

## *Rising From and To the Sea: China, Technology and the Future of Maritime Power*

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Maritime historian Felipe Fernandez-Armesto notes that “[o]nly miracles of simplicity or complexity” can make it possible to build a society centrally organized around the sea.<sup>1</sup> The sheer hostility of the maritime environment, lack of fresh water or reliable food supply and constant threat of exposure, can only bear either modest, primitive sea-based civilizations, like the Orang Laut of the Malayan peninsula or the Uros of Lake Titicaca in the Andes mountains, or intricately complex ones, like the European empires of the enlightenment or the United States of today. Study of either civilizational phenomenon tempts us to conclude, as Fernandez-Armesto claims we too often do, that “man is not made for the sea, nor the sea for man.”<sup>2</sup> Indeed, even from within great sea-faring cultures, the predominant cultural narrative of the sea is one of disorientation, longing, madness and ultimately death. These themes provide a thread from Homer to Shakespeare, through the timelessness of Melville to the contemporary narratives of Yann Martel.

But the truth is that the land is not only marginal to the sea geographically, but also socially. Successful and sustained exploitation of the sea, whether for trade, migration or war, has been a consistent hallmark of high civilization. This was so for the rich civilizations of the Indian Ocean more than 6,000 years ago, their followers in the Mediterranean, and certainly the European empires whose rise, for better or worse, marked the opening of modern age.

Today, U.S.-led globalization, under challenge by a quickly rising Asia led by China, is also underpinned by a sophisticated sea-based trading system. This system – enabled by global mega-ports, standardized containers and stories-high gantry cranes, a worldwide break-neck pace in shipbuilding, satellite communication and modern, global finance – has allowed us to experience the single largest accumulation of wealth that mankind has yet achieved.<sup>3</sup> And as was the case with Indian Ocean cultures witness to booming monsoon-powered trade in the fifth century B.C.E., so today, those nations who have successfully leveraged the sea for economic advantage have become wealthy the fastest, interacted with the world the most frequently, projected power the farthest, and thereby given their cultures, languages, religions, and political systems a large advantage in survivability.

What has changed in relative civilizational successes from the Indian Ocean thousands of years ago to today? Only technological innovation in sea power, and the number of players pursuing it. Today’s widely perceived shift in the balance of power is underpinned by just that. East Asia’s rise is best understood as a shift in sea power, primarily commercial and (to some extent) military. Led by Japan, South Korea, Singapore and Taiwan, new players like Malaysia, China, Vietnam and, increasingly, India are looking to sea power as pre-requisites for overall national success. These major successes in increasing sea power have come hand-in hand with major new geo-political

burdens, some of them urgent and intense. The 21<sup>st</sup> century, as so many before, will be shaped by national successes and failures in meeting these challenges and continuing the safe and reliable use of the sea.

An exhaustive analysis of the regional causes and consequences of the rise of maritime Asia is beyond the scope of this work. Such an investigation would be nothing less than a maritime interpretation of a vast and deep civilizational shift that is changing the global center of gravity from the Atlantic to the Pacific Ocean. However, this work can and does take on a re-description of the rise of China in particular from a maritime perspective. The case of China is taken as a special one for three primary reasons. First, it is the rise of China that will have and is already having the most widely-felt regional impact. Second, the rise of China, unlike the rise of some other players, is the most accessible and clear example of a successful, maritime-based broad national strategy. And third, the success of this maritime-based national strategy in China is prompting a re-evaluation, even among established maritime players, about the very fundamentals of the maritime domain and modern sea power. For these three reasons, the impact of maritime power on overall national development, and the role of technology in enabling that rise will be examined here in terms of China primarily. Applying these insights to Singapore, South Korea, Vietnam, Malaysia, and other powers will remain outside the scope of this paper.

Beginning from that premise, this overview will follow this logic to examine the rise of China and the strategic future of the Asia-Pacific through a maritime lens, with a view to the role of technology and development in the achievement of sea power. Analysis will be undertaken in three broad parts: it will begin with a consideration of China's two kinds of sea power, both commercial and military. It will be argued that the first is the foundation of modern China, and that the second only a natural out-growth of a maritime-based economy. Discussion will go on to explore the impressive growth in maritime capabilities, particularly sub-surface, in the wider Indo-Pacific context, considering the impact on the regional strategic outlook. Finally, it will conclude with a discussion of the policy burdens of Asia's maritime success.

## TWO KINDS OF SEA POWER

### *China as a Commercial Sea Power*

The maritime security field in the Asia-Pacific is dominated by discussions about the rise of Asian sea power translated as the rise of Asian navies. Too often, scholars and security practitioners alike assume that sea power is a single-dimensional characteristic, measured in 'gray hulls' and naval tonnage. While it is undoubtedly true that Asian power is increasingly employed not just on the continent itself, but on the world's oceans, focusing on this development alone puts the cart before the horse. Asia's naval expansion, while itself a strategic game-changer in the region's security outlook, needs to be understood as a necessary result of a dramatic rise in Asia's commercial sea power. It is this commercial sea power that is the foundation supporting, if not necessitating, Asia's turn to the sea in naval terms.

