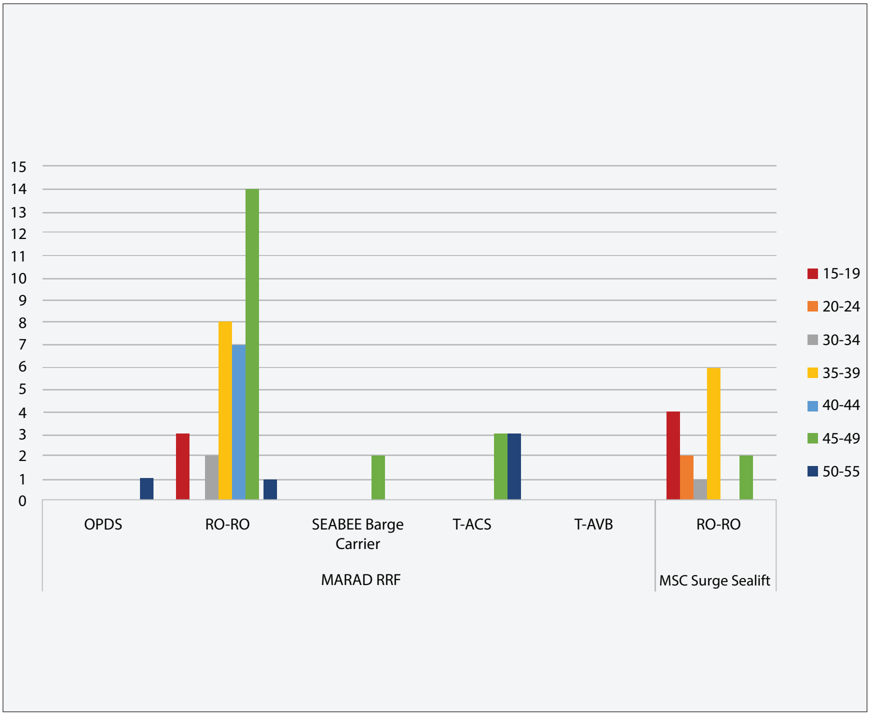
Vessels of the RRF

There are a variety of ships in the RRF, to include 27 roll-on/roll-off (RORO) ships, which are optimized for transportation of large vehicles, as well other military cargo, eight *Algol*-class fast sealift ships, which are optimized for high-speed transit, four auxiliary crane ships, and two aviation maintenance ships.

Sealift ships are specialized vessels, some of which have been in service for far longer than the normal service lives of merchant ships. Figure 1 shows the age of ships in the surge sealift and RRF fleets as of 2019. None of the ships were newer than 14 years old, a few were older than 50 years, and 23

[3] "MSC Mission," U.S. Military Sealift Command, accessed 31 December 2024.
[4] "Ship Inventory," U.S. Military Sealift Command, accessed 31 December 2024.
[5] *Maritime Administration Strategic Plan, 2017–2021* (Washington, DC: Maritime Administration, 2018).
[6] "The Ready Reserve Force," U.S. Department of Transportation Maritime Administration, accessed 31 December 2024.

Figure 1. Vessel type by age, MSC and MARAD



Source: Military Sealift Command, adapted by MCUP.

were 45–49 years old. While there is no inherent reason ships of this age cannot be maintained, there are bound to be challenges, particularly if some of the equipment on board is similarly very old. Some equipment may be several generations removed from systems in service, and, indeed, the manufacturers may be long out of business.[7]

In 2022, two newer ships were added to the RRF, the *Cape Arundel* and *Cape Cortes*, ROROs constructed in 1996 and 1997, respectively. [8]

MARAD has acquired these vessels during a period of years from commercial trade, generally when ships with potential military application went on the market as past effective commercial use. Many of the ROROs were built in

[7] Bradley Martin and Roland J. Yardley, *Approaches to Strategic Sealift Readiness* (Santa Monica, CA: Rand, 2019), https://doi.org/10.7249/RR3049.
[8] "RRF Adds Two Newer Vessels to Fleet," Seafarers International Union, 1 May 2022.

shipyards in Eastern Europe and were purchased after more than a decade of service. The fast sealift ships were constructed in the early 1970s. They were expensive to maintain and operate, requiring a large crew and significant fuel expense. They are fast ships, transiting at greater than 30 knots, a third faster than most ocean freighters. But, given expense, carriers found little benefit from the higher speeds. However, for purposes of surge military sealift, where there is no expectation of continuous peacetime use, acquiring them and keeping them in reduced operating status made—and continues to make—economic sense. There is no reason to presume that old ships that are maintained, but not constantly operated, cannot be kept ready. It is safe to assume that they will have unique manning and supply requirements.

The RRF is held in a 5- or 10-day readiness window, in which it is assumed that any given ship will be able to activate on receipt of an order and be ready to sail with a full crew ready to conduct the assigned mission. Readiness to meet requirements is regularly assessed in events called "turbo activations," in which ships are expected to respond within the 5- or 10-day activation window. The success record on individual turbo activations is generally positive. Figure 2 depicts a snapshot of activations during 2010–18. The overall success rate was more than 85 percent.[9]

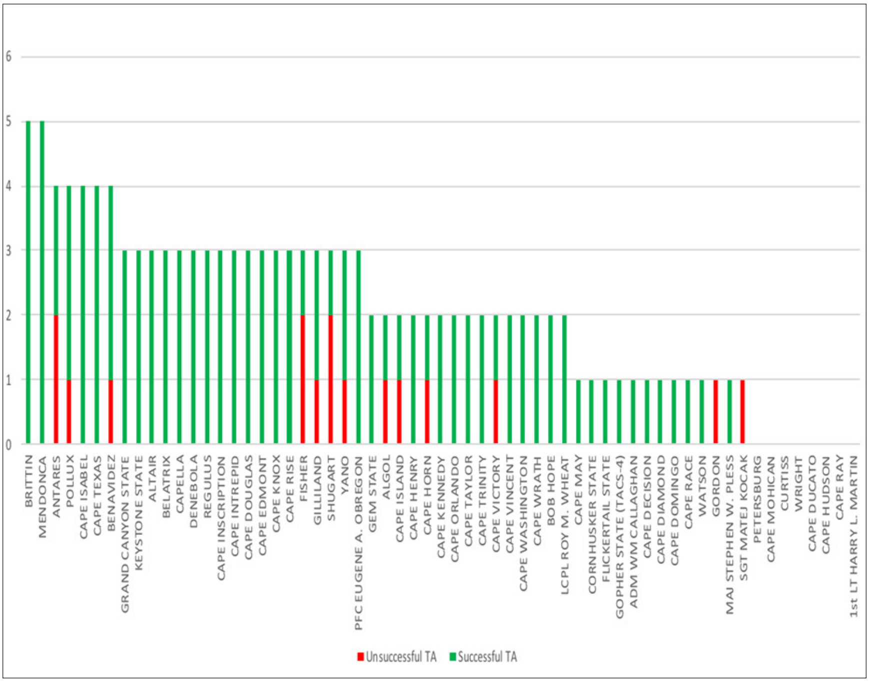
However, the success rate might be misleading. There were a few ships that were activated several times, the majority of the fleet was never activated, and activations generally did not occur more than one ship at a time. When activation of more than one ship at a time was attempted, the results were poor. Fewer than 70 percent of the ships met the time standard, and some could not get underway at all.[10] Most ships met the standard, but a standard that only tests one ship at a time might not represent the force's actual readiness to meet demand. If 40 ships were needed, only 28 would be available, at least according to the results of a large-scale activation.

The Current Requirement for Sealift and Its Limitations

Setting the requirement for sealift has been a matter of looking at the forces committed to a fight, the timing of their arrivals in theater, and the support equipment and materiel needed for these units. The requirements for strategic

[9] Martin and Yardley, *Approaches to Strategic Sealift Readiness*.
[10] "Activation Exercise Reveals Challenges Facing Sealift Fleet," *Maritime Executive*, 31 December 2019.

Figure 2. Success rates of turbo activations



Source: Created by author, adapted by MCUP.

sealift have historically been driven primarily by the needs of the ground component commander.[11] While all components need sustainment, major units of the air and maritime components self-deploy. The ground component, however, relies on sealift to move large vehicles, such as trucks, armored personnel carriers, artillery, and tanks. These requirements apply in most Middle Eastern, European, and Korean scenarios.

Analysis of the contingencies in the Western Pacific besides Koreas suggests diverse needs. A war with the People's Republic of China (PRC) contesting control over, for example, Taiwan would for the U.S. Joint Force involve primarily air and submarine delivered munitions, and there is little to no ground combat

[11] Martin and Yardley, *Approaches to Strategic Sealift Readiness*.

involved, at least on the part of the United States.[12] The ground component commander will be providing base support and coordination and equipment and sustainment for those missions will move by sea. But the kind of large-scale ground force missions contemplated in Europe or the Middle East or Korea are unlikely to be key parts of the requirement.[13]

The differing requirements might drive a reassessment of the sealift fleet's composition. The sealift assets owned by the U.S. government and readily available to the Department of Defense are focused on the movement of ground force combat equipment. This requirement and force composition was formed over decades and made complete sense when the pacing requirements were potential wars in Europe, the Middle East, or on the Korean Peninsula. This force is not well positioned to deal with the requirements as they might develop in what might be the most dangerous and pressing scenario: a large-scale action in the Pacific involving the PRC.

The Western Pacific Challenge for Resupply and Sustainment

A war with the People's Liberation Army (PLA) would be multidomain, with a significant component of space and cyber operations. Looking just at kinetic options, the PLA, through its rocket force (PLARF), air force (PLAAF), and naval (PLAN) components, has the ability to hold U.S. forces in the vicinity of mainland China at significant risk. The bases and ships that enable U.S. power projection are highly vulnerable to targeting and attack. The United States cannot assume that it can protect forces that are tied to a fixed location.

Although there will be operations from fixed air bases, an important U.S. countermeasure to PLA targeting and engagement capability is mobility, or the ability to move from one location to another and thus complicate PLA targeting. This approach might very well prove effective in reducing risk, but it also demands a significant amount of fuel and a considerable amount of flexibility in moving support elements. Getting equipment and supplies into and distributed within theater is critical. But the ability to move a large amount of

[12] Mark F. Cancian, Matthew Cancian, and Eric Heginbotham, *The First Battle of the Next War: Wargaming a Chinese Invasion of Taiwan* (Washington, DC: Center for Strategic and International Studies, 2023).
[13] Abby Doll et al., *The Backbone of Joint Operations: Army Roles in the Indo-Pacific* (Santa Monica, CA: Rand, 2023), https://doi.org/10.7249/RRA1784-1.

ground force equipment from one major port to another might not be a relevant capability.

Bulk Fuel

To look at the specific elements of Western Pacific supply and reinforcement that might drive requirements, a major challenge for operations in the Western Pacific is fuel. The current system uses defense fuel support points as storage facilities for delivery of fuel to end users by the combat logistics force for the Navy and by pipeline or tanker to air bases and other support facilities. This is a well-optimized peacetime arrangement. But, in wartime, the fixed fuel facilities in the Western Pacific are well within range of PLARF and PLAAF, and the typical mechanisms for fuel storage and distribution cannot be assumed. The problem of fuel distribution has only become more complicated by recent events. The Red Hill facility in Honolulu has been a key mid-Pacific fuel storage and distribution point, and it is currently unavailable and may be unavailable indefinitely.

Significantly greater capacity to move fuel from more distant locations may be necessary. This could involve the use of large tankers moving from ports outside theater and discharging cargo into other ships while well offshore. One option for mid-Pacific storage might be use of large ocean tankers. MSC does not currently have organic ability to move bulk fuel and relies on contracted tankers. Its combat logistics force tankers are sized and designed specifically to refuel ships at sea, and indeed their normal cycle is to refuel at a defense fuel support point and then deliver fuel to combatant ships. They are not a means of effectively moving bulk fuel. Movement—and potential storage—of bulk fuel is currently entirely a matter of contracted capacity.

Prepositioning

A portion of MSC's mission is to provide afloat prepositioning for the Army and Air Force, and to operation Maritime Prepositioning Squadrons (MPS) in support of the Marine Corps. To be clear, this mission is separate from strategic sealift and from USTRANSCOM's mission overall. There have been cases where MPS ships have been converted to sealift, but prepositioning involves a service identifying key equipment to be placed in afloat storage and then creating a maintenance and rotation schedule.

The prepositioned material is in the joint time phase force deployment plan, but the problem with reference to the Pacific is similar to the problem with strategic sealift: it is oriented primarily toward movement of ground force materiel into a theater where the main requirement might not be for large formations of ground forces.

Air Force afloat prepositioned materiel might have more direct relevance to the most stressing scenario. However, with ordnance, the issue might be less movement of preferred weapons than world-wide inventory.

Intratheater Lift

The demand for intratheater lift, as opposed to strategic lift, is another complicating factor in Western Pacific sustainment. Under the Unified Command Plan, USTRANSCOM is responsible for movements between seaports of embarkation (SPOE) and debarkation (SPOD). However, movement of materiel to the SPOE and from the SPOD belongs to the geographic combatant commander, which in turn typically delegates this responsibility to component commanders.

Theater airlift clearly belongs to the theater air component commander in every theater. In Europe and the Middle East, surface intratheater lift is done by trucks or, in Europe, trains. Consequently, responsibility for management generally falls to the Army Theater Sustainment Command for those areas. But a substantial portion of intratheater lift in the Pacific would be waterborne. Moving fuel or bulk provisions between islands would require fuel tankers, ferries, bulk carriers, and a variety of watercraft that no Service possesses. The Army has watercraft, and the Navy/Marine Corps is developing a "light amphibious warship" to address Service-specific needs, but there is no Service assigned to deal with a common user lift for within theater missions. Indeed, while every Service has concepts that will require intratheater lift, the specific requirements have not been developed to the point that anyone could provide an actual sourcing solution.

Availability of Allied and Partner Resources

Finally, the sealift requirements for European, Middle East, and Korea scenarios assume that the United States will largely supply strategic lift, and thus the requirement can largely be scoped in terms of U.S. capacity for strategic lift and allied capacity for intratheater lift. U.S. Army Theater Support Commanders have a fairly reliable idea of how much transportation can be sourced from allied militaries and contractors.

The same cannot be said for water-borne intratheater lift in the Western Pacific. There are a variety of civilian shipping providers in the Western Pacific, but the numbers decline when we begin applying restrictions on ownership, contact with Chinese authorities, willingness to enter combat areas, and, perhaps most significantly, the availability of dependable crews. Once all these are factored into availability, the need for lift directly controlled by the U.S. government begins to look more significant.

However, here again we encounter questions of organization and authority. If there were to be an expansion of U.S. sealift for intratheater lift, what agency would initiate and administer it? MSC would certainly have a key role, but whether it would do this as a USTRANSCOM component or as a service executive agent would have to be determined.

Getting to the Right Sealift Requirement: What Has to Change?

The current requirement for the size and readiness of the sealift fleet rests on very unlikely scenarios, while likely scenarios are to an exceptionally large degree unaddressed. To a degree, MSC's organization where strategic sealift is grouped apart from prepositioning and other strategic missions may be creating a seam. The overall practice of separating intratheater lift from strategic lift may perpetuate some already serious gaps with the ability to move things around within theater. Getting to the correct sealift requirement may take changes in organization and in the definition of what strategic sealift is supposed to achieve.

To begin, while clearly there should be sufficient strategic sealift to meet operational needs in theaters where the ground component has a significant role, in the Pacific the need for sealift is considerably broader, going far beyond ROROs or ground munitions. What is needed, and may be lacking, is the ability to guarantee the capacity to move fuel, either at strategic or tactical distances. Storage is an issue, transport is an issue, and potential lack of capacity to access allied and partner shipping may be an issue. At the very least, consideration of what might be required is warranted.

In addition, the practice of creating a distinction between strategic and operational and tactical use may be causing a poor estimate of the real amount of shipping, quite possibly organically held shipping, which may be necessary.

Perhaps most significantly, the demand for fuel in any Western Pacific operation will be constant and intense. This will occur at the exact time that delivery of fuel may become significantly more difficult and dangerous. The requirement for both bulk storage and local delivery is likely to become more significant as defense fuel supply points within the region start to become untenable.

Consideration of all these factors makes the requirement for sealift look considerably different than is currently envisioned. The overall sealift requirement should be conceived less in terms of major force flow in the initial stages of the battle and more in terms of long duration sustainment. This would likely drive a different force composition than what is within the RRF.

The United States cannot assume that all these demands can be met by reliance on commercial shipping. Although there is no shortage of commercial ocean shipping worldwide, it is not a given that this capacity will be made available to the Military Sealift Command. In the Pacific theater, there are some very real concerns that contracted lift might not be reliably available. Among the reasons for having an RRF currently is lack of assurance that suitable commercial sealift will be immediately available for some of the specialized requirements of military transportation. What this potential lack of availability might imply is that the requirement for transport held either organically by MSC or kept in the MARAD RRF might actually have to increase to meet an overly broad array of missions.

Generating an actionable requirement would take more research than is presented here. The analysis would have to account for combatant command overall materiel requirements, the possibility of worldwide demand, the unique needs and limitations of the theaters, and then provide a realistic view of what might be commercially available and suitable. The authors' point in this report is that the current sealift fleet is not optimized to meet the pacing scenarios, and as a result imposes a risky assumption that commercially available shipping will be sufficient. Keeping a fleet of ships for possible use is an expensive proposition, but it may carry considerably less risk than trying to find shipping when the crisis has started.

Meeting the Requirement:
How Can We Get the Required Capacity and Capability?

The problem of meeting potential surge is not restricted to sealift. Nearly any commodity might become scarce in a crisis and finding ways to meet the challenge is an enduring part of a crisis response.[14] Clearly some sealift should be kept in service to meet peacetime demand, and the working capital fund mechanisms used to fund such transportation is generally effective in helping to specify the force structure. The Department of Defense knows what is needed because that is what other agencies are willing to pay for.

However, the RRF is maintained by appropriated funds provided by the Navy to MARAD. The resulting force structure, whose number and composition are driven largely by ground-force commander requirements, is old, requires extensive manpower, and is not well suited for the pacing requirements.

The authors have already argued to revise requirements. The Navy must first decide what kind of force it needs. It also must determine whether this will be a government-owned force that serves as a stopgap pending access to commercial assets or a force that effectively does all the transportation because the commercial option is assumed to be largely unavailable.

Moreover, the Department of Defense, broadly, will have to decide whether intratheater lift will continue to be left to services or will become part of the common user lift pool that services strategic left. Most importantly, the force must be something that the Navy and the nation has some reasonable chance of sustaining with crews, spare parts, and every other element of sustainment. Old ships have unique systems and often require large crews.

Procurement Options to Meet the Lift Requirement

So, how can the Navy—in conjunction with industry and MARAD and other stakeholders in the system—acquire, build, and sustain a new force? Some part of the preferred option will depend on the finally decided overall requirement. If, for example, existing merchant designs largely fill those requirements, there may be little point in seeking any option but buying used merchant vessels. If, on the other hand, there are unique military requirements, reliance on a program of record to deliver purpose-built military sealift vessels might be

[14] Bradley Martin, *The Problem of Surge Capacity* (Santa Monica, CA: Rand, 2023),

an attractive option, more than adopting what the practice for the delivery of combat logistics forces that is already in place.

Military Sealift Command's guiding presumption is that the acquisition process should adjust to meet the requirement, rather than the acquisition process dictate the requirement. That something may be difficult or expensive to get does not mean that it is not needed. Although it is not good practice to set impossible requirements, neither is it a good practice to trim the need to what is readily available.

Reliance on Leased Capacity

One procurement option we will, however, dismiss out of hand. Trying to lease or charter commercial shipping during a crisis is not a realistic option. To begin, the supply of U.S.-flagged merchant vessels is small and declining.[15] Reflagging takes time and there is no guarantee that there would either be a sufficient number of vessels or that they would be available in sufficient time. Even with shipping available, insurers will impose immediate restrictions on the use of vessels in war zones. Even if the U.S. government indemnifies shipping, the costs and benefits are unlikely to favor international shippers making vessels available. Finally, the PRC is an active participant in international markets, which gives it considerable leverage over shipping companies.

The United States has in many ways become accustomed to the idea of contracting support services, even in war zones. For a crisis or war with the PRC, this is not a realistic option. It becomes ever more difficult the closer we get to PRC centers of influence. The Republic of the Philippines is a U.S. treaty partner, but its businesses have extensive ties with the PRC. Getting providers of intratheater lift would at a minimum require lifting restrictions on companies with Chinese business ties and might in fact be extremely difficult as PRC representatives put direct pressure on companies. Similar conditions might appear in countries throughout the region. Money talks, and the United States would be in the unusual situation of facing a competitor who might actually have more money.

Therefore, for our purposes, we will assume in a wartime or even a crisis setting, ability to access commercial markets to get sealift will be extremely

[15] Loren Thompson, "Dwindling U.S. Merchant Fleet Is a Crisis Waiting To Happen," *Forbes*, 8 October 2021.

limited, and a significant amount of lift directly under U.S. government control will be necessary to meet the requirement. Sufficient capacity for a whole variety of missions must be built or bought.

Building New Capacity

A major impediment to simply building more government-owned sealift capacity is the dearth of U.S. shipbuilding capacity. New construction in foreign countries is not a legal option. That pushes all choices to U.S. markets. There are effectively no U.S. shipyards producing large commercial vessels.[16] Besides military vessels, U.S. shipyards produce dredges, workboats, ferries, and offshore support vessels, but do not generally produce large cargo vessels or commercial tankers. Consequently, if new sealift vessels were to be built, they would not come from U.S. commercial shipbuilders. They will be purpose-built by a shipyard that is already making ships for the government. If the requirement for ships is large and varied, as it is likely to be, trying to find sufficient shipbuilding capacity in the United States to produce a fleet of government-owned vessels large enough to meet the demand would be difficult, if not impossible.[17]

The Department of the Navy appears to recognize the need to add government-controlled shipping to the sealift fleet, and has indeed for several years, but the execution details remain vague.[18] The Navy has plans to recapitalize its combat logistics force in the next generation logistics ship program. This, however, does not address the broader question of sealift for joint force requirements. The Common Hull Auxiliary Multimission Platform (CHAMP) program was intended to be a replacement for ships performing a variety of missions, including strategic sealift, but the high platform cost appears to have caused the Navy to look for less costly options.[19] The Navy's 30-year shipbuilding plan still has provision for "command and support vessels," but public statements from Navy officials seem to indicate a focus on procuring and modernizing used commercial vessels for use in the sealift fleet.[20]

[16] Eric Haun, "2022 US Shipbuilding Report," Marine Link, 11 March 2022.
[17] Daniel Goure, "Recapitalizing Strategic Sealift Should be DOD's Number One Priority," CIMSEC, 21 June 2021.
[18] David Larter, "The U.S. Navy Will have to Pony Up and Race the Clock to Avoid a Sealift Collapse," *Defense News*, October 2018.
[19] Megan Eckstein, "Navy Trying Again on CHAMP Auxiliary Design, after White House Pushback," *USNI News*, 30 January 2020.
[20] Goure, "Recapitalizing Strategic Sealift Should Be DOD's Number One Priority."

An aspect of this discussion that ought to be of broader concern is that the option of building a new sealift fleet, irrespective of its potential cost or benefit, is impractical. This is a vastly different situation than might have been the case when the United States began preparing for World War II, where the nation had ample capacity to build a variety of ships.

Buying Older Commercial Vessels and Modernizing

As discussed earlier, many of the ships in the current sealift fleet were originally merchant vessels that were then converted to military use, largely by making them better able to do RORO operations by adding ramps and vehicle space. Doing something similar again might be a reasonable alternative in the absence of ability to construct purpose-built lift.

Before settling on this as the ideal alternative, we should return to the question of what is needed. If what is most desperately needed is bulk fuel capacity, what might be needed most are tankers that can hold a large amount of fuel for a prolonged period and are capable of passing fuel to other vessels at sea. Acquiring these would seem relatively straightforward. There were 8,883 ocean oil tankers of various descriptions in the world in 2021.[21] The authors have not found reports of tanker shortages, and it would seem likely that buying used vessels and adding some specific equipment for military use would be relatively straightforward.

However, when we turn to more specialized military transport, the availability again turns to the requirement. If the requirement remains, as now, movement of large vehicles on and off ROROs, there are roughly 15,000 ROROs in the world.[22] Not all these can transport the individual weights associated with armored systems, but there is no reason to conclude that modifications such as heavier ramps could not be readily added. The sealift need might be substantially met simply by purchasing several of these vessels, making modifications, and putting them in reduced operating status, as has been done over a period of years with the existing force.

However, this makes assumptions about the sealift requirement that we should be cautious about accepting. For movements from developed port facility to developed port facility, and for the movement of vehicles or containers

[21] "Number of Crude Oil and Fuel Tankers World-Wide, 2012–2021," Statista, 18 November 2022.
[22] "How Many RORO Ships Are There in the World?," Auto Transport, accessed 31 December 2024.

moved by vehicles, this solution is sound. If this is not in fact how most materiel will get to locations, or if indeed this is not the primary materiel, other options might be necessary.

Intratheater Lift

This chapter discussed earlier that the requirement for intratheater lift is left to geographic combatant commanders. In turn, military Services/components have individual programs for servicing component needs. This arrangement thus requires not just a program to recapitalize strategic sealift but several programs to meet demands within the theater, particularly the Indo-Pacific theater.

This approach may be an artifact of a strategic lift system adapted primarily for conditions in Europe and the Middle East. For these theaters with a heavy emphasis on ground equipment and with well-developed ground distribution networks, loading a RORO in a U.S. port of embarkation, moving the equipment to a major port, then relying on trains and trucks (Europe) or trucks alone (the Middle East) is an efficient way to move a large amount of military cargo.

In the Indo-Pacific, however, moving a ship to one port, unloading it, then putting cargo into other ships is both inefficient and requires a large number of intratheater ships. To actually serve the needs of the theater, moreover, the cargo will generally not be the kinds of vehicles ROROs are optimized to move. The current sealift fleet may have excess capacity for things that the theater does not need, but lack capacity, or at least be inefficient, in delivering the things that it does.

There may therefore be value in combining the requirements and arriving at common material solutions. For example, a ship class capable of ocean transit but with shallower draft and the ability to discharge cargo at undeveloped ports might satisfy the requirements of strategic and theater lift. This would impose trade-offs in ship size and cargo-carrying capacity, and in turn would likely require a larger number of ships. There might also be fewer used commercial ships available to meet the requirement than there are used large volume ROROs. However, both the Navy and the Army do have programs for ships smaller than ROROs, which might serve, with some modification, for sealift. There are certainly times when trying to meet multiple requirements results in deficient performance all around, but there are also times when looking for a common solution might be an appropriate way to deal with a set of requirements that significantly overlap.

The Role of Industry

The U.S. shipbuilding industry currently does not have the capacity to build a large number of ROROs or tankers, and it is probably unrealistic to expect that it could rapidly grow such capacity under any set of incentives. However, under other approaches to expanding capacity, or perhaps modifying capacity to meet a revised set of requirements, industry has a key role.

A service industry could immediately provide is reminding the government of the criticality of deriving and then advertising a clear set of requirements, both in capability and capacity. Establishing and clarifying requirements is a government responsibility, and, as a review has shown, to the extent current requirements are clear, they appear to be based on poor assumptions about the likely operating environment. Although it is not industry's responsibility to question faulty requirements, industry should be seeking clarity in discovering what the government actually wants.

If the Department of Defense, in consultation with the Department of Transportation, continues down the path of purchasing used commercial ships, these ships will require modernization to be suitable for specific military support missions. Such modernization could include higher capacity vehicle ramps to allow movement of armored vehicles, rearrangement of internal storage, addition of some climate control for storage of sensitive electronics, ability to carry some amount of vehicle fuel, and ability to move and store ordnance. Companies in the United States will need appropriate equipment and workforce to make these modifications on possibly dozens of ships.

On an enduring basis, government-owned ships in the sealift fleet will require maintenance in U.S. facilities. A clear statement of requirements will be particularly important, as this maintenance will take place in an industry that is already near capacity and experiencing difficulty meeting even Navy ship maintenance demands.[23] Maintenance needs might also be subject to surge during

[23] *Testimony before the Subcommittees on Seapower and Readiness and Management Support, Committee on Armed Services, U.S. Senate, Persistent and Substantial Ship and Submarine Maintenance Delays Hinder Efforts to Rebuild Readiness* (statement of Diana C. Maurer, Director, Defense Capabilities and Management, 4 December 2019).

times of increased operational tempo. The government cannot count on the military being immediately ready to respond to surge if provisions to rapidly add capacity are not already in place.

If some options were developed to have a common response to strategic and intratheater requirements, the most likely suppliers for additional ships would be the builders already building logistics ships for the Navy. Such a choice would likely involve a significant expansion in inventory of smaller ships, which would stress builders if the expansion were expected in the immediate term. However, if this option were attempted as a gradual addition to the force, it might be more feasible.

Among all these options, we must begin with the clear understanding that industry's capacity has become limited. The relationship between industry and government will likely be one of partnership rather than of customers and suppliers in a competitive market.

Recommendations

U.S. strategic sealift is old, requires an extensive commitment of manpower, and, perhaps most importantly, not suited to the current strategic environment, let alone the anticipated one. In a Pacific scenario, it moves the wrong kind of cargo and is not suited for delivery to the places where materiel and sustainment are most needed. If we go past the narrow definition of sealift including the fleet of MSC and Ready Reserve Force ROROs and fast sealift ships, the shortfall becomes significant. The ability to get fuel and basic sustainment into the Indo-Pacific theater begins to look very much in doubt. This chapter offers the following conclusions and recommendations.

These shortfalls largely result from starting with an unrealistic view of what needs to be received in theater by sea. Accordingly, an initial recommendation is to begin a thorough reconsideration of the requirement, one which focuses primarily on supplying the forces that would most likely be employed in a Western Pacific campaign. This review should not presuppose a difference between "strategic" and "intratheater lift" but simply state what needs to be in theater and where.

Fuel distribution as currently conceived in the Pacific probably cannot be effectively executed in a contested environment. The challenges of using defense fuel supply points in theater will likely force greater reliance on primarily afloat distribution. The loss of mid-Pacific storage at the Red Hill facility further adds to the need for large-scale storage of bulk fuel. While this mission would not normally be part of strategic sealift, it is most certainly part of the demand for seaborne logistics support. Adding seaborne fuel distribution and storage capacity will be essential for Indo-Pacific operations.

There are numerous challenges to using existing commercial capacity for supporting movements, enough to warrant dropping it as a planning consideration. Government-owned shipping will move the majority of war material. Sealift force structure should be sized accordingly.

Building a whole new fleet of government-owned vessels is probably well beyond even optimistic estimates of builder yard surge capacity. U.S. shipyards do not build large commercial ships, and it is probably unrealistic to demand that they do so. U.S. shipyards do build a variety of other vessels and U.S. military vessels, including specialized logistics support vessels. There may be options that allow leveraging of these capabilities to meet the sealift need. If, for example, the requirements review indicated that most military cargo is in fact not armored vehicles, that might mean that there is less need for ROROs and thus more flexibility to use other vessels that can in fact also meet parts of the intratheater lift challenge.

But, if the requirement is for large ocean tankers or ROROs, the best mechanism is to buy used vessels on the market and provide them for modernization. There are periods in which shippers experience periods of idleness and those would be appropriate times to purchase tankers and ROROs for conversion to military use. This option does require industrial capacity to make the required conversions.

Any option carries a need for sufficient maintenance capability to meet a set of complex maintenance and modernization needs. If it were a valid assumption that working merchant ships would be available at a moment of crisis, the United States could probably also assume that the owners would take care of maintenance. But, since we are in fact concluding that the bulk of movement will be done by government-owned vessels of some variety, the U.S. government will be required to have some kind of maintenance capability programmed, drawing from industry in ways that industry would not naturally establish. The government should not assume that the required contracts will reflect the lowest cost options. The government will be paying a premium to keep ship repair companies in the United States open and focused on government-owned shipping.

Conclusions

Military materiel still moves mostly by sea, but planning about what sealift should be able to move has not kept up with changes in the international environment. The need to recapitalize the aging sealift fleet is also an opportunity to reflect on actual needs, definitions, and concepts of operation. The authors have not discussed the various service concepts for operations in the Western Pacific—Air Force's agile combat employment, Marine Corps' expeditionary advanced base operations, Army's multidomain operations, and Navy's distributed maritime operations—as they have not in general made a transition from idea to programs with defined requirements, but we note that all of them would involve demands for surface-borne reinforcement. Such reinforcement either explicitly or implicitly involves sealift. As these concepts develop and become more defined, there will be a chance to refine sealift requirements in kind.

However, the requirements do not depend exclusively on Service concepts. Simple geography and common warfighting needs dictate enough requirements that some progress can be made. Any solution at all implies a need to maintain sufficient industrial base to do maintenance on the sealift fleet.

CHAPTER 7

THE MARITIME SECURITY PROGRAM AND THE TANKER SECURITY PROGRAM

FORCE MULTIPLIERS FOR U.S. SEALIFT

William McDonald

The United States remains the only nation on Earth able to massively deploy forces to any point on the planet, sustain them in combat, and redeploy them safely when their mission is complete. This capability—strategic mobility—yields profound advantage. It deters adversaries, reassures allies, and provides American leaders with unmatched strategic and operational flexibility.[1]

While all elements of the strategic mobility triad—the combination of sealift, airlift, and prepositioned stocks—are critical to supporting U.S. deployments, the immense quantities of equipment and materiel that must be transported in war dictate that, in any extended conflict, at least 90 percent of U.S. military cargoes must move by sea.[2] To deploy and sustain forces globally therefore requires a strong, efficient U.S.-flag fleet crewed by trained, skilled

[1] John Fasching, "Strategic Mobility: The Essential Enabler of Military Operations in Great-Power Competition," Heritage.org, 17 November 2020.

