



MARITIME REVIEW

PUBLICATION OF THE MARITIME LEAGUE

Issue No. 21-4

JUL - AUG 2021

CHINA: UNDERSTANDING ITS STRENGTHS AND WEAKNESSES

Also Inside:

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- » Diesel Electric Submarines with Air Independent Propulsion Systems compared with Nuclear-powered Submarines
- » Preparing for the Worst
- » Safety of Life at Sea
- » Trees, Mangrove Planting Now Mandatory for Every PPA Contract or Permit Issued

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The Maritime Review is published bimonthly on behalf of the Maritime League and is supplied to members as a part of their annual membership package. The opinions expressed by the writers do not necessarily reflect those of the Maritime League

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ABOUT THE COVER

The Chinese carrier Liaoning sails into the South China Sea to join the PLA unilateral naval exercise.

Maritime Events Calendar

MARCH 2021

- 12-15 7TH INTERNATIONAL LNG CONGRESS (MADRID, SPAIN)
5-7 TALLINN BOAT SHOW (ESTONIAN FAIRS CENTER, FRITA ROAD,
FRITA ROAD 28, ESTONIA)
9-11 2ND WORLD HYDROGEN SUMMIT (DIGITAL EVENT)
16-18 INTERMODAL ASIA 2021 (SHANGHAI WORLD EXPO EXHIBITION
AND CONFERENCE CENTRE, SHANGHAI, CHINA)
30 INTERNATIONAL MARITIME EXPO (INMEX) VIETNAM (HO CHI
MINH CITY, VIETNAM)
23 **MARITIME FORUM #161 (MARITIME ACADEMY OF ASIA AND THE
PACIFIC (MAAP); ONLINE VIA ZOOM MEETING)**

APRIL 2021

- 12-15 SEATRADE CRUISE GLOBAL (MIAMI, FLORIDA, USA)
17-25 SEATRADE MARITIME EVENTS: SEA ASIA-SINGAPORE (SUNTEC
SINGAPORE CONVENTION & EXHIBITION CENTRE,
SINGAPORE, SINGAPORE)
21-22 OFFSHORE WINDCONFERENCE 2021 BY SCOTTISH RENEWA-
BLES (VIRTUAL EVENT)
21-22 COASTLINK CONFERENCE ANTWERP 2021 (PORT OF ANTWERP,
ANTWERP, BELGIUM)
21-22 9TH AVL LARGE ENGINE TECHDAYS - DECARBONIZATION FACING
GLOBAL ECONOMIC CHALLENGES (HELMUT LIST
HALLE, GRAZ, AUSTRIA)
19-30 NACE CORROSION 2021 VIRTUAL CONFERENCE AND EXPO
(VIRTUAL EVENT)
**TBA MARITIME FORUM #162 (MARITIME INDUSTRY AUTHORITY
(MARINA); ONLINE VIA ZOOM MEETING)**

MAY 2021

- 11-12 ENVIROTECH FOR SHIPPING FORUM (HILTON ROTTERDAM
HOTEL, WEENA 10, ROTTERDAM, NETHERLANDS)
18-20 BREAKBULK EUROPE 2021 (MESSE BREMEN, BREMEN, GERMA-
NY)
18-20 EUROPORT ROMANIA (IDU HALL, MAMAIA, CONSTANTA, ROAM-
NIA)
24-27 MARITIME WEEK AMERICAS (PANAMA CITY, PANAMA)
**TBA MARITIME FORUM #163 (PHILIPPINE NAVY (PN); ONLINE VIA
ZOOM MEETING)**

JUNE 2021

- 8-10 TOC EUROPE (ROTTERDAM, NETHERLANDS)
8-11 SEANERGY FORUM 2021 INTERNATIONAL LEADING EVENT ON
OFFSHORE WIND AND MARINE RENEWABLE ENERGY (PAYS DE LA
LOIRE, NANTES, SAINT-NAZAIRE, FRANCE)
15-17 SEAWORK SOUTHAMPTON 2021 - EUROPE'S LEADING COMMERCIAL
MARINE AND WORKBOAT EXHIBITION (MAYFLOWER PARK,
SOUTHAMPTON, UK)
16-18 SHIPPAX FERRY CONFERENCE 2021 (ONBOARD PEARL SEAWAYS,
SAILING BETWEEN COPENHAGEN, DENMARK - OSLO, NORWAY -
COPENHAGEN, DENMARK)
21-23 CRUISE SHIP INTERIORS EXPO AMERICA (CSI) (MIAMI, FLORIDA, USA)
21-23 MARINE MONEY WEEK (NEW YORK, USA)
21-23 SURFACE TECHNOLOGY GERMANY (MESSE STUTTGART, MESSE-PIAZZA
1, BADEN-WURTEMBERG, STUTTGART, GERMANY)
23-25 7TH EDITION OF PHILIPPINES MARINE (PHILMARINE 2021) (SMX
CONVENTION CENTER, SM MALL OF ASIA COMPLEX, PASAY CITY,
METRO MANILA, PHILIPPINES)
SHIPBUILD PHILIPPINES 2021 (CO-LOCATED WITH PHILMARINE 2021)
OFFSHORE PHILIPPINES 2021 (CO-LOCATED WITH PHILMARINE 2021)
22-24 ELECTRIC & HYBRID MARINE WORLD EXPO (AMSTERDAM,
NETHERLANDS)

- TBA MARITIME FORUM #164 (PHILIPPINE COAST GUARD (PCG);
ONLINE VIA ZOOM MEETING)**

JULY 2021

- 6-8 BLACK SEA PORTS AND SHIPPING (THE MARMARA TAKSIM, BEYOGLU
BELEDIYESI, TURKEY)

JULY 2021

- TBA MARITIME FORUM #165 (NATIONAL COAST WATCH COUNCIL
(NCWC); ONLINE VIA ZOOM MEETING)**

AUGUST 2021

- 3-5 INDONESIA MARITIME AND OFFSHORE EXPO 2021 (IMOEX 2021)
RADISSON GOLF AND CONVENTION CENTER, BATAM, INDONESIA
16-19 OFFSHORE TECHNOLOGY CONFERENCE (HOUSTON, TEXAS, USA)
25-26 DIGITAL OCEAN CONVENTION 2021 (HANSEMESSE
ROSTOCK, ROSTOCK, GERMANY)

- TBA MARITIME FORUM #166 (PHILIPPINE PORTS AUTHORITY (PPA);
ONLINE VIA ZOOM MEETING)**

SEPTEMBER 2021

- 13-17 LONDON INTERNATIONAL SHIPPING WEEK 2021 (LONDON, UK)
21-23 SEA ASIA 2021 VIRTUAL CONFERENCE AND EXPO (ASIA'S ANCHOR
MARITIME AND OFFSHORE EVENT) (MARINA BAY SANDS, SINGAPORE,
SINGAPORE)

- TBA MARITIME FORUM #167 (NATIONAL DEFENSE COLLEGE OF
(NCWC); ONLINE VIA ZOOM MEETING)**

OCTOBER 2021

- 5-6 MARINE ENERGY TRANSITION FORUM 2021 (HAVENHUIS
ANTWERPEN, ZAHA HADIDPLEIN 1, ANTWERP, BELGIUM)
6-8 INDONESIA MARITIME EXPO (IME 2021) (INDONESIA EXPORT IMPORT,
JAKARTA, INDONESIA)
11-13 INMEX SMM INDIA EXPO AND CONFERENCE (BOMBAY EXHIBITION
CENTER, MUMBAI, INDIA)
12 ANNUAL CAPITAL LINK NEW YORK MARITIME FORUM (VIRTUAL
CONFERENCE)
13-14 AIS SUMMIT 2021. HYBRID OF DIGITAL AND PHYSICAL EVENT (ST
ANNENUFER 5, HAMBURG, GERMANY)
13-15 CMA SHIPPING CONFERENCE AND EXHIBITION 2021 (HILTON
STAMFORD CONNETTICUT, 1 STAMFORD PL, STAMFORD, CONNETTICUT,
USA)
20-22 OIL AND GAS VIETNAM 2021 (PULLMAN VUNG TAU, VUNG TAU,
VIETNAM)
21-22 GLOBAL PORTS FORUM 2021 (OCBC CENTRE, SINGAPORE, SINGAPORE)

- TBA MARITIME FORUM #169 (PHILIPPINE PORTS AUTHORITY (PPA);
ONLINE VIA ZOOM MEETING)**

NOVEMBER 2021

- 2-3 ASIAN LOGISTICS AND MARITIME CONFERENCE (HONG KONG
EXHIBITION CENTER, HONG KONG)
2-5 EUROPORT 2021 (ROTTERDAM AHOY CONVENTION CENTRE,
AHOYWEG, ROTTERDAM, NETHERLANDS)
8-11 ABU DHABI INTERNATIONAL PETROLEUM EXHIBITION AND
CONFERENCE (ADIPEC 2021) (ABU DHABI NATIONAL EXHIBITION
CENTER, AL KHALEEJ AL ARABI ST, AL RAWDAH CAPITAL CENTER, ABU
DHABI, UAE)
11 CHINA SHIP FINANCE SUMMIT (THE RITZ-CARLTON SHANGHAI
PUDONG, SHANGHAI, CHINA)
15-18 NAVIGATION 2021 - THE EUROPEAN NAVIGATION CONFERENCE (ENC)
AND THE INTERNATIONAL NAVIGATION CONFERENCE (INC) (VIRTUAL
EVENT)

- TBA MARITIME FORUM #170 (DEPARTMENT OF ENVIRONMENT AND
NATURAL RESOURCES (DENR); ONLINE VIA ZOOM MEETING)**

DECEMBER 2021

- 1-3 INTERNATIONAL WORKBOAT SHOW (MORIAL CONVENTION CENTER,
NEW ORLEANS, LA, USA)

THE CULTURE OF MAINTENANCE

by VAdm Emilio C Marayag Jr AFP(Ref)

Before Congress abrogated the 1947 RP-US Military Bases Agreement (MBA) the maintenance of most of the country's defense equipment depended on the American logistics system. Some combatant ships and aircrafts were sent overseas for depot maintenance. Most spares came in handy with a robust supply system. In the 1960s the nation's air force, with its Blue Diamond unit, and navy, with its anti-submarine capability, were one of the best in Southeast Asia. Access to the American Foreign Military Sales and Financing in the 1970s and beyond was easy. Selected AFP personnel underwent specialized training abroad and the regular bilateral exercises kept our military units abreast with external defense operations.