In 1998, senior Chinese military officials, evaluating China's military position in Asia, argued that China needed to "foster a maritime consciousness among its citizens, develop a maritime economy, and develop its naval security forces."<sup>4</sup> While the first and third recommendations were well-taken at that time, arguably, by 1998 China had already begun to cement formidable commercial sea power. In the aggregate, the economic revolution that has lifted billions out of poverty in China and transformed China's global position has been profoundly maritime in nature. When China embarked on economic reforms in the early 1980s, its manufacturing exports as a percentage of global exports was less than 1 percent.<sup>5</sup> Two decades later, spurred by massive investment in the nation's manufacturing sector and coastal infrastructure, China accounted for more than 8 percent of all global exports in the manufacturing sector by the first half-decade of this century,<sup>6</sup> and after a brief period of negative growth following the global financial crisis in 2008, was again increasing its manufactured exports, both in absolute and relative terms, by early 2011.<sup>7</sup> While this impressive growth has often been registered as a success of national investment in manufacturing alone, it has been importantly predicated on the ability of Chinese manufacturers to get products to far-off markets via seaborne trade. This has meant that Beijing's development strategies needed to be laid out with reference to the sea: early investments, from infrastructure to capital support of identified industries, were almost exclusively focused on those coastal areas of China with easiest and cheapest access to sea-lanes. Inspired by the example of neighboring Singapore,<sup>8</sup> China's leadership in the early 1980s deliberately set out to ride the steady tide of ocean-going trade sailing past China's coast. Rather than pursue indigenous 'balanced growth' or domestically-focused industrialization, Beijing instead chose to throw its weight behind the development of a manufacturing sector plugged into the global maritime economy as an easy and accessible fulcrum for national economic development.

In 1995, three years before General Mi exhorted China to develop a maritime economy, with China's manufacturing sector already demonstrating impressive growth, steps were undertaken to ensure increased reliable maritime access for Chinese manufacturers to their customers overseas. In that year, the Shanghai Municipal Government was authorized by Beijing to develop its maritime economy with a view to leveraging the international trading system; Shanghai took this direction with a degree of energy and enthusiasm that no one could have foreseen. In 1990, Shanghai port handled less than half-a-million 20-foot equivalent units (TEUs) of containerized trade, despite its favorable geographic position at the mouth of the Yangtze River on the Pacific basin. By 1998, Shanghai's throughput had risen to 3 million TEUs, averaging almost 27 percent growth year-on-year.<sup>9</sup> By 2010, Shanghai had narrowly edged out Singapore to become the world's largest container port, a singularly magnificent and unforeseen achievement.<sup>10</sup> It was premised not only on the exploitation of natural and structural economic advantages, including Shanghai's deep-water harbor and China's competitive labor market, but also on planning, foresight and feats of engineering undertaken by the Chinese leadership. Massive infrastructure projects became the hallmark of Chinese national development, including the dredging of Shanghai harbor to make way for ever-bigger container vessels, the construction of subsidiary ports to provide excess capacity, and the building of the large-scale supporting infrastructure to connect it smoothly together, such as the impressive 32.5 km Donghai Bridge, the second-largest ocean bridge in the world. As a single national asset, the port at Shanghai is impressive enough. Consideration, however, that Shanghai

is only the largest of China's mega-ports, eight of which rank as among the world's 20 largest container thoroughfares,<sup>11</sup> and one begins to appreciate the magnitude and global relevance of China's maritime economic revolution.

But even before the emergence of Shanghai as the focal point of China's maritime economic strategy, by 1998, China had already scored notable successes in the development of credible sea power as a leading player in the global shipbuilding industry. Though in the 1980s, China was described as a "technologically backward, poor-quality manufacturer of basic ships,"<sup>12</sup> as early as 1992, China ranked as the third largest shipbuilder in the world, standing astride long-established European industry players like Germany and the Netherlands, and already eclipsing traditional maritime powers like the United Kingdom.<sup>13</sup> Today, China is the world's second largest commercial shipbuilder, second only to industry powerhouse, South Korea and second to none in terms of raw aggregate new orders (Chinese firms grabbed 61.6 percent of all new vessel orders in 2010).<sup>14</sup> While Chinese firms are preferred for low-tech bulk carriers (in contrast to South Korea's high-end ships), China has developed a sophisticated manufacturing capability that widens its maritime base, raises its indigenous technological and engineering capacity, and more deeply entrenches its economy and overall national interests in the global maritime market-place.