[2] *The Defense Transportation System*, Joint Publication 4-01 (Washington, DC: Department of Defense, 2017), I-5; James K. Matthews and Cora J. Holt, *So Many, So Much, So Far, So Fast: United States Transportation Command and Strategic Deployment for Operation Desert Shield/Desert Storm* (Washington, DC: Office of the Chairman of the Joint Chiefs of Staff, 1996), 13; and LtGen Stephen R. Lyons, "Sailing to the Fight, Marching to Victory," Army.mil, 28 April 2016.

U.S. Merchant Mariners. This includes not only the U.S. government-owned "surge" fleets of the Maritime Administration (MARAD) and the U.S. Military Sealift Command (MSC), but also the ships and crews of the U.S. commercial fleet—the United States Merchant Marine.

The need for U.S.-flag commercial sealift has assumed new urgency with the rise of heavily armed adversaries such as China that would seek to contest U.S. deployment and sustainment by sea in any future conflict. While the United States has employed foreign flag commercial ships and crews in past conflicts, including Operations Desert Shield/Desert Storm (DS/DS), the likelihood that future sealift operations may be conducted in a contested environment presents a clear risk that foreign carriers and Mariners will be unwilling or unable to sail on America's behalf.[3] Consequently, in any large-scale war, following prepositioned operations and the initial massive movement of supplies and equipment into theater by ships of the government surge fleet, the job of sustaining U.S. forces will fall largely to the U.S. commercial fleet. Most particularly, given the massive decline of the Merchant Marine in recent decades, it will fall to the vessels and crews in two unique commercial sealift programs administered by MARAD—the Maritime Security Program (MSP) and the Tanker Security Program (TSP).

It is difficult to overstate the importance of MSP and TSP. Created to provide the Department of Defense (DOD) with *assured access* to the ships, crews, and global logistical capabilities required to conduct operations, MSP and TSP are public-private partnerships linking U.S. flag carriers, MARAD, and the U.S. Transportation Command (USTRANSCOM) in support of force deployment and sustainment. These critical national security programs form the core of U.S. sustainment capacity. However, in today's challenging operational environment, their importance extends well beyond that. As we will see, MSP and TSP offer a structured and logical baseline from which to expand the commercial U.S. sealift fleet to meet the requirements of any future fight.

In this chapter, we will explore the history, structure, and significance of MSP and TSP, as well as their potential for meeting future Department of Defense sealift requirements. However, it is important to first understand their

[3] Timothy A. Walton, Ryan Boone, and Harrison Schram, *Sustaining the Fight: Resilient Maritime Logistics for a New Era* (Washington, DC: Center for Strategic and Budgetary Assessments, 2019), 14–19.

roles within MARAD's overall commercial strategic sealift programs. Combatant and Joint Force commanders and planners, as well as U.S. political leaders, must understand these programs and how they support DOD to apply strategic and operational art in the planning and conduct of sustainment operations in war.

MARAD Emergency Preparedness Programs: Voluntary Intermodal Sealift Agreement and Voluntary Tanker Agreement

All carriers in MSP and TSP are required to enroll in one of two emergency preparedness programs administered by MARAD under authority of the Defense Production Act of 1950, as amended. MSP carriers enroll in the Voluntary Intermodal Sealift Agreement Program (VISA) and TSP carriers enroll in the Voluntary Tanker Agreement (VTA). The VISA and VTA programs, in effect, are the institutional constructs under which MSP and TSP operate.

Established in 1997, VISA is an agreement between the U.S. government and the maritime industry to provide DOD with access to commercial sealift and intermodal shipping services/systems necessary to meet wartime, national emergency, national security, or contingency operation requirements. Along with internationally-sailing U.S.-flag vessels, the VISA fleet includes deep draft domestic (Jones Act) fleet ships, as well as tugs, barges, and other coastal and inland waterway vessels and equipment. Vessel operators in VISA make ships and capacity available on DOD request. In return, participating carriers receive preferential access to U.S. government cargoes. Intermodal capacity in VISA includes dry cargo vessels and their associated equipment, terminal facilities, and transport management services.

If a major conflict erupts, USTRANSCOM would look first to VISA commercial carriers for voluntary support under peacetime cargo contracts with DOD. Should VISA activation become necessary, the commander, Transportation Command, would notify the secretary of defense and the maritime administrator, who would in turn notify the secretary of transportation. MARAD would work with the command and the carriers to coordinate delivery of capacity. Throughout the activation process, members of the VISA Joint Planning Advisory Group, or JPAG, including USTRANSCOM, MARAD, DOD, SDDC, MSC, the VISA carriers, and maritime labor would provide advice and planning support for the delivery of vessels and intermodal capacity wherever and whenever needed.[4]

While enrollment in VISA is voluntary, participation by an enrolled vessel in a VISA activation is *mandatory*. Therefore, to maximize resource availability and minimize disruption to U.S. commercial operations, VISA is designed for activation in three stages, with each stage representing a higher commitment percentage of intermodal capacity. During stage I of activation, carriers must make up to 15 percent of their VISA-committed capacity available for DOD carriage. Stage II activation would require the availability of 40 percent of committed capacity, and stage III the availability of 50 percent of all non-MSP committed assets. Carriers in MSP are required to deliver 100 percent of committed capacity during stage III activation.[5] To date, MARAD and the DOD have never activated the vessels in the VISA program. This is because, during times of war and national emergency, VISA carriers have always volunteered enough capacity to meet DOD requirements. MARAD informally refers to this voluntary phase as "stage 0."

Like VISA, which ensures the ready availability of U.S. flag dry cargo capacity in times of national crisis, the VTA provides for the time-phased availability of participating carriers' tanker capacities to meet DOD petroleum, oil, and lubricants (POL) transport requirements through pre-negotiated contingency contracts between the government and program participants. The VTA may be activated in whole or in part at the request of the commander, USTRANSCOM, with the approval of secretary of defense, when a tanker capacity emergency is encountered or expected. Participation in the program is open to all operators of U.S.-flag tankers, integrated tug-barges (ITBs), and articulated tug-barges (ATBs) greater than 20,000 deadweight tons. However, operators of tankers, ITBs, and ATBs of less than 20,000 deadweight tons are also eligible to participate if MARAD and Transportation Command determine that the operator's vessels meet U.S. security needs.

The VTA may be activated in whole or in part at the request of the commander, USTRANSCOM, with the approval of the secretary of defense, when a tanker capacity emergency is encountered or expected. Participation in the program is open to all operators of U.S. flag tankers, integrated tug-barges, and

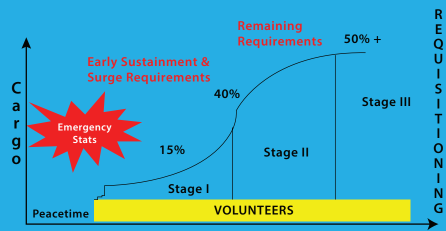
[4] "Voluntary Intermodal Sealift Agreement (VISA)," Maritime Administration, 3 January 2024.
[5] "Voluntary Intermodal Sealift Agreement," 2.

Figure 1. Activation of the VISA fleet

MARAD Voluntary Intermodal Sealift Agreement (VISA)

- U.S. -flag shippers volunteer to provide cargo capacity and access to their worldwide networks of international transportation in exchange for prioritized access to Department of Defense cargoes in peacetime.

Ship Type	Total
Bulk Carrier	3
Container	51
Container, Geared	8
General Cargo	2
Multi-purpose	9
RO-RO	24
	97



- Activation in Three Stages: Stage 1 -up to 15 percent of committed capacity must be made available for DOD carriage; Stage II -up to 40 percent of committed capacity, and; Stage III -up to 50 percent commitment of all non -MSP assets. MSP carriers must deliver 100 percent of committed capacity.

Source: "Renewal of the Voluntary Tanker Agreement Program; Revised Form of the Voluntary Agreement," Maritime Administration, 7 November 2022, adapted by MCUP.

articulated tug-barges greater than 20,000 deadweight tons. However, operators of tankers, ITBs, and ATBs of less than 20,000 deadweight tons are also eligible to participate if MARAD and Transportation Command determine that the operator's vessels meet U.S. national security needs.

The Tanker Requirements Committee (TRC) established under the VTA provides a forum for coordination and joint action to meet U.S. contingency needs. Chaired by MARAD and USTRANSCOM, the committee also includes representatives from the Military Sealift Command, the Defense Logistics Agency-Energy, each program participant, and maritime labor. The TRC is charged to analyze DOD contingency tanker requirements, identify capacity to meet them, develop and recommend concepts of operations to meet DOD-approved contingency needs, and identify national defense features appropriate for installation on commercial tankers to enhance their combat service capabilities.[6]

MSP: Keystone of Sustainment Sealift

At the heart of VISA is the MSP. Created by the Maritime Security Act of 1996 and extended through 2035 by the 2020 National Defense Authorization Act, the MSP maintains a fleet of sixty commercially viable, militarily useful ships, active in international trade, yet available "on call" to meet DOD contingency requirements.[7] The MSP fleet originally included only 47 ships but was increased to 60 vessels (beginning in 2006) at program reauthorization in 2003.

MSP is designed to meet U.S. sustainment requirements worldwide. This includes the movement of tanks, fighting vehicles, trucks, ambulances, and other equipment, along with ammunition, medical supplies, and food. The unique mix of vessels and capabilities in MSP includes roll-on/roll-off ships, container ships, geared container ships, heavy lift ships, and a conbulker-geared ship.

MSP was created in October 1996 to address the decline in the number of U.S.-flag ships in international trade following cancellation of the operating differential subsidy (ODS) program during the Ronald W. Reagan administration.[8] In place for nearly half a century, ODS was established by the Merchant Marine Act of 1936 to compensate internationally sailing U.S. carriers for the differences in certain costs (differential) when operating ships under U.S. versus foreign registry. For later reference, also cancelled during the Reagan years was the construction differential subsidy program, which compensated carriers for some of the difference in costs between building a vessel in a U.S. shipyard versus building it in a foreign yard.

Designed with input from U.S.-flag ocean carriers, MSP leverages the competitive skills and capabilities of private-sector operators to meet DOD contingency requirements. In addition to receiving an annual per-ship stipend payment (currently $5.3 million per ship/year), and preferred access to U.S. government cargoes, MSP carriers are also required to compete openly for commercial cargoes in global sea trade. These cargoes range from automobiles and containerized consumer goods to steel-related commodities and proj-

[6] "Renewal of the Voluntary Tanker Agreement Program; Revised Form of the Voluntary Agreement."
[7] "Maritime Security Program," Maritime Administration, 29 April 2023.
[8] "The Maritime Security Program," Maritime Administration, accessed 6 February 2025.

Table 1: The MSP fleet, January 2024

MSP operators	Vessels
American International Shipping	1
APL Marine Services	8
APL Maritime	1
Argent Marine Operations	1
Farrell Lines	5
Fidelio Limited Partnership	9
Hapag-Lloyd USA	5
Liberty Global Logistics	4
Maersk Line	18
Patriot Shipping	2
Waterman Steamship	2
Waterman Transport	4

Note: 28 container ships with total capacity of 120,781 TEUs; 7 geared container ships with total capacity of 9,672 TEUs; 20 ROROs with total capacity of 3.52 M square feet; and 5 heavy lifts with total capacity of 282,717 square feet.
Source: "Maritime Security Program," Maritime Administration, 29 April 2023.

ect cargoes. All MSP carriers must maintain their ships in commercial trade for a minimum of 180 days per year to continue operating under the program.

Self-Recapitalization Feature

A unique feature of the MSP and TSP programs is their "self-recapitalization" requirements. Carriers in the MSP have an age-out limit of 25 years to replace vessels while those in the TSP must replace vessels reaching an age-out limit of 20 years. This feature allows both programs to recapitalize their fleets with newer, more efficient ships that boost sealift capability while consuming less fuel per ton/mile and emitting fewer greenhouse gas emissions. Carriers may also replace ships operating under the program with newer ships for competitive purposes.

Between 2005 and late 2023, 99 MSP ships have been replaced by newer, more efficient vessels. This has kept the MSP fleet young, with an average ship age of only 13–14 years.

A Critical Mariner Base

The MSP fleet also provides employment for more than 2,400 of the trained, skilled U.S. Merchant Mariners needed to crew the U.S. government-owned surge sealift fleet (as well as the U.S. commercial fleet) in times of emergency.[9] This is crucial for mobilization, as the surge fleet—including MARAD's Ready Reserve Force and MSC's sealift vessels—is normally kept in reserve status with skeleton crewing and relies on civilian Mariners to crew its ships once they are activated.

Nevertheless, the decline of the U.S. internationally sailing fleet, from more than 200 large oceangoing vessels in 1990 to only 93 ships today, will severely impact the availability of qualified U.S. deep-sea Mariners in any major conflict. MARAD has determined that the nation could encounter a deficit of more than 1,800 deep-sea-qualified Mariners in a full mobilization exceeding 45–60 days in duration (figure 2).

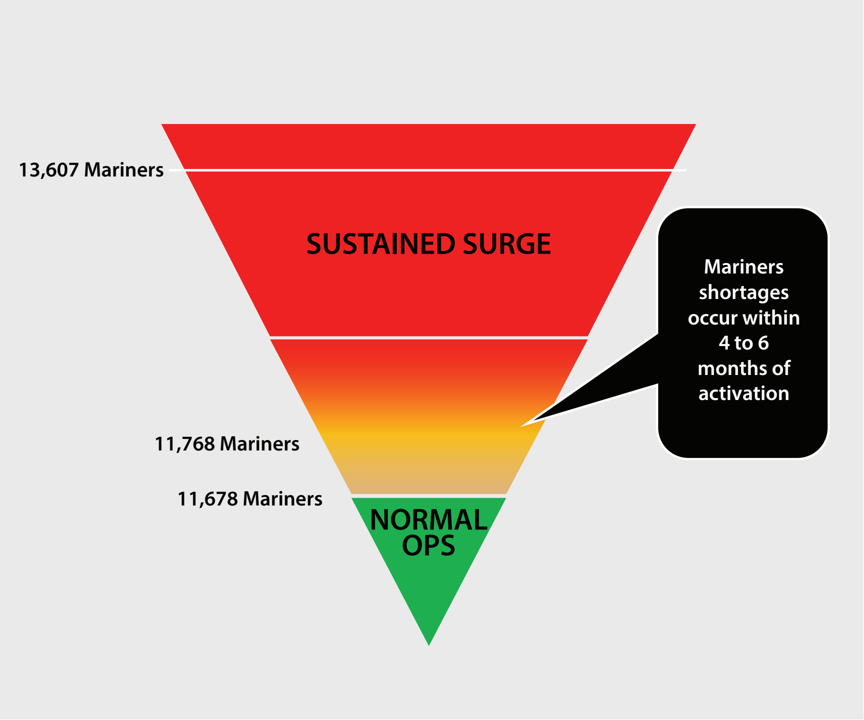
Another source of Mariners for global sealift service is domestically sailing the U.S.-flag fleet, the so-called Jones Act fleet. However, the availability of Jones Act vessels and crews for sealift in a crisis may be limited, due to the need for these ships to help maintain an American wartime economy. In a major crisis, the secretary of defense could waive the Jones Act. This would require allowing (friendly) foreign ships and crews to carry trade in domestic commerce, thus freeing Jones Act ships and crews for foreign DOD service.

The Power of Operational Reach

One of MSP's greatest benefits is the program's global reach. Along with ships, MSP carriers provide DOD with assured access to the multi-billion-dollar worldwide intermodal networks and business relationships maintained by program participants. The power of this intermodal capacity was demonstrated during the war in Afghanistan. Early in that conflict, the United States relied heavily on the Southern Distribution Network, which moved cargoes into

[9] In addition to mariner billets, the MSP program is also estimated to support more than 5,000 shore-side maritime industry jobs.

Figure 2. U.S. mariner sufficiency—challenge to mobilization



Source: courtesy of author, adapted by MCUP.

ports in Pakistan and then overland into Afghanistan. When the government of Pakistan threatened U.S. supply routes, USTRANSCOM asked MSP carriers to establish an alternate supply route to support U.S. forces in Afghanistan. In response, three MSP carriers (Maersk, Hapag Lloyd, and American Presidents Line) developed what became known as the Northern Distribution Network (NDN).

Leveraging private-sector know-how and regional business ties, the MSP carriers created a door-to-door, multimodal NDN network that routed supplies through northern Europe, Russia, and central Asia, thus bypassing Pakistan and ensuring the continuous flow of sustainment cargoes to U.S. forces in theater. This not only maintained U.S. land lines of communication into Af-

Figure 3. The Northern Distribution Network

Source: U.S. Transportation Command.

ghanistan, but it also provided a model for future efforts to deploy and sustain forces in a complex and changing combat environment.

Ultimately, as much as 90 percent of the cargoes supporting U.S. forces in Afghanistan were being transported via the NDN.[10]

Congress and the MSP

Congress provides national defense spending through the U.S. Department of Transportation's budget to maintain a strong MSP fleet in the interest of national defense. Congress dictates the number of MSP operating agreements available to MARAD, currently set at 60. Each operating agreement allows one U.S.-flagged vessel to work under the MSP program, with some carriers operating multiple MSP ships.

[10] "Northern Distribution Network (NDN)," Afghan War News, accessed 14 February 2025.

Should Congress increase the number of operating agreements available, the number of vessels in MSP would also increase. MARAD, in partnership with USTRANSCOM, should engage in the following process to award new operating agreements under MSP.

MARAD will publish in the *Federal Register* a notice seeking applications for new operating agreements, specifying the type of vessel(s) needed. It will also assess candidate vessels (and their owners) from the standpoint of commercial viability. Transportation Command will then review the offered vessels from the standpoint of military usefulness. Finally, MARAD and USTRANSCOM will jointly select the new vessels to enter MSP, and MARAD will award new operating agreements to selected carriers.

An Effective and Well-Managed Partnership

Since its launch in 1996, MSP has met and exceeded its goal of ensuring reliable and efficient sealift support for U.S. forces. For example, MARAD estimates that more than 90 percent of the sustainment cargoes carried to U.S. troops in Iraq and Afghanistan was moved on ships enrolled in the MSP.

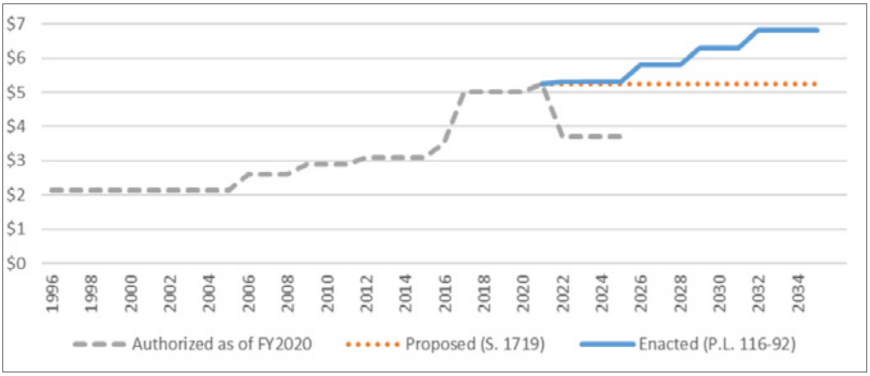
In 2008, the U.S. Office of Management and Budget (OMB) reviewed the MSP and awarded the program its rating of "effective," the highest that any government program can receive. In OMB's words, "Programs rated Effective set ambitious goals, achieve results, are well-managed and improve efficiency." In addition, also in 2008, the Office of the Inspector General conducted a review of MSP and concluded that the review process within MARAD gave confidence that oversight of the program is effective in ensuring operational compliance by MSP participants.[11]

From FY 1996 to FY 2005, stipends were capped at 47 vessels. The cap was increased to 60 vessels beginning in FY 2006 (figure 4).

One reason for MSP's success is the rigorous review process conducted by MARAD to ensure all MSP participants comply with the terms and conditions of the Maritime Security Act of 2003 and the MSP operating agreements signed by carriers. For example, since many MSP ships are operated by U.S. based firms with foreign parents, all such "documentation citizen" companies must provide MARAD with a signed statement of non-interference from

[11] "About Us," Expectmore.gov, accessed 3 January 2025.

Figure 4. Authorized maritime security program stipend per vessel, FY 1996–35, in millions of nominal dollars



Note: bill numbers refer to the 116th Congress.
Source: *U.S. Maritime Administration (MARAD) Shipping and Shipbuilding Support Programs* (Washington, DC: Congressional research Service, 2021), 7.

their foreign parents pledging use of the vessels to support the United States in times of war or national emergency.

Another key to MSP's solid track record is the close working relationship maintained by MARAD leadership with MSP carriers. Senior MARAD officials regularly meet with carriers to discuss program developments, respond to requests, and to address and allay carrier needs and concerns. The MSP carriers are valued members of the VISA Joint Planning Advisory Group and will play critical roles in supporting MARAD's allocation of ships to meet sealift needs in future national emergencies.

A defining quality of MSP is the rigor applied to payments under the program. MSP annual payments are prorated and paid on a monthly basis to ensure that ships are operating in accordance with performance requirements dictated in the signed MSP operating agreements. All MSP agreement holders are required to submit monthly invoices along with documentation noting the number of days of operation, maintenance and repair, and drydock shipyard periods. MARAD validates these invoices by checking MSP carrier operations for the month using published ship locator tools. If a carrier is not meeting performance requirements, MARAD will withhold payment. Lastly, all documents involving any change in ownership, management structure, mortgages, trust agreements, charters, etc. are reviewed for compliance and legitimacy by the MSP program office and MARAD's Office of Chief Counsel for final approval.

All requests for MSP vessel replacements are reviewed by MARAD and USTRANSCOM for final approval, as are all requests for transfer of MSP operating agreements. Ocean carriers entering ships into the MSP fleet benefit from a U.S. Coast Guard expedited reflag process created to reduce the time and costs of reflagging vessels from a foreign flag to U.S. registry.

In addition to supporting national security requirements, all ships in MSP benefit the United States by maintaining a minimal but important U.S.-flag presence in international commerce. Every MSP ship (and crew member) is an ambassador for freedom and a reminder of America's global commitment to democratic ideals.

Tanker Security Program: Restoring America's Tanker Fleet

A major U.S. logistical concern in any future war will be the availability of product tankers able to meet port of loading (POL) transport requirements for both deployed ground forces and the U.S. Navy combat fleet.

Decades ago, hundreds of U.S.-flag tankers sailed the seas, carrying American products and presence across the globe. However, by 2019, although the DOD had identified an "official" requirement for at least 86 product tankers in a high-end fight (the actual number may be far higher), there were only 52 DOD-suitable product tankers still flying the American flag.[12] Further, of these ships, only six were engaged in international trade, with the remainder coastwise-trading (Jones Act) vessels that may be largely unavailable to DOD in time of war due to domestic transport needs. By contrast, MSC required 69 tankers—4 RRF, 38 U.S.-flag, and 27 foreign-flag—at one time or another to support Desert Shield/Desert Storm.[13]

Further, this was under conditions where the United States enjoyed unchallenged access to regional ports and fuel transport networks. In any high-end fight against China, enemy forces are likely to employ all means of national power—diplomatic, information, military, and economic (DIME)—to prevent such access. More U.S.-flag tankers and assured access to POL ports in

[12] Walton, Boone, and Schram, *Sustaining the Fight*, 78.
[13] Matthews and Holt, *So Many, So Much, So Far, So Fast*, 126.

Figure 5. The global reach of the MSP

Source: World Ocean View, adapted by MCUP.

the INDOPACOM area of operations will be needed to prevail in any war with China.[14]

TSP was created to meet this need. Authorized in the FY 2021 NDAA, with full funding appropriated in FY 2022 and FY 2023, TSP supports a fleet of 10 modern U.S.-flag product tankers, active in global trade and available on call to meet DOD contingency needs. Developed during a decade-long effort by MARAD to close the U.S. "tanker gap," the TSP will include eight new tankers enrolled in the program and two tankers transferred from the MSP fleet. Offered ships must be U.S.-owned and registered product tankers, trading *internationally*, and suitable for DOD service (medium range, MR-size tankships between 30,000–60,000 dead weight tons with fuel capacity of 230,000 barrels of crude oil or greater).

While the initial, 10-ship TSP fleet would meet only a small portion of U.S. emergency tanker requirements, it will act as a pilot to demonstrate the viability of the TSP concept and provide a foundation for further fleet expansion as commercial and operational conditions warrant. Toward this end, the

[14] Timothy Walton and Bryan Clark, "Stop Counting on Foreign Tankers," *Hill*, 25 May 2020.

FY 2023 NDAA authorized the possible expansion of the TSP fleet to 20 ships, beginning in FY 2025.

In addition to supplying fuel to deployed U.S. ground forces, the TSP is designed to support U.S. Navy underway replenishment operations. All TSP ships currently in the fleet must be able to accept installation of consolidated cargo replenishment at sea (CONSOL) stations.

As the U.S. Navy moves to a distributed maritime operations (DMO) scheme, TSP and other MSC-chartered tankers equipped with CONSOL capability can restock Navy combat logistics fleet oilers during extended missions. This will enable the oilers to remain on station to replenish fleet units, rather than having to retreat to distant refueling points each time they need to take on new product, and it will greatly expand tactical and operational options for fleet commanders. A modular CONSOL adapter kit has been developed by the Navy for installation on TSP and commercial product tankers to support such operations.[15] The Navy and MARAD should waste no time getting these kits or alternate equipment installed aboard TSP ships.

The public-private partnerships of MSP and TSP are force multipliers for U.S. sealift. For a very limited government investment, they deliver access by DOD to not only ships and skilled U.S.-citizen crews, but also the global network of ports, infrastructure, and business relationships needed to deploy and sustain U.S. forces. Both programs are the brainchild of MARAD, the U.S. Department of Transportation agency responsible for maritime affairs. It is a role well suited to this small, dedicated agency, long accustomed to punching above its weight.

MARAD: Sealift Integrator

With the transfer of most MSC fleet sealift ships to the Ready Reserve Force in recent years, MARAD has become the principal sealift provider for the United States, incorporating both U.S. government-owned and commercial sealift missions.

MARAD is one of two federal agencies descended from the famed Maritime Commission of World War II (the other being the Federal Maritime Commission). Between 1941 and 1946, the Maritime Commission, in conjunction

[15] "Navy Develops Modular 'CONSOL' Capability to Refuel Oilers at Sea," National Defense Transportation Association, accessed 3 January 2025.

Figure 6. Ships of the TSP fleet equipped with consolidated replenishment stations can refuel U.S. Navy oilers at sea, thus enabling the oilers to remain on station with deployed fleet forces

Source: official U.S. Navy photo.

with the War Shipping Administration (WSA), oversaw the greatest industrial shipbuilding effort in history.[16] Nearly 6,000 merchant vessels and naval auxiliaries were constructed in U.S. yards, with the WSA routinely managing the simultaneous operation, repair, and maintenance of thousands of ships. With the war's end, the government dissolved the WSA and transferred its functions back to the Maritime Commission in 1946. Under the Merchant Ship Sales Act, several thousand ships were sold or disposed of, while retaining a nucleus of reserve shipping known as the National Defense Reserve Fleet, of which today's RRF is a part.

[16] "A Short History of the Maritime Administration," Maritime Administration, 3 January 2025.

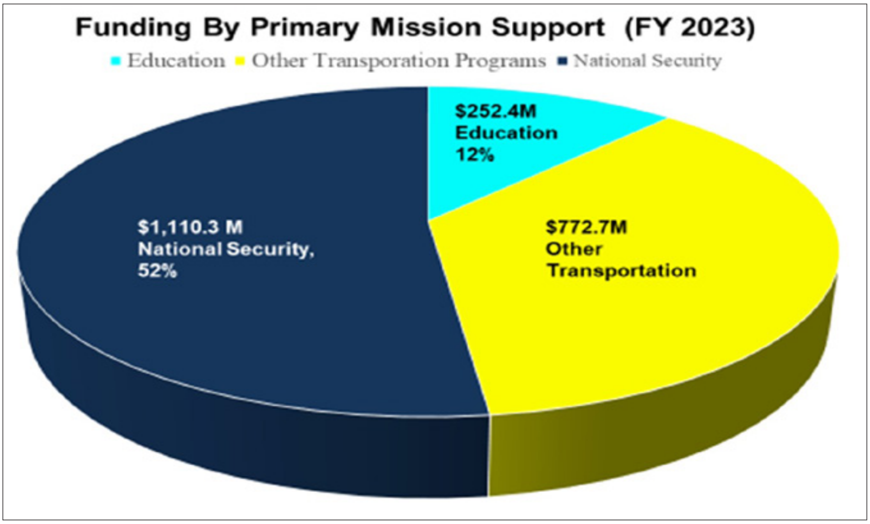
In 1950, Congress eliminated the U.S. Maritime Commission and divided its functions between the newly established MARAD and the then-Federal Maritime Board (FMB), both placed within the U.S. Department of Commerce. The Maritime Commission's subsidy and ocean shipping regulatory functions were transferred to the FMB, while the remaining promotional and government-owned shipping interests were vested in MARAD. In 1961, the subsidy functions were returned to MARAD in the form of the Maritime Subsidy Board, which reported independently to the MARAD administrator.

In 1981, MARAD transferred to the Department of Transportation. It is still charged with promoting the development and maintenance of a strong merchant marine for national defense and development of U.S. foreign and domestic commerce. However, the agency's mission also encompasses education and training, shipbuilding, coastal and inland waterway transportation, and port and intermodal development, among other efforts. MARAD operates the U.S. Merchant Marine Academy at Kings Point, New York, and provides and maintains training ships and funding for the six state maritime academies: the State University of New York Maritime College; Massachusetts Maritime Academy; California Maritime Academy; Maine Maritime Academy; Texas Maritime Academy; and Great Lakes Maritime Academy. The agency also administers grant and other programs to support U.S. deep-draft and inland port commerce, many coordinated through its gateway offices at strategic locations on U.S. coasts. MARAD also chairs the National Port Readiness Network (NPRN), a multiagency partnership that ensures the readiness of America's 16 strategic ports to support force deployment and sustainment operations in times of crisis. However, while MARAD is not all about sealift, sealift is all about MARAD, and the dominance of the agency's national security mission is evident in annual MARAD budgets (figure 7).

Challenges to Sealift: The Vanishing U.S.-flag Fleet

The need for MSP and TSP is highlighted by the massive decline in the internationally sailing U.S. flag fleet. The U.S. government-owned surge fleet, sledgehammer of American power projection, has declined from more than 100 ships in 1990 to only 56 ships today. The average age of its ships is now more than 45 years, and readiness drills have revealed that fewer than 70 percent of them may be immediately available in any emergency due to mainte-

Figure 7. Maritime Administration budget by core mission



Source: U.S. Maritime Administration, adapted by MCUP.

nance and other issues.[17] MARAD has begun the purchase of used MSP vessels to replace roll-on/roll-off (RORO) ships being aged out of the RRF, but the replacement rate is slow and more must be done. MARAD also plans to build up to 10 RRF replacement vessels in the United States, though this too will take some years to accomplish.

Meanwhile, the strength of the internationally sailing commercial U.S. Merchant Marine, responsible for moving the bulk of U.S. sustainment cargoes in any conflict, has also plummeted. In 1990, some 210 privately owned oceangoing merchant ships flew the U.S. flag in foreign trade. This fleet was marginally sufficient to meet the far-reaching U.S. sustainment requirements during the Cold War era. Today, however, of the more than 38,000 or so deep-sea merchant ships of 1,000 gross tons or larger in international trade, only 93 fly the U.S. flag. Thanks to the newly minted TSP, this is a recent increase in numbers that have hovered in the low- to mid-80s during the past decade.

[17] Christopher R. O'Dea, "China Bids to Rule the Commercial Waves," *Wall Street Journal*, 9 January 2023.

Yet, even as our sealift capacity has declined, the need for that capacity has grown. Some have tried to sound warnings to this effect on the last five years. In a 2018 U.S. Naval Institute interview, MARAD associate administrator Kevin M. Tokarski was very blunt, stating, "We're on the ragged edge, Foreign." countries [especially China] are eclipsing us" in building, maintaining and operating commercial fleets. Tokarski added, "People have forgotten why we have a merchant marine. . . . [They] don't want to pay for that readiness" that comes with having American-flagged vessels available in times of crisis. To be there then, these ships, masters and crew have to have work in peacetime."[18]

Including both its international and domestic fleets, the United States has only about 190 large commercial, U.S.-flag ships to support national economic and military security needs, down from more than 400 in 1990. China, meanwhile, has become the world's second leading ship owning nation (after Greece), as well as its leading shipbuilder, now boasting a merchant fleet of more than 2,500 ships.[19] Compounding these challenges are the loss of the robust sealift capacity once available to America's NATO allies, and the disappearance of any identifiable effective U.S.-controlled fleet of U.S.-owned, foreign-flagged vessels that could be recalled to U.S. registry in an emergency.

The United States faces multiple, emergency-level obstacles to maintaining a strong sealift capacity. The United States has few Department of Defense-qualified product tanker vessels. While TSP *begins* restoration of the United States' internationally-sailing product tanker fleet, the nation remains woefully short of these essential ships, which move the fuel needed for deployed U.S. ground, air, and naval units. As noted, the DOD has said the nation will need at least 86 product tankers to sustain military operations during an extended major conflict. Even if one considers that four Jones Act tankers may become available for foreign service in a crisis, and adds to that the 10 ships available through TSP, other internationally sailing U.S.-flag vessels are too old to enter TSP. Additional Jones Act or MSC chartered ships that could be called on in an emergency, , though a figure of no more about 20 available U.S. flag product tankers if war comes is reasonable. However, this is under *current policy*.

[18] John Grady, "Official: U.S. Military Sealift Capacity Is 'On the Ragged Edge'," *USNI News*, 11 April 2018.
[19] See "Review of Maritime Transport 2023: Facts and Figures on Asia," UN Trade & Development, 27 September 2023.