With the end of the Cold War in the late 1980s and the termination of the MBA in 1992, the Americans reduced their troop deployment overseas and transferred their forces elsewhere. The departure from the Philippines of the allied troops practically shut down the logistics support of the country's aging air and naval fleet assets and reduced the opportunities for both individual and unit training thereby affecting defense readiness and sustainability. The consequent AFP modernization proposal was only considered in 1995 when China occupied Panganiban Reef (Mischief Reef). At that time many military assets had already deteriorated due to lack of maintenance.

When Vice Admiral Eduardo Mario Santos took the helm of the Philippine Navy in late 1996, he advanced his leadership blueprint- "Future Directions of the Philippine Navy at the Turn of the Century." He identified key areas of naval modernization like fields of specialization, naval warfare development, and ship acquisition. Upon his retirement in October 1999, Vice Admiral Luisito Fernandez took over and focused on strengthening the Navy's "culture of maintenance" that complemented Admiral Santos' blueprint. The two admirals effectively set the stage for navy modernization in accordance with Republic Act No. 7898, or the AFP Modernization Act of 1995.

Admiral Santos initiated the acquisition and eventually the deployment to the combatant commands of 3 used Royal Navy (Peacock-class) offshore patrol vessels later renamed as Jacinto-class patrol ships. They were intended to be transition platforms to prepare Filipino sailors for more modern combatants. Admiral Fernandez, on the other hand, worked for rehabilitation and maintenance of existing naval assets mostly acquired from the United States, especially the logistics support vessels, WW2 patrol and cargo ships, and the smaller fast gunboats built in the '80s and '90s. Likewise, the South Korean government donated more than a dozen used fast attack craft in mid-90s. Many of these combatants are still in the service and the new arrivals from US, Australia, Indonesia, and South Korea will certainly need a comprehensive maintenance program to keep them running. For one reason or another the modernization program did not generate enough support from the political leaders until 17 years later with the enactment of the Revised AFP Modernization Law of 2012, or the Republic Act No. 10349.

I spent my last shipboard assignment as Captain of a Cannon-class destroyer escort and upon installation I articulated my vision: to see the ship operational long after my retirement. I paid close attention to unit training and maintenance of ship armaments, propulsion machineries and superstructure. Seventeen (17) years later that ship had to be decommissioned for material wear and tear, a good 74 years after keel laying. I consider my captainship of that vessel and 3 others a personal achievement having attained at least 80% ready-for-sea status, or operational availability, affording me a rare opportunity to visit 81 ports, anchorages and "lying to" areas nationwide including the West Philippine Sea. I view my 3-year stint in PCG's Aids to Navigation Unit, where I joined in many maintenance missions and drafted a manual for field maintenance and installation teams, as a great learning experience in protecting and preserving government assets located in far-flung areas.

The succeeding navy chiefs spent lot of effort to maintain the fleet combatants. Even with renewed engagement with US in 1998, it took a full decade after the turn of the century for the navy to receive refurbished and new ships from US, Australia, Indonesia and South Korea. Unlike the ships acquired when MBA was still in effect, the procurement of newly-acquired assets have been funded solely by Filipino taxpayers. Thus, the Philippine Navy is duty bound to keep those ships running through proper maintenance to ensure their functioning, minimize the cost of repairing, and provide a safe environment for the users.

Government assets, whether a facility or an equipment, fulfill administrative and social needs of the people and represent a significant chunk of public expenditure. The military and other agencies have large inventories of expensive equipment that require constant upkeep, and in some instances the need to update activities for their efficient, continuous and uninterrupted operation. With rising costs of replacing a facility or equipment, it is much better to simply repair them in a timely manner. As Kurt Vonnegut Jr. observed: "Another flaw in the human character is that everybody wants to build and nobody wants to do maintenance."

Purchasing expensive facilities and equipment entails a "cradle to grave" outlook that focuses on costs from inception, and service life to disposal stage. For naval weapons systems, the cost categories include research and development (R&D), investment, operations and sustainment, and disposal. R&D involves all activities necessary to approve the expenditure on the chosen system. Investment refers to all activities required to put the system into service. Operations and sustainment take into account all activities vital in the operation, maintenance, supply and deployment support of the system. Disposal is the planning and management of the demilitarization and removal of the system from the service.

The costs associated with operations, maintenance and sustaining support vary depending on the type and quantity of the system. For ships, the rule of thumb is that 40% of the total life

cycle cost goes to system acquisition while 20-30% represents the system's maintenance cost. The remainder is spent on operational, sustaining support and disposal costs. Of these 3 major cost components, maintenance cost is the probably the only one that could be projected because the original equipment manufacturer (OEM) provides the scheduled maintenance activities.

Maintenance is a combination of technical and administrative actions to be taken to preserve or protect a system or equipment to function properly. It aims to remove potential equipment failure, deterioration, stoppages and breakdown. Maintenance activities covers detection, inspection, troubleshooting, prevention, testing and calibration, overhaul, and replacement of parts, components or assemblies. With sophistication in technology and business decision-making several maintenance approaches emerged: reliability centered, total productive and business entered. Due to the nature of their operational environment military equipment must be subjected to reliability centered maintenance (RCM).


Maintenance culture defines the values, way of thinking, behavior, perception and underlying assumptions of any person or group to improve the skills, tenacity and diligence in maintaining a system. Culture drives behavior. In turn, behavior influences the quality of work fundamental in system reliability. Reliability enhances efficiency and cuts operational costs.

When an organization's maintenance culture is not good it is characterized by indifference, blame, frustration, distrust, waste of time, pessimism, crises, aging work order backlogs, frequent unscheduled maintenance events, and tension between operations and maintenance. When things go sour as expected, some decision makers even adopt the "denial syndrome" exemplified by outright disavowal, rationalization, lip service, but panic at the thought of command responsibility.

To establish a good maintenance culture there should be continuous effort and management commitment to improve proficiency and increase expertise through orientation and reorientation, allocate sufficient maintenance budget, and most importantly, guard against corruption. Other concerns must also be addressed: selecting the right people, investment, measurement, machine readiness, planning, scheduling, and general organization.

Some studies identify the components that greatly influence maintenance culture: responsibility, laws and their concomitant rules, knowledge, training, awareness, enforcement of policies, organizational management approaches, management commitment, policy, personality and attitude, operating system organization, culture trend, motivation, leadership, and mind set.

With renewed energy to pursue the AFP Modernization Program where bulk of the budget allocation goes to acquisition of weapons systems it would be enlightening to recall the words of one Philippine Marine Commandant when directed to increase the number of marine brigades: "Allow me first to fully assess the implications of additional units in terms of organization, training, equipage and maintenance, and their costs."

Indeed, unless the nation is about to fall, operational requirements must take into account the costs involved. And the cost of maintenance is one of the key factors to be considered. Maritime forces may revisit their capability acquisition goals, objectives, and strategies with due regard to maintenance and Philippine societal needs amidst participation in international covenants of alliance. 



CHINA: UNDERSTANDING ITS STRENGTHS AND WEAKNESSES

by Colonel Dencio S Acop AFP PA(Ret), PhD

Chinese leader Xi Jinping promised his people that by 2049, the 100th anniversary of the People's Republic, "China would become a global leader in terms of composite national strength and international influence and would build a stable international order in which China's national rejuvenation would be fully achieved." This statement alone is already pregnant with meaning. This article will attempt to break down this statement of national strategy by the controversial Chinese Premier into its pros and cons given what has happened in the world with China's actions thus far. By knowing the achievements of the up-and-coming challenger to the world order, we can better prepare ourselves for better or worse. There is no more logical way to present this thesis than to address point by point the realizations of the roadmap that Xi Jinping has charted for Pax Sinica.

Writing for *The Atlantic* in 2017, Graham Allison believed that Xi Jinping vowed to make China great again by embarking to accomplish the following: (1) 'Returning China to the predominance it enjoyed in Asia before the West intruded'; (2) 'Reestablishing control over the territories the Communist Party considers to be 'greater China', including not just Xinjiang and Tibet on the mainland, but Hong Kong and Taiwan'; (3) Recovering its historic sphere of influence along its borders and in the adjacent seas so that others give it the deference great nations have always demanded'; and (4) 'Commanding the respect of other great powers in the councils of the world.'

The preceding strategies are motivated by what Xi Jinping convinced the Communist Party to be the unfair international order dictated by the West limiting China from becoming a power equal to the United States. Now, Xi is convinced that not only will China surpass the West but will displace Pax Americana by 2049. Hal Brands explained the underlying foreign policy discourse behind Xi's expressed strategies when he wrote the following for *Bloomberg* in 2020: (1) 'A deeply skeptical view of the existing international system. In their view, American alliances do not preserve peace and stability but stunt China's potential and prevent Asian nations from giving Beijing its due. The Communist Party recognizes that the liberal international order has brought benefits but the party abhors and dreads the principles on which it is based.' (2) 'The international order must change a lot for China to become fully prosperous and secure.' If we dig deeper into what is being said, then the global implications would be just as China expert Liza Tobin concludes which is that 'a global network of partnerships centered on China would replace the US system of treaty alliances and the world would view Chinese authoritarianism as preferable to Western democracy.'

To see more clearly where the world is headed with China at the helm, it is best to look at what has actually transpired for China interiorly and exteriorly. Through this lens, we get a glimpse of this reality unfolding before our eyes but this time with the added eyes of those who have actually experienced China in other parts of the world. This eye opener allows us to better assess China on the new world order that it proposes. To understand China's strengths and weaknesses as a world leader. And to determine for ourselves individually and collectively whether Pax Sinica is going to be a better deal.