Moving up the value chain of commercial shipbuilding is not the only challenge facing Chinese commercial sea power in the coming decades. The most pressing challenge, already identified by Chinese planners, will be to ensure that Chinese ports continue to thrive without becoming their own worst competition. Chinese planners are acutely aware that, given China's unquestioned dominance of container trade in the East Asian region and globally, future competitive threat is likely to come from within, rather than from abroad. That is, the primary challenge to China's continued success is the very real prospect that the successes of Shenzhen and Guangzhou may come at the expense of Shanghai or Hong Kong, creating an effective ceiling to China's national commercial seapower. Already, analysts of port development strategies in this region have noted the problem of "mutually destructive competition"<sup>15</sup> among a group of all-Chinese ports and port operators.

However, adaptive behaviors premised on "co-opetition" rather than direct competition already characterize developments in business strategy in southern China and Hong Kong. Port operators, facing increasing competition, have formed "strategic alliances" with their competitors as a means of maintaining market share, increasing bargaining power with global shipping lines, and ensuring long-term market relevance through the development of complementary business strategies, as opposed to directly competitive ones.<sup>16</sup> Though this development was primarily observable at the firm level in southern China (that is, between companies, either private or state-owned), there is evidence that this strategy has been adopted at the level of governmental port authorities. In June 2011, Chinese media sources confirmed that a "strategic alliance" between four Chinese ports – Qingdao, Yantai, Rizhao and Weihai – signed a cooperative framework agreement with South Korea's Port of Busan to establish an integrated "shipping and logistics center in Northeast Asia."<sup>17</sup> This "port cluster" approach, in which closely sited ports may consolidate market share by taking on specialized roles within the cluster to form an integrated logistics region, is clearly aimed at taking Chinese competitiveness in the maritime logistics sector to a new level for the next century.

Whether or not such “co-opetition” is feasible, what the balance of short-term costs and long-term gains will be, and how it will affect overall port operations worldwide remain to be determined. However, China has already proven its weight in commercial sea power, suggesting that any significant organizational development there should be taken as a potential leading trend in the overall global industry.

And so, China’s fast-developing strength at sea has been several decades in the making, though its military modernization has only gained wide-spread global attention since the turn of the century. When General Mi advocated in 1998 for a Chinese “maritime consciousness” and “maritime economy” as a precursor to establishing China’s global power, he was already well-behind the times. By design, Deng Xiaoping’s opening of China to the world in 1978 firmly oriented the country to its coasts. Value-added exports in the manufacturing sector was a single plank of national development strategy, further enabled by the design and construction of major world-class infrastructure projects at Chinese ports, and by a government-led explosion in Chinese shipbuilding. Today, China’s economic miracle continues to be profoundly maritime. Chinese people are emerging from a century of poverty by making rudimentary (but increasingly modern) manufactured products, funneling them through new Chinese mega-ports at ever-increasing speed and volume, to be circulated around the globe by Chinese-built ships.

As a result, China, more so than most of the world’s littoral states, has entangled its continued prosperity and well-being with safe and reliable access to the world’s oceans. On that basis, in the widely read *Zhongguo Junshi Kexue*, a senior officer of the People’s Liberation Army uses U.S. naval theorist Alfred Thayer Mahan to underscore China’s need to control Asian sea lanes of communication (SLOCs), especially the “strategic passages” through which Chinese-traded goods and materials traverse: “In modern times, efforts aimed at securing the absolute control of [maritime] communications are turning with each passing day into an indispensable essential factor in ensuring the realization of national interests.”<sup>18</sup> Its maritime-based economy impels Beijing to direct national security policy toward safeguarding its fundamentally domestic economic interests.

### ***China as a Military Sea Power***

Thus, even before the dawn of the new millennium, China had fostered the development of credible, indigenous sea power with commercial, rather than military roots. Of course, these commercial successes, particularly with respect to China’s ever-busier shipyards, had important repercussions in the realm of military policy. If scholars in China are increasingly turning to U.S. naval theorists to understand and assess China’s strategic position in the Asia-Pacific, it is because China’s new and intense vulnerability to naval blockade is causing a deep re-assessment in Beijing of the Pacific Ocean and the posture of China’s neighbors. This re-assessment has emphasized two primary constraints on China’s geo-strategic position.

The first is China’s “Malacca dilemma.” In 2003, Chinese President Hu Jintao asserted that “certain major powers” are interested in controlling the Straits of Malacca to China’s great disadvantage.<sup>19</sup> As the primary conduit for China’s increasingly large foreign energy supplies, as

well as a conduit for Chinese exports, the strategic chokepoints through maritime Southeast Asia (including the Malacca, Lombok and Makassar straits) are a major source of anxiety among China's military planners. While steps to mitigate China's dependence on seaborne energy have been undertaken (primarily via the construction of pipelines), the economic reality remains that China will continue to be dependent on sea-borne energy cargos for the long term. Moreover, Chinese exports of manufactured goods to markets in the Middle East, Eastern Africa and the Mediterranean necessarily require transport through the narrow straits of maritime Southeast Asia. As a result, much strategic weight is placed on Beijing's ability to, if not control, then guarantee free access to these waterways.