As we will see, future policy may allow expansion of this fleet. There are also no semisubmersible heavy-lift vessels in VISA and MSP to provide the means to transport other ships on the water, posing a challenge for the recovery and repair of damaged U.S. ships in wartime.

The once mighty U.S. shipbuilding industry—following decades of financial pressure, boom-bust cycles, and competition from subsidized foreign shipyards—has lost much of its former capacity to build, repair, and replace the large, commercial-type ships needed for sealift at a pace adequate to meet potential U.S. wartime needs. As then-maritime administrator Admiral Mark H. Buzby stated in 2020, "Of the seven major shipyards that supported the government's last major commercial-type ship construction effort from the 1980s through the 1990s, only one remains capable of building this type of vessel today. As a result, a major portion of our trained shipbuilding workforce has disappeared, along with the waterfronts that once held great shipyards, but are now home to condominiums and riverwalks."[20] MARAD estimates that the nation may encounter a deficit of some 1,800 Mariners qualified for deep ocean service in an extended full mobilization. None of these deficits bode well for improved U.S. commercial maritime capability or capacity to support combat efforts.

The MSP and VISA fleets are also limited geographically in trade to/from North Atlantic and Middle Eastern ports, with only a limited presence in Pacific trade. This could create major time/space/force challenges for the United States in responding quickly to any crisis in INDOPACOM.

As Bradley Martin and Christopher Pernin of the Rand Corporation have argued, "a war with China would have an insatiable appetite for reinforcements, munitions, and supplies, most of which would have to be moved over 6,500 miles—10,000 kilometers—from the West Coast to the West Pacific," and then transported across vast intratheater reaches.[21] Moreover, as noted, China can be expected to utilize all elements of the DIME to prevent U.S. deployment and sustainment of forces. This may include not only government-to-government pressure, propaganda, financial measures, and economic war-

[20] *Statement before the Committee on Armed Services, Subcommittee on Seapower and Projection Forces and Subcommittee on Readiness* (statement by Mark H. Buzby, Administrator, Maritime Administration, 11 March 2020).
[21] Bradley Martin and Christopher Pernin, "So Many Questions, So Little Time for Pacific Logistics," *Rand* (blog), 23 June 2023.

fare, but also cyber and kinetic attacks on or seizures of cargo vessels at sea (where the U.S. Navy is unlikely to be always able to escort them), or in port, as well as against port facilities, storage areas, pipelines, and intermodal rail, road, and waterborne transport systems.[22] The effects of attacks against our logistics chain would be compounded by the limited numbers of U.S. sealift ships available and the challenges to joint commanders in sequencing, synchronizing, and executing sustainment operations while conducting multiple tactical operations to defend friendly sea lines of communication. The operational protection of both ships and infrastructure in littoral regions, where the majority of trade-warfare threats may be encountered, would be a prime consideration.

There is also the challenge of equipping sealift ships with modern communications gear. Commercial sealift ships in MSP, TSP, VISA, and the VTA must be equipped with secure communications and navigation equipment to increase their readiness for wartime operations. This should be matched by training for U.S. Mariners and officers to prepare them for operations in a contested environment. An MSC effort to train strategic sealift officers—Naval reservists with Merchant Marine licenses—to serve as tactical advisors (TACADs) aboard sealift vessels is a step in the right direction. TACADs could relay critical information between RRF and commercial sealift ships and their Navy escorts, advise ship captains on threats, and train civilian crews to operate in contested environments.[23]

MSP and TSP: A Way Forward

At a time of unchecked Chinese maritime expansion in the Pacific, Russian aggression in Europe, and combat in the Middle East, the degraded state of U.S. sealift places America, its forces, and its allies at deep strategic and operational risk. During the height of the Vietnam War, sealift accounted for 96 percent of all cargo movement.[24] Twenty years later, during Operations Des-

---

[22] David B. Larter, " 'You're on Your Own': US Sealift Can't Count on Navy Escorts in the Next Big War," *Defense News*, 10 October 2018. RAdm Mark Buzby, USN (Ret), stated that "You're on your own. U.S. sealift cannot count on Navy escorts in the next big war. The Navy has been candid enough with Military Sealift Command and me that they will probably not have enough ships to escort us. It's: 'You're on your own; go fast, stay quiet'." Walton, Boone, and Schram, *Sustaining the Fight*, 14–19.
[23] "Strategic Sealift Officers Deliver Flexible Combat Power at Sea," Military Sealift Command, 16 April 2020.
[24] Kevin Lewis, "The Role of Escalation in Sealift Planning," U.S. Naval Institute *Proceedings* 109, no. 11 (November 1983).

ert Shield/Desert Storm, it was more than 90 percent.[25] Yet, today's U.S. sealift fleet is far smaller than the 700 ships we had in the 1960s or even the more than 200 vessels we had during Desert Shield/Desert Storm.[26]

The ultimate answer to the U.S. sealift challenge is a coherent and sustained national policy to rebuild the nation's shipbuilding capacity and the U.S.-flag Merchant Marine. A detailed exploration of this topic is beyond the scope of this chapter. However, an effective policy must provide for the long-term programmed recapitalization of both the commercial and surge sealift fleets while strengthening the U.S. shipbuilding industrial base so critical to national defense.

For example, the U.S. government could provide substantial credit default swap-type funding to shipowners to support construction of new vessels in American yards in return for their commitment to operate such ships in U.S.-flag commercial trade, either in the MSP or TSP, or in Jones Act domestic trade, for a specified period of time—perhaps 10 years. Following commercial service, the ships would then revert to the government, which could place the ships into the Ready Reserve Force for an additional period of up to 20 years. Government funding might be set at 50 percent of the construction cost of new vessels.

In the case of MSP ships, carriers agreeing to build in America could be offered a higher annual per-ship stipend than that paid for foreign-built MSP vessels (currently, no MSP ships were built in the United States). This would enable carriers to offset their share of domestic production costs, as well as those associated with early "retirement" of the vessels when they revert to reserve status. Notionally, during 10 years, this kind of provision might be used to add 20 or more new, U.S.-built ships to the MSP fleet.

New vessels built under the above scheme could be designed from the start with national defense features to support their effective operation in contested wartime environments. This would greatly enhance the mission effectiveness of MSP and TSP ships. Moreover, construction of these ships would take

[25] Samuel J Cox, "H-061-3: Desert Storm—Sealift, Seabees, Navy Medicine," U.S. Naval History and Heritage Command, May 2021.
[26] Salvatore Mercogliano, "American Strategic Sealift in Peer to Peer Conflicts: A Historical Retrospective, Pt. 2," Center for International Maritime Security, 29 June 2021.

advantage of commercial shipbuilding efficiencies, including a disciplined design and construction process that delivers vessels within cost and on schedule.

However, while such solutions are longer term, requiring large scale funding and some years to implement, MSP and TSP—and the "MSP Model" on which they are based—also offer the means to greatly expand the commercial U.S. sealift fleet to meet the requirements of any *near-term* future fight.[27]

To be clear, no expansion of the MSP fleet is currently part of the Department of Transportation or MARAD policy. However, adding 20 or 30 ships to MSP, or even a doubling of the MSP fleet from 60 to 120 vessels, would significantly enhance U.S. power projection and sustainment sealift capacity in a relatively brief time frame. With ship selection based on DOD's stated priorities, such a next-generation MSP could add new, high-capacity RORO and multipurpose/heavy-lift vessels, as well as geared containerships, to the existing MSP fleet. It would also broaden U.S. access to global intermodal networks and expand America's footprint on the seas (especially in the Pacific) to counter China's growing maritime power. In addition, it would somewhat reduce America's dependence on foreign-flag ships, which currently carry more than 99 percent of U.S. international trade.

An expanded MSP fleet could include special capability vessels, such as large semi-submersible ships, to meet strategic transport requirements independent of foreign support.[28] It would also help close the mariner gap by employing thousands of additional U.S. citizen Merchant Mariners to crew the government-owned and commercial fleets in a major conflict. As stated, MARAD has identified a potential deficit of more than 1,800 Mariners in an extended major contingency. However, this is a baseline estimate that does not include attrition and assumes that all qualified Mariners will be available. The MSP would provide an additional mariner pool to meet crewing needs in a high-end fight.

Finally, recapitalization of the MSP and Reserve fleets will better enable the United States to meet International Maritime Organization (IMO) requirements for reduction of carbon emissions. The time may have arrived to

---

[27] Bryan Clark, Timothy Walton, and Adam Lemon, *Strengthening the U.S. Defense Maritime Industrial Base: A Plan to Improve Maritime Industry's Contribution to National Security* (Washington, DC: Center for Strategic and Budgetary Assessments, 2020), ii.
[28] Clark, Walton, and Lemon, *Strengthening the U.S. Defense Maritime Industrial Base*.

consider federal subsidies for marine carbon reduction, which may encourage companies to act sooner than later in building new ships.

Addressing Carrier Concerns

The men and women of the MSP fleet have proven their courage and commitment to America. Yet, many of the carriers in MSP may oppose any program expansion, since that will mean fewer U.S. government preference cargoes would be available per MSP ship. This real and understandable concern can be addressed by increasing the MSP retainer payment to fully eliminate the current operating cost differential between U.S. and foreign-flag ships, estimated at some $7 million or more per ship/per year for RORO and container ships. Doing this would level the playing field for U.S. carriers by allowing them to compete effectively against lower cost, often subsidized foreign flag carriers, thus capturing more international cargoes for the U.S.-flag. An increased stipend to cover a full operating cost differential might even induce U.S. owners of foreign-flagged ships to reflag back under U.S. registry.

Increasing the number of MSP ships will make more U.S.-flag ships readily available to handle the 100 percent of DOD cargoes and 50 percent of non-DOD government cargoes required by law to be carried on American flag ships. It may even encourage Congress to raise the requirement for non-DOD cargoes to be carried on U.S. flag vessels from 50 percent to 100 percent. A larger MSP would also better support recapitalization of the U.S. surge fleet by enabling additional modern, capable MSP fleet ships to be purchased as replacements for ships aging out of the RRF. An expanded program to purchase vessels from the MSP fleet for the RRF, and then replace MSP vessels with newer ships would, in effect, recapitalize both fleets simultaneously.

Policymakers should support a larger TSP fleet as well. Congress has already authorized the possible expansion of the TSP fleet from 10 to 20 tankers, starting in 2024. Following successful demonstration of the TSP model, this expansion should be made, and further program growth should be studied. Every product tanker added to the U.S.-flag international fleet will help counter the shortfall in available tankers to meet DOD contingency requirements. It will also strengthen the U.S. presence in international energy transport markets and U.S.-flag capacity to leverage the rising demand for export of American petroleum-based products.

However, any expansion of TSP must address several questions. The first relates to per-ship stipend amounts available to TSP carriers. Currently, most DOD POL cargoes are transported under long-term MSC charters, which last longer than 180 days and, based on TSP program rules, are not available to TSP participants. Coupled with the sometimes-declining demand to move DOD fuel cargoes, this argues for an increase in the TSP stipend well above the current level of $6 million per ship-year. One option is to provide a TSP stipend sufficiently above the current level that tankers in the program remain extremely competitive in international trade without the need for cargo preference and then mandate that TSP tankers cannot carry U.S. preference cargoes. This would keep the TSP fleet trading globally, while creating an additional demand for U.S.-flag tankers to meet federal cargo preference requirements, thus further growing the American tanker fleet.

A second question relates to the types of ships DOD will require in any future TSP expansion. The current TSP fleet of medium-range tankers is well suited to intertheater transport. However, a regional conflict may limit DOD's access to chartered foreign-flag capacity for intratheater transport in a timely manner. The U.S. Transportation Command is working with commercial industry to identify vessel characteristics to support intratheater requirements, and these may impact the composition of the future TSP fleet. The TSP's CONSOL support to U.S. Navy operations may be impacted as well, since smaller tankers and oilers might not be capable of serving as refueling platforms.

Winning the War

The United States is spending billions on new combat ships, aircraft, and long-range weapons to counter China's growing naval might and precision strike capability. Yet, the nation continues to largely neglect the one maritime asset without which it cannot hope to prevail in a war against China: strategic sealift.[29]

To deter or win a conflict against China, the United States requires a robust and muscular maritime logistics system able to deliver equipment, supplies, and personnel where and when needed in a rapidly evolving and contested op-

[29] Marcos Melendez, Michael O'Hanlon, and Jason Wolff, *America Can't Afford to Ignore the Logistics Triad* (Washington, DC: Brookings Institution, 2023).

erational environment. Chinese capabilities to threaten U.S. ships, bases of operation, and fuel stores in theater are enormous. They include new classes of precision-strike missiles with longer and longer ranges, advanced combat aircraft, and new surveillance and sensor technologies. This is coupled with the largest navy in the world by ship count, including new, heavily armed frigates and submarines and three aircraft carriers. These systems can directly threaten not only ships, but also our bases of operation, personnel, and forward fuel and other stores, in the INDOPACOM area of responsibility.[30]

Also, as stated, in an age of advanced antiaccess/area-denial (A2/AD) capabilities, any American reliance on foreign-flag ships to carry its wartime cargoes under contest could be suicidal. During the first Gulf War, 13 foreign-flag ships balked at transporting cargo in support of the U.S. war effort, and this was under conditions where U.S. sealift faced no opposition at sea. In addition, the use of foreign-flag vessels to transport DOD cargoes during a war may be prohibited by flag states themselves due to economic, political, or military pressure by U.S. adversaries.[31]

In his seminal 2016 article, "Sailing to the fight, marching to victory," then-deputy USTRANSCOM commander Lieutenant General Stephen R. Lyons captured the concerns of U.S. ground commanders as they look toward any near-term Pacific fight. "The Army needs ships and Mariners," he said, "and it is a need most of us do not readily recognize or appreciate. The aging of the organic fleet, the dwindling supply of commercial ships, and the loss of crewmembers for both fleets pose elevated risk to our decisive land force." "There is no doubt that 'boots on the ground' are the ultimate guarantor of victory," the general added. "But without strategic sealift, we join the ranks of most of the world's armies—relegated to an in-garrison force that is likely in-

[30] Walton, Boone, and Schram, *Sustaining the Fight*.

[31] John G. Kilgour, "Effective United States Control?," *Journal of Marketing Law and Commerce* (April 1977): 337, 344. During the 1973 Middle East conflict the Liberian president, William B. Tolbert Jr., reaffirmed his country's support for the Arab position by issuing Executive Order No. IV which prohibited all vessels of Liberian registry from delivering war supplies to the Middle East for the duration of the conflict regardless of ownership. John Kifner, "Liberia: A Phantom Maritime Power Whose Fleet Is Steered by Big Business," *New York Times*, 14 February 1977, 14. "Stressing the slogan that the shipping was 'American-controlled' and would be readily available to return to United States direction in the event of war, the shipping interests have been able to defeat legislation that would have required more of the imported oil to be carried on American-flag vessels. However, the Liberian-flag fleet respected the boycott of Israel imposed by the Arab states in the Six Day War, contrary to American policy."

effective at deterring its enemies. The simple truth is that the Army must sail to the fight before it can march to victory."[32]

Again, as noted earlier, the concepts outlined above for growing U.S. shipbuilding and the U.S.-flag fleet are notional and do not represent U.S. Department of Transportation or MARAD policy. However, the decades-long failure to maintain our Merchant Marine and sealift fleet is now a direct threat to the security and perhaps even the ultimate survival of the United States. In addition to placing our international trade, and to some degree our security, in the hands of foreign-flag carriers, this same neglect has resulted in a commercial shipbuilding industrial base that does not have the capacity to support a wartime economy.

The nation needs more sealift ships and Mariners now, and while expanding MSP and TSP is not the whole solution for meeting today's sealift challenge, it can be an essential ingredient in doing so. We also need to start building new ships in America again, through a coherent and sustained national commitment. These or similar efforts will not only enhance our ability to deploy and sustain forces in defense of liberty, but they will also act as a powerful deterrent to aggression by those who would attack the United States or its allies. All that is required is for policy leadership and the Congress to act.

They can begin by remembering the lesson of history, captured by our own American naval theorist Alfred Thayer Mahan, that "Control of the sea, by maritime commerce and naval supremacy together, means predominant influence in the world."[33] It is a lesson not lost on Communist China.

---

[32] Stephen R. Lyons, "Sailing to the Fight, Marching to Victory," *U.S. Army Sustainment Magazine*, May/June 2016.

[33] Alfred Thayer Mahan, *The Interest of America in Sea Power, Present and Future* (Boston, MA: Little, Brown, 1897), 124.

CHAPTER 8

THE NATIONAL DEFENSE RESERVE FLEET, THE READY RESERVE FORCE, STRATEGIC SEALIFT, AND PREPOSITIONING PROGRAMS

Sabreena Croteau

Introduction: Overview of Maritime Administration Ready Reserve Force Fleet

Other than administering the Maritime Security Program (MSP) and other commercial sealift programs, the Maritime Administration (MARAD) works closely with the Department of Defense to support its national security-related defense surge sealift programs, maintaining its own fleet that can be quickly activated and integrated into the Department of the Navy's Military Sealift Command in response to situational requirements. This program assists U.S. defense planners by a reserve force of ships that can be used to meet projected deployment and sustainment needs and capacities, especially while MARAD is in the process of mobilizing and organizing privately owned vessels associated with the MSP program.[1] The Ready Reserve Force (RRF) is the active component of MARAD's National Defense Reserve Fleet (NDRF), continually standing ready to support the initial surge deployment of U.S. armed forces, units, and equipment around the globe. The RRF also stands available for use in the

[1] "Maritime Administration," *Seapower Magazine*, January 2023.

aid of United Nations and other humanitarian missions. MARAD maintains its RRF ships in a reduced operational status (ROS).[2]

After World War II, the NDRF was created in response to the need for increased capacity within the nation's sealift reserve. However, the NDRF continually maintained an inactive status, and the process of activating the reserve forces multiple times throughout the 1950s, '60s, and early '70s, led the Navy to determine it needed a higher level of sealift readiness to support transportation needs at the initial point of force deployment. The Navy determined that the current activation time of reserve sealift capacity within the NDRF did not meet mobilization need. Therefore, in 1976, the RRF was created as a subset of the NDRF that would support a reserve fleet with a planned ship readiness within five days.[3] Sealift capability had to be completely reengineered during the 1990s as a result of poor sealift performance during the first Gulf War in 1990–91. The logistical failure highlighted the need for more effective and dependable sealift capacity out of the U.S.-flag commercial fleet and an upgraded reserve capacity for the government-owned surge fleet. [4]

Today, the RRF fleet consists of vessels purchased during the 1990 recapitalization project. All but one RRF vessel is in reduced operating (ROS-5) status, intended to be ready to tender to Military Sealift Command (MSC) within five days. The SS *Petersburg*, the Offshore Petroleum Distribution System (OPDS) tanker, is in ROS-10, ready in 10 days status. The RRF comprises 46 vessels of the following types: 35 roll-on/roll-off (RORO) ships, 6 auxiliary crane, 2 heavy-lift ships, 2 aviation repair ships, and 1 OPDS tanker.[5] While awaiting activation, RRF vessels are berthed throughout the continental U.S. coasts, strategically placed at commercial and government facilities close to their designated load ports, enabling faster cargo deployment. ROS ships are regularly crewed by up to 10 Merchant Mariners, depending on the needs of the vessel, who perform preventative and routine maintenance. While their assigned ship rests in ROS status, these permanent crew members are also able

[2] "Maritime Administration."
[3] "Maritime Administration."
[4] *Joint Hearing of the Transportation and Infrastructure, Coast Guard and Maritime Transportation subcommittee, and Agricultural/Livestock and Foreign Agriculture Subcommittees* (testimony of James Caponiti, President of American Maritime Congress 17 November 2015), 7.
[5] "Maritime Administration."

Table 1. MARAD ships of the sealift surge fleet

Roll-on/roll-off ships	Fast sealift ships
MV *Cape Decision*	SS *Antares*
MV *Cape Diamond*	SS *Denebola*
MV *Cape Domingo*	SS *Altair*
MV *Cape Douglas*	SS *Bellatrix*
MV *Cape Ducato*	SS *Pollux*
MV *Cape Edmont*	SS *Regulus*
MV *Cape Race*	SS *Algol*
MV *Cape Ray*	SS *Capella*
MV *Cape Rise*	
MV *Cape Washington*	**Auxiliary crane ships**
MV *Cape Wrath*	SS *Cornhusker State*
MV *Cape Kennedy*	SS *Flickertail State*
MV *Cape Knox*	SS *Gopher State*
MV *Cape Taylor*	SS *Gem State*
MV *Cape Texas*	SS *Grand Canyon State*
MV *Cape Trinity*	SS *Keystone State*
MV *Cape Victory*	
MV *Cape Vincent*	**Aviation logistics support ships**
GTS *Adm William Callaghan*	SS *Wright*
MC *Cape Henry*	SS *Curtiss*
MV *Cape Horn*	
MV *Cape Hudson*	**Offshore petroleum discharge system**
SS *Cape Inscription*	SS *Petersburg*
SS *Cape Intrepid*	
SS *Cape Isabel*	**Heavy lift ships**
SS *Cape Island*	SS *Cape May*
MV *Cape Orlando*	SS *Cape Mohican*

Source: *Navy Readiness, Actions Needed to Maintain Viable Surge Sealift and Combat Logistics Fleets* (Washington, DC: Government Accountability Office, 2017), 7.

to receive training appropriate to the vessel's Department of Defense missions. Currently, about 446 Merchant Mariners comprise the ROS crews of the RRF.[6]

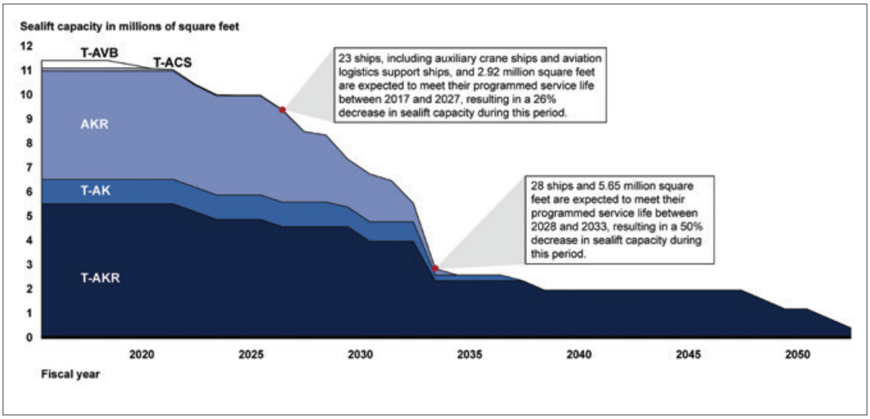
Outside of wartime and other emergency circumstances, it is important that RRF ships are activated regularly to participate in Department of Defense mission assignments. Regular activation ensures that inactivity is not detrimental to the functioning of the vessel and allows active and reserve marine mariner crews to get continual experience with activation and missions outside of basic drill procedures.[7] During 2022, MARAD's RRF vessels activated for multiple mission assignments, including cargo shipments to U.S. Central Command and U.S. Indo-Pacific Command areas of responsibility, participation in aviation readiness exercises for the U.S. Marine Corps, and involvement internationally in several large joint exercises, including Pacific Defender 22.[8] Additionally, U.S. Transportation Command directed Turbo Activation, a drill used to evaluate RRF activation procedures. A total of 17 RRF vessels were activated to assess surge fleet readiness for mission execution in a pandemic and contested environment.[9]

The existing fleet is currently in crisis, as many ships are aging out of service and the fleet has become increasingly small and unreliable. In 2019, a turbo activation exercise revealed a low 40 percent success rate in meeting their five-day activation goal and getting these vessels quickly out to sea.[10] Most of these ships matriculated into the sealift fleet during a recapitalization effort in the early 1990s, after sealift operations during the first Gulf War proved to be a failure. More than 300 ships proved unreliable and took five months to deliver their cargo to the Middle East. [11] Thirty years later, the United States would be confronted with the same dilemma now, should a need for use of the surge sealift fleet arise. Currently, the average vessel age within the sealift fleet is 46 years old.[12]

---

[6] "Maritime Administration."
[7] "Maritime Administration."
[8] "Maritime Administration."
[9] "Maritime Administration."
[10] Megan Eckstein, "House Defense Bill Calls for US-Built Ships to Modernize Strategic Sealift Fleet," *Defense News*, 23 June 2022.
[11] Eckstein, "House Defense Bill Calls for US-Built Ships to Modernize Strategic Sealift Fleet."
[12] Meagan Eckstein, "US Transportation Command Favors Buying Used Sealift Ships," *Defense News,* 17 October 2022.

Figure 1. Projected surge sealift capacity decrease over time, based on programmed service life



Source: *Navy Readiness: Actions Needed to Maintain Viable Surge Sealift and Combat Logistics Fleets* (Washington, DC: Government Accountability Office, 2017),18.

To confront this issue, during the past few years the Navy has been working on solutions and developing a plan. There are three main options that the Navy has considered: procure new ships, extend the service life of existing ships, or buy used commercial ships and refit them for military use.[13] The Navy intends to utilize all three options to develop a plan of action that aims to meet both short- and long-term sealift needs and budgetary constraints. The three-pronged approach addresses the near term with service life extension programs, uses commercial ships in the midterm, and building new ships in the long term. [14]

In the short term, the Navy and U.S. Transportation Command have determined that for select ships, it is possible to extend their service life to 60 years, allowing for more time to acquire replacements.[15] However, this solution will only work for some ships, and even for those possible, potentially not as long as intended. A comment from a Navy official admits that due to the current age of the sealift fleet vessels, there are limited opportunities for additional service

[13] Burgess, "Sealift Sustainment Strategy"; and David Larter, "US Army Warns of Crippling Sealift Shortfalls during Wartime," *Defense News*, 12 November 2018.
[14] *Navy Readiness*.
[15] *Navy Readiness*.

life extensions.[16] The material and economic limits of a ship's service life are the result of multiple factors, including hull deterioration, replacement part availability, engine conditions, and the continuing shortage of steam engineers manage the life extension projects of steam powered ships.[17]

In the long term, the Navy and U.S. Transportation Command recognize the need to procure new ship, with an expected service life of 50 years that can maintain sealift needs well through the twenty-first century. [18] However, new ships are the most expensive option, and a plan needs to be put in place to make space in the budget for the gradual buildup of new ships. In 2019, the Navy put forward a budget of about $242 million for five years, driven toward designing and developing a new platform to replace current vessels. House Armed Services Committee lawmakers at the time did not consider that amount of funding to be enough for a serious jumpstart to recapitalization and certainly not enough to prevent a critical shortfall. [19]

To maintain sealift capacity in the meantime, the Navy and U.S. Transportation Command has proposed the purchase of used commercial vessels—ones that can be acquired less expensively than new ships and still have at least 25 years of service life.[20] However, this process, a major feature of the 1990s recapitalization plan, would find the surge fleet facing the same circumstances in another 30 years. Furthermore, there is a limited market for U.S.-built ships, and officials have stated that they do not intend to purchase foreign-built ships on the commercial market due to statutory limitations.[21]

The Challenges of Purchasing Used Commercial Ships

The Navy was initially very optimistic about the prospect of buying used ships, with a Navy official reporting, "purchasing used commercial roll-on/roll-off ships is an economical way to quickly improve the quality of the military's sealift capability for a fraction of the cost of building new ships. . . . Replacing the most-costly, less-ready ships with used ships that have military utility and significant remaining service life supports a reversal in declining sealift readi-

[16] Burgess, "Sealift Sustainment Strategy."
[17] *Navy Readiness*.
[18] *Navy Readiness*.
[19] Larter, "US Army Warns of Crippling Sealift Shortfalls during Wartime."
[20] *Navy Readiness*.
[21] *Navy Readiness*.

ness."[22] The purchase of used commercial ships will require modifications to bring them up to military standards, but the Navy viewed this as an opportunity for the program to have a direct and positive impact on American shipyards and their workers.[23]

For the past few years, Congress has tried to get the MARAD to purchase up to seven used vessels to add to the Ready Reserve Force. In March 2023, MARAD and the U.S. Navy selected the first two ships to add to the fleet.[24] The budget for fiscal year 2021 had authorized the Navy $60 million for those first two used ships. The Navy requested $299.9 million for fiscal 2022 to procure another five used ships.[25] However, budgetary funds aside, it is unclear whether there are even five more ships on the market suitable to MARAD's needs.[26]

The more time the Navy spent attempting to carry out its plan of purchasing new ships, the more that the optimism faded about the program. The challenges have extended past just the availability of viable options. As it has turned out, the ships built for commercial use are not as compatible with military use as originally hoped, with large spaces turning out to be unusable and the needed modifications turning out to be more excessive than initially assessed. Sealift expert Jim Strock has worked on sealift and prepositioning issues for decades while serving in the Marine Corps and as a Marine civilian. He reports that the used ships in question were mostly built as commercial car-carriers, where it has been determined that, in some cases, more than one-half the space onboard is not militarily useful. Of the space that is potentially useful, there are still issues: decks not strong enough, ceiling clearances too low, ramps too steep, and corners too tight. [27]

Furthermore, between the limited availability and the cost of extensive modifications, the program has not turned out to be the money saver it was touted as. Looking, for example, at the March 2023 purchases, *Honor* and *Freedom*, paints a picture of the type of history ships that end up in the Ready Reserve Force might have. These two were built in the 1990s in a Japanese

[22] Burgess, "Sealift Sustainment Strategy."
[23] Burgess, "Sealift Sustainment Strategy."
[24] Eckstein, "House Defense Bill Calls for US-Built Ships to Modernize Strategic Sealift Fleet."
[25] Burgess, "Sealift Sustainment Strategy."
[26] Eckstein, "House Defense Bill Calls for US-Built Ships to Modernize Strategic Sealift Fleet."
[27] Eckstein, "House Defense Bill Calls for US-Built Ships to Modernize Strategic Sealift Fleet."

shipyard or in the early 2000s in a South Korean shipyard. [28] While the Navy had hoped to purchase American-made vessels, they did not find a promising market and expanded their search to include the shipyards of allies. The two vessels were then operated for about seven years shipping cars, tractors, and other massive gear around the globe by a big company like Wallenius Wilhelmsen. At this point, the ships might be sent to a U.S. subsidiary of the parent company, where they would be eligible to participate in the Maritime Security Program (MSP).[29] MSP is a separate MARAD program used for sealift operations, though not part of the surge fleet. The program pays U.S. shipping companies a yearly retainer to be on call if needed to transport military cargo in the incident of crisis or war. At about 25 years old, at that point having served about 18 years in the MSP program, these ships would be considered past their service life at the company and sold to MARAD as a used vessel for the Ready Reserve Force.[30]

In initial assessments, MARAD expected used ships to be purchased for about $30 million apiece. But when it came time to sign the contract on the first two in March 2023, the figure rose to about $45 million, though MARAD did not disclose the price it paid.[31] With *Honor* and *Freedom*, MARAD likely paid a combined total somewhere between $150 and $200 million for the ships' retainers over the years, acquiring them and repairing them before putting them in the Ready Reserve Force. Furthermore, these ships are past their planned lifespan, making it unclear how long can remain in the Ready Reserve Force.[32] Since most of the used ships would have comparable lifespans, this practice essentially just replaces vessels so old that they are past the possibility of further service life extensions for somewhat old vessels that are past their planned lifespan but eligible to enter service life extension programs. Service life extension programs are therefore not a solution to the current fleet capacity problems, but an ongoing necessity given the continuing profile of the ships joining the RRF.

While the used ships purchased were once built in the shipyards of allied countries, the practice of buying used ships is one that now, at the end of the day, benefits Chinese shipyards. The United States pays for the 18 years of re-

---

[28] Eckstein, "House Defense Bill Calls for US-Built Ships to Modernize Strategic Sealift Fleet."
[29] Eckstein, "House Defense Bill Calls for US-Built Ships to Modernize Strategic Sealift Fleet."
[30] Eckstein, "House Defense Bill Calls for US-Built Ships to Modernize Strategic Sealift Fleet."
[31] Eckstein, "House Defense Bill Calls for US-Built Ships to Modernize Strategic Sealift Fleet."
[32] Eckstein, "House Defense Bill Calls for US-Built Ships to Modernize Strategic Sealift Fleet."

tainer fees ($5 million a year now but gradually increasing to $7 million a year by next decade) and the price of buying a vessel past its planned lifespan directly to, in the case of *Honor* and *Freedom*, a European parent company. That European parent company is likely to turn around and use the money to purchase a brand-new ship from a Chinese shipyard.[33] American shipyards are only thrown a bone in the process through modifications as the used vessels join the RRF. If the current trend continues, eventually the only used ships left on the market will be Chinese-made. Sealift expert Art Divens, a former Navy senior executive and sealift program manager who now also works as a maritime business consultant, explained that to "buy used is essentially buy Chinese."[34]

The MSP has been a valuable program for accessing increased sealift capacity from newer ships that the United States does not bear the brunt of maintaining.[35] The retainer fees that the United States pays for the program are a great bargain, and MARAD cannot control where private companies purchase their ships, only what ships are accepted into the program. The United States will have to continue to pay these fees in order to have access to increase sealift capability. However, the process of purchasing used ships out of this program for the RRF prevents American shipbuilding from obtaining contracts for new surge fleet vessels and ensures that the surge fleet will always be composed of ships that require expensive and extensive modifications, are past their planned lifespan, and need excessive maintenance and repair. The reason that U.S. Transportation Command has favored this process over new ships is likely due to the upfront cost of new ships. These used ships appear to be cheaper at first, but their costs likely pile up past the price point of a new ship. Ultimately, relying too heavily on this program has left the United States with a

[33] Eckstein, "House Defense Bill Calls for US-Built Ships to Modernize Strategic Sealift Fleet."
[34] Eckstein, "House Defense Bill Calls for US-Built Ships to Modernize Strategic Sealift Fleet."
[35] Eckstein, "House Defense Bill Calls for US-Built Ships to Modernize Strategic Sealift Fleet." "The MSP is the core of U.S. sustainment sealift for the nation's armed forces. Created in 1996 and codified at 46 U.S.C. §§ 53101–11, the program supports the active operation of the privately owned, U.S.-flag and U.S.-crewed internationally trading merchant fleet. In return for an annual federal retainer payment, MSP participants make their military-useful ships available 'on-call' to support the DoD's global transportation needs. In addition to providing ships, the MSP supports employment for 2,400 of the skilled U.S. merchant Mariners needed to crew the government-owned surge sealift fleet in times of crisis. The MSP also provides the DoD with assured access to the multibillion-dollar global network of intermodal facilities and transport systems maintained by MSP participants and their affiliates at no additional cost to the government. The MSP fleet has age restrictions, such that the participants must regularly invest in and maintain newer, more efficient ships. Vessels in the MSP fleet average less than 14 years old, compared to the RRF fleet average vessel age of over 45 years."

surge sealift fleet that is composed of aged vessels, poorly suited to their roles, and requiring expensive maintenance and repair to limp them through another service life extension.

