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BACKGROUNDER

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Rebuilding America's Maritime Strength: A Shipping Proof-of-Concept Demonstration

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KEY TAKEAWAYS

The United States needs to modernize its domestic maritime sector, which will require partnering with dependable long-time maritime allies.

A successful demonstration of the new multi-modalism would provide key insights into the engineering challenges and operational costs.

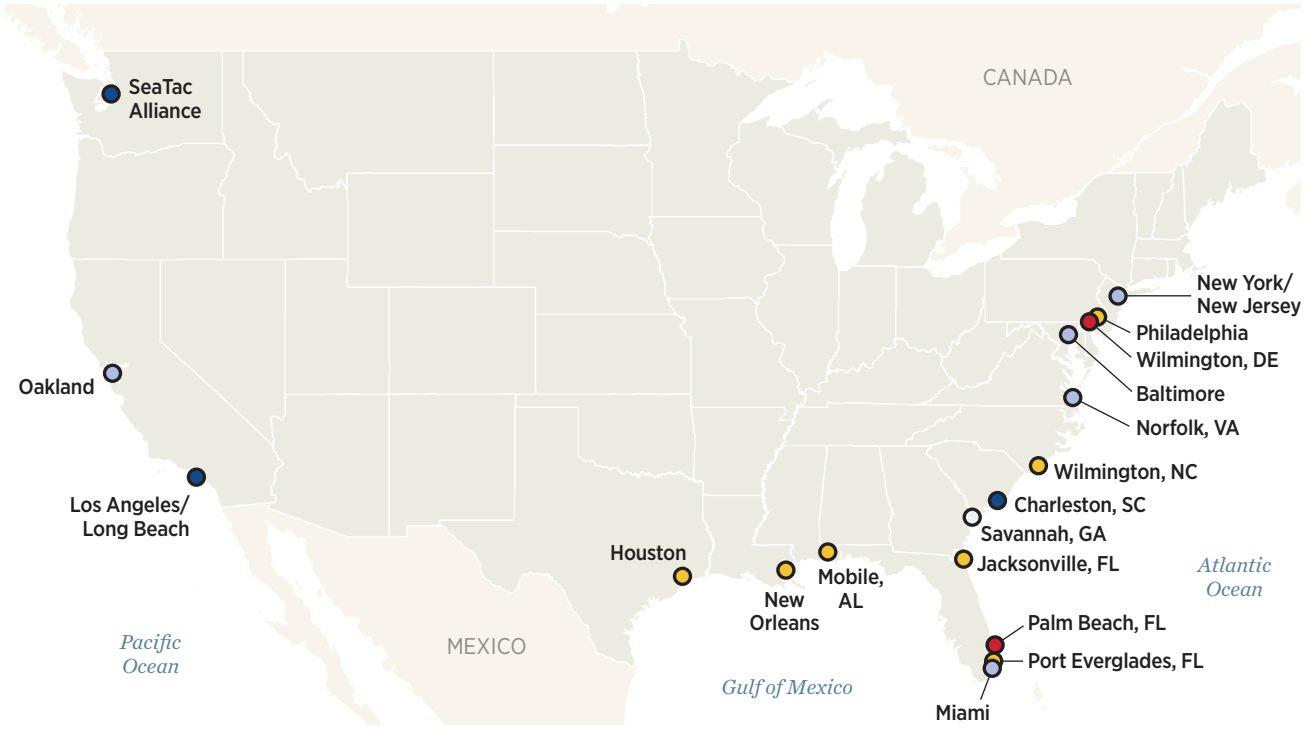
American shipping and shipbuilding have atrophied, yet domestic industry and capacity for innovation remain strong.

For years the United States has neglected a core element of its security and prosperity—its commercial maritime strength. Of the more than 80,000 ships arriving at American ports, fewer than 200 are U.S.-flagged, -owned, and -crewed.[1] American shipping and shipbuilding have atrophied, but this problem can be solved. The United States needs to unleash American potential to ensure that the nation's security and prosperity are not hostage to the whims of unfriendly nations.