Xi Jinping took over from the retiring Deng Xiaoping as leader of China in 2012. To carry out the China Dream that he had been advocating from day one, Xi set out to execute his agenda for action along four key fronts. Graham Allison pointed these out in 2017. First, Xi 're-legitimized a strong Communist Party to serve as the vanguard and guardian of the Chinese state.' Second, he made sure that China became wealthy again through sustained economic growth. Third, 'Xi is making China proud again.' And fourth, Xi has 'pledged to make China strong again.'

Unlike his predecessor Deng, Xi Jinping asserts that the Communist Party be in the thick of China's mainstream governance. This was his first critical action agendum. Though Communist in state ideology, China had learned its lesson from the past and managed Capitalism to suit its national interest. This quasi-shift began in the '80s. Not long after, corruption began to rear its ugly head on party bureaucrats, prompting Xi to declare upon taking power '*corruption could kill the party.*' As Allison cites, Xi quoted Confucius and 'vowed to govern with virtue and keep order through punishments.' Xi then launched an anticorruption drive, dubbed the 'tigers and flies' campaign where 'more than 900,000 party members were disciplined and 42,000 expelled and prosecuted in criminal courts.' 'Among those have been 170 high-level 'tigers,' dozens of high-ranking military officers, and 18 sitting or former members of the 150-person Central Committee.' 'Xi moved to cement the party's centrality in China's governance.'

While Xi's landmark crackdown on corruption among party members is laudable and a clear illustration of China's strength, 'corruption remains a very significant problem in China, impacting all aspects of administration, law enforcement, healthcare, and education.' The continuing corruption remains a damper to China's reforms and Xi cannot let-up his anticorruption campaign if China is to reach its goal in 2049. Public surveys on the mainland since the late 1980s show corruption is among the top concerns of the general public. 'In popular perception, there are more dishonest CCP officials than honest ones. China specialist Minxin Pei argues that failure to contain widespread corruption is among the most serious threats to China's future economic and political stability. He estimates that bribery, kickbacks, theft, and waste of public funds cost at least 3% of GDP. *Transparency International's 2019 Corruption Perception Index* ranks the country 80th out of 198 countries.

While China's external dealings may indicate unrelenting strength towards Xi's strategic blueprint, they can also mask domestic pressures that may not be so visible but are unmistakable owing to historical precedents of authoritarian regimes like the former USSR. That meltdown was not so long ago. As Harlan Ullman wrote (*Atlantic Council*: 2021), "*China too may be subject to huge domestic pressures and an increasingly controlling party structure that risk alienating substantial segments of the population. Over 100,000 large-scale protests a year have been reported in China as people call for more resources at home and an end to rampant corruption that favors the few rather than the many. A combination of so-called social credits that grade citizens on loyalty and credit-worthiness – using facial recognition – enables the CCP to exert control.*"

The second action agenda of Xi is sustaining China's

unparalleled wealth in the world through its consistently high growth rate. With so much liquidity, China has become indispensable in the world's financial and trade markets. With its unique domestic mix of public-private partnership, it operates like the world's biggest multinational corporation (MNC). Its centralized ways and means of operating have made it a lot more efficient than Japan Inc. or the biggest MNCs of the West. They have also advanced China's national interests in ways unparalleled by the democracies of the world. Thus far, China has succeeded in what it must do to sustain a high-performing economy for years to come as Allison has pointed out: *"accelerating the transition to domestic consumption-driven demand; restructuring or closing inefficient state-owned enterprises; strengthening the base of science and technology to advance innovation; promoting Chinese entrepreneurship; and avoiding unsustainable levels of debt."*

Most of these were on course until the pandemic hit in late 2019. Much of China's silence at the time was mostly in view of the negative repercussions the coronavirus from Wuhan would have had on Xi's ambitious goals that began at the start of his reign. China was doing so well. It was not a time to highlight a problem. Even a problem as serious as a global pandemic. China actually managed to put a handle on the coronavirus flouting a 'Mask Diplomacy' donating even not fully-tested vaccines and other medical equipment to Global South countries that would have them, including the Philippines. But given the need for readjustment brought on by Covid, Xi's ambitious timetable goals appear to be encountering significant challenges whether China admits or not. Gunther Hilpert and *Stanzel of Stiftung Wissenschaft und Politik (SWP)* wrote in early 2021 that *"due to the pandemic-related dip in growth, China will just fall short of its self-imposed target of doubling its national income between 2011 and 2020. However, all other long-term development plans remain on course. By 2025, China plans to be the world leader in ten value-added industrial sectors. By 2035, the country aims to double its national income yet again, while also setting the standards for global technology. And in 2049, Xi's 100th anniversary target, China hopes not only to be modern, strong, and prosperous, but also to assume its position as the leading industrial nation."*

As an adjustment due to the effects of the pandemic, China has had to come up with a Five-Year Plan to ensure it stays on Xi's timeline targets. However, Hilpert and Stanzel point out, *"it is not clear how these guidelines differ from aspirations, which China has pursued (in vain) for 15 years, to balance China's economic growth. Over the course of the pandemic, the already limited progress in China's desired macroeconomic rebalancing has vanished into thin air. The share of private consumption in aggregate demand remains at a historically uniquely low-level of less than 40%. Mirroring this, China's gross fixed capital formation is far too high; inefficient, a drain on resources and the cause of growing internal debt. China's economic growth, driven by investments and exports, is therefore unsustainable, to the extent that declining economic growth rates are inevitable in the medium term. Productivity growth and the number of people employed have been stagnating for several years. Internal debt has risen to 280% of GDP, and a growing number of state-owned enterprises are technically insolvent."*

To avert a financial and debt crisis, China would need to make a macroeconomic turnaround. This change of course would require redistribution of income in favor of labor and the rural population, big improvements in public pensions, health

care, and rapid reduction of industrial and real estate overcapacity. However, whether the party and state are politically and ideologically capable of changing course is questionable in view of the hesitant approach in Chinese economic policy. Reforms are not the priority of the Xi administration as it prefers to strengthen CCP's claim to global leadership. National economy has made a comeback over the past decade, and market reforms are back. Against this backdrop, in the face of an increasingly confrontational environment in the global economy, China is not well-positioned to meet economic and structural challenges that lie ahead. With declining economic growth and a budget spread thin, China will face difficulty in financing increased spending on health, retiree pensions, environment, and climate. It is hard to imagine how China's ambitious development plans can be realized in this context. Xi made a vow to make China great again but the pandemic has thrown a monkey wrench to his unprecedented 2049 goals. Xi is trying to satisfy an expectant domestic public while trying at all costs to go down in Chinese history as the leader who not only made China great again but did it in notable time.

Xi not only wanted China to ascend but to do it his way. To promote itself as a world leader, China under Xi sought to spread its influence beginning with the Global South countries –the developing world which is in need of development cash. With its wealth, China can certainly do so. In fact, China was even confused where to begin. At first, it thought that the conservative way of first establishing primacy in the East-Asian region was necessary before it could expand Pax Sinica through the rest of the world. But now, China feels confident that it could do both simultaneously: win Asia and the rest of the world at the same time. Until the pandemic hit. Regardless, Xi did not let anything get in the way of his 2049 goals. Throughout the pandemic, China has been relentless in pursuing its goals across all fronts globally. To pragmatic critics, this does not seem doable. But Xi is tenaciously proving everyone wrong. The way things stand, China's resources are spread out too thinly across almost every region and country. Its investments are in almost every industry. The momentum of its unique public-private machinery has taken on a mind of its own that even Xi may no longer control it. But Xi has unleashed a tiger whose momentum and audacity are its greatest assets. Thus, Xi is neither changing course nor turning back. He is letting his gains from 2012 carry on to their logical conclusion which, he believes, is on track as envisioned. Xi has assumed a god-like status in China that some say may even surpass Mao's if his legacy succeeds.

But not so fast just yet. The Belt and Road Initiative (BRI) Diplomacy launched by Xi in 2013 indeed has had its fruits, wise or otherwise. The development loans dangled by China to Global South countries in Asia, Africa, and South America seemed perfect – a mutually beneficial deal. However, as partnerships developed with these countries, recipient governments had to deal with loans they could not repay, forcing some to surrender certain natural or man-made resources to China. The result is most favorable to China whose economic front serves political ends in Beijing, but ends very badly for unsuspecting loan recipients that had to lease strategic ports to China for 99 years. It is a very delicate issue as small borrowing countries never realized that such loans with China could infringe on their sovereign rights and the very lives and livelihood of their citizens. With these kind of bilateral relationships entered into by China with a growing number of states, it does not seem rational that the BRI diplomacy will ultimately work towards a world that would benevolently embrace China. It appears to lead

to a global order that could isolate China once again. This type of deal, which is acceptable in authoritarian settings, does not work in mutually beneficial arrangements.

As former U.S. Secretary of State Rex Tillerson said in March 2018, “Beijing encourages dependency using opaque contracts, predatory loan practices, and corrupt deals that mire nations in debt and undercut their sovereignty.” When Sri Lanka owed more than a US\$1 billion debt to China, their Hambanethota Port had to be handed over to companies owned by the Chinese government; Djibouti in Africa had to do the same under like circumstances. Tillerson added that the recipient countries do not even benefit by way of livelihood jobs as China sends its own overseas workers. This was echoed by former U.S. Vice-President Mike Pence in a speech he delivered later that year. While China has characterized its ‘BRI as a win-win between China and recipient nations, countries that know better call it China’s ‘debt-trap diplomacy.’ ‘China has faced ‘accusations of imperialist behavior when its debt plans go wrong’ according to Tim Fernholz writing for Quartz (2018). “The non-profit Center for Global Development analyzed debt to China incurred by nations participating in the BRI investment plan and saw that eight nations found themselves in above-average debt to China: Djibouti, Kyrgyzstan, Laos, Maldives, Mongolia, Montenegro, Pakistan, and Tajikistan.” The Philippines is now feared to be part of this group due to incurred loans with China. Researchers say evidences should raise concerns about economic distress stemming from debt that undermine development efforts altogether. In the past, China has responded to debtors inconsistently and has not followed best practices adopted by international lenders working with poor countries. Sometimes, the debt is forgiven; other times, disputed territory or infrastructure is demanded as payment. Thus, Pakistan and Nepal turned down Chinese infrastructure loans in 2019 in favor of better sources of funding. China’s incursions into the Philippines’ EEZ in the West Philippine Sea / South China Sea, where both countries are claimants, has been increasingly emboldened. The Philippines continues to suffer incursions by Chinese vessels despite having won the Arbitral ruling in 2016 upholding the validity of its claims over China.