Current Plans and Discussions on Building/Acquiring Modern Design Sealift Ships

The Joseph R. Biden administration's abbreviated fiscal 2022 Long Range Plan for Construction of Naval Vessels allocated $369 million for five used ships.[36] This divides up into about $74 million per ship, even though the previous purchase in 2022 had allocated $60 million for two ships.[37] Former Navy logistics official in the Office of the Chief of Naval Operations Jonathan Kaskin explains that "the amount available per ship may severely limit whether you can purchase a relatively modern ship that you can keep for 20–30 or more years like the one we bought in the early-mid '90s, or an obsolete and worn-out ship."[38] Unlike the financial constraints of building new ships, acquiring used ships that are expected to last is not cheap.

However, $74 million per ship may not be too much less than the cost of a new RORO ship built in Korea.[39] In comparison, the Donald J. Trump administration's 30-year shipbuilding plan was released in December 2020 and provided for 11 used ships to be purchased at an average of $97 million each between 2023 and 2027. This is certainly much more than the cost of a new one from a Korean shipyard.[40] While generally critical of the Navy's inaction when it comes to sealift fleet recapitalization over the last decade, Kaskin acknowledged that solving the problem will require "a mix that immediately replaces the ships that already have been bottom-blown out of the RRF and MSC ROS fleets."[41] While the Navy plans to procure a total of 57 used ships between 2021 and 2040, the development requirements for the construction of new next-generation Maritime Prepositioning Force ships have been initiated with the necessary timeline to be able to replace the ships that will age out in 2030.[42]

[36] *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2022* (Washington, DC: Department of the Navy, 2021), 7.
[37] Burgess, "Sealift Sustainment Strategy."
[38] Burgess, "Sealift Sustainment Strategy."
[39] Burgess, "Sealift Sustainment Strategy."
[40] Burgess, "Sealift Sustainment Strategy."
[41] Burgess, "Sealift Sustainment Strategy."
[42] Burgess, "Sealift Sustainment Strategy."

At the same time, these next generation replacements will have to be redesigned to fit the needs of future missions, as the current maritime prepositioning ships have been criticized for being unsuited to future Indo-Pacific conflicts, as publicly stated by former Marine Corps Commandant General David H. Berger.[43] Addressing this issue would include new construction to maintain and potentially expand the shipbuilding industrial base. The effort would require active management and development of the country's shipbuilding industrial base in order to maintain the necessary capacity and capability. While the Navy could manage such a plan, it may not be willing to allocate the necessary resources to it within its ship construction, Navy, budget if it were to require building the ships earlier than what has already been proposed.

If the Navy is not willing, it would then be up to Congress to develop and resource a national shipbuilding industrial base.[44] The FY 2023 National Defense Authorization Act directs MARAD to both design and then orchestrate the build of up to 10 new sealift ships at a U.S. shipyard. However, construction of the new ships would still depend on Congress providing the required funding to the Department of Transportation.[45] Representative Joe Courtney (D-CT), ranking member of the House Armed Services Seapower and Projection Forces subcommittee, acknowledged the challenged but maintained that the project "will be a growth opportunity for America's shipbuilding industrial base and will reduce our dependency on the foreign used-sealift market, which is far from reliable."[46]

The Challenges of Developing New Ships

The Navy attempted to design an updated sealift ship a few years ago, with a project called the Common Hull Auxiliary Multimission Platform (CHAMP). The intention of the design was to create a ship that addressed a range of missions.[47] The effort eventually fell apart as it continued to grow more and more expensive, and the Navy began to raise questions about the feasibility of the project.[48] In 2019, the Navy contracted with Bollinger, General Dynam-

43 Burgess, "Sealift Sustainment Strategy."
44 Burgess, "Sealift Sustainment Strategy."
45 Eckstein, "House Defense Bill Calls for US-Built Ships to Modernize Strategic Sealift Fleet."
46 Eckstein, "House Defense Bill Calls for US-Built Ships to Modernize Strategic Sealift Fleet."
47 Eckstein, "House Defense Bill Calls for US-Built Ships to Modernize Strategic Sealift Fleet."
48 Larter, "US Army Warns of Crippling Sealift Shortfalls during Wartime."

ics NASSCO, VT Halter, and Philly Shipyard as industry consultants to help the program office through various design iterations. In the Navy's fiscal year 2020, a long-term shipbuilding plan indicated that the first sealift variant ship was to be delivered in FY 2028, with a note indicating a desired acceleration to FY 2026.[49]

Ultimately, the mission set that the Navy had hoped to cover in the CHAMP design was too broad, including strategic sealift, aviation intermediate maintenance support, medical services, command and control, and submarine tending.[50] When it quickly realized that a single hull was not a practical means of covering this range of missions, the initial project was revised to include two distinct ship designs—one geared toward people-centric missions and the other aimed at volume-centric operations. While this undermines the initial common hull idea, it was significantly cheaper than the complex single hull design and would still generate significant savings over pursuing individualized replacement programs.[51]

To recapitalize ship capacity in these five mission areas in the most affordable way possible, CHAMP's two hull redirect focused on trying to leverage a common propulsion plant and hull design with the two categories of missions.[52] The main focus of the sealift variant was to be able to hold a massive amount of cargo, as the main sealift mission was to move the necessary materials that the military needed to address a variety of different situations and crises. The second hull variant was intended to support the missions that people are conducting at sea. These ships would therefore need the versatility to be hospital ships, command and control ships, submarine tenders, and aviation logistics ships. In this case, the hull could potentially be smaller, but it would also require more specialized and sophisticated berthing and workspaces.[53]

However, when the CHAMP program update was presented at the annual Surface Navy Association conference, it received pushback from the Office of Management and Budget. The program office acknowledged that the orig-

[49] Megan Eckstein, "Navy Trying Again on CHAMP Auxiliary Design, after White House Pushback," *USNI News*, 30 January 2020.
[50] Larter, "US Army Warns of Crippling Sealift Shortfalls during Wartime."
[51] "US Navy Considering 2 Variants for Next Common Auxiliary Hull," Army Recognition, 17 January 2019; and Eckstein, "Navy Trying Again on CHAMP Auxiliary Design."
[52] Eckstein, "Navy Trying Again on CHAMP Auxiliary Design."
[53] Eckstein, "Navy Trying Again on CHAMP Auxiliary Design."

inal requirements were above what they needed to be. The Navy then asked its industry partners to go back, again start with a commercial hull design, and add in the military-unique requirements only where needed.[54] Commercial design would specifically have to be outfitted for things they were never intended for, like weapons-handling capabilities, cranes that could move tanks or other heavy loads, and the military grade communications capabilities. The shipyards have responded with innovative ideas on how to adapt their existing hull designs to add those capabilities where needed.[55]

Ultimately, the issues with the CHAMP project came down to a matter of price and the way in which the budget is allocated. While auxiliary ships are important to supporting a larger Navy fleet and the joint force, they are given less priority for funding than something more in-demand, like combat surface vessels or attack submarines.[56] Ultimately, it is not a just a question of optimizing a hull design, but rather of getting all the necessary capability at the lowest possible price. Former Navy secretary Richard V. Spencer summarized the problem concisely, explaining that it was difficult to go to Congress and ask for a lot of money for new ships when there existed a cheaper alternative of buying used sealift ships.[57]

In response to MARAD's 2019 request for design ideas based on the commercial hull, General Dynamics NASSCO drew up design plans for a basic purpose sealift ship built to commercial hull standards. While the ship is smaller than the standard used car-carriers typically reoutfitted, it does not have wasted space, thus solving a huge issue sealift has faced with its fleet of used commercial vessels. It has 150,000 square feet of deck space, and its 28-foot draft enables it to access more ports than the current fleet can.[58] Brett Hershman, the director of business development and government relations at General Dynamics NASSCO, prices the new design at about $330 million per ship within the domestic shipbuilding industry, if multiple yards could sign on to build the same design with the same set of vendors.[59] This is a much more feasible cost structure for new ships, as opposed to the estimates coming out of the CHAMP

[54] Eckstein, "Navy Trying Again on CHAMP Auxiliary Design."
[55] Eckstein, "Navy Trying Again on CHAMP Auxiliary Design."
[56] Eckstein, "Navy Trying Again on CHAMP Auxiliary Design."
[57] Eckstein, "Navy Trying Again on CHAMP Auxiliary Design."
[58] Eckstein, "House Defense Bill Calls for US-Built Ships to Modernize Strategic Sealift Fleet."
[59] Eckstein, "House Defense Bill Calls for US-Built Ships to Modernize Strategic Sealift Fleet."

project, where the single-hull design estimate had risen to $1 billion and the two-hull designs were still coming in around $600 million.[60]

NASSCO estimated to be able to build one a year in the near term, with the potential to increase to three a year over a decade. Assuming that other companies, including VT Halter, Philly Shipyard, and Ingalls Shipbuilding, could reach similar building capacities and that the companies could all reach cooperation agreements, it would be possible to replace the entire aging fleet with 40 new ships in about 15 years. As an additional benefit, such a fleet of new ships would have a much longer service life than the used ships recently added to the fleet.[61] In comparison, MARAD's national security multimission vessel, a training ship of comparable size and complexity to the basic sealift ship, costs about $380 million apiece from the Philadelphia Shipyard. The added volume of ship production for a sealift recapitalization program would bring down the price per ship.[62]

The price point could be further mediated if American companies were to partner with foreign companies, like those in South Korea or Japan that built the used car-carriers. While it is not possible to directly compete with China, given that they underwrite the cost of their industry, such collaborations can still build a logistic ship that is very competitive and that has the full service life left.[63] Representative Rob Wittman (R-VA) of the House Armed Services Seapower and Projection Forces subcommittee, admitted that "it will not be as cheap as a used ship, but I do think there's utility in using a combination of those efforts—both buying used and building new." He notes that the cost of buying used is only going to continue to increase due to inflation and current market availability.[64] However, the investigation in the design and proposed construction of the first new sealift ships is just the first step. The next step is to pursue design-to-cost comparisons so that Congress can make longer term decisions about the sealift fleet.[65]

[60] Eckstein, "Navy Trying Again on CHAMP Auxiliary Design."
[61] Eckstein, "House Defense Bill Calls for US-Built Ships to Modernize Strategic Sealift Fleet."
[62] Eckstein, "House Defense Bill Calls for US-Built Ships to Modernize Strategic Sealift Fleet."
[63] Eckstein, "House Defense Bill Calls for US-Built Ships to Modernize Strategic Sealift Fleet."
[64] Eckstein, "House Defense Bill Calls for US-Built Ships to Modernize Strategic Sealift Fleet."
[65] Eckstein, "House Defense Bill Calls for US-Built Ships to Modernize Strategic Sealift Fleet."

Conclusion

Sealift recapitalization consistently faces the challenge of being a budgetary afterthought due to the behind-the-scenes nature of its operations, however logistically necessary they might be. Furthermore, despite its significant importance to the use of American military force, sealift lacks a natural constituency designated to pay for it. Except for the few MSC vessels, the sealift fleet and its programs are managed by the Maritime Administration, while the Navy has the expertise to manage its logistical use, and then, it is the Army that is the beneficiary of it. This division of administration, management, and need creates a continual condition for its funding to fall through the cracks, especially in the face of tight budgets.[66]

These factors have contributed to the decay of both current and past fleets, the ad hoc approach to solving fleet issues largely by pushing them just a little further down the line, and the ongoing delays to fleet recapitalization. Thus far, both MARAD and the Navy have been involved in the purchase of used ships and in design programs for new sealift vessels, but it is unclear how much the two departments are able to collaborate on these efforts and cooperate on budgetary restraints. Their efforts often come across as independent, sometimes even redundant. The main beneficiary of sealift, the Army, seems to be surprisingly absent from the conversation and from bearing the cost burden.

Yet, the Army does in fact fully appreciate the extent to which their capability is reliant on their use of sealift. In response to an earlier inquiry, in February 2018, the Army sent a memorandum to the House Armed Services Committee regarding the nation's surge sealift capacity, noting that "the Organic Surge Sealift Fleet is critical to maintaining this power projection military advantage."[67] The memorandum goes into further detail, explaining that "Power projection, and the ability to rapidly deploy, is the U.S. military's operational center of gravity and is arguably the most crucial military advantage of the United States. Strategic sealift is the Army's primary means of power projection and 90% of the Army's unit equipment moves by strategic sealift."[68] Furthermore, the Army is fully aware of the current condition of the fleet, with the same memorandum noting "without proactive recapitalization of the Or-

[66] Eckstein, "House Defense Bill Calls for US-Built Ships to Modernize Strategic Sealift Fleet."
[67] Larter, "US Army Warns of Crippling Sealift Shortfalls during Wartime."
[68] Larter, "US Army Warns of Crippling Sealift Shortfalls during Wartime."

ganic Surge Sealift Fleet, the Army will face unacceptable risk in force projection capability beginning in 2024. . . . By 2034, 70% of the organic fleet will be over 60 years old—well past its economic useful life; further degrading the Army's ability to deploy forces."[69] Despite knowledge of its dependence on an increasingly unreliable fleet, the Army had remained largely inactive across recapitalization efforts, and it is unclear as to why this may be.

This issue has been noted within the House Armed Services Seapower and Projection Forces subcommittee, with Representative Wittman noting, "the Army can do all kinds of great things . . . but, you know what, you're going to be sitting in [the continental U.S.] if something breaks out and you can't get to the fight. . . . But we have so neglected our logistics fleet that it will be our Achilles heel if we don't get our derrieres into gear, and fast. . . . The Army needs to be pounding the table."[70] Even if it were not going to be involved in the planning or budgetary sides of fleet recapitalization, the Army could certainly aid the efforts of MARAD and the Navy by calling attention to the issue. By increasing the profile of the idea that the Army does not move without a logistics force, both Congress and the financially responsible departments would be forced to prioritize fleet recapitalization.

Recapitalization efforts are not at a loss of options. The lower price point of used ships and service life extensions should be about to maintain an adequate level of capacity while design, funding, and construction of new ships take the time it needs to move forward. Ideally the result would leave the United States with an RRF surge fleet consisting of vessels introduced to the program as new ships with a long service life. But the efforts to get there have been disjointed. Strategic sealift would truly benefit from the introduction of a liaison office, including housing planning and budgetary experts from MARAD, the Navy, and the Army. The office could streamline the communication between departments, coordinate recapitalization programs, mitigate the budgetary contributions of each department, and work with Congress to secure further funding. Doing so would not only increase the efficiency of recapitalization efforts but would allow the allocated funds to be used more effectively. The ongoing rounds of discussions and planning have further illustrated the need to centralize the process, both for efficiency and awareness. As Represen-

[69] Larter, "US Army Warns of Crippling Sealift Shortfalls during Wartime."
[70] Eckstein, "House Defense Bill Calls for US-Built Ships to Modernize Strategic Sealift Fleet."

tative Wittman pointed out, "We've been jumping up and down about logistics the last four or five years, and I think it's finally starting to hit home with folks about the incredible importance of that. We can talk all the time about warships, but if you can't sustain a force, then you don't have a force."[71]

[71] Eckstein, "House Defense Bill Calls for US-Built Ships to Modernize Strategic Sealift Fleet."

PART 3

THE MERCHANT MARINE

CHAPTER 9

INTRODUCTION TO THE MERCHANT MARINE

John Konrad

The story of America's maritime history is not just about ships and sailors; it is a tale of ambition, innovation, and the relentless pursuit of opportunity. Dive deep into the annals of our nation's past, and you will find that free trade and American enterprise are the twin currents that propelled the United States to its position as a global maritime powerhouse. For most of that history, this was delivered by the U.S. Merchant Marine under the protection of the U.S. Navy.

In America's nascent days, the colonies were inextricably tethered to the rhythms of the sea. The formidable Atlantic, initially a daunting barrier to the Americas, swiftly transformed into a vibrant artery for trade, discovery, and cross-cultural dialogue. The maritime endeavors of these English settlers charted the course for a future naval juggernaut and a formidable merchant marine presence. It was the dawn of an era and the earliest seeds that would eventually flourish into peaceful oceans on which globalization would eventually sail after World War II.

The geographical and topographical features of the American colonies provided a natural impetus for maritime activities. Dense forests offered an abundant supply of timber, essential for shipbuilding. The intricate coastline, dotted with deep harbors and protected bays, facilitated the establishment of port cities like Boston, Massachusetts; New York; and Charleston, South Carolina. These ports would soon become hubs of trade, communication, and innovation.

The colonists, many of whom hailed from maritime communities in England, brought with them skills in shipbuilding, navigation, and trade. They quickly recognized the potential of their new environment. The vast rivers that snaked into the interior of the continent provided avenues for exploration and inland trade, further embedding the importance of maritime activities in the colonial psyche.

Within the framework of the British Empire, the American colonies enjoyed certain privileges. The Navigation Acts, while restrictive, ensured that the colonies had a guaranteed market for their goods in England. In return, England became the primary source of manufactured goods and luxuries for the colonists. This symbiotic relationship fostered a robust maritime trade network.

Opportunities also imposed stifling restrictions. The mercantilist policies, enforced by the control of ports, of the British Crown sought to ensure that the colonies remained economically subservient, producing raw materials for the mother country and consuming British manufactured goods. Over time, these restrictions became a source of contention, sowing the seeds of revolutionary thought.

The American Revolution was more than just a battle for political independence; it represented a quest for economic liberty and the freedom to sail the seas without imperial restrictions. The nascent Continental Navy, despite being outnumbered and outgunned by the formidable Royal Navy, played an indispensable role in the conflict. Established in 1775, the U.S. Merchant Marine predates the U.S. Navy and the U.S. Coast Guard. Serving as privateers sanctioned by the Continental Congress, the Merchant Marines targeted British vessels and disrupted their supply chains. The close relationship between the Services is evident in the story of a merchant captain John Paul Jones, who later joined the U.S. Navy and rose to become its most renowned commanding officer.

With independence came the challenge of establishing a new nation on the global stage. The newly formed United States grappled with the task of building its maritime infrastructure without the support of the British Empire.

The country needed to protect its merchant vessels from pirates, negotiate trade treaties, and establish a naval force capable of defending its sovereignty.

The Revolutionary War's conclusion did not signify calm seas ahead. America, in its infancy, grappled with Barbary corsairs, territorial tussles with European juggernauts, and the pressing imperative to carve its niche in global commerce. At the vanguard sailed the U.S. Merchant Marine, navigating the nation through its early trials. The foundation laid during the colonial period, marked by resilience, innovation, and a deep connection to the sea, set the national precedent for maintaining a strong merchant marine, but the Articles of Confederation threw a spanner in the works. Every state hoisted its own set of rules, slapping duties and fees left and right, all in the name of safeguarding their own. This jigsaw of laws threw sand in the gears of our interstate trade, opened the floodgates for foreign vessels, and turned our coasts into smugglers' paradises. And if that was not enough, our ports, once bustling with American vessels, now saw the Union Jack fluttering once more.

Paradox

The birth of the United States was deeply intertwined with ideals of liberty, self-determination, and free trade. Yet, as the young nation sought its place in the global economic order, it found itself grappling with the very mercantilist policies it had once opposed. This juxtaposition, often referred to as the "Mercantilist Paradox," played a pivotal role in shaping America's maritime and economic trajectory.

To understand the paradox, one must first delve into the tenets of mercantilism, the dominant economic theory of the European powers during the sixteenth to eighteenth centuries. At its core, mercantilism advocated for a positive balance of trade, where nations sought to export more than they imported. This was achieved through a combination of tariffs, subsidies, and monopolistic trade practices, enforced in ports, and defended by U.S. Navy warships at sea, all designed to protect domestic industries and maximize national wealth.

Post-independence, the United States faced a conundrum. On one hand, the nation championed the principles of freedom of navigation and open markets, ideals that had partly fueled the Revolutionary War. On the other hand, the young country was vulnerable. It lacked a strong navy to protect its merchant ships, faced stiff competition from established European powers, and needed to develop its domestic industries.

In response, the U.S. government adopted policies reminiscent of European mercantilism. Tariffs were imposed to shield budding American industries from foreign competition. Subsidies were granted to encourage domestic shipbuilding. And much like the British Navigation Acts, laws were enacted to ensure that American trade was carried predominantly on American-built ships.

The irony was palpable. The United States, born from a revolution against imperial control and restrictive trade practices, was now mirroring some of the very policies it had once decried. However, these measures were not merely a regression to old ways. They were seen as necessary tools to foster national growth, solidify economic independence, and level the playing field against dominant European powers.

Yet, this protectionist stance came at a cost. While it did bolster domestic industries and the U.S. Merchant Marine in the short term, it also led to tensions with trade partners and stifled innovation in certain sectors, particularly in shipbuilding and maritime technologies.

As the nineteenth century progressed, the United States began to reevaluate its mercantilist policies. The nation's growth, both in terms of territory and economic prowess, necessitated a more flexible approach to trade. Debates raged between protectionists and free traders, leading to fluctuating tariff rates and shifting trade policies. Questions about the ethical treatment of Mariners were frequently debated.

Eventually, a balance was reached, and the mid-nineteenth century marked an era of growth for the American Merchant Marine industry. It was a period characterized by unparalleled dominance, innovation, and the looming shadows of technological evolution. The Age of Sail, with its majestic clipper ships and intrepid Mariners, would soon face challenges from the relentless march of industrial progress.

The Pinnacle of American Shipbuilding

Between 1830 and 1860, American shipyards produced vessels that were the envy of the world. The clipper ship, with its unmatched speed and skilled U.S. Merchant Marine crews, became synonymous with American maritime prowess. These ships, primarily built in the shipyards of New England, were designed for speed, enabling them to transport goods like tea and spices from distant lands in record time.

American shipbuilders, leveraging the abundant timber resources and the accumulated expertise from generations of shipwrights, crafted vessels that were not only faster but also more durable and cost-effective. This gave American merchants a competitive edge in global trade routes, from the opium trade with China to the transport of gold prospectors to California during the Gold Rush.

Yankee traders, as American merchants were often called, ventured into uncharted waters, establishing trade relations with distant nations and Indigenous peoples. They introduced American goods to remote markets and brought back exotic commodities, enriching the nation's economy and cultural tapestry. A vast whaling fleet was built to circumnavigate the world.

This period also saw the U.S. government actively promoting and protecting its maritime interests abroad. The opening of Japan to Western trade in 1853, facilitated by Commodore Matthew Perry's expedition, is a testament to the intertwining of naval power, maritime commerce, and diplomacy.

The Winds of Technological Change

However, even as American sailing vessels dominated the oceans, technological innovations were on the horizon. The advent of steam power and the development of iron-hulled ships in Europe signaled a paradigm shift in maritime transportation.

While steamships were not entirely new, their designs and capabilities were rapidly evolving. These vessels were not dependent on winds, making them more dependable for scheduled services. Moreover, iron hulls offered greater durability and capacity compared to wooden counterparts.

The American maritime industry, deeply invested in its successful wooden sailing vessels, was initially resistant to these changes. There was a prevailing belief that the tried-and-tested methods of the Age of Sail would endure. This reluctance was further exacerbated by economic factors. The British iron industry, benefiting from economies of scale and lack of significant tariffs, produced iron at a fraction of the cost of its American counterpart.

In 1849, Britain repeals its Navigation Acts, a move that would have profound implications for global maritime trade. This deregulation allowed British companies to purchase ships from any country and register them as British, providing significant cost advantages. Furthermore, it opened British trade routes to foreign vessels, intensifying competition.

The United States, with its protectionist stance, continued to mandate that ships under the American flag be constructed domestically. This policy, combined with the transition from sail to steam, rendered much of the U.S. fleet less competitive on the global stage. The golden age of American maritime dominance faced an impending eclipse.

Industrialization and Civil War

The American Civil War, fought from 1861 to 1865, was a watershed moment in the nation's history, affecting nearly every aspect of American life. Its impact on the maritime industry was profound, setting the stage for a new era of industrialization and policymaking that would shape the future of the U.S. Merchant Marine.

While the Civil War is often remembered for its land battles, the conflict also had a significant naval component. The Union Navy's blockade of merchant ships entering Southern ports was a crucial strategy aimed at crippling the Confederacy's economy and cutting off its supply lines. The Confederacy, in turn, resorted to privateering and the use of innovative technologies like ironclads and submarines to challenge Union naval and maritime supremacy.

The war led to rapid advancements in naval technology and tactics. Ironclads like the USS *Monitor* (1862) and the CSS *Virginia* (1862) rendered wooden warships obsolete almost overnight. These ships sunk not only warships but captured merchant ships as well. The conflict also saw the first successful use of a submarine in combat when the Confederate CSS *H. L. Hunley* (1863) sank the USS *Housatonic* (1861).

After the war, the decline of the American Merchant Marine became a subject of intense scrutiny. The Lynch Committee, named after its chairman, William F. Lynch, was convened to investigate the causes of this decline. The hearings revealed a complex web of factors, including outdated protectionist policies, the rise of powerful shipbuilding lobbies, and the inability to adapt to technological changes.

One of the most startling revelations was the disproportionate influence of the shipbuilding industry over maritime policy. Despite the unmistakable evidence that American-built ships were becoming less competitive on the global stage, the shipbuilders' lobby resisted any attempts to open the United States registry to foreign-built ships.

The postwar period also saw the rapid industrialization of the Northern states, fueled by the demands of the war effort and the absence of the divisive issue of slavery. Black Merchant Mariners like Robert Small became successful pilots and influential politicians. Cities like Boston, New York, and Philadelphia, Pennsylvania, became centers of manufacturing and innovation. However, this industrial boom had a dual effect on the maritime industry.

Snug Harbor purchased 130-acres in Staten Island and in 1833 opened a retirement home for American sailors, and the U.S. Public Health Service was created in 1889 to build huge marine hospitals in major port cities and care for U.S. Merchant Mariners, ushering in the nation's first veterans' health service.

On one hand, advancements in technology, particularly in steam engines and ironworking, offered the potential for a modernized fleet. On the other hand, the focus on industrialization and the expansion of the railroad network began to divert capital and attention inland. The nation's economic priorities were shifting, and the maritime industry found itself at a crossroads.

The postwar era brought with it a renewed debate on maritime policy. While the need for reform was widely acknowledged, the path forward was anything but clear. Early subsidy programs aimed at reviving the Merchant Marine met with limited success. Protectionist policies, such as those requiring U.S.-built ships for domestic registration, continued to hamper competitiveness.

The Lynch Committee's findings, although insightful, did little to sway a Congress influenced by powerful lobbies and regional interests. The result was a policy stalemate that would persist into the late nineteenth century, leaving the American Merchant Marine in a state of limbo.

The Civil War and its aftermath were pivotal in shaping the American maritime landscape. The conflict accelerated technological advancements but also exposed the systemic issues plaguing the industry. As the nation moved towards industrialization, the maritime sector faced the challenge of modernization and policy reform—a challenge that would define its trajectory for decades to come.

End of the Nineteenth Century

As the nineteenth century drew to a close, the American maritime industry found itself at a critical juncture. The era was marked by significant shifts in economic priorities, technological advancements, and global politics. While the United States experienced a naval revival, the Merchant Marine continued its decline, raising questions about the future of American maritime power.

The late nineteenth century saw a resurgence in American naval power, driven by a combination of geopolitical considerations and the rise of nationalism. The 1890 publication of Alfred Thayer Mahan's seminal work, *The Influence of Sea Power upon History*, galvanized public and political support for a strong Navy and highlighted the importance of the Merchant Marine. Mahan argued that control of trade at sea was essential for national security and economic prosperity, a thesis that resonated deeply with American policymakers.

The result was a concerted effort to modernize the U.S. Navy, culminating in the construction of new steel-hulled warships equipped with advanced weaponry. The Spanish-American War of 1898 served as a proving ground for this revitalized navy, which emerged victorious, signaled America's arrival as a global maritime power, and extended the reach of its Navy and Merchant Marine to ports in the faraway Philippines.

The Decline of the Merchant Marine

In stark contrast to the naval revival, the American Merchant Marine continued its downward trajectory. Despite the lessons of the Civil War and the Lynch Committee's findings, Congress remained resistant to substantive policy reforms. Protectionist measures, such as the insistence on domestically built ships for U.S. registration, continued to stifle competitiveness.

Early subsidy programs aimed at revitalizing the merchant fleet met with limited success. These subsidies often ended up benefiting specific sectors or companies without addressing the underlying structural issues. Moreover, the rise of transcontinental railroads offered a more efficient means of domestic transport, further eroding the merchant marine's share of the market. Wealthy U.S. Merchant Mariners turned businessmen like Cornelius Vanderbilt and ship owners like J. P. Morgan found more lucrative returns on capital in other industries like railroads.

As the nineteenth century waned, America's focus shifted from maritime enterprise to continental development. The completion of the transcontinental railroad, the discovery of vast natural resources, and the westward expansion fueled an economic boom that was largely land-based. Maritime trade and exploration, once the lifeblood of the nation, took a back seat to railways, mining, and agriculture.

This shift in focus had a profound impact on the maritime industry. Investment in shipbuilding and maritime infrastructure dwindled, as capital flowed into emerging industries like steel, oil, and railroads. The maritime sector, lacking the innovation and investment needed to compete globally, found itself increasingly marginalized.

Toward the end of the century, there were efforts to consolidate the fragmented maritime industry. Mergers and partnerships were explored as potential solutions to improve efficiency and competitiveness. However, vested interests often hampered these efforts.

The end of the nineteenth century was a period of paradox for the American maritime industry. While the nation emerged as a naval power, its merchant marine languished in a state of decline. The era highlighted the complexities of balancing military prowess with commercial competitiveness, continental development with maritime interests, and protectionism with the need for reform.

As the United States stepped into the twentieth century, the maritime industry faced an uncertain future, fraught with challenges yet ripe with opportunities. It was a future that would be shaped by the decisions and debates of this pivotal era.

Wilsonian Era

The early twentieth century, particularly under the leadership of President Woodrow Wilson, was a transformative period for the United States, both in terms of its global standing and its maritime policies. The Wilsonian era, spanning from 1913 to 1921, witnessed America's transition from a period of inland focus to an active participant in global affairs. This shift had profound implications for the U.S. maritime industry.

Woodrow Wilson, the 28th president of the United States, held a vision of America as a leading global power, both economically and diplomatically. Central to this vision was a strong and competitive maritime industry. Wilson recognized that for the United States to exert influence overseas, it needed not only a powerful navy but also a robust merchant marine capable of supporting trade and projecting American values.

The U.S. Merchant Marine's lack of readiness at the start of World War I spurned the most significant maritime legacies of the Wilsonian era, a series of Merchant Marine Acts, particularly those of 1916, 1920, and 1928. These acts were designed to revitalize the American Merchant Marine, which had been in decline since the late nineteenth century.

The Merchant Marine Act of 1916 established the U.S. Shipping Board, which was tasked with regulating maritime commerce and overseeing the construction and operation of merchant ships. The act also provided for government subsidies to support shipbuilding and the establishment of a naval auxiliary reserve, ensuring that merchant ships could be requisitioned for military use in times of war.

Perhaps the most well-known of the three, the Jones Act aimed to support domestic shipbuilding and maritime commerce. It mandated that all goods transported by water between U.S. ports be carried on U.S.-flag ships, constructed in the United States, owned by U.S. citizens, and crewed by U.S. citizens or permanent residents.

The Merchant Marine Act of 1928 built on the foundation of the previous acts. The 1928 legislation focused on long-term planning and further financial support for the industry. It sought to ensure a steady flow of funds and resources to maintain a competitive merchant fleet.

This era also saw the establishment of federal agencies dedicated to maritime affairs. The U.S. Shipping Board, an early precursor to the U.S. Maritime Administration (MARAD), created by the 1916 act, was the first such entity. It played a pivotal role during World War I, overseeing the construction of new ships to support the war effort and managing the nation's merchant fleet.

This period marked the beginning of significant federal involvement in maritime affairs, setting the stage for future policies and regulations that would shape the industry throughout the twentieth century.

The Wilsonian era was a turning point for the American maritime industry. Under President Wilson's leadership, the United States embarked on a concerted effort to revitalize its Merchant Marine and establish itself as a dominant maritime power ready for the next great war. The policies and institutions established during this period laid the groundwork for America's maritime strategy in the decades that followed, reflecting the nation's evolving role on the global stage.

Interwar Period

The years between the two World Wars, commonly referred to as the Interwar Period, were marked by significant upheavals in the global political and economic landscape. For the American maritime industry, this era presented a unique set of challenges and opportunities, as the nation grappled with the aftermath of World War I and the looming shadows of World War II.

The Interwar Period was characterized by economic volatility. The Roaring Twenties, a decade of prosperity and cultural dynamism, was abruptly halted by the Great Depression in 1929. This economic downturn had profound implications for the maritime industry.

The Great Depression led to a sharp contraction in global trade, affecting the demand for maritime transport. American merchant vessels found fewer opportunities in international routes, leading to reduced revenues and, in many cases, the mothballing of ships.