Despite the best intentions of the century-old Jones Act,[2] the few ships that are domestically produced, flagged, and crewed are not competitive in the world marketplace. One estimate from the Department of Defense's U.S. Transportation Command estimates that regulatory costs, mandates, and labor costs render U.S.-produced ships

MAP 1

How U.S. Ports Can Currently Accommodate Large Container Ships



Category	Capacity in TEU*	Mean Low Water Channel Depth, in Feet
Panamax or less	4,200	Less than 38 feet
Panamax	4,500	39–40 feet
Post-Panamax I	6,000	41–45 feet
Post-Panamax II	8,000	46–48 feet
New Panamax	12,000	49–50 feet
Post Panamax	16,000	51 feet and above

* TEU refers to twenty-foot equivalent unit, which is a measure of volume in units of twenty-foot-long containers.
SOURCE: Jean-Paul Rodrigue, "Channel Depth at Major North American Container Ports," Hofstra University, Department of Global Studies and Geography, https://transportgeography.org/wp-content/uploads/Map-North-America-Container-Ports-Depth-1.pdf (accessed April 28, 2023).

26 times more expensive than sourcing overseas,[3] which must be recouped via higher shipping rates, with costs estimated at $9.8 billion per year.[4] The problem includes human capital, and the United States continues to struggle to grow its maritime workforce, especially ship crews.[5]

MAP 2

Opportunities for New Intermodalism

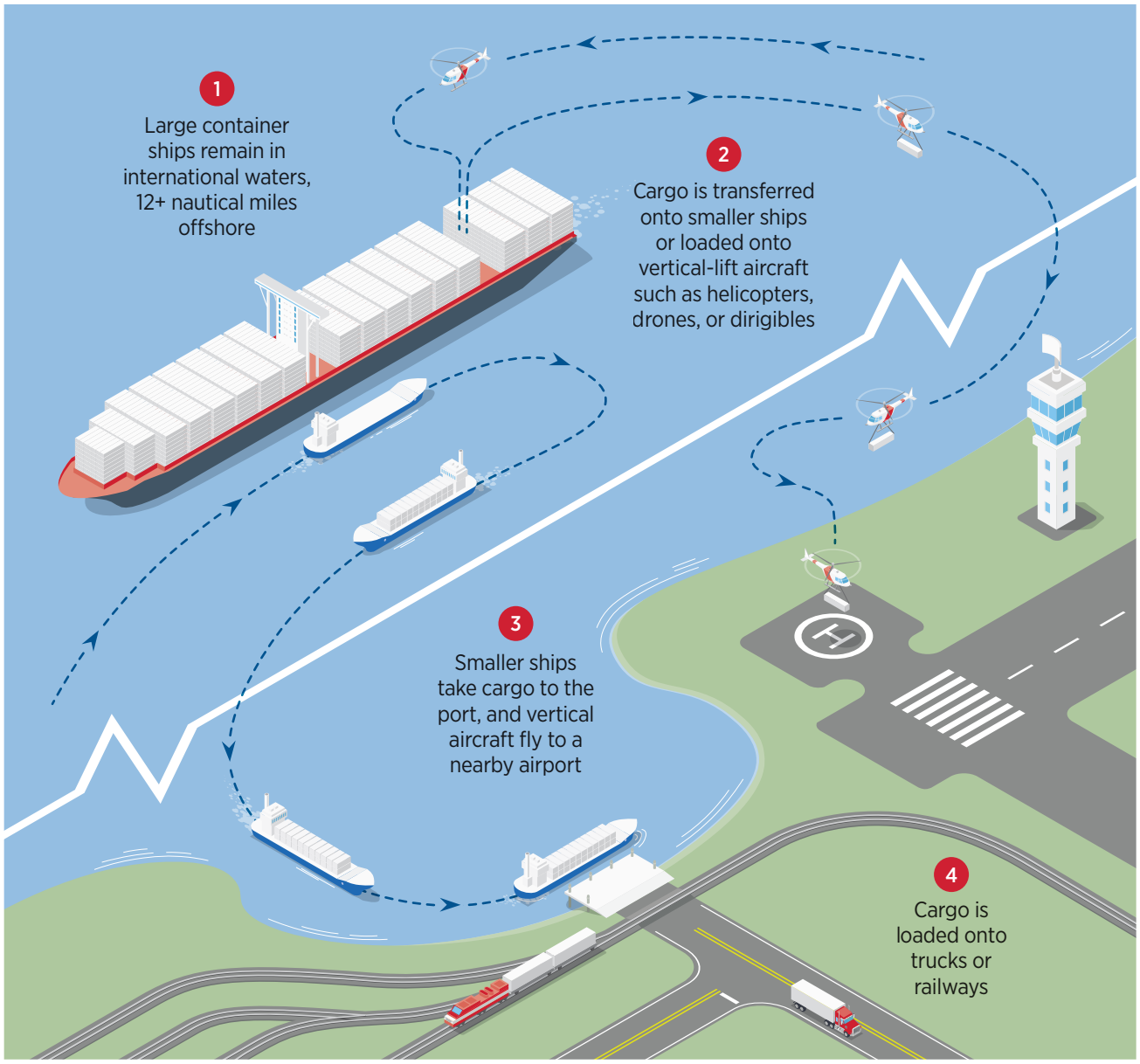
With rail, road, and airports nearby, two dozen cities and ports on the West Coast and well inland could be accessed by this new multi-modalism. Today only three metropolitan port areas on the West Coast service large international container traffic. This new approach could greatly expand economic and trade access to more Americans.