The second primary constraint on modern China's geo-strategic position, given its maritime-focused economy, has been identified by Chinese military leaders as the problem of the 'first island chain.' Writing in 2003, Chinese scholars Hou Songling and Chi Diantang explain:

[A]lthough China's geographic position causes China to face the sea, it does not border the ocean. Between the nearby seas and the greater ocean is an island chain composed of the Japanese archipelago, the Ryukyu Islands, Taiwan, and numerous Southeast Asian archipelagos. This is the "first island chain." To pass through the nearby seas and enter the larger ocean, China must pass through this island chain. The northern part of this island chain is currently controlled by the U.S.-Japan alliance. These areas can easily be blockaded during times of war since they are isolated frontally by Taiwan, which has still not been reunified with the motherland.<sup>20</sup>

Thus, the vulnerability of China's coastal economic centers to blockade, disruption or destruction by the United States and its allies has put a new imperative on controlling all of the waters within the 'first island chain.' Beijing seems to believe that controlling these coastal seas is the only means of guaranteeing free and reliable access to the open ocean in the event of regional hostilities. This control of the sea includes, of course, regaining control of Taiwan, the largest single island in the chain, strategically located at its center. Seen in this light, China's naval modernization and strategic focus to regain control of Taiwan can be understood as an inevitable structural corollary to its economic miracle.<sup>21</sup>

Just as its commercial success in the maritime realm has had important effects on military policy, it also has had important benefits for the military modernization that it necessitates. That is to say, that not only does China's maritime economy create a new strategic imperative at sea, it also makes it easier to meet that imperative. In contrast to many in the developing world, China is increasingly employing a defense-sector innovation model perfected in the United States that leverages the global marketplace through the commercial sector as a means to spur sustainable, indigenous technological growth directed at long-term defense priorities. This has paid big dividends in China's shipbuilding sector, in which commercial and naval shipbuilding projects are undertaken literally alongside one another, sometimes in the same shipyard by the same state-owned enterprise.<sup>22</sup> While technology is not uniformly applicable to military and commercial shipbuilding, there are enough areas of overlap that the sectors have mutually benefited one another.<sup>23</sup> Both

commercial and naval shipbuilding in China have seen a veritable explosion: just as China moved surely up the ladder of commercial shipbuilding nations, so the People's Liberation Army (Navy) has ratcheted up the pace of its shipbuilding programs. China's PLA(N) unveiled two classes of nuclear-powered submarines over the last decade and looks on track to launch another by 2015, an unanticipated achievement in a remarkably short period of time. The aggregate result is that China is positioning itself to be a maritime superpower with not only far-reaching strategic interests, but strategic advantages that are deeply intertwined with its commercial success.

Of course, China is not alone in discovering the high-value return on investment in linking commercial industrial capability to military sea power. Other countries have recognized and, to varying degrees, employed this logic as well. South Korea, for example, spent much of the last decades of the 20<sup>th</sup> century nurturing the development of industry giants – Daewoo, Hyundai and Samsung – and eventually succeeded in all but cornering the global market on ship construction. Like China today, South Korea quickly leveraged this industrial high-technology capacity to fast-track the development of modern naval shipbuilding of high-quality platforms enabled by foreign-produced accompaniments. Most recently, the much-envied KDX programme, in which the Republic of Korea Navy will take delivery of three classes of vessels in less than a decade, brought the second of three planned Aegis-capable destroyers online in June 2011.<sup>24</sup> The ROK Navy describes the new platform as a “the world's top class anti-ship, anti-aircraft and anti-submarine” asset, noting that it carries a wide array of American, European and Korean weapons, including the Aegis Combat System produced by Lockheed Martin.<sup>25</sup>

It is this kind of natural strategic synergy that the then Chief of Naval Operations Admiral Gary Roughead was eyeing when he told the Senate Armed Services Committee that the United States Navy requires a “stable shipbuilding program” not only to maintain the Fleet's capability and access in the world's oceans, but to safeguard the American commercial industrial base in the shipbuilding sector as an easily-eroded, but not easily rebuilt national strategic asset.<sup>26</sup> Perhaps under pressure of shrinking budgets, some underperforming shipbuilding contracts or empowered organized labor, there is palpable consternation among U.S. Navy professionals about the state of U.S. shipbuilding and its eventual impact on both commercial and military sea power.