In a bid to shield homegrown enterprises, nations worldwide, with the United States at the helm, embraced insular trade stances. The Smoot-Hawley Tariff Act of 1930 stands as a testament, hiking tariffs on foreign commodities. This move ignited a cascade of countermeasures, constricting global trade. The ensuing lull in merchant shipping not only deepened the world's economic depression but the resulting despair fanned the embers of political ideologies that would soon engulf the world in conflict.

In the early 1930s, the Black Committee, named after its chairman, Hugo L. Black, was established to investigate the state of the American Merchant Marine and the effectiveness of existing subsidy systems.

The committee's findings highlighted mismanagement, inefficiencies, and the need for comprehensive reform. This led to the Merchant Marine Act of 1936, which is often considered the cornerstone of modern federal maritime policy. The act

> provid[ed] subsidies for ship construction and operation, [and] the act sought to make the American merchant fleet more competitive on the global stage and ensure national security by recognizing the strategic

> importance of a strong merchant marine. The act emphasized the need for a fleet that could support military operations in times of war.[1]

The act also addressed labor concerns, ensuring better wages and working conditions for maritime workers.

The Interwar Period saw significant labor movements across various industries, and the maritime sector was no exception. Maritime labor unions gained prominence, advocating for better wages, safer working conditions, and job security. While these movements led to improved conditions for many workers, they also resulted in tensions between ship owners and labor leaders, occasionally culminating in strikes and disruptions.

As the 1930s progressed, the geopolitical situation became increasingly tense. The rise of fascist powers in Europe and imperial ambitions in Asia signaled the approach of another global conflict. For the U.S. maritime industry, this meant a renewed focus on shipbuilding and preparedness. Efforts were made to modernize the fleet, ensuring that it could support military and logistical needs in the event of war.

The Interwar Period was a time of reflection, reform, and preparation for the American maritime industry. The policies and decisions of this era laid the foundation for the industry's role in the subsequent global conflict and the postwar world.

World War II

The period encompassing World War II and the years that followed was a defining epoch for the American maritime industry. The industry was thrust into the global spotlight, playing a pivotal role in the conflict, and shaping the postwar world. This era witnessed monumental changes, from the mass mobilization of resources to the emergence of new maritime technologies and policies.

The U.S. Merchant Marine faced significant dangers, from U-boat attacks in the Atlantic to aerial bombardment in the Pacific and pain in places like Bataan. Their sacrifices—the U.S. Merchant Marine sustained the highest casualty rate of any Service—were crucial in maintaining supply lines and supporting military operations.

[1] Lane Kendall, "Capable of Serving as a Naval and Military Auxiliary . . ." U.S. Naval Institute *Proceedings* 97, no. 5 (May 1971).

As the United States entered World War II, the maritime industry became a cornerstone of the war effort. The concept of the "Arsenal of Democracy" was not limited to tanks and planes; it extended to the ships that would carry them across the oceans.

These cargo vessels, mass-produced by both legacy shipbuilders and new corporations like Kaiser Shipyards, became symbols of American industrial might. Built in record time and numbers, they served as the workhorses of the war, transporting troops, equipment, and supplies to various theaters of conflict.

The end of World War II presented a new set of challenges for the maritime industry. The massive wartime shipbuilding effort led to a surplus of vessels, many of which were not suited for American commercial interests. This glut impacted the economics of the shipping industry, leading to lower freight rates and increased competition globally. U.S. Merchant Mariners, promised veterans benefits by President Franklin D. Roosevelt, would fight more than four decades for veteran benefits, and see funding dwindle for marine hospitals and Snug Harbor until they both closed. When the Veteran Administration was formed in 1989, Merchant Marine war veterans who served after World War II were denied both recognition and service.

More than 250,000 U.S. Merchant Mariners served in various theaters during the war. The task of supplying the Eastern European front via the port of Murmansk stood out for its extreme danger. This route attracted a notable number of individuals, including some communist sympathizers, who joined ships to support Russian forces. Although only a small portion of Merchant Mariners volunteered for the Murmansk mission, and an even tinier subset were Communist sympathizers, this association, coupled with union advocacy for labor rights, had political ramifications. Following the fall of the Iron Curtain, these sentiments were amplified during the Joseph McCarthy era and lingered through President Ronald W. Reagan's presidency. This climate made garnering political support for the Merchant Marine and its veterans challenging, straining the relationship between the Merchant Marine and the U.S. military.

The National Security Act of 1947 had significant implications for the Merchant Marine. Prior to this act, the U.S. Navy maintained its own cabinet secretary and primarily competed with the U.S. Army for budgetary allocations. Post-1947, the Navy had to contend with not only the Army but also the newly established U.S. Air Force for resources. This shift led navalists to distance themselves from the leaders of the three sea Services. While the Commandant of the Marine Corps engaged in a political struggle to secure funding and influence, the Commandants of the U.S. Coast Guard and the U.S. Merchant Service realigned their Services under the Departments of Treasury and Commerce, respectively. Both Services still hold their military designations today. However, the U.S. Merchant Marine Commandant typically opts for civilian attire, and uniformed Merchant Mariners are primarily found at federal and state maritime academies, while the Coast Guard and Merchant Service remains outside the Pentagon.

In the backdrop of the Korean War, civilian Mariners aboard U.S. commercial carriers undertook a pivotal role, facilitating the movement of 80 percent of U.S. government cargo. The Military Sea Transportation Service shouldered the responsibility for the remaining cargo portion. Notably, these commercial ships assumed the dual role of naval auxiliaries, exemplified by their involvement in the amphibious Inchon landing and the heroic rescue of Korean civilians from the advancing Chinese Communist forces in Hungnam.

Beyond their wartime duties, U.S. commercial carriers were also summoned by the U.S. government to alleviate shortages in coal and grain in Europe and India respectively, showcasing their versatility and importance to global humanitarian missions. While this provided immediate opportunities for the Merchant Marine, U.S. funding also facilitated the reconstruction of foreign shipping fleets, which would soon compete with American shipping.

Postwar maritime policy continued to be influenced by protectionist measures and government subsidies. Programs were initiated to support the conversion of wartime vessels for commercial use and to subsidize the construction of new, more advanced ships. However, these policies had mixed results. While subsidies helped maintain a sizable merchant fleet, they also led to inefficiencies and a lack of competitiveness in the global market. As operating costs under the American flag remained high, some shipowners began to register their vessels under foreign flags, where regulations were less stringent and costs lower.

The aftermath of the war witnessed maritime labor unions holding their sway. Their relentless advocacy yielded improved wages and conditions. However, this victory came at a cost: the escalating operating expenses for

American-flagged ships, denting their global competitiveness. In an ironic twist, these unions, once champions of the mariner, began undercutting each other, initiating a wage suppression cycle that persists even today.

The onset of the Cold War added a new dimension to the role of the maritime industry. The Merchant Marine was seen as an essential component of national security, capable of supporting military operations and serving as a logistical deterrent against the Soviet Union. This led to further government involvement and investment in maritime infrastructure and training programs.

World War II and the subsequent years were a period of intense activity and transformation for the American maritime industry. From supporting the war effort to navigating the complexities of the postwar world, the industry proved its resilience and adaptability. However, the era also exposed underlying challenges, from policy dilemmas to global competition (often funded with support from Wall Street), that would shape the maritime landscape for decades to come.

Containerization

In the annals of maritime history, no innovation has lifted more people out of poverty and improved the lives of the world population as containerization did in the latter half of the twentieth century.[2] This seemingly simple concept of standardizing the size and shape of cargo containers transformed not just the maritime industry but the very fabric of global trade.

The traditional method of "break-bulk" shipping, where goods were individually loaded onto ships, was labor-intensive and time-consuming. Enter Malcolm McLean, an American trucking magnate, often hailed as the father of containerization. In the 1950s, McLean envisioned a seamless system where cargo could be effortlessly transferred from trucks to ships and vice versa, eliminating the tedious process of multiple loadings and unloadings.

The immediate benefits of containerization were manifold. Efficiency skyrocketed as the time taken to load and unload ships was drastically reduced, allowing for quicker turnaround times in ports. This efficiency translated to significant cost reductions. With fewer manual labor requirements and reduced time in port, the cost of shipping goods dropped dramatically. Moreover, the

[2] Breck Pappas, "Giants of the Sea: Ships & Men Who Changed the World," *Mobile Bay Magazine,* 12 July 2021.

standardized containers ensured better security for the cargo, reducing the risk of theft and damage. The flexibility introduced by these containers also paved the way for intermodal transport systems, where goods could easily transition between ships, trucks, and trains.

The transformation of a World War II-era oil tanker into the containership SS *Ideal X* by McLean in 1955 signaled the dawn of containerization. However, it would take about a decade to overcome numerous challenges before the innovation could truly revolutionize the shipping industry. Labor unions were initially resistant to the concept of containerization, and businesses were reluctant to invest in what were then untested, large-scale initiatives. Ports around the world required substantial upgrades to accommodate the new breed of container ships, but local authorities were often unwilling to shoulder the financial burden. The quest for economies of scale hit a turning point when the U.S. military, facing port congestion issues in Vietnam, stepped in. They took on the task of building large-scale container ports on both sides of the Pacific, which entailed considerable investments in infrastructure, ranging from cranes to the building of steel boxes. The maritime sector soon acknowledged that traditional cargo ships were not suitable for containerized transport. This led to the creation of specialized container ships, engineered for optimal cargo capacity and efficiency.

As the maritime sector navigated its infrastructural shifts, the ripples were felt deeply in the socioeconomic fabric. The dwindling demand for dockworkers triggered widespread job losses across ports. This labor upheaval ignited tensions, with strikes punctuating the daily rhythm of many major ports. Old port cities like New York City saw factories pulling up stakes, draining local tax revenues and leaving residents jobless. This economic fallout bore a stark resemblance to war's aftermath, with neighborhoods like the Bronx withstanding the worst of the resulting fires and devastation.

Yet, the global implications of the container revolution were overwhelmingly positive. Global trade experienced an unprecedented boost. The reduced costs and increased efficiency, which the U.S. military proved in Vietnam, made it economically viable to produce goods in one part of the world and sell them in another. Supply chains became more intricate and interconnected, leading to the rise of globalization as we know it today.

McLean's SeaLand secured an early lead and captured a substantial market share. However, its sale to the R. J. Reynolds Tobacco conglomerate in 1969, coupled with a series of missteps—such as constructing the fuel-intensive SL-7 containerships right before the 1973 Arab oil embargo led to soaring oil prices—resulted in a loss of market share. Overseas lines like Evergreen and Maersk, the latter of which eventually acquired SeaLand, benefited from these misjudgments.

Flags of Convenience

The post–World War II liquidation of surplus Liberty and Victory ships at deeply discounted prices enriched many foreign ship owners. A few decades later, the resounding success of containerization ignited a shipbuilding boom that also influenced supertanker designs. This led to the production of increasingly larger containerships and colossal supertankers from shipyards outside the United States. The globalization of shipping required financial resources that extended beyond the capacity of a single nation. As shipowners sought funding, crews, and contracts outside the United States, they also explored more lenient regulatory frameworks and lower tax regimes. This search steered them toward adopting foreign flags of convenience.

The three predominant flags of convenience (FOCs)—Panama, Liberia, and the Marshall Islands—were established with the assistance of U.S. military and intelligence agencies, aiming to maintain some influence over foreign shipping. In time, military leaders' interest in FOCs waned. With the world's oceans safeguarded by a pervasive U.S. Navy, commercial entities no longer saw value in the nominal protection that FOCs, associated with the U.S. military, provided. Tensions between the United States and Panama, coupled with the withdrawal of troops from the canal zone, further strained the relationship. The U.S. Navy's apparent indifference to Marshall Islands ships seized by Somali pirates dispelled any lingering perceptions the U.S. Navy would protect to FOCs.

Today, the registries of Liberia and the Marshall Islands are managed by corporations based in the United States. While they do employ former U.S. military officers, primarily from the Coast Guard, any direct ties to American national interests are, at best, minimal. Meanwhile, indications suggest that Panama's affiliations lean more toward Chinese interests than those of the United States.

At its essence, the practice of flags of convenience involves shipowners registering their vessels in a foreign country. This is not done out of allegiance or business operations in that nation, but rather for the benefits that come with the flag. Today, these countries offer lenient regulations, lower fees, and favorable tax structures. In return for a fee, they allow the ship to fly their flag, designating the vessel's nationality for international purposes.

The siren call of the flag of convenience is layered. At its core, it is a financial game for ship owners. Registering under a flag of convenience can slash costs, thanks to lower registration fees and the option to hire crew from lower-wage nations. Beyond economics, many flag of convenience nations offer a more lenient regulatory landscape, particularly around safety and labor. This laxity has seen crew sizes dwindle dramatically. Today, a behemoth containership, dwarfing even an aircraft carrier, might be manned by a mere 20 souls.

This relaxed stance can translate to further savings, albeit sometimes at the cost of worker rights and environmental stewardship. Furthermore, some ship owners are drawn to the confidentiality that certain flags of convenience nations offer, particularly regarding the intricacies of offshore shell company ownership structures.

Environmentalists too have raised alarms. They point out that some ship owners use flags of convenience to bypass stringent environmental regulations, leading to practices that harm marine ecosystems.

In the grand chessboard of geopolitics, the flags of convenience introduce a murky layer. Incidents involving flags of convenience ships often plunge into a quagmire of legal gray areas, making responsibility and jurisdiction a convoluted puzzle. While ship owners pocket gains, the United States grapples with lost tax revenues, a diminished vote on maritime affairs in United Nations bodies, and a loss in control over shipping.

Post-Vietnam, President Richard M. Nixon aimed to rejuvenate the U.S. Merchant Marine, appointing Andrew E. Gibson as the U.S. assistant secretary of commerce. Gibson's ambitious Nixon Maritime Program was crafted as a robust blueprint for maritime growth. However, in a strategic countermove, the Russians slashed their cargo rates, inundating the Atlantic shipping markets and pressuring American maritime ventures. The plan's momentum waned as Nixon's focus shifted amid the engulfing quagmire of the Watergate scandal.

Under Reagan, shipbuilding and repair took center stage, driven by the audacious 600-ship Navy initiative. Yet, the Merchant Marine remained sidelined. As naval demands surged, commercial shipbuilding costs in U.S. yards soared. While the naval fervor subsided post–Cold War, the commercial shipbuilding industry it overshadowed struggled to regain its former prominence.

While American shipyards focused on military construction, Japanese and South Korean shipyards capitalized on the available capacity. Additionally, the epicenter of ship finance shifted from Wall Street to European markets. By the end of the Cold War, American shipbuilders struggled to remain competitive. Corporate raiders recognized that many maritime firms possessed assets exceeding their stock valuations. This realization led to a rapid sell-off of assets and real estate, resulting in skeletal companies with outdated fleets. While some firms sought refuge within larger conglomerates, high-profile incidents like the *Marine Electric* and *Exxon Valdez* disasters diminished corporate interest in the shipping industry.

The Gulf War

The Gulf War, which erupted in 1990 following Iraq's invasion of Kuwait, was a conflict that showcased the might of modern military technology and strategy. Yet, beneath the televised missile strikes and tank battles, a less visible but equally vital operation was unfolding: the massive sealift effort that sustained coalition forces in the desert. This maritime endeavor, often overshadowed by the war's more dramatic moments, was a testament to the importance of logistics in modern warfare.

Military strategists often emphasize that wars are won as much by logistics as by combat prowess. The Gulf War was no exception. The vast distances separating coalition home bases from the theater of operations in the Middle East meant that an enormous amount of equipment, supplies, and personnel had to be transported across seas. This is where the concept of military sealift came into play.

Sealift refers to the use of merchant ships and naval auxiliaries to transport military assets. In the context of the Gulf War, it was the lifeline that enabled the rapid deployment and sustained operations of coalition forces in the region.

The scale of the sealift for the Gulf War was staggering. Thousands of tanks, armored vehicles, helicopters, and vast quantities of ammunition, fuel, and other supplies had to be transported to support the Coalition's operations. This required a fleet of ships capable of carrying heavy and oversized cargo, as well as the infrastructure and expertise to load, unload, and distribute these assets efficiently.

The Gulf War sealift faced several challenges. The Persian Gulf's ports were limited in number and capacity, and the threat of mines and enemy action necessitated careful navigation. Moreover, the sheer volume of cargo and the need for rapid deployment meant that traditional loading and unloading methods would be too slow.

In response, the U.S. Military Sealift Command, along with its counterparts from coalition nations, employed several innovative solutions They included the roll-on/roll-off ships, vessels designed to carry wheeled cargo like trucks and tanks, which allowed for quicker loading and unloading. Also included were prepositioning ships, vessels the United States had strategically placed and loaded with military equipment near potential conflict zones. This foresight ensured that when the war began, a sizable portion of the necessary equipment was already nearby. Some ships were used as floating storage units, holding supplies that could be quickly transferred to combat units as needed.

The Unsung Heroes

Behind the successful sealift were countless unsung heroes: the Merchant Mariners who crewed the ships, the logistics planners who orchestrated the complex dance of loading and unloading, and the port workers who ensured that cargo reached its intended recipients. Their efforts, though less visible than frontline combat, were crucial to the coalition's success.

The Gulf War showcased the pivotal role of maritime logistics in warfare, though the military sealift took longer than expected, delaying the Army's advance into Kuwait. This highlighted the crucial nature of timely asset deployment in conflict. As military tactics adapt in the twenty-first century, the insights from the Gulf War's sealift continue to hold paramount significance.

After the Gulf War

From the earliest days of seafaring nations, maritime policy has been a cornerstone of national strategy. Whether it was the British Empire's dominance of the seas, ensuring the sun never set on its territories, or the United States'

Merchant Marine Act of 1920, also known as the Jones Act, which sought to promote a robust national maritime industry, political decisions have always played a pivotal role in shaping maritime destinies.

In the modern era, as global trade expanded exponentially, maritime policy became even more crucial. Nations recognized that controlling sea routes and ensuring safe passage for their merchant fleets was not just an economic imperative but a matter of national security. This led to a delicate balance of power, with Chinese and Russian interests forging alliances, investing in ports, establishing naval bases in strategic locations, investing heavily in their naval fleets and even, in the case of Russia, invading sovereign nations to control critical maritime chokepoints like Crimea.

The latter half of the twentieth century saw a growing awareness of environmental issues. As concerns about pollution, overfishing, and climate change came to the fore, maritime policies had to evolve. International conventions like MARPOL, the international Convention for the Prevention of Pollution from Ships, and the United Nations Convention on the Law of the Sea (UNCLOS), which sought to govern the world's oceans, were outcomes of this new environmental consciousness.

The maritime industry, with its diverse workforce drawn from across the globe, has often been at the center of labor rights debates. Political decisions, both at national and international levels, have sought to improve the working conditions of seafarers, ensure fair wages, and provide safety standards. Organizations like the International Maritime Organization (IMO) have been instrumental in framing regulations that prioritize the human element in the maritime equation.

Today, the political landscape influencing maritime policies is more complex than ever. The rise of new global powers, territorial disputes in strategic waterways like the South China Sea, and the challenges posed by nonstate actors like pirates off the Somali coast all play a part in shaping maritime strategies. Additionally, economic considerations, such as trade wars and sanctions, have a direct impact on shipping routes and maritime commerce.

The Rise of China

On 11 September 2001 (9/11), American Mariners in New York harbor executed the largest maritime evacuation since Dunkirk and, soon after, U.S. Merchant Mariners sailed to support U.S. forces in Iraq and Afghanistan. But, while they served the nation with valor, China's shipbuilding and shipping sectors surged (mostly) unnoticed. This looming shadow of China's maritime ascendancy hinted at the challenges awaiting the already diminishing U.S. Merchant Marine.

China's ascent in the maritime domain is a testament to its strategic foresight and economic prowess. During the past few decades, the nation has meticulously nurtured its shipbuilding industry, transitioning from a peripheral actor to the world's premier shipbuilding hub. State-backed enterprises, coupled with rapid technological advancements, a vast labor force, and financial engineering have positioned China at the zenith of global ship production.

Parallel to its shipbuilding triumphs, China has aggressively expanded both its shipping and naval capabilities with dual-use strategies. Giants of industry, such as COSCO, now command the high seas, controlling pivotal trade routes and establishing an omnipresent footprint in major ports across continents. This maritime expansion is not merely economic; it is strategic. The Belt and Road Initiative, an ambitious endeavor to weave a web of connectivity from China to Europe, Africa, and other parts of Asia, underscores Beijing's grand maritime vision. By purchasing and developing ports, forging new shipping routes, and creating logistics hubs, China is redefining the contours of global maritime trade and is injecting capital in all maritime sectors, too often with the help of Wall Street capital.

In stark contrast, the U.S. Merchant Marine narrative has been one of challenges and decline. The once-mighty fleet, which played pivotal roles in both World Wars, grapples with the realities of high operating costs, stringent regulations, and shifting global trade dynamics. U.S.-flagged vessels, burdened by these challenges, find it hard to compete on the global stage, leading to a dwindling presence in international waters. Furthermore, policy decisions over the years have often lacked the foresight and consistency needed to bolster the maritime industry. Antiquated regulations such as Title XI fell out of favor among financiers, who increasingly gravitated toward overseas ventures free from stringent regulations and not beholden to the approvals of an overwhelmed and thinly stretched MARAD.

Since the dissolution of the House Committee on Merchant Marine and Fisheries in 1995, there has been a prevailing indifference toward maritime matters. In the absence of robust congressional oversight, both MARAD and FMC faced significant budget reductions. The Global War on Terrorism further magnified this issue. During the Iraq War, the nation relied on foreign-flagged ships to supplement the capabilities of the U.S. Merchant Marine. Moreover, public focus shifted significantly inland due to the conflict in Afghanistan. A particularly detrimental political setback occurred when the U.S. Merchant Marine, under MARAD's jurisdiction, was separated from the U.S. Coast Guard. This took place as the Coast Guard transitioned from the Department of Transportation to the newly established Department of Homeland Security, severing the remaining subtle ties it had with the broader military establishment.

The winds of globalization and the outsourcing of manufacturing to cost-effective hubs in Asia have further exacerbated the imbalance, with many trade routes skewed against the United States.

The geopolitical ramifications of these maritime trajectories are profound. The diminishing U.S. Merchant Marine raises alarm bells about America's ability to sustain overseas military operations, given the indispensable role merchant fleets play in logistics during conflicts. On the other hand, China's maritime dominance offers it unparalleled economic and diplomatic leverage, allowing Beijing to shape global trade dynamics and, in some instances, use it as a tool for diplomatic influence.

Current Readiness

In the strategic maritime landscape, a pressing query looms: What is the operational status of the Merchant Marine? The U.S. Maritime Administration, the federally designated keeper of U.S. shipping statistics, has not rolled out a comprehensive manpower assessment since 2017. Compounding this intelligence gap, the Coast Guard's Merchant Mariner Licensing and Documentation System, a potential reservoir of data that contains detailed information on every registered U.S. Merchant Mariner, remains bafflingly silent, inexplicably unable to export its information in a useful way.

Based on the outdated MARAD report, there are more than 200,000 credentialed Mariners. However, many lack the "unlimited oceans endorsements" required for commanding large oceangoing vessels vital for sealift. The bulk serve on inland channels, near-coastal operations, and smaller crafts. Of this pool, roughly 33,000 have the sought-after unlimited oceans credentials.

Yet, this does not necessarily translate to recent direct experience with large vessels, nor does it gauge their readiness or willingness to operate in conflict situations. Additionally, there is the strategic conundrum of reallocating resources. For instance, pulling Mariners from the Washington State Ferry system to man sealift ships might offer a short-term fix but would disrupt the ferry service to Naval Air Station Whidbey Island. Shifting Jones Act tankers to support INDOPACOM could leave entire regions gasping for gasoline and diesel.

Part of the challenge lies in defining operational readiness, as each ship type has distinct training requirements and standards under the Standards of Training, Certification, and Watchkeeping for Seafarers (STCW). For instance, a senior officer on a tanker could likely serve as a junior officer on a basic containership, but the reverse is generally not true. This is because tankermen must have specialized knowledge of pumps, flow rates, and specific safety protocols—areas typically managed only by engineers on a containership. Similarly, below decks, most steam engineers can operate basic diesel engines, but diesel engineers often find themselves at a disadvantage when faced with the complexities of steam systems. To effectively determine readiness numbers, we must grapple with a foundational query: What constitutes a U.S. Merchant Mariner?

The label "U.S. Merchant Marine" is shrouded in strategic ambiguity. At its core, this title undoubtedly covers both officers and the unlicensed—maritime equivalents to the military's enlisted ranks—who serve aboard the expansive U.S.-flagged vessels that traverse international waters. Additionally, Mariners on U.S.-flagged replenishment and sealift vessels, directed by the Military Sealift Command and MARAD, are firmly within the U.S. Merchant Mariner fold, with their official U.S. Navy titles civil service Mariners "CIVMARS" and contracted Mariners "CONMARS." These are titles that some Merchant Mariners consider derogatory because they undermine more traditional titles.

However, as we delve deeper, the clarity dissipates. A widespread belief suggests that the U.S. Merchant Marine also encompasses coastwise vessels under the Jones Act, and even sizable vessels like the Staten Island Ferry that consistently operate within protected waters. The status of operators of smaller vessels, such as tugboat captains, is up for debate. Yet, it seems counterintuitive to dismiss them entirely, especially when some Mississippi River barges rival traditional ships in magnitude.

From a more encompassing viewpoint, one might argue for the inclusion of all commercial Mariners, from the hardy Alaska crab fishermen to the breezy Florida dive boat captains, provided they command U.S.-registered vessels. This perspective, however, raises another conundrum: Where does it position Mariners who have navigated the near coast of the Gulf of Mexico on foreign-flagged drill ships, but under American operational mandates?

Many graduates of America's prestigious maritime academies serve proudly at sea, in some cases commanding some of the largest moving objects on the planet such as mega-cruise ships and post-panamax container ships, yet those vessels do not sail under the U.S. flag. Are these individuals still U.S. Merchant Mariners?

To formulate a cohesive maritime strategy, the initial task is unequivocal: clarify the definition of a U.S. Merchant Mariner. Only with such clarity can we accurately assess morale, readiness, and future prospects in this vital sector. It is important to note, however, that this responsibility falls squarely on the shoulders of the U.S. government, not on individual advocates like me.

While nobody has accurate U.S. Merchant Marine information, some sealift experts, like Dr. Sal Mercogliano, believe there are currently enough Mariners to meet the most basic surge sealift requirements for a few months. There is, however, no point in citing any of these estimates because, without available MARAD data, it is pure conjecture.

The U.S. Merchant Marine is grappling with a dual challenge: dwindling morale and an identity crisis. Naval academies revel in their storied past with much fanfare, yet Merchant Marine academies frequently sideline their own illustrious history. Despite each academies being under the aegis of a U.S. Merchant Service admiral, uniform inconsistency among midshipmen is evident. Both MARAD and the Military Sealift Command have the authority to bestow medals for service, yet such recognitions are seldom granted. This ambiguity leaves many Mariners questioning their place and purpose in national defense.

In today's era, an increasing number of Mariners view themselves as "merely civilians," a concerning trajectory for a nation that might rely on their service in potential future conflicts.

Morale within the Merchant Marine has hit a new low, exacerbated during the COVID pandemic. While uniformed U.S. Navy officers aboard Military

Sealift Command ships operated under the liberties and directives of the Uniformed Code of Military Justice (UCMJ) and the secretary of the Navy, the rights of U.S. Merchant Mariners remained in a gray zone. This ambiguity resulted in stark disparities: Navy personnel, in some instances, were granted shore leave to visit families, while Merchant Mariners on the same U.S. naval ship were restricted, unable to even cross the street for essentials at a pharmacy. This glaring inconsistency further eroded morale and trust between the Navy and Merchant Marine communities.

The U.S. Merchant Marine, a tightly woven community, is deeply attuned to narratives of inequity. Stories of unfair practices do not merely echo within the confines of the Military Sealift Command but reverberate throughout commercial fleets worldwide. This trust deficit, while regrettable, is not a novel chapter in our history and is a sentiment that is also often mirrored by pivotal allies, such as the Philippine Merchant Marine, the world's most populous naval force by headcount.

In times of conflict, U.S. Merchant Mariners have historically been summoned to the front lines, a tradition dating back to the American Revolution. Yet, today's Mariners sail without the safety nets of yesteryears: the free healthcare once provided by marine hospitals, which predate the Veterans Administration, and retirement sanctuaries like Snug Harbor are now gone. With these benefits now extinct, one ponders: Will Mariners heed the call of duty in wartime, knowing they lack veteran care if injured? While some might still venture, the overarching concern remains: What of their kin? Personally, if beckoned to serve on a U.S. merchant ship now, the author would probably decline. The absence of assured basic educational and health provisions for my children, should calamity befall me, is a risk too great for my children.

Historically, promises have proven fragile for the U.S. Merchant Marine. In the throes of World War II, President Franklin D. Roosevelt pledged commitments to these Mariners. Yet, in the wake of his demise, these assurances faded into obscurity. It took a court order after a protracted legal skirmish in 1988 for U.S. Merchant Mariners to secure limited veteran status, and a staggering wait until 2022 for full congressional acknowledgment. Given this backdrop, it is improbable that today's Mariners, especially those with families, would venture into active conflict zones based merely on promises devoid of solid legal grounding (which we currently do not have).

There is also the question of training. The U.S. Merchant Marine finds itself at a crossroads. While the U.S. military pours billions into war preparations against superpowers like China—and while China has started to militarize and train its much larger merchant marine—our readiness remains questionable. Despite their pivotal role in every war plan, our Mariners do not enjoy the privileges of active-duty military, or the benefits of veteran status, we grapple with an identity crisis, and we lack training.

Our status is nebulous, at best, with most of us unsure of their place in the broader maritime defense strategy.

Training is another gaping hole. WWII saw significant investment in preparing Mariners for war, but today, essential wartime navigation and defense skills are absent from our repertoire. The Navy's recent admission that Mariners should not expect naval escorts in a major conflict further underscores this deficit.

Not long ago Merchant Marine officers could enroll in basic classes on subjects like avoiding mines, joining a convoy, and secure communications. Then MARAD shut down the U.S. Merchant Marine Academy's Global Maritime and Transportation School, the last school that offered these courses. Today, a small percentage of U.S. Merchant Mariners receive basic military instruction as part of the Navy's Strategic Sealift Officer program. This program, however, lacks a cohesive structure, objective, and scope, and it is only open to those willing to join the Navy Reserve.

Others who sail on ships contracted by the military take some basic classes including firearms and chemical, biological, and radiological defense, but the scope of these classes is usually limited to basic shipboard self-defense.

This situation is unlikely to be corrected as you will have great difficulty finding any Merchant Mariners working at the Pentagon, in national security think tanks, in Congress, or at any war college. On extremely rare occasions you will find U.S. Merchant Mariners who work for Military Sealift Command on replenishment ships—there are currently two seats open for them at the Naval War College—but these individuals have a vastly different skill set (and government benefits package) from the U.S. Merchant Mariners who can conduct sealift operations.

The U.S. Merchant Marine's exclusion from war planning exercises, war gaming, and academic research presents a critical strategic oversight. Given that plans anticipate Merchant Mariners transporting more than 90 percent of all military fuel and supplies in any INDOPACOM conflict, sidelining their expertise is a monumental miscalculation. You cannot make plans without expert advice so the ramifications of this oversight will be dire, and its importance cannot be emphasized enough.

The ambiguity surrounding the U.S. Merchant Marine's identity poses significant strategic challenges. How can military officers integrate Merchant Mariners into their planning without a clear understanding of who they are? The lack of security clearances among many Mariners, coupled with uncertainties about their rights, legal standing, and UCMJ applicability, further complicates their inclusion. If the Merchant Marine grapples with its identity, can it realistically expect to be part of joint exercises, educational initiatives, or military exchange opportunities?

The clarity of role as a Service is a paramount prerequisite for any collaboration in peace and in war.

The challenges facing the U.S. Merchant Marine are as profound as the depths of the Mariana Trench, but we have not even reached the greatest dilemma. At the heart of these challenges is the mass retirement of the baby boomer generation who once heavily manned the Merchant Marine. The Mariner shortage, a looming threat MARAD has cautioned about for two decades, is no longer on the horizon—it is here right now. Shipping companies are grappling to fill their ranks, as a robust job market tempts Mariners with lucrative shoreside opportunities. With wages at sea largely stagnant for years and shoreside compensation soaring, the allure of land is undeniable.

The situation is exacerbated by a surge in vacancies for even the most prestigious maritime roles, like harbor pilots. Military Sealift Command, in a bid to attract talent, is dangling unprecedented recruitment bonuses exceeding $50,000 for some positions. Internationally, companies are luring Mariners with attractive packages to relocate to hubs like London and Singapore. Global disruptions, from port congestion to the European energy crisis, are amplifying the demand for experienced Mariners in shoreside roles. Today, U.S. Merchant Mariners are presented with a plethora of opportunities, and many are opting to bid farewell to the waves.

The greatest sealift challenge in our history, the Battle of the North Atlantic during WWII, came at the heels of the Great Depression when U.S. Merchant Mariners were happy to find any job. But today, opportunities abound. Opportunities that are not dangerous.

If the balloon goes up in the Pacific, will the U.S. Merchant Mariners heed the call to service? The only logic reason to join a ship is a sense of patriotism and duty, but even the fiercest patriotism has its limits. The U.S. Merchant Marine often finds itself overshadowed, largely forgotten by all the military branches except the U.S. Coast Guard. The absence is palpable, especially when our nation's leaders routinely extend gratitude to veterans from every other Service, leaving the Merchant Mariners conspicuously absent from even the most basic acknowledgments.

The question remains: How long can dedication persist in the shadow of abject neglect and near-universal apathy toward the U.S. Merchant Marine?