SOURCE: Authors' research.

FIGURE 1

The Concept of New Intermodalism

As maritime container ships grow larger, fewer ports will be able to accommodate their requirements for water depth, crane sizes, and offloading areas without incurring massive construction costs. One solution is to offload ship cargo without going to port.



To remedy this, the nation needs to modernize its domestic maritime sector, which will require partnering with dependable long-time maritime allies such as Japan, Korea, and the Philippines. Just as America would not be able to dominate technology without cheap microchips from Taiwan, America cannot dominate the maritime frontiers if it is locked into inputs costing 26 times the going rate. By creating these partnerships, the nation can regain a competitive edge against China.

Critically, America has not sustained a viable merchant marine fleet, nor has its supply of merchant shipping sustained its military in securing its national interests abroad. The consequence is that the nation is today prone to economic blackmail by nations such as China, a sample of which was evident during the COVID-19 pandemic when container shipping backed up in U.S. ports.[6] A stronger and globally competitive U.S. maritime sector serves as a deterrent to Chinese economic coercion and military adventures, because with it American trade can proceed with confidence even during a crisis with China, and the U.S. military will be able to sustain combat operations on U.S.-flagged vessels.

A recent Heritage Foundation paper detailed how several key technologies could revolutionize shipping and shipbuilding.[7] However, attracting the investments and political will requires a proof-of-concept demonstration. This was how today's container shipping came about, which still dominates maritime shipping. At the same time, given today's global economy and supply chains and the paucity of U.S. commercial shipbuilding, shipping, and merchant marines, a consortium of like-minded maritime nations will need to work together to ensure long-term success.

Lessons of America's Last Shipping Renaissance

American shipping and shipbuilding missed a rare opportunity for rejuvenation with the invention of container shipping, the brainchild of American businessman Malcolm McLean. To improve his long-haul trucking business, he took advantage of cheaper and faster transit by sea. In April 1956, using a repurposed wartime cargo ship and strengthened truck trailers, he executed a proof of concept that sparked a revolution in shipping: containerization.[8]

Regrettably for American shippers, the need for large port staging areas and limited carrying capacity of early container ships slowed what should have been a dominant American position in intermodal shipping. McLean lost the advantage to the Japanese, who had already embraced another American invention—modular ship construction. The lesson is that, without

first developing a pathway to economic sustainability, any future multi-modalism concept will remain vulnerable no matter how soundly engineered, economical, or environmentally beneficial.

Neutering China's State-Controlled Shipbuilding and Shipping Predations

Today the largest commercial fleet is China's (when including Hong Kong), which is backed by the world's largest shipbuilding sector enjoying significant subsidies from the Chinese Communist Party. This situation threatens the ability of the United States to sustain a wartime economy that in peacetime has become reliant on foreign shipping and shipbuilding.[9]

China's "civ-mil" fusion blends civilian activities such as shipping with military needs. It has focused on achieving a dominant position in global shipping, shipbuilding, and port operations.[10] To this end, Chinese companies enjoy significant government backing: Between 2010 and 2018, Chinese shipbuilders received $132 billion in direct subsidies, which does not include vast indirect subsidies.[11] Chinese shipbuilding also enjoys a relaxed regulatory environment that avoids the enormous costs of U.S. environmental, labor, and special interest regulations.