China’s BRI is a strategy under Xi that affects about 80 countries, covering more than two thirds of the world’s population. Its declared aim is a cross-border, win-win economic stimulus package that will spur economic growth in China and the countries with which it engages. In exchange for global trade opportunities and economic advantage, it intends to strengthen hard infrastructure with new roads and railways, soft infrastructure with trade and transportation agreements, and cultural ties with university scholarships, and other people-to-people exchanges. This is from a January 2021 panel of experts composed of Professor Ramon Guillermo of the University of the Philippines; Senior Fellow Didi Kirsten Tatlow of the German Council on Foreign Relations (DGAP); Maung Zarni of Forces of Renewal Southeast Asia (FORSEA), and former Malaysian Senior Minister Tan Sri Dato’Seri Syed Hamid Albar.’ Given the accusation by BRI participants that Chinese loans are more of a debt-trap diplomacy, ‘is the debt-trap diplomacy then a calculated move by China to seize strategic assets to further its geopolitical ambitions as an emerging superpower? Or is it just a misuse of language to describe a common phenomenon depicting the need and greed of a predator lender? Is it fair to accuse China when the International Monetary Fund also provides massive loans with onerous conditionalities (Structural Adjustment Programs)

to defaulting countries knowing that they are unable to repay their debts, but are justified by implausible assumptions of future economic recovery, to make the borrower countries more pliable to and supportive of U.S. foreign policy, at the expense of losing sovereignty, democracy, and human rights? Are ASEAN countries the new victims of China’s ‘debt-trap diplomacy?’ Malaysia, Indonesia, Laos, and Philippines are now BRI participants.

In the case of the Philippines, President Rodrigo Duterte decided to pivot away from its long-time U.S. ally in favor of China. Duterte took over power in 2016 and since then, his preference for China over the West has been unmistakable. In October of that year, Manila and Beijing sealed US\$24 billion worth of deals and 13 government-to-government agreements. In November 2018, the Philippines officially announced its cooperation with the BRI by formalizing the deal under a Memorandum of Understanding. The Duterte administration’s ‘Build Build Build’ Program, which pledged to usher in the Philippines’ ‘golden age of infrastructure,’ dovetails with the concept of the BRI as outlined above. According to Jane’s Defense Journal, China eyes a strategic port in the Philippines where Chinese companies look to win control of a bankrupt but strategic shipyard at Subic Bay, the ex-site of U.S. military bases and a potential key outpost on the South China Sea. Two unnamed Chinese companies, Philippine government sources say, have expressed interest in taking over the 300-hectare shipyard, reportedly the world’s fifth largest. Analysts note that China Ocean Shipping Company (COSCO) and China Merchants Group have recently aggressively bid to operate ports in recent years. Chinese investments have become robust in the Philippines and there are efforts to allow them to own real estate properties beyond the traditionally allowable limits that were set so as not to infringe on sovereignty issues. Even the popular Boracay Island has been eyed by Chinese business interests. Philippine Off-Shore Gaming Operations (POGOs) are investments which compete with local workers as thousands of mainland Chinese have been allowed in as overseas workers.

An international tribunal invalidated China’s claim to 90% of the South China Sea in 2016, but Beijing does not recognize the ruling and has built artificial islands in the disputed waters equipped with radar, missile batteries, airstrip, and hangars for fighter jets. *“They have done this (occupy disputed areas) before at Panatag Shoal or Bajo de Masinloc and at Panganiban Reef, brazenly violating Philippine sovereignty and sovereign rights under international law,”* said Defense Secretary Delfin Lorenzana. The defense chief was reacting to the latest incursions by more than 200 Chinese militia vessels into San Felipe Reef waters which is within the Philippines’ EEZ waters. The trespassing by the foreign boats was also called out by Foreign Affairs Secretary Teodoro Locsin in a strongly worded note to the Chinese Ambassador in Manila.

Harlan Ullman wrote, “an internal financial system with huge debt, shadow banking, probable signs of a real estate bubble, and the need for significant real annual economic growth to respond to expectations of better standards of living, raise massive challenges for the leadership in Beijing. The ‘one-child’ policy led to an aging population, in which the ratio of retirees to workers is headed in the wrong direction, with substantially more men than women, meaning many men will not find spouses. China also lacks viable allies. Still, China has managed to contain the U.S. by reaching a trade and investment agreement with the European Union. It signed the 15-country Regional Comprehensive Economic

Partnership, strengthening its potential for economic growth. China has reportedly struck another deal with Iran involving trade, oil, and investments that could circumvent the sanctions imposed on Iran.” With these, China hopes to avert a ‘debt-ridden balance sheet that could lead to a financial crisis.’ However, Ullman argues, ‘the CCP’s increasing autocratic control over the general public stifles economic productivity. The more China attempts to control its population, the more it risks a backlash. As in the former Soviet Union, China has an oppressive political-ideological regime, limiting human ingenuity, imagination, and innovation. This may prove to be the fatal flaw in Chinese aspirations.’

Third in Xi’s action agenda is making China proud again. Xi challenged the Communist Party that its people must become proud of their national identity through its leadership. Almost reminiscent of Adolf Hitler’s charismatic call to the German people to avenge their humiliation at the hands of the Western Allies in World War I, Xi wants to exact vengeance upon the West for humiliating China through the centuries. Allison wrote, *“Xi has increasingly portrayed the party as the inheritor and successor to a 5,000 year-old Chinese empire brought low only by the marauding West. The phrase ‘wuwang guochi’, or ‘never forget our national humiliation,’ has become the mantra that nurtures a patriotism grounded in victimhood and infused with a demand for payback. This payback is nothing but China’s assertion that her time for glory has come, and that it is ready to bring in a new world order –one that it will dictate, for a change. That the time of democracies is over. That authoritarianism is back with a vengeance. And that China will lead it where none has ever done before.*

Xi’s fourth action agenda is his pledge to make China strong again. Allison said, *“Xi believes that a military able to fight and win wars is essential to realizing every other component of the China Dream. To achieve the great revival of the Chinese nation, Xi argued China must ensure there is unison between a prosperous country and strong military. While all great powers build strong militaries, this ‘Strong Army Dream’ is especially important to China as it seeks to overcome its humiliation at the hands of foreign powers. Despite all the challenges on his agenda, Xi is simultaneously reorganizing and rebuilding China’s armed forces in a manner that Russia’s foremost expert on Chinese military, Andrei Kokoshin, calls ‘unprecedented in scale and depth.’ He has cracked down on graft in the military and overhauled its internally focused organization to concentrate on joint warfighting operations against external enemies.”*

Writing for the Atlantic Council, Harlan Ullman said, *“China has fielded a modern military with a navy on track to have 500 ships, with many patrol boats and small craft (while substantially larger than the U.S. Navy’s approximately 300-ship fleet, it is not nearly as capable). China has become more aggressive in its region in pursuing its aims.”* It is not far-fetched to see how China’s BRI may be related to its defense positioning in the world. After all, it is to any nation’s interest to advance itself across all fronts. How much more for a huge powerhouse like China whose public-private national structure is unparalleled in the world. In fact, all of Xi’s four action agenda are interrelated in more ways than one. Being an autocratic regime, it makes the most sense to reinvigorate the CCP as the center of stimuli that drives the engines of growth towards superpower-hood in 2049. It is the communist ideology that has been the common thread giving rise to a near 100 year-old, new nation. But using a foreign ideology –capitalism– to do the work since communism is a failed economic system. Wealth

attains power. A powerful military is a source of national pride, along with economic might. And power will in turn restore the long-lost national pride. All combined, in sheer magnitude, that is China of a billion people, with the makings of a superpower, enough to challenge the reigning superpower and world order.

If China engages in saber-rattling, it may indicate two possibilities. One, the CCP may be at a point where foreign policy action needs to distract the population away from nagging domestic issues. The end state of Xi’s 2049 China Dream is not so much about assuming the crown of a superpower as compared with failing the Chinese people. If the people are in need of resources not found at home, the logical scapegoat is to be found elsewhere whether it be fishing in the South China Sea or generating jobs from the BRI. Rather than be threatened by its own people, China would rather beam the people’s wrath on some external threat somewhere. After all, there are lots to choose from. Another is that China may not yet be ready in terms of a full-scale confrontation where it confidently holds the winning card. Massive oil purchases from Iran, Brazil, and Venezuela indicate huge needs for defense or industry. Per estimates, China only has 25 billion barrels of oil reserves. Settling for oil and gas in the South China Sea than purchase all the way from South America or the Middle East passing through waters controlled by India or Russia makes sense for China. Stalling until Chinese submarines go nuclear also makes sense for China. In fact, China’s below level of war engagements make better sense now given Xi’s self-imposed timelines. But who knows? China may need not even have to fire a single shot since it already is at war with the world.

Will China really go to war? Witnesses who have observed how Chinese interests operate in the world say NO. The obsessive concern to let Chinese goods and services continue flowing through global trade markets from manufacturing hubs in the mainland point to a basic principle that is firmly grounded in the world. Add the art of faith to this rocket science of pure pragmatism and one can conclude that indeed the center of gravity of all this is an ideology that sees nothing beyond this earthly existence. Man is the end all. Communism is the bible of this approach that sees only the genius of man as the ultimate answer to all of man’s aspirations. There is nothing supernatural in Communism. And the CCP is the author of this march towards 2049 where a new god of the earth can rule over mankind.