While many believe the antithesis of love to be hate, it is truly apathy that stands in stark contrast. Judging by this measure, the once revered U.S. Merchant Marine finds itself adrift in a sea of indifference, a Service long relegated to the annals of forgetfulness–a Service wholly unloved by our nation.

CHAPTER 10

THE MARITIME ACADEMIES AND MARITIME TRAINING

Christopher Chiego, PhD; Amy Skoll, PhD; and Ryan Wade, PhD

Introduction: A Brief History of the Maritime Academies

The six state maritime academies and the national maritime academy at Kings Point, New York, have diverse origins, but shared challenges. For much of their history, the academies have fought existential funding battles, experienced difficulties in expanding outside the demographic pool of previous Mariners, debated the role of military-style corps and regiments on campus, navigated up-and-down relationships with the maritime industry, and faced administrative turnover and questions of oversight at the state and federal levels. Yet, they have also produced Mariners of distinction who loyally carried out their missions, responded with aplomb when called on to act in times of crisis, and developed deep ties to their alma maters that helped carry the institutions through financial headwinds.

We start this chapter by briefly reviewing the history of the academies and how the training provided by these institutions evolved over time to meet the needs of individual states and the nation as a whole. The chapter then outlines the current state of maritime training and the standards required for graduates to obtain licensure with the U.S. Coast Guard. Finally, the authors discuss some of the current challenges facing the maritime academies today and how the academies have responded to those challenges. Many issues that the academies grapple with today have echoes throughout the history of these academies and stem from the unique mixture of academic and professional training that is a hallmark of maritime education.

Origins and Early Years

Formal institution-based maritime education in the United States emerged in the latter half of the nineteenth century. Maritime disasters and accidents as well as periodic shortages of trained crew members led to a perceived need for improved training and standardized competencies.[1] The Maritime Schools Act of 1874 encouraged states to create "public marine schools" in certain ports and directed the Navy to provide training vessels for those. New York City immediately acted to start the New York Nautical School in 1874, which would be followed later by schools in Philadelphia (1889) and Boston (1891) sponsored by their respective states.[2]

These early schools were centered on the ships themselves and these "ship schools" might well return to a new berth in their home harbor after each foray out to sea.[3] From the start, maritime education had to shed the historical association of serving at sea with punishment as floating reformatories in Boston and New York preceded the establishment of the nautical schools.[4] The fledgling nautical schools were also tasked with developing their own set of training procedures and vision for what skills their graduates should demonstrate, leading to long-term debates about the length of their programs and content of their curriculum.[5]

In New York, state support was obtained in 1913 to transfer authority from the city of New York to the state and in the process head off an attempt to close the school.[6] As will be discussed, attempts to close these schools were relatively

---

[1] Capt S. B. Luce, USN, "The Manning of Our Navy and Mercantile Marine," U.S. Naval Institute *Proceedings* 1, no. 1 (December 1874).

[2] Jeffrey L. Cruikshank and Chloe G. Kline, *In Peace and War: A History of the US Merchant Marine Academy at Kings Point* (Hoboken, NJ: Wiley, 2008), 32–33; and Joseph A. Williams, *Four Years Before the Mast: A History of New York's Maritime College* (New York: Fort Schuyler Press, 2013), 14–15.

[3] *Massachusetts Maritime Academy: 125 Years of Excellence* (Boston, MA: Pohly, 2016), 10.

[4] Williams, *Four Years Before the Mast*, 10.

[5] Luce, "The Manning of Our Navy and Mercantile Marine"; and Cruikshank and Kline, *In Peace and War*, 32, 64.

[6] Williams, *Four Years Before the Mast*, 81–82.

frequent, especially in their early years. The survival of these schools depended on coalitions of local politicians, the maritime industry, alumni, and other well-wishers in key positions across the state and federal governments who supported the Merchant Marine and the training offered at the academies.

World War II and a New Wave of Academies

Federal intervention in the maritime training domain accelerated in the 1930s as new legislation and amendments established training procedures and the development of a more formal Maritime Service.[7] California started a nautical school in 1929 to meet demand for training on the West Coast, though as it was founded in the inauspicious year of 1929 it barely survived the aftermath of the stock market crash.[8] The coming of World War II saw a massive expansion in the Merchant Marine that led to the establishment of additional training centers around the country and accelerated the opening of the national U.S. Merchant Marine Academy (USMMA) at Kings Point. After some initial debates over where a national maritime academy would fit within the existing network of state-sponsored academies, land at Kings Point on Long Island, New York, was acquired and authority over the institution eventually given to the Maritime Administration.[9] Maine also started its own maritime academy in 1941 just months before American entry into World War II.[10]

Throughout WWII, maritime cadets and graduates actively participated in the American war effort, serving with distinction and in many cases paying with their lives; the USMMA alone saw 142 cadets lost at sea during the war.[11] After the war ended, the final two state academies were added in regions of the country that had not yet seen permanent maritime academies. In Texas, support from the local Propeller Club and business leaders led to legislative action to allow for state appropriations for such an academy in 1959 on Galveston Island, Texas.[12] Texas Maritime Academy was initially opened in 1962 and became incorporated into Texas A&M University at Galveston in 1971.[13] Finally,

[7] Cruikshank and Kline, *In Peace and War,* 69.
[8] G. W. Reichard, *Cal Maritime: The First 90 Years* (Vallejo: California State University Maritime Academy, 2019), 14.
[9] Cruikshank and Kline, *In Peace and War*, 65.
[10] "75 Years—Interactive Timeline," Maine Maritime Academy, accessed 14 February 2025.
[11] Cruikshank and Kline, *In Peace and War*, 96–104.
[12] "A Sea Aggie Celebration," Rosenberg Library Museum, accessed 22 February 2024.
[13] "A Sea Aggie Celebration."

the Great Lakes Maritime Academy opened as part of Northwestern Michigan College in 1969 on the shores of Grand Traverse Bay in Michigan, initially offering an associate degree before acquiring a permanent training ship and developing a four-year bachelor's degree.[14]

Cruises, Skills, and Majors

The defining feature of early maritime education was the school ship, which both facilitated learning the duties of sailors through time at sea and housed the cadets and faculty.[15] Over time, the schools expanded in enrollment to the point where a school ship alone would be insufficient to meet the training needs of cadets and therefore sought more permanent shore facilities to better weather budget challenges and accord with Maritime Administration (MARAD) policies.[16] After a name change in 1929, for instance, the New York State Merchant Marine Academy acquired—after considerable effort—a permanent land-based location for docking the school's ship and establishing shoreside facilities at Fort Schuyler in the Bronx.[17]

On these newfound shoreside campuses, the nautical schools gradually began shifting toward a four-year academic training program that would result in the awarding of bachelor's degrees. Time at sea remained important, however, with the USMMA splitting its individual cadets' "Sea Year" into two half-years while other academies took their training ships out to sea for months at a time on cruises.[18] Such cruises not only served as invaluable experiential learning opportunities, but also opportunities for goodwill visits to venues around the world such as bringing supplies to war-affected regions of Europe and conducting Cold War diplomacy with citizens of the Soviet Union.[19]

Outside of maritime training, the academies also worked to upgrade their curricula in preparation for obtaining accreditation from the regional

[14] Peg Siciliano, "Great Lakes Maritime Academy Anchored by Past Sails Toward Future," *Royal Oak (MI) Tribune*, 16 June 2021.
[15] Cruikshank and Kline, *In Peace and War*, 42; and Reichard, *Cal Maritime*.
[16] James McCloy, ed., *The Future of Maritime Officer Education and Training* (Galveston, TX: Moody College of Marine Sciences and Maritime Resources, 1976), 195.
[17] Williams, *Four Years Before the Mast*, 141.
[18] Cruikshank and Kline, *In Peace and War*, 182–83, Reichard, *Cal Maritime*, 14; and Philbrick, *Massachusetts Maritime* Academy, 9–10.
[19] Reichart, *Cal Maritime*, 32–33; and Philbrick, *Massachusetts Maritime Academy*, 50.

accrediting agencies for higher education.[20] As many early graduates of the academies moved on to shoreside careers, the importance of developing competitive and transferable skills in leadership and critical thinking grew even further, increasing the incentives to diversify the educational experience of maritime cadets to simultaneously prepare them for careers at sea and shoreside. Though primarily focused on the degrees of marine transportation (deck) and marine engineering (engine), many academies have also ended up adding additional majors and a wider range of courses. Cal Maritime, for instance, added both a business administration major and a global studies major with a focus on global awareness while Massachusetts Maritime added an emergency management major and Maine Maritime a marine biology major.[21] Even in the non-licensure-track majors, the maritime academies tend to focus on experiential learning, with internships, co-ops, and other hands-on programs a crucial part of most degrees.[22] Such focus makes academy graduates very competitive in the job market, resulting in exceptional job placement rates of cadets post-graduation well into the 90 percent range at some schools along with high average starting salaries.[23]

Financial and Existential Challenges

Maritime education requires an investment in an unusual array of equipment and training, from the ships themselves to supplies for cruises to modern-day ship simulators. The academies have faced much questioning from a wide variety of opponents, from budget-minded bureaucrats and legislators to fears of competition from the maritime unions. To take one example, the U.S. Merchant Marine Academy survived one particularly narrow escape during the Dwight D. Eisenhower administration as the Maritime Administration planned to close USMMA as part of a cost-cutting measure. USMMA supporters rallied to resist the cut and pass federal legislation that enshrined Kings Point as a permanent academy in 1956.[24]

---

[20] McCloy, "The Future of Maritime Officer Education and Training," 144–45.

[21] Reichard *Cal Maritime*, 72–73; Philbrick, *Massachusetts Maritime Academy*, 27; and John Tierney, "An Educational Surprise from Down East: The Maine Maritime Academy," *Atlantic*, 20 November 2013.

[22] Philbrick, *Massachusetts Maritime* Academy, 57; and Tierney, "An Educational Surprise from Down East."

[23] Andra Cernavskis, *The Hechinger Report: Some Small Universities Can Promise Big Paychecks* (New York: Hechinger Report, 2015).

[24] Cruikshank and Kline, *In Peace and War*, 156–64.

New York's maritime school had to fend off at least five serious attempts to close it from the City of New York and later the State of New York, usually whenever it seemed such closure might help solve a budget shortfall.[25] The California Maritime Academy survived multiple attempts to close it by the state legislature from the 1930s into the 1950s even after setting up a shoreside campus.[26] And in the case of the Pennsylvania Nautical School, it temporarily closed for six years in the 1910s and then permanently closed in 1947 after the Pennsylvania State legislature found that it could save $7 million by doing so.[27]

To acquire a firmer financial footing, some of the academies were integrated into their state university systems. New York's Maritime College was incorporated as a founding member of the State University of New York (SUNY) system in the late 1940s.[28] California Maritime Academy entered into the California State University (CSU) system in 1995 after a series of scandals related to sexual harassment on cruise attracted negative press attention in the late 1980s.[29] Incorporation into the CSU system was seen as both a way to provide more oversight of the school to complement ongoing efforts to stem harassment and a financial backstop to solve perennial budget problems.[30]

Other academies also experienced challenges involving the mistreatment of female cadets on commercial cruises and on campus.[31] After a federal policy change in 1972, the academies were allowed to go coed and the first female cadets arrived and graduated amid often difficult circumstances in the face of skepticism and harassment.[32] The negative experiences at sea in particular during commercial and school cruises pointed to a longtime obstacle for maritime education: even from the very start of cadets going on commercial ships, time at sea could be a risky endeavor for cadets with few resources to address mistreatment.[33]

On the campuses of the maritime academies, many officer corps of cadets or regiments with military-style structure and leadership opportunities for ca-

[25] Williams, *Four Years Before the Mast*, 141.
[26] Reichard, *Cal Maritime*, 14–16.
[27] "Maritime School to Close," *New York Times*, 89; and Cruikshank and Kline, *In Peace and War*, 120.
[28] Williams, *Four Years Before the Mast*, 180.
[29] Reichard, *Cal Maritime*, 55–56.
[30] Reichard, *Cal Maritime*, 60–61.
[31] Cruikshank and Kline, *In Peace and War*, 239; and Williams, *Four Years Before the Mast*, 223–27.
[32] Williams, *Four Years Before the Mast*, 223–27; and Reichard, *Cal Maritime*, 48–49.
[33] Cruikshank and Kline, *In Peace and War*, 70–71.

dets have also sometimes been the source of resentment and unrest.[34] Clashes over plans or even rumors of plans to modify these bodies led to public conflict at several schools such as when SUNY Maritime College sought to admit civilian majors outside of the regiment in the early 2000s.[35] Given the unique status of the Merchant Marine more generally in the United States, the debate over the extent to which military-style regulations are integrated with the student experience at these campuses remains likely to continue into the future.

Enrollment also fluctuated at the academies, with expansions and retractions in enrollment numbers varying depending on concerns over budget issues and program cuts. In the early 1990s, for example, SUNY Maritime suffered from a major decline in enrollment after budget cuts led to prospective student concerns over the financial viability of the institution and the loss of several academic programs.[36] Enrollment issues were addressed in part by broadening recruitment efforts, though such initiatives sometimes ran into cultural issues surrounding the lack of racial and gender diversity at the schools. SUNY Maritime and Kings Point for instance both sought to attract exchange students from abroad, although the reception on campus was not always welcoming.[37] The academies as a whole began to make tentative inroads to recruit and welcome non-White students as well in the 1970s and 1980s, though considerable challenges remain through the present day.[38]

Over the years, federal action and state legislation have been important tools in helping to fund cadet training. Updating facilities has been a long-running need, with new ships and building facilities requiring large sums of funding to acquire national security multimission vessels (NSMVs). While such funding is invaluable to defraying these costs, it also varies depending on political circumstances, which can make appropriations for upkeep and support outside of major purchases more difficult. Federal and state support additionally come with strings attached as well and can complicate oversight. As Alfultis et al. note, the academies must maintain accreditation, stay in compliance with state and system-wide academic regulations, obey MARAD and federal policies, and follow the Standards of Training, Certification and Watchkeeping

[34] Reichard, *Cal Maritime*, 52.
[35] Williams, *Four Years Before the Mast*, 233–37; and Cruikshank and Kline, *In Peace and War*, 408–10.
[36] Williams, *Four Years Before the Mast*, 260–62.
[37] Williams, *Four Years Before the Mast*, 237, 275; and Cruikshank and Kline, *In Peace and War*, 315.
[38] Reichard, *Cal Maritime*, 51, 76; and Cruikshank and Kline, *In Peace and War*, 228–331.

(STCW) program from the Coast Guard.[39] Organized labor has also had periods of greater and lesser support for the academy model of maritime education amid historical fears of academies overproducing graduates when the job market is not as strong.[40] And private schools for specific maritime specialties as well as community colleges offering maritime programs have been occasional competitors to the academies.

Outside organizations from the maritime industry like the Propeller Club and academy alumni support have been crucial to ensuring the survival of the academies in hard times. When the academies are threatened, alumni are often mobilized to come to their rescue, as the alumni of California Maritime Academy rose to defend the academy in the 1950s against proposed state cuts.[41] Alumni of USMMA did the same in response to cost-cutting measures under the early years of the William J. "Bill" Clinton administration.[42] Involved alumni also could push back against changes, as seen by a major split between SUNY Maritime and its alumni association in the aftermath of opening up majors to nonregiment students.[43]

Mariner Training Components

Today, U.S. Merchant Marine unlimited-license training at the university level continues to be provided by the remaining seven institutions of maritime higher education. The United States Merchant Marine Academy (USMMA), California State University Maritime Academy, Texas A&M Maritime Academy, Massachusetts Maritime Academy, Maine Maritime Academy, SUNY Maritime College, and the Great Lakes Maritime Academy offer various degree programs that, upon successful completion of the curriculum and United States Coast Guard licensing exams, culminate in a bachelor's degree and Coast Guard endorsed credential as a third mate or third assistant engineer. The federal USMMA and six state maritime academies have evolved to vary in institutional structure, campus culture, and academic programs, among others,

[39] RAdm Michael A. Alfultis, Capt Ernest J. Fink, and Capt Mark S. Woolley, "State Maritime Academies: Educating the Future Maritime Workforce," *Journal of Safety & Security at Sea* (January–April 2017): 16.
[40] Cruikshank and Kline, *In Peace and War*, 47, 69.
[41] Reichard, *Cal Maritime*, 50.
[42] Cruikshank and Kline, *In Peace and War*, 361.
[43] Williams, *Four Years Before the Mast*, 282–84.

yet provide a common mariner training curriculum for cadets pursuing Coast Guard licenses and careers in the maritime industry.

The merchant mariner training programs are structured by the STCW Convention of the International Maritime Organization (IMO), and the specific regulations and policies for mariner training in the United States are established by the Coast Guard Office of Merchant Mariner Credentialing (CG-MMC). Each of the Coast Guard-approved programs at the seven maritime academies are reviewed and reapproved every five years by the CG-MMC and the U.S. Maritime Administration (MARAD) to ensure compliance with all IMO STCW Tables of Competencies as established in Title 46 United States Code.[44] Each maritime academy campus follows the same minimum STCW standards established by the Coast Guard but may vary in required sea time for graduation, number and type of license-track degree programs, training ship size, functionality, and access, regiment and/or corps of cadet's requirements, and other campus-specific institutional designs and structures. On each campus, all licensed-track degree programs culminate in examinations developed by the Coast Guard and successful completion of each exam component is required for Coast Guard endorsement as a third mate or third assistant engineer.[45] Coast Guard examinations are a grueling, multiday process designed to ensure that endorsed academy graduates are fully prepared to assume positions as officers aboard vessels of all types including unlimited tonnage. The credentialing of qualified officers that have met all domestic and international standards for licensure is performed by the Coast Guard National Maritime Center (NMC) after graduation.[46]

Professional mariner training at the USMMA and six state maritime academies is unified via STCW curricula, Coast Guard certification, relationship to MARAD, and a campus Corps of Cadets. MARAD fully funds and operates the USMMA through a congressional endorsement and provides federal funding and resources to the six state academies through individual memoranda of agreement for the specific merchant mariner training component of degree curricula including, but not limited to, STCW training resources, training

[44] See "The Office of Merchant Mariner Credentialing (CG-MMC)," USCG.mil, for more detailed information.

[45] See "Deck and Engineering Guide for the Administration of Merchant Marine Examinations," USCG.mil, August 2014, for more detailed information.

[46] See USCG National Maritime Center for more detailed information.

vessels, and port and marine operations resources. While the physical environments, academic programs and student body communities may vary across the seven institutions, every student pursuing a license-track degree is a member of a Corps or Regiment of Cadets on each campus. Uniformed cadets participate in required activities and responsibilities that dovetail with STCW requirements and provide a professional training environment in preparation for positions as officers aboard vessels in the U.S. Merchant Marine.

As codified in Title 46 U.S.C. (46 Code of Federal Regulations 10, 11, 12, 13, 15, 16) and regulated by the Coast Guard, STCW requirements provide the core curriculum for licensed-track majors at each academy. Each program then has the liberty of curricular design to ensure that upon successful completion of coursework and Coast Guard examinations, each cadet has met the standards for STCW endorsement in the relevant categories for each degree that include the following: master and deck department, engine department, radio communication and radio operators, special training requirements for personnel on certain types of ships (tanker cargo), and emergency, occupational safety, medical care, and survival functions.[47] The course structures and curriculum roadmaps within which cadets develop and master the skills and competencies required by STCW vary from campus to campus. For example, marlinspike and rope work competencies may be an independent, one-unit course at one campus and built into a larger three-unit course at another. Regardless of the variation in curricular design, the USMMA and six state academies embed all STCW requirements to provide cadets with the knowledge, skills, and competencies necessary for success in Coast Guard licensing examinations.

Professional mariner training at the seven academies is demanding. It combines the general education principles and courses found at most universities nationally with major-specific courses and all STCW requirements into academic majors with high unit totals. In addition to the unique academic structures of licensed-track degrees at the academies, each offers supplementary programming designed to enhance the national security and strategic sealift capacities of the United States Armed Forces. The Strategic Sealift Midshipman Program (SSMP) is offered and administered by the Department of Naval Science at each of the seven academies and is designed to qualify cadets

[47] See USCG Standards of Training, Certification, and Watchkeeping for more detailed information.

for commissioning into the Strategic Sealift Officer Force (SSOF) as a strategic sealift officer (SSO) as an ensign in the U.S. Navy Reserve.[48] SSMP enrolled maritime academy cadets qualify for MARAD's Student Incentive Payment Program (SIP) and receive federal funding to offset academy costs.[49] Successful graduates of the SSMP receive a Coast Guard-endorsed merchant mariner's license and are placed as SSOs in the Strategic Sealift Readiness Group (SSRG) of the U.S. Navy Reserve. In addition, the United States Coast Guard offers the Maritime Academy Graduates (MARGRAD) Program after commencement for graduates of all degrees including those not culminating in a Coast Guard license. Due to the specialized education and training of students and cadets at the U.S. maritime academies, the MARGRAD Program offers a direct commission pathway to carry out the missions of the Coast Guard as an officer.

Mariner education and training involves a complex system of theory, experiential learning, and sea-training that takes place in classrooms, laboratories, simulators, the corps and/or regiment of cadets, and training and/or commercial vessels. Licensed-track faculty instructors play a critical role in the education and training of Coast Guard licensed officers. Instructors are required to have all Coast Guard licenses and other credentials such as Transportation Worker Identification Credential (TWIC) and Merchant Mariner Credential (MMC) relevant to the STCW, maritime facility, and shipboard course requirements. During the course of the four-year degree program, faculty work closely with cadets through both classroom and hands-on instruction modalities in preparation for licensing examinations, commencement, and commissioning as a third mate or third assistant engineer. The unique and highly regulated requirements of both cadets and faculty provide career opportunities that are difficult to achieve outside of the seven institutions; however, they introduce challenges that the U.S. academies and maritime industry more broadly are facing today and potentially into the future.

The USMMA and six state academies share a common mission in training future generations of Coast Guard licensed officers for careers in the merchant marine. However, each academy holds a unique history and has evolved since its founding to a unique institution today. Many of the challenges facing maritime education and officer training at the university level are shared

[48] See NROTC Strategic Sealift Midshipman Program for more detailed information.
[49] See MARAD Student Incentive Payment Program for more detailed information.

by all seven campuses while others impact individual academies more significantly. To various degrees, recruiting of cadets, students, and faculty; diversity of licensed-track graduates; placement of matriculating cadets and graduates aboard training and merchant vessels; the industry impact of COVID-19; and the general declining trend in university enrollment nationwide have presented challenges to the seven academies that provide officer training and licensure in the United States. The policy responses from the federal and state governments and the maritime academies themselves will play a critical role in the future of maritime higher education and the national and global positions and capabilities of the U.S. Merchant Marine.

Current Challenges for the U.S. Maritime Academies

History has demonstrated that it is vital for U.S. national security to maintain a robust supply of Mariners who are trained, qualified, and willing to respond in the case of a crisis or emergency. However, maintaining an adequate supply of licensed Mariners has not always been easy. Today, the industry is not only facing numerous mariner retention issues stemming from the COVID-19 pandemic and a longstanding shipboard culture that has not provided a safe and equitable work environment for all Mariners, but also the traditional pipelines for officers into the maritime industry (e.g., the U.S. Merchant Marine Academy and the six state maritime academies) have also faced their own challenges in both recruiting and graduating enough cadets.[50] As a result of these compounding issues, in 2017, MARAD reported an estimated shortage of 1,839 Mariners with unlimited tonnage credentials and has projected that this shortage of licensed Mariners is only likely to increase, particularly in the aftermath of COVID-19.[51] This section therefore addresses both the current challenges and opportunities the Maritime Academies have in addressing this pressing mariner shortage.

For starters, the largest constraint to the number of Mariners that can receive their license from a maritime academy in any given year is the limited capacity of existing training vessels. Until recently, existing training vessels

[50] *Assessing the Shortage of United States Mariners and Recruitment and Retention in the United States Coast Guard, U.S. House Committee on Transportation and Infrastructure and Subcommittee on Coast Guard and Maritime Transportation*, 118th Cong. (11 May 2023) (statement of Anne C. Phillips).
[51] *Assessing the Shortage of United States Mariners and Recruitment and Retention in the United States Coast Guard*.

docked at each of the maritime academies were not only old and outdated, but also only had capacity for only a few hundred students. Texas A&M Maritime Academy even has had to send cadets to the other maritime academies to get their sea time due to their current lack of berth capacity.[52] However, in 2018, Congress appropriated $1.61 billion for the recapitalization of the MARAD training ship fleet, which has resulted in the approval of five new NSMV to be built for five of the state maritime academies (excluding the Great Lakes Maritime Academy).[53] Each of these new state-of-the-art training vessels has the capacity for 600 cadets, a dramatic increase from the capacity of the existing training vessels. The keel laying ceremony for the first NSMV, *Empire State VII*, occurred on Friday, 10 December 2021, at SUNY Maritime, and by 2026 all of the five NSMVs should be in operation, with California State University Maritime Academy receiving the last of the five new training vessels.

Although the funding of the NSMVs will result in a substantial increase in capacity to train Mariners at the existing state maritime academies, some still argue that it is necessary to consider expanding the number of state maritime academies all together in order to adequately address the Mariner crisis. The Maritime Administration addressed the pros and cons of this option in a 2020 report to Congress. Conversely, the report acknowledges that existing state maritime academies disproportionately draw from their home states due to the significant difference between in-state versus out-of-state tuition fees.[54] Therefore, even though these state maritime academies market themselves as regional institutions and in some cases provide regional discounts for out of state students (such as the Western Undergraduate Exchange), the practical realities of moving out of state for students as well as prohibitive out-of-state tuition costs are resulting in untapped populations of future Mariners.[55] The Southeastern United States is particularly underrepresented when it comes to access to the maritime academies even though the Southeastern United States has a substantial coastal population and a number of important maritime industries.[56] However, building a new state maritime academy is extremely costly and would fall

[52] *Assessing the Shortage of United States Mariners and Recruitment and Retention in the United States Coast Guard*.
[53] *Assessing the Shortage of United States Mariners and Recruitment and Retention in the United States Coast Guard*.
[54] *Opportunities and Challenges to Increasing the Number of United States Coast Guard Credentialed Mariners: Report to Congress* (Washington, DC: U.S. Department of Transportation, 2020).
[55] *Opportunities and Challenges to Increasing the Number of United States Coast Guard Credentialed Mariners.*
[56] *Opportunities and Challenges to Increasing the Number of United States Coast Guard Credentialed Mariners.*

on the state to fund with only minimal assistance from MARAD.[57] For example, the operating budget for Cal Maritime in 2016–17 was $44.1 million, of which the state paid more than 65 percent.[58] Even though the state maritime academies are great tools for upward mobility for their cadets and can provide industry opportunities for states, the start-up costs and operating expenses required to sustain the state maritime academies are extremely prohibitive and risky, especially given the uncertainty surrounding the future of automation in the maritime industry.

One way that the state maritime academies have sought to address the gap between their enormous operating costs and low student enrollments is to increase their offerings of nonlicensed shore-side majors, and in some cases, such as SUNY Maritime, move to an opt-in corp experience (i.e., an "academy *within* a university" model). Nonlicensed majors can bring in tuition dollars without significantly increasing operating costs and can therefore reduce the amount of money needed by the state to subsidize operations. Although this option has proven to have enormous financial potential, it is not without its challenges. In particular, the decision to move to an opt-in corp experience has raised many questions related to campus identity and culture, inciting fears of ossifying divisions on campus even further between the "licensed" and "shore-side" majors. Furthermore, although theoretically moving to an opt-in corp has the potential to increase campus enrollment by attracting students who would not otherwise consider the state maritime academies due to the corp requirements, initially it may be very difficult to rebrand the university and overcome existing biases regarding the student experience on campus. With already stretched financial resources and limited campus personnel, undertaking these rebranding and recruitment efforts are likely to be taxing on these institutions that were not initially designed to compete with all the other campuses within the state for student enrollments.

This challenge is further exacerbated by the fact that there is a national college student enrollment crisis. College student enrollment dropped eight percent from 2019 to 2022, the steepest decline on record according to the U.S.

[57] *Opportunities and Challenges to Increasing the Number of United States Coast Guard Credentialed Mariners.*
[58] *Opportunities and Challenges to Increasing the Number of United States Coast Guard Credentialed Mariners.*

Bureau of Labor Statistics.[59] Although the pandemic is part of the story, a hot job market and the rise of the "gig" economy have further undermined the perceived value of a college degree.[60] This has fueled even greater competition between universities that now have to fight even harder to recruit the declining pool of potential applicants to their campuses. In the case of the California State University (CSU) System, Governor Gavin Newsom announced in 2023 a new plan to address declining student enrollments: any campus that is missing its enrollment target by at least 10 percent will permanently lose 5 percent of their state funding starting in academic year 2024–25.[61] California's State Maritime Academy is currently one of the seven CSU campuses missing its enrollment target by 10 percent or more, and unless it can resolve its enrollment challenges quickly, it runs the risk of permanently losing some of its state funding.[62]

Not only is the United States facing a national college student enrollment crisis, but young men in particular are going to college at much lower rates. According to the Pew Research Center, only 42 percent of college students at four-year universities in 2021 were men, down from 47 percent in 2011.[63] Given the fact that the maritime industry is heavily male dominated, with women making up only 1.2 percent of global seafarers, this trend has the potential to further exacerbate recruitment challenges at maritime academies in the United States. Furthermore, although the maritime academies have sought to increase student enrollment and retention rates of female students, a lot of work is still to be done in order to make the cultures of the maritime academies more welcoming, safe, and inclusive for female students, especially in light of the high-profile Midshipman X case.[64] In the aftermath of the Midshipman X case, the Department of Transportation, USMMA, and MARAD have sought to reform policy and training procedures surrounding sexual assault and harassment, launching the "Every Mariner Builds a Respectful Culture" program in

[59] Colin Binkley, "The Labor Shortage Is Pushing American Colleges into Crisis, with the Plunge in Enrollment the Worst Ever Recorded," *Fortune*, 9 March 2023.
[60] Binkley, "The Labor Shortage Is Pushing American Colleges into Crisis."
[61] Mikhail Zinshteyn, "College Enrollment Decline Leads to Funding Changes for Underperforming Cal State Schools," CalMatters, 24 January 2024.
[62] Zinshteyn, "College Enrollment Decline Leads to Funding Changes."
[63] Richard Fry, "Fewer Young Men Are in College, Especially at 4-Year Schools," Pew Research Center, 18 December 2023.
[64] "Women in Maritime," International Maritime Organization, accessed 24 January 2024.

December 2021, which among other reforms, specifically requires commercial carriers to agree to an extensive list of sexual assault prevention procedures before MARAD authorizes USMMA cadets to cruise with them.[65]

In addition to these challenges in recruiting a robust pool of future Mariner's vis-a-vis the USMMA and state maritime academies, it is also proving to be difficult to recruit and retain an adequate pool of licensed Mariners willing to serve as a faculty member at a maritime academy. The salary range that the maritime academies are able to offer potential faculty recruits pales in comparison to the salary potential licensed Mariners can get at sea as well as in the numerous shore-side positions available to them. As a result, existing licensed faculty members at the maritime academies are often stretched thin as they try to fulfill all of the Coast Guard licensing requirements for their students with a limited number of faculty members who are qualified and willing to teach all of the course requirements. In turn, the demands placed on extant licensed faculty makes it much more difficult for the maritime academies to retain their faculty and further exacerbates faculty recruitment difficulties.

Conclusion

Although the challenges facing the maritime academies are numerous, the maritime academies also have many strengths that can be leveraged to address some of these recruitment and retention problems. A maritime education is a practical, hands-on experience with high earnings and prestigious job potential; it places a significant emphasis on leadership development and gives students opportunities to see the world; it has a proven track record of increasing social mobility for underrepresented groups; and it offers students an opportunity to pursue a career that is meaningful, full of adventure, and vital to U.S. security. In a time when many are rethinking the value and purpose of higher education in the twenty-first century, the maritime academies have an opportunity to set an example of what a valuable and purposeful education can look like. Traditional models of higher education are in crisis, presenting an incredible opportunity for the maritime academies to step up and remind students, parents, educators, and policymakers that there are alternative models to higher education that are also worth considering.

[65] *Assessing the Shortage of United States Mariners and Recruitment and Retention in the United States Coast.*

It is evident from the dynamic history of the U.S. maritime academies that this is not the first time that the U.S. maritime academies have faced challenges, nor will it be the last. They have had to adapt over time to address the needs of the maritime industry as well as national security demands. The survival of the U.S. maritime academies has relied on and will continue to rely on key stakeholders understanding the value of a maritime education and the vital importance of providing a well-trained, robust supply of Mariners for national security.