China does not play by free-market rules, which poses a threat to any disruptive new entrants to the shipping and shipbuilding sector. The risk is not just the military use of commercial ships and ports in war but the ability to edge out market competitors and stifle any innovation contrary to Chinese interests. Contending with this situation requires challenging China's state-owned shipping sector, setting a favorable regulatory environment, and leveraging the resources of several major players in this sector.

After decades of neglect, the U.S. maritime sector alone cannot take on China's goliath state-controlled shipping and shipbuilding sectors, but a consortium of like-minded maritime nations could. Common interests regarding freedom of navigation, free trade, and a shared threat perception of China would bind the group together. This new grouping could together represent a formidable bloc critical for an American-led revolutionary transformation in shipping.

No One Cares Until a Novel Intermodalism Proof of Concept Makes Them Care

A successful demonstration of the new multi-modalism envisioned would provide key insights into the engineering challenges and inform the

TABLE 1

Top Shipping Nations

RANK	SHIPBUILDING BY TONNAGE, AS PERCENTAGE OF GLOBAL TOTAL		NUMBER OF MERCHANT MARINERS		NUMBER OF COMMERCIAL SHIPS OWNED*	
1	China	44.2%	Philippines	252,393	China (plus Hong Kong)	9,829
2	South Korea	32.4%	Russia	198,123	Greece	4,870
3	Japan	17.6%	Indonesia	143,702	Japan	4,007
4	Philippines	1.06%	China	134,294	Singapore	2,799
5	Italy	0.82%	India	113,474	Indonesia	2,411
6	Germany	0.63%	Ukraine	76,442	Germany	2,221
7	Vietnam	0.61%	United States	59,586	Norway	1,987
8	Finland	0.36%	Malaysia	35,000	Russia	1,833
9	Taiwan	0.30%	Vietnam	34,590	United States	1,783
10	France	0.29%	United Kingdom	33,743	South Korea	1,680
11	Norway	0.29%	Myanmar	33,290	Turkey	1,583
12	Russia	0.22%	Poland	31,222	United Kingdom	1,380
13	Turkey	0.22%	Greece	30,507	Netherlands	1,189
14	Netherlands	0.19%	Turkey	28,587	Vietnam	1,133
15	India	0.12%	South Korea	27,919	United Arab Emirates	1,087

Ranked in top 15 in all three categories Ranked in top 15 in two categories

Recommended Members of Maritime Group of Nations

United States	Greece	Singapore	Indonesia
South Korea	Italy	United Kingdom	Netherlands
Japan	Turkey	Vietnam	Switzerland**
Philippines	Norway	Germany	

* Greater than 1,000 gross weight tonnage.
** Switzerland is a significant financier and owner of oceangoing vessels.
SOURCE: United Nations Conference on Trade and Development, "Review of Maritime Transport 2022," https://unctad.org/system/files/official-document/rmt2022_en.pdf (accessed August 3, 2023).

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operational costs of such a novel approach to shipping. Today there are several ports, technology companies, and local governments experimenting with new shipping innovations. A well-planned demonstration would show the way to link together their efforts. For this reason, location is key for an initial demonstration. Some good candidates are on the Great Lakes near current efforts to use drones for cargo movement; along the U.S. East Coast, where efforts are underway to reduce road and rail traffic; and smart ports

MAP 3

New Multi-Modalism Proof of Concept: Detroit-Toledo-Chicago

1. Cargo ship in Lake St. Clair receives cargo via drone from multiple sites in and around Detroit.
2. Cargo ship relocates to Lake Erie. During transit, cargo is repackaged for helicopter and drone transport.
3. Cargo ship arrives near Toledo. Drones deliver small cargo loads to multiple sites in and around Toledo, and helicopters deliver cargo to Chicago distribution sites.

SOURCE: Authors' analysis.

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technology being tested in Puerto Rico.