Yet there are also enough in the world who would say YES, China will indeed go to war if the need for it arises. Just to put things into perspective, nuclear war is unwinnable by any protagonist. This realization was good then. It is still good now. Limited wars like conventional skirmishes may not lead to total annihilation but just their conduct by nuclear powers can trigger an escalation. So why do nations develop these engines? For conflict? For self-defense to back-up their diplomacy? For national pride as Xi pointed out? There can be no superpower in the world without a credible army. China has embarked on a most ambitious goal under Xi and it may lead to war on a global scale. China is currently operating in the gray zone where it has practically done everything short of going to war. To some, this indicates a strategy of intimidation to see who blinks first. But this could also indicate an acceptance of the inevitable that the price for leading a new world order may be worth it.

In summary, what have been the emerging consequences of China’s engagements with the world on its way to China Dream 2049? While the BRI may have advanced China’s interests as Xi

envisioned, it may also have incurred unwitting enemies for China in the debtor nations whose interests were compromised in terms of lost revenues and sovereign rights. The list is growing. As of this writing, this list includes Sri Lanka, Djibouti, Kyrgyzstan, Laos, the Maldives, Mongolia, Montenegro, Pakistan, Tajikistan, Malaysia, Indonesia, Laos, Nepal, and the Philippines. How many more of the 80 countries covered by the BRI are in the same boat? The 80 countries targeted by the BRI are mostly those in the Global South which need development funds. Richer nations have not been targeted as they are not vulnerable targets of Chinese capital. Add to this growing list of Chinese 'enemies' the US-led Western countries who have never been fans of China and one gets a picture of a world where not many members are likely to fall into China's new world order. Even China's traditional allies like Russia, Iran, and North Korea are cautiously drawn into its orbit only by necessity as they face embargo from the West. Is it really surprising to see such an emerging picture? I do not think so.

Firstly, Xi's 'better feared than loved' policy may work in an authoritarian environment but to expect the same effect in non-authoritarian regimes is a stretch and quite naïve. Secondly, while there are still working monarchies and non-secular states, these are very few in the world where majority are now secular nations based on democratic principles which allow for self-determination, the highest human aspiration. A political system that allows people the pursuit of happiness and freedoms is hard to replace, much more by an ethno-centric totalitarian system. Thirdly, Communism which China promotes is a failed economic system. If China is prosperous today, it is only through capitalism, the very same system it tried to destroy but now relishes. The China model is hardly a model as it works only for China and not for any other nation. Fourthly, much of the rest of the world is either of the three monotheistic religions (Christianity, Islam, and Judaism) built on moral codes that China neither practices nor respects. This fact is a deep divide that is a major hindrance to a new world order characterized by a marginalization of what tugs at men's hearts. Finally, China cannot be so certain of winning imminent wars between superpowers. Even China knows only too well that no one emerges from nuclear annihilation, and that is the surest dead-end along the China Dream to 2049. 🚢

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CAD/CAE/CAM Systems for the Naval Architecture, Ship Design & Shipbuilding Industry

The image displays a collection of software logos used in the ship design and construction industry. The logos include Rhinoceros (design, model, present, analyze, realize...), Orca3D, Simerics (TECHNOLOGY BY DESIGN), EXPRESSMARINE (Structural modeling plug-in for Rhinoceros), MAXSURF (Integrated Naval Architecture & Ship Construction Software), AUTODESK, ShipWeight, MOSES, NavCad, PropExpert, PropCad, and SHIPCONSTRUCTOR. A central diagram illustrates the design process for a ship hull, with various stages and components labeled around a central 'FINIAL DESIGN' core. The labels include: DESIGN REQUIREMENTS & PURPOSE, COST ESTIMATES, WEIGHT ESTIMATE, COMPLIANCE WITH DESIGN STANDARDS, EQUIPMENT LIST, PLUMBING, MECHANICAL, ELECTRICAL, ENGINE & POWERING, MASTS, APRÉS, STANDING & RUNNING RIGGING, DECK LAYOUT, HULL & DECK CONSTRUCTION, HULL & DECK ENGINEERING, HYDROSTATICS & STABILITY, LINES PLAN, SAIL PLAN, GENERAL ARRANGEMENT, BASIC DIMENSIONS & DESIGN RATIOS, COMPRESSION DESIGN, and FINIAL DESIGN.

NO ORDINARY BOATS: CRACKING THE CODE ON CHINA'S SPRATLY MARITIME MILITIAS

by Ryan Martinson



In this photo provided by the National Task Force-West Philippine Sea, Chinese vessels are moored at Whitsun Reef, South China Sea on 27-March-2021. (Philippine government photo).

A Chinese fishing vessel appears in a sensitive location — near the Senkaku Islands in the East China Sea, a South China Sea reef, or just offshore from a U.S. military base. Is it an “ordinary” fishing boat, or is it maritime militia?

This straightforward question seldom yields straightforward answers. China does not publish a roster of maritime militia boats. That would undermine the militia’s key advantages — secrecy and deniability. Nor is it common for Chinese sources to recognize the militia affiliations of individual boats. Analysts can gather clues and make a case that a vessel is likely maritime militia, or not. That process requires painstaking effort, and the results are rarely definitive.

The People’s Republic of China (PRC) may have made that process much easier, at least in the most contested parts of the South China Sea—the Spratly Islands. Since 2014, the PRC has built hundreds of large Spratly fishing vessels, collectively called the “Spratly backbone fleet” (南沙骨干船队). As I recently suggested at War on the Rocks, most if not all of these vessels are maritime militia affiliated. This insight can help overcome the perennial challenge of differentiating wayward Chinese fishermen from covert elements of China’s armed forces.

Backbone Boats are Militia Boats. In late 2012, PRC leaders decided to invest heavily in the modernization of China’s marine fishing fleet. Prompted by a proposal made by 27 scholars at the Chinese Academy of Engineering, they implemented a series of policies to help fishing boat owners replace their small, old wooden vessels with larger, steel-hulled craft. These programs provided subsidies to large segments of the Chinese fishing industry. But the most generous support was reserved for a specific class of fisherman: i.e., those licensed to operate in the “Spratly waters,” the 820,000 square kilometers of Chinese-claimed land and sea south of 12 degrees latitude.

The Chinese government, both at the central and local levels, allocated large sums of money to reimburse fishing boat owners willing to build new Spratly boats. Hundreds of Chinese

fishing boat owners took them up on this offer. The new boats constituted the “Spratly backbone fleet.”

The PRC was very particular about what kinds of boats it wanted in the new fleet. In a January 2018 interview, the Party Secretary of a Guangxi-based firm named Qiaogang Jianhua Fisheries Company (桥港镇建华渔业公司) acknowledged that while the subsidies were quite large, the new boats had to meet very exacting standards. According to the Secretary, surnamed Zhong, the vessels must be quite large, have powerful engines, and be equipped with advanced refrigeration units, among “many, many” other stipulations. Zhong declared, “The document listing these requirements (批文) is very thick. If you don’t adhere to these stipulations, then there’s no subsidy.”

Aside from controlling what types of boats got built, Beijing likely desired some control over how the new boats got used. If deployed effectively, their actions could, like at Scarborough Shoal in 2012, enable new territorial acquisitions. Conversely, if misused, they could damage China’s reputation and even precipitate a violent clash. When the program began, China already had in place a system for controlling the activities of its fishing boats in contested waters: the maritime militia.



27-April-2021 – Philippine Coast Guard personnel survey several ships believed to be Chinese militia vessels in Sabina Shoal in the South China Sea. (Philippine Coast Guard photo)

The “maritime militia” (海上民兵) is the saltwater element of China’s national militia. Like the People’s Armed Police and the People’s Liberation Army (PLA), it is a component of the country’s armed forces. Most members of the maritime militia have day jobs, often as fishermen. However, their affiliation with the militia means their vessels can be “requisitioned” (征用) to participate in training activities and conduct missions (service for which they are compensated). Militia members are trained and managed by PLA officers assigned to People’s Armed Forces Departments (PAFDs) in the city, county, or town in which the militiamen reside.

Subsidies for construction of the Spratly backbone fleet have been channeled both to existing members of the maritime militia and unaffiliated fishing boat owners that were willing

to take the oath as a condition for the money. Among the first to receive the new boats, members of the Tanmen Maritime Militia benefited from the first approach. Spratly backbone boats registered to Hainan's Yangpu Economic Development Zone offer an example of the second.

The Spratly backbone fleet appears to be managed by the coordinated efforts of provincial fisheries authorities and the provincial military system (of which PAFDs are a part). The most compelling support for this thesis comes from a 2017 report by the Guangzhou-based MP Consulting Group, which was hired to audit Guangdong's Marine and Fisheries Bureau. The resulting 96-page document was subsequently posted on the website of the Guangdong Department of Finance.

In their report, MP consultants assessed the Bureau's success at achieving the seven goals established for 2016. Most were domestic regulatory functions, irrelevant to this story. However, the Bureau's seventh goal set out the organization's mission to help protect China's "rights" in disputed maritime space in the South China Sea. MP consultants generally gave favorable marks on this account, listing eight noteworthy achievements. These included the Bureau's role in "promoting the construction of maritime militia forces." Specifically, the Bureau spent 2016 clarifying the division of responsibilities between it and the provincial military district with respect to the "construction, daily operation, combat readiness training, and other relevant tasks" of the Spratly backbone fleet. This statement indicates that the Guangdong elements of the Spratly backbone fleet —and, by extension, those backbone vessels based in Guangxi and Hainan provinces— are organized into militia units jointly managed by the provincial military district and the provincial Marine and Fisheries Bureau.

Other evidence supports the hypothesis that "backbone" boats are militia boats. In August 2020, for instance, the Jiangmen City branch of the Bank of Guangzhou released a summary of its contributions to the local economy. Among these, the branch cited a 97 million RMB loan it provided to an unnamed "top tier fishing company" to build 11 Spratly backbone boats. The bank unwittingly revealed that these new fishing vessels also had "militia functions" (民兵用船功能).

A generic employment contract for crew members embarking on Spratly backbone boats offers additional evidence. The contract —which was uploaded to a Baidu document sharing platform in February 2019— outlines terms for employment at the Shanwei City Cheng District Haibao Fisheries Professional Cooperative (汕尾市城区海宝渔业专业合作社). While little is known about this cooperative, its members are clearly active in the Spratlys. Indeed, its operations manager, Mr. Zhang Jiancheng (张建), serves as the General Secretary of the Shanwei Spratly Fishing Association (汕尾市南沙捕捞协会).