### ***China's Collapsing Domains***

As noted above, China is innovating to send a fleet to sea, boasting greater size and exhibiting greater technological sophistication. This trend was most prominently in evidence to everyone in the strategic community, and not limited to maritime professionals only, with the long-overdue confirmation in June 2011 by China's PLA Chief of General Staff General Chen Bingde that China was indeed preparing to sail its first aircraft carrier.<sup>27</sup> The confirmation was quickly acted upon: the refurbished ex-Soviet carrier, *Varyag* completed its maiden voyage on August 17, 2011, uncomfortably coincident with a visit from U.S. Vice President Biden.<sup>28</sup> Follow-on commentary offered to the *Hong Kong Commercial Daily* by Lt. Gen. Qi Jianguo, Assistant Chief of the General Staff, noted that aircraft carriers are “symbols of a great nation” that are deployed by all of the

world's great nations.<sup>29</sup> While strategic commentators outside China are generally cautious in their overall assessment of the immediate strategic impact of this new development vis-à-vis the United States,<sup>30</sup> there is no doubt that China's emergence as a maritime power of significant size and scope is irreversible and of great portent in the long term.

In addition to its impressive feats of relatively short-fuse shipbuilding, China's efforts to meet new strategic imperatives at sea have come in unconventional forms as well. It is likely with these unconventional, asymmetric capabilities, and not through the development of traditional capabilities like aircraft carriers, that China will seek to gain advantage over established naval powers. Facing overwhelming U.S. regional superiority, combined with the clear technological superiority of U.S. allies Japan and South Korea's maritime forces, China has sought to leapfrog and innovate its way to an asymmetric balancing of those maritime powers of which it is most suspicious. Through technological innovation, China's military today aims to not only add assets to the maritime domain, but fundamentally change its character by collapsing it with land and space. The most obvious example of this is the development of the Anti-Ship Ballistic Missile (ABSM), Dong-Feng 21D (DF-21D) by the Chinese People's Liberation Army, which might one day be able to accurately target an aircraft carrier strike group sailing as far as 2,700 kilometers away from the Chinese coastline. As leading analysts note, the DF-21D could be stationed on the coast to fully exploit the range of the technology, or it could be embedded so deeply within Chinese territory so as to make any retaliation or pre-emptive measure against it an attack on the heart of China, and therefore "extremely escalatory."<sup>31</sup> For this reason, many analysts agree that the DF-21D is not just another in a string of technological milestones marked by the PLA, but is a potentially paradigm-shifting development that will uncomfortably blur long-held distinctions between the maritime realm and the territorial one. Historically, the former has been exploited as a realm offering a lot of political and strategic maneuverability: nations could put pressure on rivals at sea that they could not realistically get away with on land, engaging in everything from gunboat diplomacy to minor provocations with little escalatory effect. Blurring the line between the land and the sea will mean that this valuable maneuverability will be importantly and significantly reduced.

Not only is China's modern technological environment fusing seapower with conventional land-based power, it is also blurring the distinction between sea power and dominance of both outer space and cyberspace. Modern navies, led by the U.S., increasingly found power projection capability on information technologies and enabling assets in the sky, rather than at sea. Such information and communications technologies allow forces to employ global positioning systems, precision-guided munitions, and other networked & digitized information-based capabilities necessary for modern fighting forces operating far from home ports. In important ways, seapower in the 21<sup>st</sup> century will also require deep reliance and control of space and space-based assets.<sup>32</sup> Further down the chain, ensuring the integrity of information and the reliability of communications channels in cyberspace is vital to ensuring the operational viability of a far-flung fleet sailing in the vast oceanic region of the Pacific. Though not specifically or overtly directed at one another, both the United States and China are clearly aware of the deepening multi-dimensionality of modern sea power in terms of expanding spatial domains. As a result, both organizations continue to



innovate to further project their power along all dimensional axes, and hedge against vulnerability through innovated defensive technologies and postures.

Certainly, this is the message that senior U.S. military officials are delivering to Washington. Challenged by political leaders to demonstrate that the formidable U.S. Navy and U.S. Pacific Command (PACOM) would have a response to missile developments achieved in China, comments made by senior officials including Admiral Gary Roughead and Admiral Patrick Walsh (Pacific Fleet Commander) suggest that the appropriate response to China's DF-21D announcement will be multi-tiered. As early as 2009, Admiral Roughead told U.S. Senator John McCain at a hearing of the U.S. Armed Services Committee that the best innovation to maintain the credibility and influence of U.S. sea power is not technological *per se*, but organizational. He argued that, as the U.S. already deploys a technologically unmatched fleet, the U.S. Navy should adapt to changing strategic conditions by thinking about new paradigms for the maritime domain. This will include, among other adaptations, thinking in new ways about how to arrange and structure the use of its already-established assets. A new paradigm might privilege, for example a "Blue Water Antisubmarine Warfare" premised on "integrated air and missile defense." The new paradigm might also require focusing shipbuilding efforts not on large, targetable platforms like aircraft carriers, but on more agile, dispersible littoral-capable vessels instead.<sup>33</sup> In 2011, responding to Congressional concerns about the DF-21D innovation in particular, Admiral Walsh implied in an interview with Japanese media that Chinese missile development put a new premium on the missile defense program, including the cooperation of U.S. allies in Asia in that program, as "essential to [U.S.] ability to operate freely" in the Pacific.<sup>34</sup>