CHAPTER 11

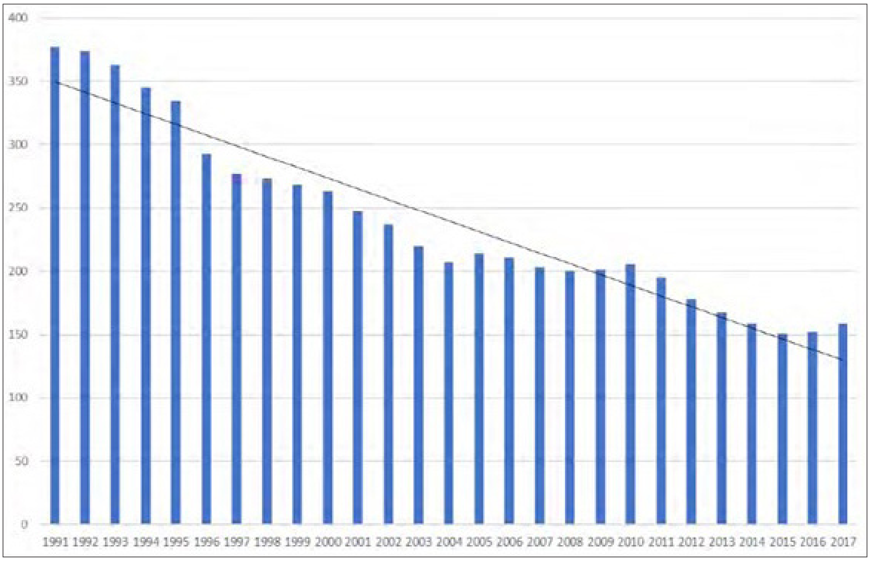
MARINER RETENTION: DECADES OF NEGLECT

Geoffrey Brown with Lieutenant Commander Eric Bardot, USN

The current state of the U.S. Merchant Marine presents a national security problem: the labor force is demonstrably so tight that risks of ship delays in a conflict are a real hazard. For the past three decades, the number of U.S.-flag merchant vessels and Merchant Mariners have been on a downward trajectory. In 2017, the most recently conducted Mariner Workforce Working Group (MWWG) report found that the United States is 1,839 Mariners short of what would be necessary for sustained operations in wartime.[1] As noted by U.S. Army lieutenant general John Sullivan, deputy commander of U.S. Transportation Command (USTRANSCOM) at a maritime industry meeting in March 2023, this is an issue of national security. Nearly 90 percent of U.S. military equipment would move by ship in wartime. Sullivan also underlined the importance of the mariner workforce: "U.S. Merchant Mariners are the backbone of our maritime capability. The qualified Mariners you employ are the lifeblood we rely on to power our strategic sealift portfolio."[2]

[1] *Maritime Workforce Working Group Report* (Washington, DC: Maritime Administration, Department of Transportation, 2017), 146.
[2] Rob Wieland, "Government and Maritime Industry Executives Discuss Readiness," Defense Visual Information Distribution Service, 16 March 2023.

Figure 1. U.S.-flag privately owned merchant fleet, 1991–2017



Source: *Maritime Workforce Working Group Report* (Washington, DC: Department of Transportation, 2017), 5.

The fact of the matter is that mariner numbers are linked to ship billets, and those have been going down year after year for the past three decades.[3] According to sealift expert Dr. Salvatore Mercogliano's math, the U.S. Merchant Marine went from 16.9 percent of the world's fleet (2,296 ships) in 1960 to a mere 0.4 percent (182) by 2019.[4] Based on reports from recent years, overall mariner numbers are estimated at just under 200,000, an overall drop from the 208,718 that the MMWG report cited in 2017.[5] However, only a mission essential subset of Mariners crews the surge sealift fleet.[6] These Mariners that possess unlimited tonnage and horsepower credentials are therefore the source

[3] *Maritime Workforce Working Group Report*, 5.

[4] Salvatore R. Mercogliano, "American Strategic Sealift in Peer-to-Peer Conflicts: A Historical Retrospective, Pt. 2," Center for International Maritime Security, 29 June 2021.

[5] *Maritime Workforce Working Group Report*, 25; and Melissa D. Baker, *U.S. Mariner Mental Health & Wellbeing during COVID-19 and Beyond* (Seattle: University of Washington, 2021), 10.

[6] *Maritime Workforce Working Group Report*, 1.

Table 1. Estimated demand for Mariners under surge fleet full operating status

Category	MSC CIVMARs	Active Mariners	Total demand	Mariner deficit
Total active pool	5,576	11,616	Active = 17,192	Inactive = 16,023
Launch (3 months)	4,646*	7,500	12,146	0
Initial activation (6 months)	5,576	11,678	17,254	62+
Sustainment (indefinite)	5,576	13,607	19,183	1,991

* Estimate based on MSC 1.2 manning billet; + MARAD's estimate of 11,768 would not result in a deficit.

Source: *Maritime Workforce Working Group Report* (Washington, DC: Department of Transportation, 2017).

of USTRANSCOM retention woes. In 2017, out of the 208,718 Mariners, only 33,215 held such unlimited credentials.[7]

As seen in figure 1 from the 2017 MWWG report, the U.S.-flagged fleet went from 350 ships to less than 150.[8] The number of *active* Mariners, defined by the MWWG as commercial Mariners that have sailed in the last 18 months, has been on a downward trend for a long time.[9] In 1991, there were approximately 25,000 qualified Mariners, but later in 2004, it was 16,900.[10] In the interim, the 1991 report stated numbers could drop as low as 11,000 if nothing was done, which led to the creation of the Maritime Security Program (MSP).[11] The current MWWG estimate is 11,768, while the MWWG's commercial partner figure is 11,616.[12]

The yardstick that MARAD uses to consider sufficient mariner numbers is simultaneously manning the commercial fleet, Military Sealift Command (MSC) ships, and the Ready Reserve Force; a total of 281 ships.[13] Crewing would be at 1.75 Mariners per billet, or 3 months at sea and 2 months on shore.[14] The MWWG considers two scenarios: sustainment and initial activa-

[7] *Maritime Workforce Working Group Report*, 26.
[8] *Maritime Workforce Working Group Report*, 5.
[9] *Maritime Workforce Working Group Report*, 5.
[10] *Maritime Workforce Working Group Report*.
[11] *Maritime Workforce Working Group Report*, 4, 5.
[12] *Maritime Workforce Working Group Report*, 23.
[13] *Maritime Workforce Working Group Report*, 24.
[14] *Maritime Workforce Working Group Report*.

tion. There is also a logical third, launch. Sustainment is the scenario where sufficient Mariners exist to crew the fleet and consistently relieve Mariners indefinitely.[15] Initial activation is the ability to go for six months to man the entire U.S. flag fleet and sealift and complete a single rotation of Mariners, while launch refers to a scenario where all ship billets are filled without enough Mariners to provide relief and would most likely have a tour of three months or less.[16]

The number of *active* Mariners as reported by employers and unions in the working group report is not enough to crew the surge fleet sustainably. Even using MARAD's estimate of 11,768 active Mariners, there was only a 0.8 percent margin for manning an initial activation in 2017, a mere 90 Mariners. Using the industry estimate of active Mariners, the numbers are not sufficient for initial activation.[17] Looking at the table above, the estimated demand would exceed the current workforce by 1,991. Due to this tiny margin, there are two further factors to consider for ensuring a sufficiently large mariner workforce exists for surge sealift.

From 2001 to 2017 the total number of Mariner credentials decreased by 68 percent. The lion's share of this decrease can be seen in the number of unlicensed mariner credentials, referred to as "ratings." Ratings, for lack of a better comparison, are equivalent to enlisted members of the U.S. armed forces. This decrease in total ratings numbers over the 16 years between 2001 and 2017 suggests a manpower shortage that will affect the surge sealift fleet's readiness.[18] Apart from the workforce numbers themselves there is the question regarding the willingness of Mariners to sail in war time.

For Mariners, joining the activation of the surge sealift fleet for national defense is voluntary.[19] As such, there needs to be some margin between the number of Mariners required to crew the surge sealift fleet and the current U.S. mariner workforce. Based on the 2017 report, the margin for six months of surge sealift operations is tiny, a total of 90 Mariners, not even 1 percent of the

[15] *Maritime Workforce Working Group Report*.
[16] *Maritime Workforce Working Group Report*, 5, 24.
[17] *Maritime Workforce Working Group Report*, 23.
[18] *Maritime Workforce Working Group Report*, 29; and *2001 Mariner Survey Principal Findings* (Washington, DC: U.S. Department of Transportation, 2001).
[19] *Maritime Workforce Working Group Report*, 146.

Table 2. Decrease in total Mariner numbers, 2001–7

Breakdown	2001 survey	2017 MWWG	Percent change
Officers	20,157	14,645	-27%
Ratings	84,013	18,570	-78%
Total	104,170	33,215	-68%

Source: *Maritime Workforce Working Group Report* (Washington, DC: Department of Transportation, 2017).

total.[20] It would take 99.2 percent of Mariners currently working in the maritime industry to partially meet the surge sealift needs outlined in the MWWG report. The figures in table 3 based on the University of Washington's 2021 survey data illustrate how even in the best-case scenario there are approximately 2,000 Mariners who would be unwilling to sail in wartime.[21]

The lack of mariner numbers for sustained operations in wartime, the shortage of unlicensed Mariners, and the tiny margin between sealift manpower requirements and the available labor pool are all difficult to tackle. Formulating policy to target and fix mariner retention is hamstrung by the lack of quality data. There is a lack of a comprehensive data set that allows for granular analysis, and it is possible there are further unknown issues affecting the readiness of surge sealift.

Data Issues: An Inability to Assess Manpower

The mariner population is highly diverse with a constant back and forth of workers leaving and returning to industry.[22] This constant flux makes pinning down an exact number over any significant length of time impossible.[23] Everything is an estimate. Problematically, different estimates contain different subsets of information, making comparisons difficult. The U.S. Coast Guard's Merchant Mariner Licensing and Documentation (MMLD) system is the authoritative data source but can only provide the total count of mariner credentials.[24] This resulted in the MWWG working with industry to calculate an

[20] *Maritime Workforce Working Group Report*, 24.
[21] Baker, *U.S. Mariner Mental Health & Wellbeing during COVID-19 and Beyond*, 39.
[22] *Maritime Workforce Working Group Report*, 23; and L. E. Bardot, interview, 18 September 2023.
[23] *Maritime Workforce Working Group Report*, 23.
[24] *Maritime Workforce Working Group Report*, 2.

Table 3. Overall willingness to sail during a time of national need by vessel type

Willingness to serve on:	Before COVID	After COVID	Change
At least 1 of 4 vessel options (coastal/Great Lakes, international commercial trade, private vessel engaged by government, government vessel)	77.6%	82.2%	4.6%
At least 1 of 3 vessel options (international commercial trade, private vessel engaged by government, government vessel)	77.6%	78.0%	0.4%
At least 1 of 2 vessel options (private vessel engage by government, government vessel)	74.8%	69.4%	-5.5%
A government vessel	71.9%	62.7%	-9.2%

Source: based on data by Marissa G. Baker, *U.S. Marine Mental Health and Well-being during COVID-19 and Beyond* (Seattle: Environmental & Occupational Health Sciences, University of Washington, 2021).

estimate of the total number of Mariners actively sailing using ship billets; the active Mariners previously mentioned.[25] The difference between these two datasets results in an inactive population of Mariners that are qualified but not readily available since they are working on shore, they may not have all their documents up to date.

The lack of a single data source is being worked on. The MMLD was made to issue mariner credentials and is a poor dataset for analyzing mariner manpower.[26] Outside of the basic information regarding a mariner's credential, all additional data such as sea time and skill endorsements are entered into the system in a free text field. This valuable additional information had not been standardized at the time of the 2017 MWWG report. As such, the MWWG

[25] *Maritime Workforce Working Group Report*, 21.
[26] *Maritime Workforce Working Group Report*, 2.

could only use MMLD data to count the total number of unlimited mariner credentials. In the FY 2024 National Defense Authorization Act (NDAA), an overhaul of the system has been authorized, but the overhaul is not projected to be completed before 2026.[27] It could take five years after completion before the system would have enough robust data to be used for analysis. Based on this the MMLD will not be upgraded in time for the next Mariner Workforce Working group that FY 2024 NDAA authorized in section 3534..[28]

The MWWG contains two active mariner estimates: (1) the calculation by using ship billets and (2) the combined numbers provided by commercial partners.[29] This chapter will use the commercial figure of 11,616, because it contains a breakdown of officers and ratings that is necessary for further analysis. It needs to be noted that this number is a narrow estimate, which represents the union and nonunion Mariners currently working at the time of the MWWG report. It is possible some independent Mariners were missing, and some Mariners that have not sailed in the last 18 months are just as ready to sail as those working.[30]

The known factor is 11,616 active Mariners. Some subsets of the inactive Mariners will sail in a national emergency.[31] However, due to lack of data, it is impossible to know the size of this subset. It could be tiny or sizable. In theory, this means there is a safety margin in sealift, but its size is unknown. Currently, the readiness state of inactive Mariners is a black box, and planning cannot assume they will reliably show up to man sealift at full strength.

A further unknown is that the ratings/unlicensed mariner figures of the inactive mariner population in the MWWG were oversimplified. There are a number of oceangoing rating billets that can be filled by Mariners with credentials with less than unlimited tonnage/horsepower: such as ordinary seaman, wiper, steward, etc.[32] This does not apply to the active mariner figures, because *active* Mariners have to have sailed on an oceangoing vessel in the last 18 months.[33] However, this means that certain unlicensed mariner fields, for

---

[27] C. Bright, personal email communication.
[28] National Defense Authorization Act for Fiscal Year 2024, S. 3534, H.R. 2670, 118th Cong. (2023).
[29] *Maritime Workforce Working Group Report*, 21–24.
[30] Bardot, interview, 18 September 2023.
[31] Bardot, interview, 18 September 2023.
[32] "National Maritime Center Checklists," U.S. Coast Guard, accessed 7 January 2025; and L. E. Bardot, interview, 13 October 2023.
[33] *Maritime Workforce Working Group Report*, 23.

example brown-water, great lakes, or near coastal fleets, could be considered as part of inactive mariner figures.[34] Whether ratings that have never served on oceangoing vessels would volunteer for the surge sealift fleet or U.S.-flag fleet during wartime remains a question. It should be noted that ratings that have never sailed on oceangoing vessels might be missing passports and STCW required trainings.[35] As such, the delays to train, document, and credential this group might be more pronounced.[36] Further data is needed in order to flesh out how realistic considering this group as part of readiness is. In any case, it does not change the active mariner ratings figures.

Reports of mariner numbers are sporadic and published when requested by Congress. The bottom line is there is no usable system of record with which to analyze the mariner workforce, and the MMLD will not be ready for use as a comprehensive dataset anytime soon. As such the most current mariner workforce data is from 2017.[37] The data is from before COVID-19, which was by all accounts an extremely rough time for Mariners who were restricted to their ships and sometimes did not get relieved for months at a time.[38]

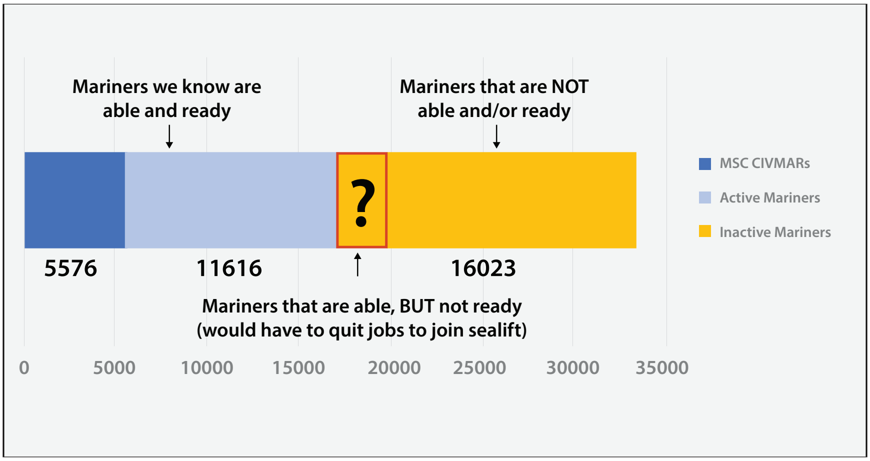
This is a massive issue for both readiness and retention. The inability to dive deeper into the data means it is unknown what specific skills are missing. For example, currently there are only eight steam engine ships in the entire civilian fleet while there are at least twelve in the Ready Reserve Force (RRF) alone.[39] Therefore, even if there are sufficient Mariners for ship billets, skill mismatches could still exist. Without data policies intended to target specific skill sets required to maintain surge, sealift readiness cannot be formulated.

Breaking Down Mariner Numbers

In 2017, only 33,215 out of the 208,718 Mariners held unlimited credentials. This group can be further broken down into three categories: (a) CIVMARs who are the Mariners working for MSC civil service Mariners; (b) active Mar-

[34] "National Maritime Center Checklists"; and Bardot, interview, 13 October 2023.
[35] "National Maritime Center Checklists"; and Bardot, interview, 13 October 2023.
[36] Bardot, interview, 13 October 2023.
[37] *Maritime Workforce Working Group Report*, 144.
[38] Salvatore R. Mercogliano, "Why Military Sealift Command Needs Merchant Mariners at the Helm," Center for International Maritime Security, 2 September 2020; and Joshua Tallis, "Rising Tide Swamping Seafarers: COVID-19 and Mariner Welfare," U.S. Naval Institute *Proceedings* 147, no. 7 (July 2021).
[39] J. Reardon, personal email communication, 2023.

Figure 2. How to view mariner data



Source: courtesy of author, adapted by MCUP.

iners who are commercial Mariners and have sailed in the last 18 months; and (c) inactive Mariners who hold an unlimited credential but have not sailed in the last 18 months.

These distinctions are important for readiness, but Mariners make up one labor pool and it is common for a mariner to shift between different unions, companies, and MSC.[40] The CIVMARs and active Mariners make up the current mariner workforce. Inactive Mariners are working outside the profession and need to be kept engaged. If not, they would lose their credentials after five years.[41]

The readiness component is that the active Mariners would be available and prepared to man the surge sealift fleet in time of war. CIVMARs would already be manning MSC vessels and therefore unavailable. Lieutenant Commander Eric Bardot, strategic sealift officer and license unlimited tonnage master, defines Mariner preparedness as a state where their skills are current (not rusty), have current and applicable Coast Guard credential, current medical

[40] Bardot, interview, 18 September 2023.
[41] *Maritime Workforce Working Group Report*, 30; and Bardot, interview, 18 September 2023.

certification, appropriate maritime and DOD training courses, passport, and transportation workers identification card (TWIC).[42]

On the other hand, the inactive population falls into two categories. Category one includes those Mariners who are ready to sail in a moment's notice (credential, medical, passport, training, TWIC, etc.), but are not actively seeking employment in the sailing maritime sector. The other category would be those who do not have all their paperwork, training, medicine, etc. already and would potentially take weeks if not months to get ready. It falls to inactive Mariners themselves to navigate the ever-changing rules and maintain all their credentials and endorsements; and the reality is overwhelmingly likely inactive Mariners are working onshore jobs that they would have to voluntarily leave.[43] There is little incentive for inactive Mariners to maintain their credentials, and therefore, a low probability that many would be ready and available to sail at short notice.[44] Therefore, the smooth activation and operation of surge sealift relies on active Mariners.

In 2017, between MSC and the commercial sector there were a total of 17,192 Mariners that were ready and able to sail in national emergencies. The 5,576 CIVMARs already working for Military Sealift Command would already be in service and unable to man the surge sealift fleet. Therefore, CIVMARs are considered separately, which leaves 11,616.

In essence, while enough active Mariners exist to fill all ship billets and launch the fleet, relief for Mariners would be in short supply. This is not as bad as it first appears; finding 62 more Mariners, .003 percent, from the inactive population is reasonable. Nevertheless, it would require 12 percent of the inactive Mariners, 1,991, for sustained operations. Even though both ship numbers and Mariners are constantly in flux, these margins are tiny.

Finally, there are two issues with taking these numbers at face value, which put the ability of the surge sealift fleet to achieve initial activation in question. The first is the decline in ratings numbers, the unlicensed Mariners. The second is the willingness of Merchant Mariners to sail during a major conflict. Given the tiny margin of active Mariners that are sealift qualified, these two issues impact readiness.

[42] *Maritime Workforce Working Group* Report.
[43] Bardot, interview, 18 September 2023.
[44] Bardot, interview, 18 September 2023.

Table 4. Mariner numbers by category and rank

Breakdown	MSC CIVMARs	Active Mariners	Inactive Mariners	Total unlimited credentials
Officers	1,136	5,316	8,193	14,645
Ratings	3,986	6,300	7,830	18,115
Other	455	0	0	455
Total	5,576	11,616	16,023	33,215

Source: *Maritime Workforce Working Group Report.*

Table 5. Estimated demand for Mariners under surge fleet full operating status

Category	MSC CIVMARs	Active Mariners	Total demand	Mariner deficit
Total active pool	5,576	11,616	Active = 17,192	Inactive = 16,023
Launch (3 months)	4,646*	7,500	12,146	0
Initial activation (6 months)	5,576	11,678	17,254	62+
Sustainment (indefinite)	5,576	13,607	19,183	1,991

* Estimate based on MSC 1.2 manning per billet; + MARAD's estimate of 11,768 would not result in a deficit.

Source: *Maritime Workforce Working Group Report.*

Unlicensed Mariner Shortage: Ladder of Advancement Issues

Ratings are the backbone of the Merchant Marine, equivalent to enlisted in the military. They join with the promise of a good wage and a ladder for advancement without the need to go to university. However, they have seen a decline in numbers. From 2001 to 2017, there has been a massive 78 percent decline of unlimited ratings credentials.[45]

[45] *Maritime Workforce Working Group Report*, 29; and "2001 Mariner Survey Principal Findings," Maritime Administration, U.S. Department of Transportation, August 2001, 2.

Table 6. Decrease in total Mariner numbers, 2001–17

Breakdown	2001 survey	2017 MWWG	Percent change
Officers	20,157	14,645	-27%
Ratings	84,013	18,570	-78%
Total	104,170	33,215	-68%

Source: *Maritime Workforce Working Group Report.*

This decline is so steep it presents a separate challenge when it comes to manning the surge sealift fleet. The decline has taken the total population from 3.3 ratings per officer to 1.3 (1.07 with MSC CIVMARS excluded) per officer. For reference, MSCs ratio in the MWWG data is 3.5 ratings per officer.[46]

According to MARAD, the average ratio across the CIVMAR, RRF, and commercial ships is about 1.18 ratings per officer, not including the steward's department.[47] This means manning is restricted to approximately 55 percent ratings and 45 percent officers. Every ship is a bit different, and it is impossible to know which ships a shortage would affect, but the generalization holds when applied across all 281 sealift vessels. Table 7 shows this mismatch on initial activation.

The above estimate shows that the real manning issue with an initial activation is specifically the shortage of active unlicensed Mariners. Officers on mass are not going to volunteer to take ratings' billets on ships and incentivizing them to do so in significant numbers requires foreknowledge and pay beyond what would normally be budgeted.[48] The Merchant Marine is a voluntary service, and the Strategic Sealift Officer program cannot fill this void, as they are all deck and engine officers.[49]

Finally, this problem is likely larger than the shortage of 21 on table 7. The ratio of 1.18 is without a stewards department, and with stewards the ratio to 1.54 or about 66 percent of the total numbers.[50] This is because stewards on

[46] *Maritime Workforce Working Group Report*, 29.
[47] M. Mueller, personal communication, 2023.
[48] Bardot, interview, 13 October 2023.
[49] Bardot, interview, 13 October 2023.
[50] Mueller, personal communication, 2023.

Table 7. Estimated initial activation requirement

Mariners	Initial activation*	Active Mariners	Without MV Pride of America
Officers	5,357	5,316	5,316
Ratings	6,321	6,300	5,512
Total	11,678	11,616	10,828

* Estimate based on 1.18 ratings/officer ration; MV *Pride of America* had 788 crew listed in Steward's department in 2017.
Source: *Maritime Workforce Working Group Report.*

sea-going vessels do not necessarily need an unlimited credential. Therefore, our problem is when they are included in the data. According to Matt Mueller at MARAD there are many stewards with unlimited credentials counted in the MWWG data, more than 788 worked on the ship MV *Pride of America* in 2017 alone.[51] As such the total ratings shortage is unknown, but evidence indicates it is an order of magnitude larger than on table 7. With this potential shortage, the gap the inactive mariner pool would need to fill has grown larger.

There are several factors that led to this result, but limited numbers of entry and junior level jobs are a main cause.[52] To simplify a complex system, Mariners with highest unlicensed credential, able seaman-unlimited for deck and qualified member of the engine department for engine, have historically been the overwhelming majority of Mariners hired to man commercial vessels.[53] Consequently, the unlicensed manpower pool looks like an inverted pyramid. It takes three years at sea or about six years working a normal schedule for a mariner to reach this level.[54] The inability to consistently land one of the limited entry or junior level seaman positions would delay a mariner's career advancement due to lack of sea time.

According to the vice president of the Transportation Institute, Sara Fuentes, maritime training programs, such as Seafarers International Union's Piney Point, is full. However, a significant portion of trainees failed to get an

[51] Mueller, personal communication, 2023.
[52] Bardot, interview, 13 October 2023; Fuentes, interview, 29 September 2023; and Tellez, interview, 5 December 2023.
[53] *Maritime Workforce Working Group*, 68.
[54] *Proposed Changes to Merchant Mariner Credential Requirements to Modernize and Help Address the Mariner Shortage*, 46 U.S.C. §7307–46 U.S.C. §7315.

entry-level position as an ordinary seaman. Historically, pretty much only MSC offered these entry-level billets, but the lack of commercial billets created a bottleneck.[55] In Lieutenant Commander Eric Bardot's experience, the junior level able seaman billets exist, but they have been few and far between outside of MSC. These are not allocated as development billets and are sometimes taken by senior Mariners.[56]

Furthermore, it is not only the start of the rating's career ladder where problems occur. Through experience and further education, a rating can become an officer, without a college degree. These Mariners are called hawsepipers. However, the new requirements have greatly reduced the opportunities for advancement from ratings to officer.[57] Only a few unions are willing to pay for this training and in limited quantities. additionally, the time outside of work spent on training is lost income.[58] This has had a major impact on the officer corps. According to T. Christian Spain, vice president of American Maritime Officers, in the 1990s when he started in the union 70 percent of the officers were hawsepipers, but currently 70 percent of the union is made up of the graduates of the maritime academies.[59] This change is an issue for retention as 80 percent of hawsepipers will still be sailing deep-water at the 10-year mark, compared with less than 50 percent of academy graduates.[60] Considered alongside the historical issues with finding entry level positions, the decrease in ratings credentials from 2001–17 is unsurprising.[61]

Questions of Willingness

As stated previously, Mariners are not required to join an activation of the surge sealift fleet for national defense. It is voluntary. Therefore, a readiness estimate must take mariner willingness into account. Based on the MMWG estimate it would require 99.2 percent of Mariners to volunteer to crew ships for an initial activation.[62] Looking at table 9, the smallest possible volunteer rate that would allow for all ship billets to be manned in 2017 was 71 percent.

[55] Bardot, interview, 13 October 2023; and Fuentes, interview, 29 September 2023.
[56] Bardot, interview, 13 October 2023.
[57] T. C. Spain, "Numbers Matter," U.S. Naval Institute *Proceedings* 74, no. 1 (2017): 10–13.
[58] Spain, "Numbers Matter."
[59] T. C. Spain, interview, 27 October 2023.
[60] Spain, interview, 27 October 2023.
[61] Spain, interview, 27 October 2023.
[62] *Maritime Workforce Working Group Report*, 24.

Table 8. Desk officer requirements

1996	2016
U.S. Coast Guard license	U.S Coast Guard license (MMD)
Radar endorsement	Radar endorsement
	• STCW officer endorsement[1] • Training required for OICNW endorsement • Medical first aid provider • Search and rescue • Terrestrial and celestial navigation and electronic navigation systems • Watchkeeping, including COLREGS and IMO standard marine communication phrases (SMCP) • Basic cargo handling and stowage • Basic ship handling • Basic stability and ship construction • Basic meteorology • Medical first aid provider • Visual signaling • Bridge resource management • Leadership and teamworking skills • ECDIS
	ARPA endorsement[2]
	GMDSS operator endorsement[3]
	Basic training endorsement
	Advanced firefighting endorsement
	Survival craft endorsement
	GMDSS FCC license[3]
	U.S. Coast Guard medical certificate
	TWIC[4]

[1] Standards of training certification and watchkeeping: officer in charge navigational watch.
[2] Automatic radar plotting aid.
[3] Global maritime distress and safety system.
[4] Transportation worker identification card.
Source: Kevin S. Cook, *Meeting the Strategic Sealift Needs of the US with a Limited Merchant Marine* (Carlisle, PA; U.S. Army War College, 1999), 18.

Table 9. Estimated volunteer requirement for sealift

Category	MSC+ active	Required volunteer rate	Mariner deficit	Deficit as % of inactive
Mariner total	17,192			Inactive = 16,023
Launch (3 months)	12,146*	71%	0	0
Initial activation (6 months)	17,254	101%	62	1%
Sustainment (indefinite)	19,183	112%	1,991	12%

*Estimate based on MSC 1.2 manning per billet.
Source: *Maritime Workforce Working Group Report*.

The most recent evidence suggests there are enough willing Mariners for launch, but not for initial activation or sustainment. In 2021, the University of Washington surveyed unlimited credential officers about their willingness to sail during a time of national need, as part of their post-COVID study on mariner mental health.[63] The report's author, Dr. Marissa Baker, provided the authors with the raw data from the survey, which was filtered to only include unlimited credential officers, who had sailed in the last year, reported working on an oceangoing vessel, and had finished the survey.[64] This left a group of 477 officers, 130 of which reported working for MSC.

A total of 82.2 percent of respondents answered that, post-COVID-19, they would be willing to serve on some type of U.S.-flag vessel during a time of national need. In readiness terms, this data suggests that 1,148 officers of 6,452 would not sail if the surge sealift fleet were activated. Therefore, it would take more than a thousand inactive officers volunteering to have sufficient crewing for initial activation. Considering the bottom willingness figure of 62.7 percent for government-owned vessels, the surge sealift ships are likely to struggle to attract active officers the most. That is without considering the willingness factor for ratings, which were last surveyed in 2002. In the historical survey data below, ratings were less likely to answer that they would volunteer during a time

[63] Baker, *U.S. Mariner Mental Health & Wellbeing During COVID 19 and Beyond*.
[64] Baker, *U.S. Mariner Mental Health & Wellbeing During COVID 19 and Beyond*, 12.

of national need.[65] Sealift's challenge would be how to get inactive Mariners sorted to join ships. They could need a new TWIC, a passport, or refresher training; issues that delay them for weeks or months. There is no margin for error or rank/skill mismatch. Therefore, the evidence suggests that the maritime industry would have had manning problems from the outset under surge sealift conditions.

Further problems could occur as the duration of activation increases. Table 11, built from Dr. Baker's survey data, gives the willingness of officers to work the schedule MARAD lays out in the MMWG report of 1.75 Mariners per billet, which means three months on two months off.[66]

These numbers suggest that sustaining surge sealift after activation would further exacerbate shortages. While 82.2 percent of officers are willing to sail, only 57.7 percent responded as being willing to sail for three months or more. More importantly for sealift, less than half of officers would accept two-month shore breaks during a time of national need. There is a risk that a mariner shortage would worsen during an activation. Longer shore breaks put the viability of any operation more than five months into question, even if enough Mariners initially volunteer. If Mariners decide they are taking a three-month break after sailing for three months, reliefs will not be available for those at sea.

In summary, applying the 2021 survey data set to the available mariner workforce data from 2017 shows that actual readiness of active Mariners is likely lower than the 11,678 figure the MWWG cites as needed for an initial activation. Furthermore, these survey figures do not consider the shocks that could occur in a near-peer conflict with enemy attacks on the U.S.-flagged fleet.[67] Given all the moving parts, it is very difficult to tell when and where the issues would occur. As things stand, the available data indicates a real risk that surge sealift activation does not go smoothly. The manning situation is likely to worsen as time goes on, and the possibility for delays that lead to mission failure exists.

---

[65] *2001 Mariner Survey Principal Findings* (Washington, DC: U.S. Department of Transportation, 2001, 6; and *2002 Mariner Survey Principal Findings* (Washington, DC: U.S. Department of Transportation, 2002), 6.

[66] Baker, personal communication, 2023.

[67] *Maritime Workforce Working Group Report*, 20; Baker, *U.S. Mariner Mental Health & Wellbeing During COVID-19 and Beyond*, 38–39; and Bardot, interview, 13 October 2023.

Table 10. Mariners that would volunteer for national need

Breakdown	2001 survey	2002 survey
Officers	68%	77%
Ratings	66%	67%

Source: "2002 Mariner Survey," U.S. Bureau of Transportation, June 2003.

Table 11. Willingness for length of afloat tour/shore break

Question	Before COVID	After COVID	Change
Willingness to serve for 3 months or longer	68.6%	57.7%	-10.9%
Willingness to accept leave of 2 months or less	59.3%	47.2%	-12.2%

Source: based on data by Marissa G. Baker, *U.S. Marine Mental Health and Well-being during COVID-19 and Beyond* (Seattle: Environmental & Occupational Health Sciences, University of Washington, 2021).

Why Are the Numbers This Bad?

Structurally, there are two ongoing issues with the mariner manpower pool that have led to the current scenario. The first issue is that only the maritime unions do any recruitment.[68] Both the government and companies hire Mariners from a common pool the unions provide, and that model means there really is no incentive for them to recruit. Any benefit of recruitment would go to the common pool and not the individual organization. This pooling of manpower has resulted in a tragedy of the commons, with all stakeholders needing to contribute something or risk the shortage affecting their operations.[69] The second issue is that the shortage of Mariners creates a self-reinforcing negative spiral for mariner quality of life. It means longer hours, longer assignments,

[68] "Recommendations for Recruiting & Retention," NDTA—Marketing and Outreach Workgroup, 2023, 26.
[69] "Recommendations for Recruiting & Retention."

and less time off for the Mariners that remain, resulting in more attrition and worsening conditions.[70]

Frankly speaking, working as a mariner is a hard job that demands personal sacrifice, months at sea, and regular overtime. Austin Tellez, executive vice president of the Seafarers International Union, estimated that three to four hours of overtime a day is average.[71] The industry has been feast or famine. As demonstrated by the 68 percent decrease in Mariner credentials from 2001 to 2017, the industry has been hemorrhaging people, based on even pre-COVID figures (see table 3). The 2021 University of Washington post-COVID study looking into Mariners mental health found that 50 percent had a high score for one of the five mental health outcomes of depression, anxiety, suicidal ideation, perceived stress, and PTSD.[72] While this study surveyed all Mariners, at least 44 percent of respondents were from the unlimited credential groups examined in this chapter.[73] Engine ratings and engine and deck officers with unlimited credentials "tended to have worse mental health outcomes across the board," and Military Sealift Command (MSC) had the "highest rates of adverse mental health outcomes."[74] In summary, it is not surprising it can be difficult to find enough of the right people for these professions.