Recommendations

The Secretary of Transportation Should Establish a Maritime Group of Nations (MGN). The MGN would coordinate regulatory and commerce policies to facilitate a new multi-modalism—specifically, at-sea container traffic connected to shore via feeder vessels and further inland via vertical lift craft. The initial meeting of the MGN should be held in the United States with invitations for representatives from like-minded maritime nations. (A list of recommended participants is provided in Table 1.) Potential agenda items for the initial meeting could include assurances of access to shipping in crisis and regulation of small nuclear reactors in commercial shipping. Administratively, this effort would be led by the Secretary of Transportation and supported by interagency subject matter experts. Initial membership should include South Korea and Japan given their treaty alliances with the United States and the fact that they are in practice the only competitive countries to China in shipbuilding. Likewise, Indonesia, the Philippines, Poland, Turkey, and Vietnam—with their tens of thousands of experienced mariners—should be included. Additionally, Germany, Greece, the Netherlands, Norway, and Singapore have thousands of large commercial ships of their own, and they are currently developing novel

MAP 4

New Multi-Modalism Comprehensive Proof of Concept: U.S. East Coast and Puerto Rico

1. Cargo ship is offshore of New York City. Cargo is delivered to cargo ship from various sites in and around the city. Feeder vessels deliver standard shipping containers from piers to cargo ship.
2. Cargo ship relocates to offshore Delaware. During transit, it repackages cargo for distribution.
3. Cargo ship arrives offshore Delaware and offloads cargo via helicopter for delivery to D.C. and Baltimore distribution sites.
4. Cargo ship relocates to offshore Cape Canaveral, Fla., and delivers cargo via drones and helicopters to various sites to include potentially Patrick Space Force Base.
5. Cargo ship relocates to Miami for conventional cargo operations.
6. Cargo ship gets underway for Ponce, Puerto Rico. During transit, cargo is repacked for drone, helicopter, and feeder vessel transfers.
7. Prior to mooring at Ponce, cargo transfers via drone, helicopter, and feeder vessels conducted to points on Puerto Rico. While moored at Ponce, "smart port" concepts and operations to be tested.

SOURCE: Authors' analysis.

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methods of shipping. Lastly, Switzerland should be considered given its significant financial and chartered presence in the global maritime sector.[12]

Industry, Community, Municipal, and State Leaders Should Welcome a Proof of Concept. While Congress and the executive branch should be engaged, it is industry and commercial investors who must bear the burden of executing a proof of concept. To get the greatest value and attract future investment, a comprehensive demonstration at Manhattan, Washington, Miami, or Ponce is recommended. Before this, a scaled initial demonstration on the Great Lakes should be held focusing on refining vertical lift and drone operations in high-traffic and populated areas to an

offshore cargo ship. This two-step demonstration would inform business models, inform needed regulatory relief or action, and galvanize local and national attention.

Congress Should Establish a Special Committee on Regaining American Commercial Maritime Competitiveness. Congress, as it has attempted with its Commission on the Future of the Navy,[13] should establish a select committee focused on American competitiveness in shipping and shipbuilding. Given that the maritime sector covers commerce, transportation, and national defense, the committee should hold routine hearings at a minimum with leadership from the Maritime Administration, the U.S. Coast Guard, and the U.S. Navy.

Conclusion

The United States has neglected a core element of its security and prosperity—its historic maritime strength. As a result, American shipping and shipbuilding has atrophied, yet domestic industry and capacity for innovation remain strong. This advantage needs to be pressed by restoring American maritime competitiveness in pursuit of a new multi-modalism.

A stronger and globally competitive maritime sector would deter 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. The revolution in shipping could also mitigate environmental degradation, promote domestic production, and expand American exports to global markets, which can spur wider job growth and advance technological innovation. Getting underway on this renaissance of America's maritime sector begins with a proof-of-concept demonstration.