None of these answers represent a fully satisfying American answer to the challenge of Chinese missile innovation. As more and more unclassified sources become available, it is likely we will see that the overall U.S. response to the Dong Feng 21D will involve a myriad of actions, including the ones discussed above alongside many others. The United States, with a considerable indigenous and sustainable technological capability of its own, will nonetheless be unlikely to directly out-innovate China on this measure with a single counter-platform, but will adapt in a multi-dimensional fashion to new strategic realities.<sup>35</sup>

## THE PROLIFERATION OF SEA POWER: MODERN MULTI-POLARITY AT SEA

Though the People's Republic of China's emergence as a firmly founded seapower is pre-eminent to understanding the modern Asia-Pacific, it is contextually important to note the overall proliferation of new maritime players throughout the region. In 2011, there is no doubt that technological innovation is changing the seascape of the Indo-Pacific region in military terms. While the development of commercial sea power is inarguably more important in terms of the impact it has on the day to day lives of the region's inhabitants and its broad security outlook, advances in military power are important corollaries to understanding the strategic future of the Asia-Pacific. Whether in Japan, South Korea or Singapore, or Vietnam, Malaysia or India, the economic structure of the Asia-Pacific is generating a new or reinforced interest in the oceans in

virtually every major capital on the continent. In these countries – just as in China – as commercial interests in seaborne trade become more sophisticated and profitable, so the imperative to secure the nation’s interests through military credibility will sharpen. In the modern Indo-Pacific, this logic has been borne out: today, the flag follows trade, that is to say that the natural result of increasingly trade-dependent economies is the concurrent development of sophisticated sea power to protect those interests wherever they may be threatened.

There are many places to find evidence of this trend across the region, but the single most instructive area for investigation is the explosion in naval capability across the theater. Though the U.S. Navy remains the preponderant power at sea and will for some time,<sup>36</sup> there is increasing erosion of the Navy’s strategic advantage by an array of increasingly credible players on the ocean. Not only China’s People’s Liberation Army (Navy) and the Indian Navy, but also the Japanese Maritime Self Defense Forces (JMSDF), the Republic of Korea Navy (ROKN), the Republic of Singapore Navy (RSN), and the Royal Australian Navy (RAN) are sending increasingly capable platforms to sea with increasing frequency, in service of an ever-widening sphere of strategic missions for the governments that they serve. Whether fisheries patrol, customs enforcement, anti-piracy operations, disaster management and humanitarian assistance, or old-fashioned naval exercise, patrol and port visits, the Indo-Pacific oceans complex is now more than ever a high-traffic area for regional navies.

In no single indicator is this explosion in capability more stark than in the proliferation of submarines. At least one private market consultancy, Forecast International, predicts that 111 submarines will be built globally between 2011 and 2020, nurturing a market worth \$106 billion.<sup>37</sup> Though the estimate is, especially in the out-years, highly speculative, we can say for sure that more than 50 submarines have been acquired or announced by Indo-Pacific nations in the last five years alone.<sup>38</sup> A straight-line extrapolation of this regional trend would suggest that a global projection of 111 submarines built is perhaps an under-estimation of the true rate of proliferation of submarines in the new Indo-Pacific.

While there are a number of ways to measure naval strength and ambition, aggregate number of submarines is an interesting barometer for two reasons. First, submarines are oftentimes the first acquisition of a newly ambitious naval power because they are an asymmetric weapon of maritime warfare. A single, relatively pedestrian submarine can inflict tremendous damage on an unsuspecting adversary, and even the possibility that a submarine is nearby can keep a well-trained, well-resourced surface fleet on the defensive and reluctant to maneuver. In confrontational circumstances, a submarine is a uniquely cost-effective platform for a modest power facing a more capable adversary. The tragic sinking of ROKS *Cheonan* in March 2010 is evidence of that truth: in that instance, an unsophisticated North Korean coastal submarine broke a state-of-the-art South Korean corvette in two and killed 46 sailors. For that reason, submarine acquisition can be understood as the first sign of an emerging naval power gaining a foothold in strategic context. In the Indo-Pacific today, we are seeing a number of first-time submarine acquisitions, suggesting a number of strategic transformations underway at the same time across the region.