The Haibao Fisheries contract makes clear that its backbone boats are militia boats, without actually using the words "maritime militia." It contains a section on "rights protection requisitioning" (维权征用), i.e., removing the boat from production so that it can serve state functions in disputed maritime space. According to Article 2 in that section, if required for "national defense," the fishing vessel and its crew must "participate in training activities and rights protection tasks, and support military operations." Article 2 also indicates that crew members must comply with arrangements made by the fishing cooperative and "obey the command of the military" and other

government authorities. Article 4 states that if and when the fishing vessel is requisitioned, the boat and its crew must "obey the command of the state," operating in the manner required, mooring in the determined location, and "completing the operational tasks according to the specific requirements."

Section 6 outlines the rules governing crew behavior, both ashore and at sea. For example, crew members must not gamble, solicit prostitutes, or visit strip clubs while in port (Article 6). The rules also include content specific to the vessel's militia functions. Article 7 proscribes taking photos and "divulging the secrets of the boat." Without the permission of the captain, crew members cannot bring outsiders aboard the boat to view its "design structure and internal setup" (设计构造和内部设置).



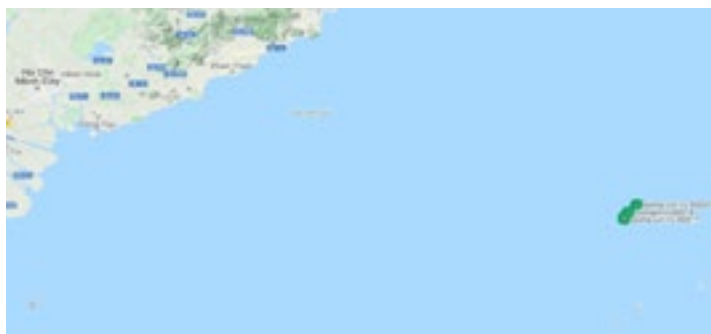
23-March-2021 – This satellite image by Maxar Technologies shows Chinese vessels in the Whitsun Reef located in the disputed South China Sea. (Maxar Technologies)

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Implications. In this article, I have argued that most if not all Spratly backbone boats are militia boats. They may actually catch fish, but their militia affiliation makes them available for state and military tasking. If this conclusion is correct, it offers useful new ways to identify Chinese maritime militia forces operating in the Spratly waters. While the PRC does not publish lists of active maritime militia boats, it does share information about which boats belong to the Spratly backbone fishing fleet. This can serve as an indicator of militia status.

How might this work in practice? At the time of this writing, a team of 4 Chinese fishing boats is operating illegally within 200 nautical miles of Vietnam's coast, i.e., within the country's exclusive economic zone (EEZ). The 4 vessels are named Qionglinyu 60017, 60018, 60019, and 60020, indicating registry at Hainan's Lingao county (临高县). Vietnamese maritime law enforcement authorities could evict them, but before doing so they might ask, are they maritime militia?

My answer: “very likely.” A quick sifting of open-source materials reveals they are all backbone boats. This information appears in a March 2020 open letter posted on the website “Message Board for Leaders” (领导留言板). In it, the boat owners entreat PRC officials to restore fuel subsidies and other rewards for operating in “specially-designated waters” in 2018. Likely amounting to hundreds of thousands of RMB, the subsidies were withheld as punishment for operating in the Spratlys without the required licenses. To elicit special consideration, they emphasized that their four vessels were Spratly backbone boats. (Their ploy ultimately failed, as the Lingao County Bureau of Agriculture responded to their letter with a firm but polite refusal to change their decision.)



Qionglinyu 60017, 60018, 60019, and 60020, May 2021. (Via www.marinetraffic.com).

Southeast Asian countries can and should compile lists of known Spratly backbone boats. They can start with local newspapers, which are a great source for such information. In December 2016, for example, Zhanjiang Daily published an article about the launching of the city’s first Spratly backbone trawlers: the 48-meter (577-ton) Yuemayu 60222 and 60333. Registered to the city’s Mazhang District, the craft are owned by Zhanjiang Xixiang Fisheries (湛江喜翔渔业有限公司). With these clues in hand, one can then try to learn the identities of the company’s two other Spratly backbone boats, then still under construction.



Yuemayu 60333 (Via NHJD.net).

The websites of Chinese shipbuilding companies are another useful source of information. Those with contracts to build backbone boats often issue news releases when these vessels are launched or delivered. In October 2017, for instance, the Fujian-based Lixin Ship Engineering Company launched 5 very large Spratly backbone trawlers built for a Guangdong fishing company, Maoming City Desheng Fisheries Limited. The 5 boats

were delivered two months later. They included Yuedianyu 42881, 42882, 42883, 42885, and 42886. The boats were 63.6 meters in length and had the large (1244kW) engines typical of the backbone fleet. Of note, Desheng Fisheries is the same company that owns Yuemaobinyu 42881, 42882, 42883, 42885, and 42886, all moored at Whitsun Reef in March. Indeed, they may be the very same boats (their names having been slightly altered in the years since they were built).



Yuedianyu 42882, December 2017 (Photo via Fujian Lixin Ship Engineering).

Provincial and municipal governments may be the most valuable sources of all. In November 2020, the Guangdong Bureau of Agriculture and Rural Affairs released information about the province’s Spratly (“NS” for Nansha) fishing license quota for 2021. The document indicated that 255 Guangdong boats would receive Spratly fishing licenses this year, among which 185 would go to backbone boats and 70 would go to “ordinary boats” (普通渔船). The Bureau attached an Excel spreadsheet listing the chosen vessels. The document omitted Table 1, containing the list of backbone boats. But it did include Table 2, listing the 70 “ordinary” fishing boats. Since only two types of Guangdong boats operate in the Spratly, i.e., ordinary and backbone — any Guangdong boat there and not found in Table 2 must be a backbone boat, and therefore presumed to be militia.

These data help shed light on recent events. In March and April 2021, the Philippine Coast Guard released photos of Chinese fishing boats loitering at Whitsun Reef. Thanks to the Asia Maritime Transparency Initiative (AMTI), we know the identities of 23 of them.

Both AMTI and the Philippines Coast Guard classified them as “militia.” They are right. All are from Guangdong. All are absent from Table 2. And that makes them no “ordinary” boats. Reprinted with permission.

About the Author:

Ryan D. Martinson is a researcher in the China Maritime Studies Institute at the Naval War College. He holds a master’s degree from the Fletcher School of Law and Diplomacy at Tufts University and a bachelor’s of science from Union College. Martinson has also studied at Fudan University, the Beijing Language and Culture University, and the Hopkins-Nanjing Center.



Source: <https://cimsec.org/no-ordinary-boats-cracking-the-code-on-chinas-spratly-maritime-militias/>

MARINES FACILITATE THE SURRENDER OF 10 ASG MEMBERS AND SUPPORTERS IN SULU

by Naval Forces Western Mindanao



A total of ten (10) individuals surrendered to government authorities in Seit Lake, Poblacion I, Panamao Sulu on 23-April-2021. According to reports, of the ten (10) individuals, four (4) were identified to be regular members of the terrorist group under ASG sub-leader SABSIBAR BENCIO, and the others were ASG supporters, who are identified as: Marisa Marajan 35 years old, wife of ASGSL Sansibar Bencio; Maybat Saliddin – a 60 year old, mother of ASGSL Sansibar Bencio; and Arnylyn Aburaja 20, wife of ASG member Sikal Hussein; and three others.

The ceremony was presided by COL HERNANIE S SONGANO PN(M)(GSC) the Commander of Naval Task Group

Sulu and concurrently the Commander of 4th Marine Brigade. It was facilitated by MBLT-1 under its OIC, MAJ JOHN A DELA CRUZ PN(M)(GSC). The ceremony was also witnessed by Hon. Alfraizer S Abdurajak, Municipal Mayor of Panamao, and the barangay chairmen of Barangay Kan Asaali and Barangay Bangday.

Those who surrendered turned over several firearms including three M16 rifles with 2 long magazine loaded with sixty 5.56mm rounds of ammunition, two Cal 45 pistols with defaced serial numbers, one M14 rifle

with defaced serial number, and one M1 Garand rifle with SN 1688805.

Before the ceremony, those who surrendered were taken to Panamao District Hospital for medical check-up.

The collective peace-building efforts of the Marine Units together with the Local Government Unit of Panamao played a vital role in their surrender with the hope that others will follow their lead. Terrorism should end so that the government can focus on peace and development efforts not only in the 2nd District of Sulu but also in the whole province, COL Songano said. [📌](#)



Source: NAVFORWESMIN on Facebook

SAFETY OF LIFE AT SEAS

by Karl M Garcia

Photo Credit: KON MARITIME rescue boat.

In my previous contributions to the Maritime Review, I highlighted the importance of an all-government approach to national security in updating a National Defense and Act. In my second contribution which was about Maritime Governance and administration, I highlighted the fragmentation of our various agencies and recommended amending the executive order that created the Coast Watch System, and updating the National Marine Policy. We now focus on Safety of Life At Sea.

- Maritime Disasters from boat accidents to large vessels burning and sinking has plagued us through the years. Accidents happen but can be prevented. Much has been said about interagency cooperation and coordination to address perennial overlapping functions among agencies, several round table discussions among focus groups and have formulated strategies, submitted white papers only to fall on blind eyes and deaf ears or perhaps our ningas cogon quirk took the best of us more often than not.

Presidential Certification of Urgency

Several bills related to Maritime Safety and or Maritime Governance had been filed and refilled in congress such as:

- The creation of a National Transport Safety Board;
- Maritime Code of the Philippines;
- Creation of Admiralty Courts; and
- Maritime Administration Act.

At present, the current Maritime Administration of our government is thinly spread among 14 bureaus and agencies under 7 departments. The fragmentation of our maritime administration has led to bureaucratic entanglement, functional overlaps, and conflicting maritime laws and regulations. The restructuring of maritime administration is a first step by creating one superbody consisting of maritime bureaus and agencies.