Despite these issues, the University of Washington study cites that an overwhelming majority of Mariners, more than 90 percent, like what they do and who they work with.[75] Mariners love their job, but loss of jobs and the poor treatment over the last decades have resulted in the 78 percent loss seen in the ratings section of this chapter. If more of these negatives are turned into positives, more Mariners will have a reason to return to sea.

There are many ideas, opinions, and options about how to go about mariner retention. Making it more complicated, there are two distinct goals. First is keeping Mariners working in the industry. The second is supporting Mariners maintaining their credentials even if they are working onshore (so enough Mariners exist in an emergency). However, crafting smart, targeted policy solutions is arduous given how complex and nebulous the maritime industry is.

---

70 "Recommendations for Recruiting & Retention."
71 Tellez, interview, 5 December 2023.
72 Baker, *U.S. Mariner Mental Health & Wellbeing During COVID-19 and Beyond*, 5.
73 Baker, *U.S. Mariner Mental Health & Wellbeing During COVID-19 and Beyond*, 12.
74 Baker, *U.S. Mariner Mental Health & Wellbeing During COVID-19 and Beyond*, 5.
75 Baker, *U.S. Mariner Mental Health & Wellbeing During COVID-19 and Beyond*, 35.

Proposed Solutions: Operation Mariner

Recently, an effort by the Transportation Institute, Operation Mariner, has made a broad effort working with many industry stakeholders to improve the common mariner problems and recommend solutions. The four working groups for mariner retention and recruitment that Operation Mariner created addresses wages and benefits, quality of life, marketing and outreach, and regulatory barriers.[76] Some of these ideas rely on the maritime industry to adopt them, and some rely on government bureaucracy to ease the burden on Mariners. A few would even require legislation. The proposals listed are not a complete list of the Transportation Institute's work, but major points tied to the myriad of issues mentioned in the above sections of this chapter.

Wages and Benefits

For improving wages, the institute's proposals are to allow Mariners to keep more of what they earn and help minimize the financial burdens of training and certifications. The first proposal is to have oceangoing Mariners stop paying federal income tax.[77] Since foreign Mariners do not have to pay federal income tax, it would put those wishing to employ American Mariners on an even playing field and make them more competitive internationally.[78] While the Transportation Institution recommends a change to the Internal Revenue Code, an alternate change could be to have the mariner income earned in international waters considered "earned abroad." Thus, this would allow Mariners to use the foreign earned income exclusion to have $120,000 in tax-free income, the same as any American that lives and works internationally.[79]

The next proposal is more targeted at officers: tuition/student loan assistance for state maritime academy graduates. Students attending such academies spend up to $150,000 on tuition alone.[80] This is a major disincentive for those considering careers as officers. The student incentive payment program, which is supposed to offer these students support in exchange for service in the naval reserve, only offers $32,000 total, and the program is limited to 75 stu-

[76] Fuentes, interview, 29 September 2023.
[77] "Wages, Taxes, Benefits, & Incentives Task Force Recommendations," Transportation Institute, 2023, 2.
[78] "Recommendations for Recruiting & Retention," 2.
[79] "Foreign Earned Income Exclusion," Internal Revenue Service, accessed 7 January 2025.
[80] "Wages, Taxes, Benefits, & Incentives Task Force Recommendations," 3.

dents annually.[81] The proposed solution is to offer loan forgiveness as tuition reimbursement over five years tied to seagoing commitments after graduation aboard U.S.-flagged ships.[82]

Other recommendations include funding centers of excellence to reduce the costs to upgrade or get new certificates, waive merchant mariner credential and TWIC fees for seagoing Mariners, and having the Department of Labor return to their previous practice of making state-level funds eligible for nationally recognized apprenticeship programs.[83] All of these would help in pushing the needle and reducing barriers to entry for new and old Mariners trying to join, rejoin, or upgrade their credentials.

Quality of Life

As seen in the University of Washington study, mariner mental health is a major issue post-COVID. Connections to family, friends, and social ties are one of the most critical factors in mental health, and due to lack of communication options at sea, specifically the internet, this is an area where many Mariners struggle. As such, one proposal is for all operating companies to make internet connectivity available on all vessels. This is a more reasonable proposition in the age of Starlink.[84] A further proposal is to allow for online mariner training. This would enable Mariners onboard vessels to complete training to further their careers instead of using their valuable vacation time.[85] One drawback with this solution is that connectivity might not be something that can be maintained during wartime.[86]

A second recommendation is providing access to telehealth services while at sea, including regular mental health checkups. For physical health, improvements to fitness equipment and healthier food options are recommended.[87] Finally, more flexibility for schedules and leave to retain Mariners who might have family or medical emergencies.[88] Quality of life has no panacea, but it could make a big impact on retention when done across the entire population.

81 *Maritime Workforce Working Group Report*, 28.
82 "Wages, Taxes, Benefits, & Incentives Task Force Recommendations," 3.
83 "Wages, Taxes, Benefits, & Incentives Task Force Recommendations," 4–6.
84 Fuentes, interview, 29 September 2023.
85 "Quality of Life Task Force: Recommendations," Transportation Institute.
86 Bardot, interview, 12 November 2023.
87 "Quality of Life Task Force," 1.
88 "Quality of Life Task Force," 1–2.

Marketing and Outreach

Marketing and outreach can be split into two functions, both of which target increasing the number of Mariners sailing and ready for strategic sealift.[89] On the one hand, there is marketing and outreach aimed at raising national awareness and recruitment in the merchant marine. On the other hand, there is messaging targeted at the inactive Mariners with the goal of getting them sailing again and retaining their credentials. In the latter case, the main proposal is the creation of a Merchant Mariner Reserve.[90]

Until 2011, the strategic sealift officers (SSOs) were known as the Merchant Mariner Reserve. SSOs are deck and engine officers that are part of U.S. naval reserves.[91] Transportation Institute's proposal calls for a completely civilian Merchant Marine.[92] The plan is to have volunteers with mariner credentials currently working onshore join a reserve force that would sail three months of the year, with one month of vacation and eight months at their shore job.[93] The intention for the system is to have sufficient reservists when current active mariner volunteers are not sufficient to crew the surge sealift fleet.[94]

For Mariners, the incentives are the chance to upgrade and maintain their credentials while working as Mariners part time. Currently, the proposal is entirely voluntary for the employers of these Mariners.[95] There are a couple of problems with this set up. One foreseeable issue with this proposal is the lack of willingness to participate from employers. In this case, the Transportation Institute's proposal's next step may be to seek congressional support to have members of the MMR covered by the Uniformed Services Employment and Reemployment Rights Act or similar legislation.[96] Functionally, the system would be designed so that once all jobs are offered and refused to eligible union members, an MMR dispatcher would fill vacant billets with reservists.[97]

There are two noteworthy concerns with this proposal. First, the jobs Merchant Mariner reservists would be filling are jobs that all other Mariners in the

89 "Recommendations for Recruiting & Retention."
90 "Recommendations for Recruiting & Retention," 8–10.
91 Bardot, interview, 12 November 2023.
92 "Recommendations for Recruiting & Retention."
93 "Recommendations for Recruiting & Retention."
94 "Recommendations for Recruiting & Retention."
95 "Recommendations for Recruiting & Retention."
96 "Recommendations for Recruiting & Retention."
97 "Recommendations for Recruiting & Retention."

industry turned down and they could be unattractive assignments. Over time, this could lead to an MMR system gaining a bad reputation. The second concern is that this MMR design is intended to manage the shortage of Mariners. Therefore, to meet surge sealift readiness needs, the MMR would need to be sufficiently large to cover any gap in volunteer active Mariners and sealift requirements. To have enough reservists for sustainment level numbers would require thousands of Mariners.[98] Still, even a smaller MMR would have an impact and is worthwhile.

With inactive Mariners, covered the next step is to increase recruitment. One potentially impactful proposal would be to tap into the existing military recruiting infrastructure.[99] For those individuals that fail to meet more exacting recruitment standards for the military, they could be made aware of the possibility of serving in the merchant marine.[100] Similarly, for those that separate at boot camps and are interested in a more regimented lifestyle, a mariner career could be a good fit.[101] Finally, for military personnel finishing their service, especially those with experience at sea, informing them about the option of taking their experience and joining the Mariners would not only help recruitment but retain naval experience in the maritime industry.[102] Finally, the military to mariner program has not held a hiring event since 2018.[103] Reinvigorating the program by improving the points of contact and adding mentors to guide others through the process will help both recruitment and retention.[104] However, it would require the DOD or executive branch to act for this recruitment avenue to open.

Regulatory Issues

The primary regulatory issues that the Transportation Institute and SIU are targeting is the mismatch between the credentials of American unlicensed Mariners (ratings) vis-à-vis the rest of the world. American Mariners are required to spend more time at sea than other nations to upgrade their credentials. This

98 *Maritime Workforce Working Group Report*, 24.
99 "Recommendations for Recruiting & Retention."
100 "Recommendations for Recruiting & Retention."
101 "Recommendations for Recruiting & Retention."
102 "Recommendations for Recruiting & Retention," 13–14, 21–25.
103 "Recommendations for Recruiting & Retention," 17–20.
104 "Recommendations for Recruiting & Retention," 13–25.

change would make the task of refilling the ranks of the much in demand able seaman easier. The proposal would slash the time down to six months at sea for able seaman credential level. This is 18 months in total for an unlimited able seaman and 6 months for an able seaman special, which is one-half the time at sea it would otherwise require for both credentials.[105] A further proposal would simplify the process further by allowing qualified training days to count as sea service time.[106] If implemented, this would bring American Mariners in line with the rest of the world and reduce the regulatory burden on them.

Mariners have a lot of paperwork to keep up with to work in their chosen profession. Even worse, this paperwork is divided across different government departments.[107] The various departments involved in these procedures (state, transportation, defense, and homeland security) have different renewal timelines, medical requirements, training courses, etc.[108] The overwhelming complexity of these procedures can result in Mariners losing out on job opportunities and income.[109] The Coast Guard's National Maritime Center takes months to process mariner credentials, with only 21 percent of applications finished within 30 days.[110] One proposed amendment calls for the Coast Guard to issue interim credentials after meeting minimum requirements so that they can begin working while the process is ongoing.[111] This would allow new and old Mariners to continue working and not miss pay due to bureaucracy moving slowly.

Improving Willingness

Merchant Mariners are essential personnel to America's economy and warfighting enterprise. Merchant Mariners operate up to 20 percent of Navy vessels.[112] Regardless, they are not treated the same as naval servicemembers, even when they face the exact same challenges and threats during war. During World War II, Mariners took heavier losses as a percentage than any military Service, Kings Point has the sad distinction as the only Service academy with a bat-

[105] *Maritime Workforce Working Group Report,* 16, 17.
[106] *Maritime Workforce Working Group Report*, 2–5.
[107] Bardot, interview, 12 November 2023.
[108] *Maritime Workforce Working Group Report*, 9–11, 27.
[109] "Regulatory Barriers—Packet," Transportation Institute, 2023, 10.
[110] "Regulatory Barriers."
[111] "Regulatory Barriers."
[112] Mercogliano, "Why Military Sealift Command Needs Merchant Mariners at the Helm."

tle standard, the only academy to have lost cadets in a war.[113] Mariners from WWII waited 40 years until in 1988, a court ruling finally forced the DOD to honor the promises made to them.[114] However, this did not apply to U.S. Mariners in any other conflict. If they die or are injured as part of the military operations, they do not have the same safety net as servicemembers despite facing the same risks.[115]

Based on the precedent already set for those that served in WWII, the United States could extend servicemember benefits to Mariners that sail in wartime. This would offer reassurances that Mariners families will be taken care of should they die or be greatly injured in a war zone. It could be the deciding factor improving mariner's turnout for surge sealift in the aftermath of an attack on a U.S.-flagged vessel, which would likely coincide with when merchant Mariners for military logistics are needed the most. Given historical precedence—the 40 years World War II Mariners were forced to wait—legislation would be needed, as promises would be viewed with distrust.

Conclusion

The shortage of Mariners is a known problem. Large institutions such as the Seafarers International Union and Military Sealift Command have already begun taking what actions they can to combat the issue.[116] According to executive vice president of SIU Augustin Tellez, SIU's Center for Maritime Training and Education in Piney Point, Maryland, has not had a recruitment problem—they have had a placement problem. Recently they have signed an agreement that guarantees placements and crew member pay for their graduating classes.[117] Should that hold, it would greatly help in bridging the gaps seen now.[118] On the government side, MSC has been working to hire more Mariners to change its manning model to four months on ship, two months off ship, from four months on and one month off.[119] This would take them from 1.2 Mariners per billet to 1.4 Mariners and would give the CIVMARs more relief to be able to take

113 "Battle Standard," U.S. Merchant Marine Academy, accessed 7 January 2025.
114 "Wartime Merchant Seamen to Get Veterans' Status," *New York Times*, 21 January 1988.
115 Mercogliano, "Why Military Sealift Command Needs Merchant Mariners at the Helm."
116 A. Tellez, interview, 5 December 2023; and J. K. Morris, personal communication, 2023.
117 Tellez, interview, 5 December 2023.
118 Tellez, interview, 5 December 2023.
119 Morris, personal communication, 2023.

time off and have an improved quality of life.[120] These are both major institutions in the maritime space, and the operational changes they have managed to push through are a sign of how serious the problem is and the need for a solution of the myriad actors in the maritime space to the shortages they are seeing.

Mariners crew 20 percent of Navy ships, and in conflict 90 percent of military equipment will be deployed via sealift. Merchant Mariners are the foundation of the United States' ability to deploy and sustain its military abroad.[121] Operation Mariner had all the major stakeholders come together to formulate proposals designed to alleviate mariner workforce issues. However, many of these proposals will require Congress or the White House to act. This would be a great effort on its own, but it should be underlined that all proposals are aimed at fixing and maintaining the current mariner workforce, a national sealift capacity smaller than what the United States possessed during the previous wars.[122] The question that goes beyond the scope of mariner retention is whether that number is enough for a near-peer conflict.

---

[120] Morris, personal communication, 2023.

[121] Geoffrey Brown, "Strategic Sealift's Merchant Mariner Problem," Center for International Maritime Security, 1 July 2021.

[122] *Maritime Workforce Working Group Report*, 5, 32; and Mercogliano, "American Strategic Sealift in Peer-to-Peer Conflicts: A Historical Retrospective, Pt. 2."

SELECT BIBLIOGRAPHY

2001 Mariner Survey Principal Findings. Washington, DC: U.S. Department of Transportation, 2001.

2002 Mariner Survey Principal Findings. Washington, DC: U.S. Department of Transportation, 2002.

Air Mobility Command, FY 2024: U.S. Government Department of Defense Channel Passenger and Cargo Airlift Customer Billing Rates and Guidance for the Transportation Working Capital Fund, version 2. Scott AFB, IL: Air Mobility Command, 2023.

Baker, Melissa D. *U.S. Mariner Mental Health & Wellbeing during COVID-19 and Beyond*. Seattle: University of Washington, 2021.

Beyond the Horizon: Carbon-Neutral Fuel Pathways and Transformative Technologies. Spring, TX: American Bureau of Shipping, 2024.

Birol, Fatih. *Nuclear Power in a Clean Energy System*. Paris: International Energy Agency, 2019.

Cancian, Mark F., Matthew Cancian, and Eric Heginbotham. *The First Battle of the Next War: Wargaming a Chinese Invasion of Taiwan*. Washington, DC: Center for Strategic and International Studies, 2023.

Carter, RAdm Worrall Reed. *Beans, Bullets, and Black Oil: The Story of Fleet Lo-*

gistics Afloat in the Pacific during World War II. Newport, RI: Naval War College Press, 1953.

Chen, Dongxu, Meifeng Luo, and Zhongzhen Yang. "Manufacturing Relocation and Port/Shipping Development along the Maritime Silk Road." *International Journal of Shipping and Transport Logistics* 10, no. 3 (2018). https://doi.org/10.1504/ijstl.2018.091676.

Clark, Arthur H. *The Clipper Ship Era: An Epitome of Famous American and British Clipper Ships, Their Owners, Builders, Commanders, and Crews, 1843–1869*. New York: G. P. Putnam's Sons, 1912.

Clark, Bryan, Timothy Walton, and Adam Lemon. *Strengthening the U.S. Defense Maritime Industrial Base: A Plan to Improve Maritime Industry's Contribution to National Security*. Washington, DC: Center for Strategic and Budgetary Assessments, 2020.

Comparisons of U.S. and Foreign Flag Operating Costs. Washington, DC: Maritime Administration, 2010.

Costinot, Arnaud, and Dave Donladson. "Ricardo's Theory of Comparative Advantage: Old Idea, New Evidence." *American Economic Review* 102, no. 3 (May 2012). https://doi.org/10.1257/aer.102.3.453.

Cruikshank, Jeffrey L., and Chloe G. Kline. *In Peace and War: A History of the US Merchant Marine Academy at Kings Point*. Hoboken, NJ: Wiley, 2008.

Doctrine for the Armed Forces of the United States, Joint Publication 1. Washington, DC: Joint Chiefs of Staff, 2017.

Doll, Abby, Yvonne K. Crane, Gian Gentile, D. Sean Barnett, John Gordon IV, Timothy R. Heath, Jeffrey W. Hornung, Mark Hvizda, Sale Lilly, and Bradley Martin. *The Backbone of Joint Operations: Army Roles in the Indo-Pacific*. Santa Monica, CA: Rand, 2023. https://doi.org/10.7249/RRA1784-1.

Eash-Gates, Philip, Magdalena M. Klemun, Goksin Kavlak, James McNerney, Jacopo Buongiorno, and Jessika E. Trancik. "Sources of Cost Overrun in Nuclear Power Plant Construction Call for a New Approach to Engineering Design." *Joule* 4, no. 11 (2020). https://doi.org/10.1016/j.joule.2020.10.001.

The Economic Importance of the U.S. Private Shipbuilding and Repairing Industry. Washington, DC: Maritime Administration, 2021.

Faber, Jasper, Shinichi Hanayama, Shuang Zhang, Paula Pereda, Bryan Comer, Elena Hauerhof, Wendela Schim van der Loeff , Tristan Smith, Yan Zhang, Hiroyuko Kosaka, Masaki Adachi, Jean-Marc Bonello, Connor Galbraith, Ziheng Gong, Koichi Hirata, David Hummels, Anne Kleijn, David S. Lee, Yiming Liu, Andrea Lucchesi, Xiaoli Mao, Eiichi Muraoka, Liudmila Osipova, Haoqi Qian, Dan Rutherford, Santiago Suárez de la Fuente, Haichao Yuan, Camilo Velandia Perico, Libo Wu, Deping Sun, Dong-Hoon Yoo, and Hui Xing. *Fourth IMO Greenhouse Gas Study, 2020*. London: International Maritime Organization, 2021.

Fink, Anya M. *Defense Primer: Strategic Nuclear Forces*. Washington, DC: Congressional Research Service, 2024.

Frittelli, John F. *The Jones Act: An Overview*. Washington, DC: Congressional Research Service, 2003.

Gibson, Andrew, and Arthur Donovan. *The Abandoned Ocean: A History of United States Maritime Policy*. Columbia: University of South Carolina Press, 2000.

Gilday, Michael. *Navigation Plan 2022*. Washington, DC: Chief of Naval Operations, Department of the Navy, 2022.

Grynspan, Rebeca. *2024 Review of Maritime Transport Navigating Maritime Chokepoints*. New York: United Nations, 2024.

Hacker, Tyler F., and G. James Herrera. *Defense Primer: United States Transportation Command*. Washington, DC: Congressional Research Service, 2020.

The Internation Convention for the Safety of Life at Sea, 1974. London: United Nations Maritime Organization, 2020.

Kim, W. Chan, and Renee Mauborgne. *Blue Ocean Strategy: How to Create Uncontested Market Space and the Competition Irrelevant*. Boston, MA: Harvard Business Review Press, 2015.

King, Adm Ernest J. *First Report to the Secretary of the Navy: Covering Our Peacetime Navy and Our Wartime Navy and Including Combat Operations up to 1 March 1944*. Washington, DC: Department of the Navy, 1944.

Lewis, Kevin. "The Role of Escalation in Sealift Planning." U.S. Naval Institute *Proceedings* 109, no. 11 (November 1983).

Lilly, Doris. *Those Fabulous Greeks: Onassis Niachos and Livanos*. New York: Cowles Book Company, 1970.

Mahan, Alfred Thayer. *The Interest of America in Sea Power, Present and Future*. Boston, MA: Little, Brown, 1897.

Maritime Administration Strategic Plan, 2017–2021. Washington, DC: Maritime Administration, 2018.

"The Maritime Unions, a Caldron of Labor for Commissioner Kennedy to Stir." *Fortune* 16, no. 3 (September 1937).

Maritime Workforce Working Group Report. Washington, DC: Maritime Administration, Department of Transportation, 2017.

Martin, Bradley, and Roland J. Yardley. *Approaches to Strategic Sealift Readiness*. Santa Monica, CA: Rand Corporation, 2019. https://doi.org/10.7249/RR3049.

Massachusetts Maritime Academy: 125 Years of Excellence. Boston, MA: Pohly, 2016.

Matthews, James K., and Cora Holt. *So Many, So Much, So Far, So Fast: United States Transportation Command and Strategic Deployment for Operation Desert Shield/Desert Storm*. Scott Air Force Base, IL: U.S. Transportation Command, 1996.

Maurer, Diana. *Weapon System Sustainment: Aircraft Mission Capable Goals Were Generally Not Met and Sustainment Costs Varied by Aircraft*. Washington, DC: Government Accountability Office, 2022.

McCloy, James. ed. *The Future of Maritime Officer Education and Training*. Galveston, TX: Moody College of Marine Sciences and Maritime Resources, 1976.

McCown, John. D. *Giants of the Sea: Ships and Men Who Changed the World*. New York: self-published, 2020.

Medeiros, Evan S., Roger Cliff, Keith Crane, and James C. Mulvenon. *A New Direction for China's Defense Industry*. Santa Monica, CA: Rand, 2005. https://doi.org/10.7249/MG334.

Navy Readiness, Actions Needed to Maintain Viable Surge Sealift and Combat Logistics Fleets. Washington, DC: Government Accountability Office, 2017.

Nicastro, Luke A., and Cameron M. Keys. *Defense Primer: United States Transportation Command*. Washington, DC: Congressional Research Service, 2022.

Oakley, Shelby S., Diana Moldafsky, Laurier Fish, Stephanie Gustafson, Jeff Hartnett, William Reed, Lori Fields, Anne L. Taylor, Brian Bothwell, and Lorraine Ettaro. *Arleigh Burke Class Destroyers: Observations on the*

Navy's Hybrid Electric Drive Program. Washington, DC: Government Accountability Office, 2020.

The Papers of Thomas Jefferson, vol. 18, *4 November 1790–24 January 1791*. Edited by Julian P. Boyd. Princeton, NJ: Princeton University Press, 1971.

Pinzon, Tristan. *The Sinking Ship: The American Shipbuilding Industry*. Vallejo: California State University Maritime Academy, 2019.

Reichard, G. W. *Cal Maritime: The First 90 Years*. Vallejo: California State University Maritime Academy, 2019.

Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2022. Washington, DC: Department of the Navy, 2021.

Rost, Ronald F., John F. Addams, and John J. Nelson. *Sealift in Operation Desert Shield/Desert Storm: 7 August 1990 to 17 February 1991*. Alexandria, VA: CNA, 1991.

Sadler, Brent Droste. *U.S. Naval Power in the 21st Century: A New Strategy for Facing the Chinese and Russian Threat*. Annapolis, MD: Naval Institute Press, 2023.

Sadler, Brent, and Peter St. Onge. *Regaining U.S. Maritime Power Requires a Revolution in Shipping*. Washington, DC: Heritage Foundation, 2023.

Santayana, George. *The Life of Reason or the Phases of Human Progress*. London: Archibald, Constance, 1906.

Shields, Jerry. *The Invisible Billionaire, Daniel Ludwig*. Boston, MA: Houghton Mifflin Company, 1986.

"Ship Is Launched 10 Days from Start." *New York Times*, 24 September 1942.

Smith, J., and M. Nigra, eds. *The Force Behind the Force: U.S. Transportation Command and Strategic Deployment for Operation Iraqi Freedom*. Washington, DC: U.S. Transportation Command, 2015.

The United States Navy in "Desert Shield" and "Desert Storm." Washington, DC: Department of the Navy, 1991.

The U.S. Navy's Military Sealift Command: 2023 in Review. Norfolk, VA: Military Sealift Command, 2023.

Walton, Timothy A., Ryan Boone, and Harrison Schram, *Sustaining the Fight: Resilient Maritime Logistics for a New Era*. Washington, DC: Center for Strategic and Budgetary Assessments, 2019.

War in the Persian Gulf: Operations Desert Shield and Desert Storm, August 1990–March 1991. Washington, DC: Center for Military History, 2010.

Wood, Dakota L. *2023 Index of Military Strength*. Washington, DC: Heritage Foundation, 2022.

Wooley, Alexander, Sheng Zhang, Rory Fedorochko, and Sarina Patterson. *Harboring Global Ambitions: China's Ports Footprint and Implications for Future Overseas Bases*. Williamsburg, VA: AidData, 2023.

Zhou, Weifeng, and Mario Esteban. "Beyond Balancing: China's Approach towards the Belt and Road Initiative." *Journal of Contemporary China* 27, no. 112 (2018). https://doi.org/10.1080/10670564.2018.1433476.

ABOUT THE AUTHORS

Admiral James G. Foggo, U.S. Navy (Ret), is the dean of the Center for Maritime Strategy. He is a 1981 graduate of the U.S. Naval Academy. Admiral Foggo is also an Olmsted Scholar and Moreau Scholar, earning a master of public administration at Harvard University and a *diplôme d'études approfondies* in defense and strategic studies from the University of Strasbourg, France. He held operational commands in the U.S. Navy from commanding officer of USS *Oklahoma City* (SSN 732) to commander U.S. Naval Forces Europe/NATO Joint Forces Naples, Italy. Foggo is a distinguished fellow of the Center for European Policy Analysis and a distinguished fellow of the Council on Competitiveness. He is a member of the board of directors of the Olmsted Foundation and the Naval Historical Foundation. He occupies a seat on the editorial board of the Marine Corps University Press in Quantico, VA. He is also a member of the Council on Foreign Relations and the Explorer's Club of New York. Admiral Foggo sits on the Senior Military Advisors Group at the United States Institute of Peace.

Dr. Steven Wills currently serves as a navalist for the Center for Maritime Strategy at the Navy League of the United States. He is an expert in U.S. Navy strategy and policy and Navy surface warfare programs and platforms. Dr. Wills had a 20-year career as an active-duty Navy officer and served on a variety of small and medium surface combatants. He is the author of *Strategy Shelved: The Collapse of Cold War Naval Strategic Planning* (2021) and, with former Navy Secretary John Lehman, *Where Are the Carriers?: U.S. National Strategy and the Choices Ahead* (2021). He holds a master of arts from the U.S. Naval War College and a master of arts and PhD in history from Ohio University.

John D. McCown Jr. is a nonresident senior fellow at the Center for Maritime Strategy. He is an internationally recognized expert in container shipping and maritime commerce. McCown has more than four decades of operating and investment experience in his field. He was a cofounder and chief executive officer of U.S. flag carrier Trailer Bridge and formerly led transport investments at a large hedge fund. Transportation pioneer Malcom McLean, the inventor of container shipping, mentored McCown, and they worked together for 20 years. He holds an MBA from Harvard Business School and is also the holder of two maritime related patents. McCown is the author of *Giants of the Sea: Ships and Men Who Changed the World*, a self-published book on the modern cargo shipping industry and how it developed.

Bent Sadler joined Heritage Foundation after a 26-year Navy career with numerous operational tours on nuclear powered submarines, personal staff of senior Department of Defense leaders, and as a military diplomat in Asia. His focus as a senior research fellow is on maritime security and the technologies shaping future maritime forces, especially the Navy. He is s a 1994 graduate with honors of the U.S. Naval Academy, with a degree in systems engineering (robotics) and a minor in Japanese. As a 2004 Olmsted Scholar in Tokyo, Japan, he studied at Keio University, Jochi University, and the United Nations University. He has a master of arts from Jochi University and master of science from National War College, where he graduated with distinction in 2011 and received several writing and research awards. He is the author of *U.S. Naval Power in the 21st Century: A New Strategy for Facing the Chinese and Russian Threat* (2023).

Thomas Davies is the director of analytics at Core Power, United Kingdom. He completed a bachelor's degree in marine biology at Swansea University in

2020. Following that, he pursued a master of science in environmental bioscience at the University of Warwick from 2020 to 2021.

Sanjana Shashikumar is a senior regulatory analyst at Core Power. She holds a bachelor of science degree in international relations and affairs from the Elliott School of International Affairs at George Washington University.

Vice Admiral Dee Mewbourne graduated from the U.S. Naval Academy, received an MBA from Colorado State University, and is currently working toward a doctorate in education at Vanderbilt University. He is also an honors graduate of the U.S. Naval Test Pilot School and completed the Navy's nuclear power program, Air Command and Staff College (ACSC), and Joint Forces Staff College. Mewbourne served as the deputy commander of the U.S. Transportation Command (USTRANSCOM), the DOD's single distribution process owner across air, land, and sea. USTRANSCOM expanded its efforts into space logistics through reusable rockets with SpaceX under Vice Admiral Mewbourne's leadership. In his service under USTRANSCOM commander, General Stephen Lyons, he helped support the 2021 Afghanistan evacuation, the largest noncombatant evacuation airlift in U.S history. Under the next USTRANSCOM commander, General Jackie Van Ovost, he helped coordinate the rapid delivery of U.S. aid to the people of Ukraine following the Russian 2022 invasion.

Dr. Bradley Martin is a senior policy researcher at Rand. He retired from the Navy as a surface warfare captain after 30 years of service, including four command tours. In addition to his operational tours, Martin served on the staff of U.S. Forces Japan, the OPNAV staff as an operations analyst, and most recently as the Navy coordinator for participation in Joint Staff and OSD requirements and resources forums. His subspecialties included operations research, operational logistics, and strategic planning. Prior to joining the Navy, he earned a doctorate in political science from the University of Michigan, while working as a research assistant for the Correlates of War Project.

William MacDonald has held numerous senior positions in the U.S. Maritime Administration including director, Office of Sealift Support; professor of Joint

Military Operations and Maritime Administration's Emory S. Land Chair for Merchant Marine Affairs at the U.S. Naval War College, and the senior maritime advisor at the U.S. Embassy in Iraq from 2007 to 2009.

Sabreena Croteau has been a research fellow at Rand and is a PhD candidate in political science at the University of Chicago. Her research interests include the political economy of international security, power projection, alliances and security networks, and the politics of the global oil market. She recently contributed to an academic symposium exploring global monetary order and is currently working on research with the Chicago Project on Security and Threats. She received dual BAs in history and political science from Eastern Connecticut State University and completed an MA in the social sciences at Chicago before entering the PhD program.

Captain John Konrad is the founder and chief executive officer of gCaptain and author, with Tom Shroder of the book *Fire on the Horizon: The Untold Story of the Gulf Oil Disaster* (2011). He is licensed to captain the world's largest ships and has sailed from ports around the world. Konrad has built some of the world's most advanced ships and managed billion-dollar offshore construction projects in some of the harshest marine environments. He is a distinguished alumnus of the New York Maritime College.

Dr. Christopher Chiego is an assistant professor of international strategy and security at the California State Maritime Academy. He has also taught at the Naval Postgraduate School and Haverford College. He is a PhD graduate from the University of Pennsylvania.

Dr. Amy Skoll is an assistant professor of international strategy and security at the California State Maritime Academy. She is a PhD graduate of the University of California-Davis and also holds an MBA from the California Polytechnic State University-San Luis Obispo.

Dr. Ryan Wade is an associate professor, and the chair of the international strategy and security program, and the director of international programs at the

California State Maritime Academy. He holds a PhD in political science from the University of California-Davis.

Geoffrey Brown is an analyst at the U.S. Transportation Command. He is graduate of Valparaiso University in German, a bachelor's degree in international business from the Corvinus University of Budapest, Hungary, and a master's degree in international affairs from the George Institute of Technology.

Lieutenant Commander Eric Bardot is graduate of the U.S. Merchant Marine Academy and has served as an active mariner through the rank of first mate. He has served as a Joint mobility officer at U.S. Transportation Command and currently serves as the Bridge Resource Management Workshop program manager for the commander, U.S. Naval Surface Forces, Pacific.

RETURNING FROM EBB TIDE

Returning from Ebb Tide highlights the decline in our nation's commercial maritime capability for a variety of reasons: the peace dividend in the post-Cold War era; elimination of subsidies for the commercial maritime sector during the Ronald W. Reagan administration; and globalization whereby we outsourced our maritime lift requirements to foreign carriers, some of whom may not be friendly to us in times of war. It is one thing to lament the inability of our current maritime industrial base to produce aircraft carriers, warships, icebreakers, and submarines on time and on budget, yet policy makers and commentators often ignore the atrophy of our commercial maritime fleet. This is the fleet that supported the Allies to defeat authoritarian regimes in the First and Second World Wars and ferried hundreds of thousands of troops and millions of pounds of equipment in support of Desert Shield and Desert Storm. This fleet is a shadow of its former self, and this book represents a clarion call to action. Failure to revitalize America's once-great merchant fleet will spell sure defeat the next time the United States finds itself fighting a major conflict. We cannot afford to idly observe the status quo in the commercial maritime sector.

Cover photo courtesy Adobe Stock, adapted by MCUP.

MCUP
Marine Corps University Press
2044 Broadway Street
Quantico, VA 22134
www.usmcu.edu/mcupress

ISBN 979-8-9873362-6-7
90000
9 798987 336267