The second reason that it is an interesting metric is that submarines, though cost-effective, are incredibly technologically daunting. Save for outer space, there is no more hostile operating environment for human beings than under the ocean's surface. As a result, the operation of submarines require a lot of professional training for personnel, a time-intensive and laborious effort to operate and maintain, and even greater effort and skill to safely design, build or modify submarines indigenously. Whether newly emerging navies are building their own submarines (like China and India) or whether they are acquiring them from abroad (like Vietnam and Malaysia), the inclusion of submarines in substantial numbers in the region is evidence that navies are increasingly capable, or at least, increasingly ambitious in technological terms. The fact that the Asian continent is today not just an active buyer of submarines, but also a designer and merchant,<sup>39</sup> speaks to the truly remarkable technological revolution that the continent has undergone in recent decades. The upfront investment in technology, training and professionalization can and will pay dividends to investing nations in terms of the strategic advantage that submarines can provide. Moreover, this strategic advantage will have immediate impact, creating a new multi-polar Asia in which multiple credible players will be operating in the ocean at any given time.

## THE BURDEN OF ASIA'S MARITIME SUCCESS

Of course, the proliferation of submarines in particular, and of naval assets more generally in a heterogeneous strategic environment greatly increases geo-strategic uncertainty. Couple this with the growing reliance on maritime-based trade by virtually all of the countries of the region, and it is easy to see that the stakes of maritime security are rising. The increase in interests and acquisition of capabilities does not foreordain military conflict, but does make such conflict easier to stumble into over relatively minor political flashpoints. In this context, the continued proliferation of maritime boundary disputes in both East and South Asia lends particular cause for concern. As military credibility and technological capabilities continue to rise in Asia, the crisis events at sea of 2010, including the sinking of ROKS *Cheonan* in March and the confrontation of Japanese Coast Guard vessels and a Chinese fishing trawler in September, will likely become more numerous and perhaps more deadly than in times past. In this sense, the burden of economic and military successes in China and in the wider Asia-Pacific will be the need to sharpen both conflict resolution and crisis management skills throughout the civilian bureaucracies of the region. Without an evolution in policy and diplomatic innovation in skill commensurate with innovation clearly on display in the realm of maritime power, the burden of Asia's success may also be its Achilles heel.

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## Notes

1. Felipe Fernandez-Armesto, "Maritime History and World History," in *Maritime History as World History*, ed. Daniel Finamore (Gainesville, FL: University Press of Florida, 2004), 8.

2. Ibid.

3. For a great historical overview of containerized trade and the "world the box made" see Marc Levinson, *The Box: How the Shipping Container Made the World Smaller and the World Economy Bigger* (Princeton, NJ: Princeton University Press, 2006).

4. Lt Gen Mi Zhenyu, "A Reflection on Geographic Strategy," quoted in James R. Holmes and Toshi Yoshihara, "The Influence of Mahan on China's Maritime Strategy," *Comparative Strategy* 24, no. 1 (2005): 30.
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20. Hou Songling and Chi Diantang, "Southeast Asia and Central Asia: China's Geostrategic Options in the New Century," *Dangdai Yatai* 4 (April 15, 2003): 9-15, quoted in Holmes and Yoshihara, 31.
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24. "Seoul deploys second Aegis destroyer," *Space War*, June 10, 2011, [www.spacewar.com/reports/Seoul\\_deploys\\_second\\_Aegis\\_destroyer\\_999.html](http://www.spacewar.com/reports/Seoul_deploys_second_Aegis_destroyer_999.html).