The creation of a **National Transportation and Safety Board** is a major step to promote transportation safety by conducting independent safety investigations and by formulating safety improvement recommendations.

The **Maritime Code of the Philippines** hopes to address the Philippines' non-implementation of international conventions.

The Philippines has been a party to these international safety conventions:

- The International Convention for Safety of Life at Sea (1974);
- The International Convention for the Prevention of Pollution at Ships (1973);
- The Convention on International Regulations for the prevention of Collisions at Sea (1972);

- The International Convention of Load Lines (1966);
- The International Convention of Tonnage Measurement (1969).

The Philippines is not a part of the following conventions:

- SOLAS Protocol of 1988
- MARPOL Protocol of 1997
- Load Lines Protocol of 1988(amended 2003)

The Bill seeks to implement these protocols with **MARINA** as the lead agency.

Lastly, the creation of specialized **Admiralty Maritime Courts** will unclog our courts of all maritime case backlogs.

Like the National Defense Act Legislation, the Biazons have filled these bills as far back as the 13th Congress. Certification of urgency from the past presidents were badly needed but certain circumstances prevented the bills' passage.

It is a given that our institutions are fragmented, our bureaucracy is caught in an entangled web, turf wars overlapping functions happen more often than not.

A creation of the Coast Watch system seemed to have a failure of launching because of Command and Control Issues, so a creation of a super-body with Command and Control to handle Maritime Administration is a must.

A non-regulatory independent investigative body is also needed to handle maritime accidents, and safety incident investigations.

A **Maritime Code** will make our local safety laws and regulations in consonance with international safety laws.

Lastly the creation of the Maritime court will speed up the resolution of Maritime related cases.

I hope there is a way for the Legislative-Executive Development Advisory Council (LEDAC) to meet more often to discuss bills that require certification of urgency.



About the Author:

Karl M Garcia's interest in Maritime concerns developed while observing his dad through the years in his capacity as a retired Navy officer who supervised the Navy's first phase of modernization and once led the Committee on the separation of the PCG from the PN. Karl joined his father later as a consultant to Senators Biazon and Trillanes. Karl holds a BS Computer Science degree from AMA Computer University, and an MBA from DLSU Graduate School of Business.



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DIESEL ELECTRIC SUBMARINES WITH AIR INDEPENDENT PROPULSION SYSTEMS COMPARED WITH NUCLEAR-POWERED SUBMARINES

by CAPT Tomas D Baino PN (Ret)

Introduction. The Diesel Electric Submarine was considered as a principal weapons system of naval warfare, especially in littoral waters. Submarine designers and builders focused their design in making them capable to operate, run silent and run deep, with increasing underwater endurance. Diesel Electric Submarines need to surface and link to the atmospheric oxygen to supply air for the generators to charge their batteries and be capable to achieve longer underwater endurance.

New developments in battery technology has improved significantly in extended submerged endurance underwater, but not enough to last beyond a week. The Introduction of the Air Independent Propulsion (AIP) gave a distinct advantage to improve underwater endurance. For this reason, majority of world navies opted to acquire and build new generations of diesel electric submarines with Air Independent Propulsion, which can be integrated and inserted in between the hull section by segment in the pressure hull of both single hull and double hull diesel electric submarine.

This article is a research paper extracted from various reading materials and from my study papers on submarine design submitted as a requirement at the Department of Naval Architecture, University College of London, United Kingdom, Great Britain way back in 1998 under the sponsorship of the UK Ministry of Defense. It seeks to give a comparative view of the Diesel Electric Submarine with an AIP system versus the nuclear-powered submarine.

Effectiveness of a Submarine. Stealth in littoral waters is the primary reason for the acquisition of a diesel electric submarine. It is the most feared adversary of surface combatant Ship Naval Commanders in the area of conflict at sea. Diesel electric submarine can operate, run silent and run deep from extremely shallow water up to a depth of 250-300 meters, almost the limitation of diesel submarine hull crushing or collapsed depth.

The invincibility of a diesel electric submarine is when her presence in the arena of conflict at sea is not detected. But once her presence is located with the specific depth, bearing, and rate of movement and direction, her effectiveness as a weapons system is greatly diminished, and is at the mercy of the anti-

submarine ship. Instead of the hunter, she becomes the hunted.

The stealth of a diesel electric submarine is dependent on the emission of acoustic signatures from her propeller, the internal combustion engine vibration, opening of the bow door of the torpedo tubes, concentration of a heavy marine growth at the outer hull surface in the contact with seawater while moving underwater, crew activities onboard the submarines, etc., all contributing to the vulnerability of being detected within the underwater battle envelope of the surface ships and other submarines.

Modern up-to-date anti-submarine warfare in the underwater dogfight between submarine against another submarine focus on how they can deflect each other, through the combat reputation of their torpedoes with acoustic homing guidance system, and counter measures' ability to create and simulate a false target to deceive, distract, and avoid being hit by a deadly homing torpedo underwater.

Diesel Electric Propulsions System Code Designation SSK. There are variants of diesel electric propulsion systems developed per the submarine's country of origin. One is the Diesel electric submarine type code designation SSK, the Diesel Attack Submarine:

- **French Diesel Electric Submarine** – the MESMA (Module d'Énergie Sous Marine Autonomy) (Autonomous Submarine Energy Module) is the propulsion system of the Scorpene Class Submarine that we envisioned to acquire for the PN is an Air Independent Propulsion (AIP) system which makes use of ethanol and oxygen as energy sources to run the turbine with higher power output. The drawback is its lower efficiency and oxygen consumption is to be high and the system is very complex.
- **Swedish Diesel Electric Submarine** – a closed cycle engine with a working fluid which is permanently contained in the system. A source of energy used to heat the working fluid, which in turn moves the piston and runs the engine coupled with a generator which then produces electricity and charges the battery with low refueling cost and is very silent. MESMA is used by Japanese Sub SORYU Class, Sweden for Gotland Class, and Yuan Class of China.

- **German Diesel Electric Submarine** – uses a fuel cell which converts chemical energy to electricity. It uses fuel as oxidizer into the electricity with water, and the heat released is the by-product. This is done by an electrolytic cell with two electrodes (negative and positive). The reaction produces a current that is used to charge batteries. PEM Cell (Proton Exchange Membrane Fuel Cell) also known as Polymer Electrolyte Membrane is fuel for Submarine Air Independent Propulsion System. It does not need to connect to Atmospheric Oxygen and can operate through chemical reaction to charge batteries of submarines.

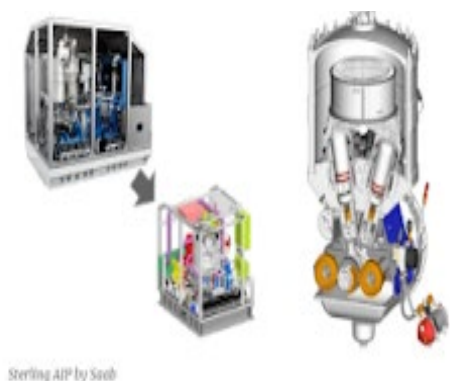
Fig. 1

MESMA (Module d’Energie Sous-Marine Autonome/Autonomous Submarine Energy Module)



Fig. 2

Sterling Engine Closed Cycle Engine with a Working Fluid Permanently Contained Within the System



Sterling AIP by Saab

Diesel Electric Submarine can dominate in extremely shallow littoral waters.

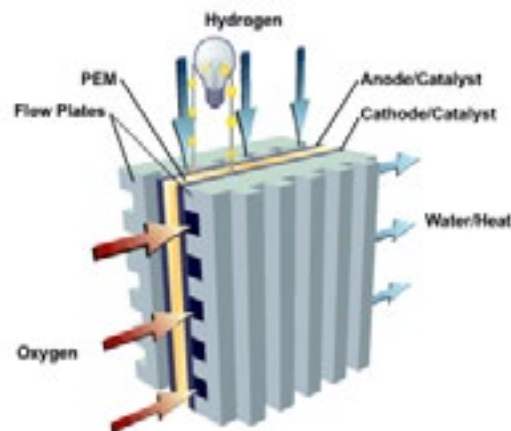
- A Nuclear Submarine can travel for an unlimited range at maximum speed of 30-35 knots underwater without surfacing for months. The AIP cannot replace the nuclear submarine and is incomparable in terms of enormous amount of power source when it comes to blue and deep water operation for extended periods of operation specially in the open ocean, above in the arctic, and below in the Antarctic region of vast sea areas.

Examples of Conflict Scenarios:

- The Diesel Electric Submarine type code designation SSK, is a small to medium sized submarine ranging between 1,500 to 3000 tons displacement, capable of hiding in underwater terrain, stationary and quiet in ambush position in extremely shallow water against coming hostile submarine and surface battle fleet. Said submarine is difficult to detect in the littoral waters with heavy maritime traffic, noise emanating from land activities, and variable sea conditions such as water salinity and other coastal/shore activities. However, these can also affect SONAR reception, which can make it difficult for the submarine to conclude whether to launch a deliberate torpedo attack or not.
- Nuclear Submarine Type Code designation SSBN (submersible ship ballistic missile nuclear), provides the principles of strategic deterrence, capable of carrying nuclear warheads in the missile launch vertical silo. Nuclear submarines can also operate in littoral waters during peacetime. But during conflict situation, it cannot take unacceptable risks to operate under certain circumstances in shallow waters. This type of submarine emits a constant acoustic signature because of continuous operation of seawater pumps for the cooling system of the nuclear reactor to prevent possible meltdown. The Displacement of OHIO Class and Virginia Class submarines is approximately 16,600 tons surface and 18,750 dive condition.