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Endnotes

1. Brent Droste Sadler, *U.S. Naval Power in the 21st Century: A New Strategy for Facing the Chinese and Russian Threat* (Annapolis: Naval Institute Press, 2023), pp. 1–2 and 239–250.
2. The Jones Act, also known as the Merchant Marine Act of 1920, requires, among other things, that shipping between U.S. ports be conducted by U.S.-flagged ships (46 U.S.C. § 50102). See Cornell Law School, "Jones Act," March 2022, https://www.law.cornell.edu/wex/jones_act (accessed August 2, 2023).
3. John Frittelli, "Shipping Under the Jones Act: Legislative and Regulatory Background," Congressional Research Service *Report for Congress*, updated November 21, 2019, p. 23, https://crsreports.congress.gov/product/pdf/R/R45725 (accessed March 4, 2023). See General Steve Lyons, U.S. Transportation Command, testimony before the Subcommittees on Seapower and Projection Forces and Readiness, Committee on Armed Services, U.S. House of Representatives, "U.S. Transportation Command and Maritime Administration: State of the Mobility Enterprise," March 7, 2019.
4. Colin Grabow, Inu Manak, and Daniel J. Ikenson, "The Jones Act: A Burden America Can No Longer Bear," Cato Institute, June 28, 2018, https://www.cato.org/publications/policy-analysis/jones-act-burden-america-can-no-longer-bear (accessed July 10, 2023).
5. Transportation Research Board, *Impact of the United States Coast Guard Regulations on United States Flag Registry*, February 25, 2016, pp. 8 and 24, https://onlinepubs.trb.org/onlinepubs/reports/USFlagRegistry.pdf (accessed August 8, 2023).
6. Rebeca Grynspan, "Here's How We Can Resolve the Global Supply Chain Crisis," United Nations Conference on Trade and Development, January 18, 2022, https://unctad.org/news/blog-heres-how-we-can-resolve-global-supply-chain-crisis (accessed July 18, 2023).
7. Brent Sadler and Peter St. Onge, "Regaining U.S. Maritime Power Requires a Revolution in Shipping," Heritage Foundation *Special Report* No. 272, May 15, 2023, pp. 11–20, https://www.heritage.org/sites/default/files/2023-05/SR272.pdf.
8. Andrew Gibson and Arthur Donovan, *The Abandoned Ocean: A History of United States Maritime Policy* (Columbia, SC: University of South Carolina Press, 2000), pp. 208–215.
9. Joseph Trevithick, "Alarming Navy Intel Slide Warns of China's 200 Times Greater Shipbuilding Capacity," *The War Zone*, July 11, 2023, https://www.thedrive.com/the-war-zone/alarming-navy-intel-slide-warns-of-chinas-200-times-greater-shipbuilding-capacity (accessed July 14, 2023).
10. David Axe, "Thousands of Ships, Millions of Troops: China Is Assembling a Huge Fleet for War with Taiwan," *Forbes*, July 27, 2021, https://www.forbes.com/sites/davidaxe/2021/07/27/thousands-of-ships-millions-of-troops-china-is-assembling-a-huge-assault-flotilla-for-a-possible-attack-on-taiwan/?sh=4eb763c8751b (accessed July 7, 2023); Lonnie D. Henley, "China Maritime Report No. 21: Civilian Shipping and Maritime Militia: The Logistics Backbone of a Taiwan Invasion," China Maritime Studies Institute, May 2022, p. 11, https://digital-commons.usnwc.edu/cgi/viewcontent.cgi?article=1020&context=cmsi-maritime-reports (accessed July 7, 2023).
11. Jude Blanchette et al., "Hidden Harbors: China's State-Backed Shipping Industry," Center for Strategic and International Studies, July 8, 2020, https://www.csis.org/analysis/hidden-harbors-chinas-state-backed-shipping-industry (accessed July 7, 2023).
12. Bundersat Ignazio Cassis, "Maritime Strategy 2023-2027," Swiss Federal Department of Foreign Affairs, June 2, 2023, p. 8, https://www.admin.ch/gov/en/start/documentation/media-releases.msg-id-95536.html#:~:text=2023%20%2D%20The%20Federal%20Council%20adopted,of%20interests%20in%20maritime%20affairs (accessed August 10, 2023).
13. Justin Katz, "Congress Lags in Setting Up Its Own 'Future Navy' Panel," *Breaking Defense*, May 10, 2023, https://breakingdefense.com/2023/05/congress-lags-in-setting-up-its-own-future-navy-panel/ (accessed July 18, 2023).