25. Ibid.
26. Admiral Gary Roughead, "Hearing to Receive Testimony on the Department of the Navy in Review of the Defense Authorization Request for Fiscal Year 2010 and the Future Years Defense Program" (June 4, 2009): 6. Full text available at [www.armed-services.senate.gov/Transcripts/2009/06%20June/09-40%20-%206-4-09.pdf](http://www.armed-services.senate.gov/Transcripts/2009/06%20June/09-40%20-%206-4-09.pdf).
27. "China Aircraft Carrier Confirmed by General", *BBC News*, June 8, 2011, <http://www.bbc.co.uk/news/world-asia-pacific-13692558>. Initial tests were expected on July 1, 2011 but were reportedly delayed.
28. Jonathan Manthorpe, "Beijing Greets Biden by Testing First Aircraft Carrier," *Vancouver Sun*, August 19, 2011, <http://globalbalita.com/2011/beijing-greets-biden-by-testing-first-aircraft-carrier/>.
29. Quoted by BBC News, "China Aircraft Carrier."
30. Most commentators agree that a single aircraft carrier is of limited global strategic value; key advantage can only be achieved with multiple carrier platforms. An important caveat is that even a single aircraft carrier may have an important, if not decisive impact on the strategic balance in the more limited Taiwan and South China Sea regional disputes. Indeed, the carrier's name, *Shi Lang*, suggests that the carrier is a tribute to the Chinese Admiral who conquered Taiwan in 1861. See, *inter alia*, Holmes, James. "Blue Water Dreams." *Foreign Policy*, The Slate Group, June 27, 2011. Moreover, following the first sea trial of the carrier, commentators across the globe seem to agree with U.S. PACOM Commander, Admiral Robert Willard, that this step was only a very small beginning to developing a carrier capability. See Viola Gienger and Tony Capaccio, "China's Carrier Poses Mostly Symbolic Threat, U.S. Admiral Says," *Bloomberg News*, April 12, 2011, <http://www.bloomberg.com/news/2011-04-12/china-soviet-era-carrier-poses-mostly-symbolic-threat-u-s-admiral-says.html>. See also Abraham M. Denmark, Andrew S. Erickson, and Gabriel Collins, "Should We Be Afraid of China's Aircraft Carrier? Not Yet", *Foreign Policy*, June 27, 2011, [http://www.foreignpolicy.com/articles/2011/06/27/should\\_we\\_be\\_afraid\\_of\\_chinas\\_new\\_aircraft\\_carrier?page=full](http://www.foreignpolicy.com/articles/2011/06/27/should_we_be_afraid_of_chinas_new_aircraft_carrier?page=full).
31. Andrew S. Erickson, "Ballistic Trajectory: China Develops New Anti-ship missile," *Jane's Intelligence Review*, (February 2010).
32. Andrew S. Erickson and Kathleen A. Walsh, "National Security Challenges and Competition: Defense and Space R&D in the Chinese Strategic Context," *Technology in Society* 30 (2008): 349-361.
33. Admiral Roughead, "Hearing to Receive Testimony," 6.
34. Yoichi Kato, "U.S. commander blasts Chinese Navy's Behavior", *Asahi Shimbun*, June 15, 2010, [www.asahi.com/english/TKY201006140534.html](http://www.asahi.com/english/TKY201006140534.html).
35. Note that the United States is not the only maritime player thinking about this dilemma: Japan and India, for example, are exploring the same problem. See "China's ASBM Programme Matter of Concern: Navy Chief," *Indian Defence*, December 5, 2010, [www.indiandefence.com/forums/f8/chinas-asbm-programme-matter-concern-navy-chief-2966/](http://www.indiandefence.com/forums/f8/chinas-asbm-programme-matter-concern-navy-chief-2966/).
36. This judgment remains the mainstream verdict, despite some reporting suggesting the contrary following the publication of a report by the IISS that the Chinese Navy commands more ships in the Pacific than the US Navy. Overly simplistic analysis resulted from this report. For a good critique of over-simplification see James R. Holmes and Toshi Yoshihara, "When Comparing Navies, Measure Strength, Not Size," *Global Asia*, December 10, 2010, [http://www.globalasia.org/V5N4\\_Winter\\_2010/James\\_R\\_Holmes\\_&\\_Toshi\\_Yoshihara.html](http://www.globalasia.org/V5N4_Winter_2010/James_R_Holmes_&_Toshi_Yoshihara.html).
37. "FI Projects a \$106+ Billion Submarine Market," Press Release, January 10, 2011, <http://www.forecastinternational.com/press/release.cfm?article=219>.
38. This trend is led by the United States Navy, which plans to bring 30 *Virginia*-class nuclear attack subs online; seven are already active, six have been commissioned in the last five years, and an eighth was christened in November 2010. See "Newest Virginia-Class Submarine Christened," Press Release, November 6, 2010, [http://www.navy.mil/search/display.asp?story\\_id=57044](http://www.navy.mil/search/display.asp?story_id=57044). Other big acquisitions are projected for China (20+), Republic of Korea (15), Australia (12), India (12), Indonesia (12), Russia (8), Taiwan (8), and Japan (6).

39. At the time of writing, media sources in India suggest that Pakistan has confirmed a deal with China to procure six new conventionally powered submarines. If confirmed, this would be the first export of Chinese submarines to Pakistan. Rajat Pandit, "Pak adding submarine muscle as India dithers," *Times of India*, April 11, 2011, [http://articles.timesofindia.indiatimes.com/2011-04-11/india/29405993\\_1\\_submarines-pns-hamza-navantia](http://articles.timesofindia.indiatimes.com/2011-04-11/india/29405993_1_submarines-pns-hamza-navantia). South Korea has also entered the submarine market as merchants, entering into fierce competition with more established French and German firms to supply Indonesia with three diesel-electric submarines. "S. Korea close to clinching Indonesia submarine deal," *The Korea Herald*, August 26, 2011, <http://www.koreaherald.com/national/Detail.jsp?newsMLId=2-11-826000596>.