Fig. 3

Fuel Cells Using Fuel Oxidizer



Advantages of the Air Independent Propulsion (AIP) System and Nuclear Power Submarines:

- The AIP System on a Diesel Electric Submarine significantly enhances underwater operations endurance, permits the submarine to stay submerged underwater for several weeks, approximately 3-4 weeks depending on power consumption load on speed without going surface to charge batteries. Their underwater endurance gives advantages to other non-AIP equipped diesel electric submarines and cannot replace the nuclear reactor of nuclear submarines. But the AIP

Table 1
Listing of Diesel Electric Submarine with Variant of Propulsion System

| Country | AIP type | Builder | Submarines with AIP | Operators | Numbers with AIP, and notes |
|---------|-------------|---|----------------------------|---|--|
| | Fuel cell | Siemens-Dieselschiffbau | Dolphin class | Germany | 5 active / 1 under construction (2021) |
| | | | Type 209-130 class | South Korea Greece Spain | 1 confirmed retrofit with AIP (2021) up to 6 additional Cheng Shi class possible events (2020-2022) |
| | | | Type 212 | Germany Italy Norway (planned) | Norway plans to procure four submarines based on the Type 212 by 2025 (20) |
| | | | Type 214 | South Korea Canada Portugal Turkey | 13 active / 2 under construction / 8 more planned (2021) 3 Turkish orders are being built at Gölcük Naval Shipyard. 3 more are planned. |
| | | | Type 218 | Singapore | 2 under construction / 2 more planned, with first delivery expected in 2022 (2021) |
| | Sinking AIP | Kockums | Gotland class | Sweden | 3 active (20) |
| | | | Archer class | Singapore | 2 active (retrofit of the Västergötland class) (20) |
| | | | Södermanland class | Sweden | 2 active (retrofit of the Västergötland class) |
| | | | Sjöbjörns class submarine | Sweden | 2 planned |
| | Sinking AIP | Sanrioh-Fukushima | Harushiro class | Japan | 1 retrofit, Asahi (20) |
| | | | Oyashio class | Japan | 10 active (all 10 completed) / 3 under construction / 3 more planned (20) |
| | MESEMA | Naval Group | Agosta 900 | China | 2 in service |
| | | | Scorpene | China Brazil (planned) | 6 active (all 7 completed) / 4 under construction / 3 more planned |
| | Fuel cell | Navantia | S-80 class | Spain | 4 under construction / 4 planned |
| | Fuel cell | Defence Research and Development Organization | Kalvarit class | Italy | All six Kalvarit class will be retrofitted with AIP during their first upgrade (21) |
| | Fuel cell | Rubin Design Bureau VSEET Nizhny | Project KTT Nela (Lada) | Russia | Planned status; no confirmation that systems are operational on any Russian submarines |
| | | | Project 1800 Jang-Armar | None | |
| | Sinking AIP | TIT Research Institute- CSRE | Type 661 (Yuan class) | People's Republic of China | 10 completed and 5 under construction |
| | | | Type 662 (Qing class) | People's Republic of China | Experimental submarine |

Conclusion. The Diesel Electric Submarine equipped with current technology and AIP can only be used during conflict scenario deployment, and not necessary to use during peacetime patrol operation. An AIP-equipped submarine can use a snorkel to connect to the atmospheric oxygen to recharge batteries during patrol in non-hostile territories. Most fuel and other oxidants and consumables are quite expensive and therefore are not practical to be replenished on a routine basis.

The endurance and reliability of current battery technology permits more considerable submerge time for AIP submarines to operate underwater.

However, a Diesel Electric Submarine with known limitations in endurance and power is incomparable to a Nuclear Submarine's power and endurance underwater, which is a true AIP but with more capabilities.



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About the Researcher/Editor:

CAPT TOMAS D BAINO PN (Ret) completed his post-graduate studies in Submarine Design at the Department of Naval Architecture, University College of London, United Kingdom of Great Britain under the sponsorship of educational grant of UK Ministry of Defense. Capt Baino is a contributing member of the Editorial Board of Maritime Review, providing series of articles in Naval Ship Design; and served as Naval Architect Consultant with the Department of Transportation and Philippine Coast Guard Project Management Office in Ship Acquisition Program from 2017 to 2020.

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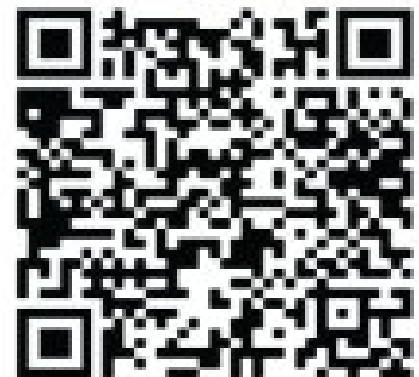
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DA-BFAR'S FISHERIES OBSERVER PROGRAM CONTINUES TO MEET INTERNATIONAL CONSERVATION AND MANAGEMENT STANDARDS

by DA-BFAR

The Philippines' Fisheries Observer Program (PFOP), implemented by the Department of Agriculture's Bureau of Fisheries and Aquatic Resources (DA-BFAR), gets authorized anew to continue to participate in the Regional Observer Program in the Western and Central Pacific Ocean Region, proving the country's continuous adherence with international fisheries conservation and management standards.

This, after the PFOP attained satisfactory ratings on all the minimum standards required by the Western and Central Pacific Fisheries Commission (WCPFC), a regional fisheries management organization implementing conservation and management measures, and in which the Philippines is a member, and showed improvements in many areas based on the results of the Online Audit conducted in December 2020.

With this, the PFOP can continue their usual functions which include training, certifying, authorizing and deploying fisheries observers to collect scientific data and other information related to fishing, onboard fishing vessels operating within the Philippine waters including the Exclusive Economic Zone, or in the high seas and in the waters of other countries as mandated by the Philippine Fisheries Code in coordination with other regional fisheries management organization (RFMO).

Based on the Audit Report of the WCPFC, the program has successfully continued to increase their observer pool and coverage citing that to date the Program's management office based in Navotas City has conducted 20 trainings, producing a total of 584 fisheries observers, of which around 175 are currently

deployable and available for placement in important fishing ports around the country.

In order to ensure the fisheries observers are performing their duties onboard properly, the program carries out regular appraisal through debriefing sessions and observer assessment scoring. Since the last Audit in 2014, the debriefing program has grown from 3 active debriefers to 90 debriefers spread across the country.

Other notable observations by the WCPFC include the program's comprehensive training agenda and the management office in Navotas City being equipped with excellent facilities. The program's use of a training vessel, according to WCPFC is extremely helpful in demonstrating the operations of different types of fishing gears. Further, following up on the last 2014 Audit's findings on the lack of regular medical checks for fisheries observers before deployment, the program now offers annual medical checks for them. Since the pandemic arose, these checks also included COVID 19 rapid and swab tests before deployment.

Establishment of the Philippine Fisheries Observer Program

The establishment of the Philippines Fisheries Observer Program is in accordance with Article 28 of the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean which requires the development of a regional observer program (ROP) in the WCPFC to collect verified catch data, other scientific data and additional information related to the fishery from the Convention Area and to monitor the implementation of the Conservation and Management Measures (CMMs) adopted by the Commission."



The first observer training in the Philippines was conducted in 2009 and since then, trained observers have been deployed in Philippine-flagged fishing vessels operating within the country's Exclusive Economic Zone (EEZ), as well as in the high seas. In fact, the PFOP is the first Observer Program audited by the Commission and granted full authorization to participate as part of the ROP.

The PFOP became fully implemented in 2011 following the issuance of Fisheries Administrative Orders 236, 236-1, and 240, and subsequently, FAOs 245-3, s. of 2015 and 261, s. of 2018. Currently, the PFOP applies to the following categories of fishing vessels authorized to fish within the country's EEZ and the Convention Area, in accordance with RA 8550 and relevant FAOs and the WCPFC's CMMs: 1) all commercial purse seine/ring net vessels that target tunas operating exclusively in the high seas; 2) all commercial purse seine/ring net vessels that target tunas operating within Conservation Areas of various Regional Fisheries Management Organization (RFMO), including the high seas and in waters under the jurisdiction of one or more coastal States and vessels fishing in the waters under the national jurisdiction of two or more coastal States; 3) all commercial purse seine/ring net vessels that target tunas operating within Philippine EEZ and High Seas; 4) sufficient coverage for all commercial purse seine/ring net vessels operating within the Philippine waters; and 5) other foreign flagged purse seine vessels through appropriate channels or arrangements.


PFOP as a tool to combat IUUF

The PFOP not only promotes responsible fisheries, it also plays a critical role in the conduct of monitoring control and surveillance activities. It seeks to provide independent reliable primary data and information on production, catch and efforts, stock assessment, industry practice/operations and compliance to fisheries regulation for the use of fisheries managers, research organizations, environmental agencies the fishing industry and other concerned parties.

As such, among the new provisions introduced by the Amended Philippine Fisheries Code in 2015, which sought to provide for better mechanisms in deterring illegal, unreported, and unregulated fishing, is BFAR's mandate to train, designate and deploy fisheries observers in Philippine flagged vessels engaged in commercial fishing in Philippine waters or distant water fishing. The law now also criminalizes sailing of Philippine distant water fishing vessels without a fisheries observer onboard as required by RFMO conservation and management measures.

Philippine Fisheries Observer Program Training Course

Currently, the Philippines continues to develop its pool of fisheries observers through the Fisheries Observer Training Course. The training course is a 33-day live-in training program conducted at the BFAR-MCS Station and Fishing Technology Laboratory in Navotas City, with a 10-day actual observation on fishing operations onboard M/V DA-BFAR. Each training is expected to produce 30 Observers from the BFAR Central Office, NFRDI, BFAR Regional Offices, and newly BS Fisheries or allied Natural Science Graduates from Fisheries Universities/Colleges screened and accepted into the training program, and to be deployed to commercial fishing vessels.

The program includes six (6) major components that would be needed to satisfy the scientific and monitoring compliance of the vessels, namely: 1) Preparation of Observers which discusses safety and basic navigation and seamanship as well as Radio Communication Skills; 2) Relevant International and Philippine Regulations that will tackle relevant international and national laws/instruments; 3) Regional Observer Program to give the duties and responsibilities and Terms of Reference of observers as well as the vessel operators and crew; 4) Form Instructions for the different cards that will be filled-up including Observer Trip Reports; 5) Data Collection and Verification which included briefing and debriefing of observers; and 6) practical and shipboard operation onboard M/V DA-BFAR. 



PREPARING FOR THE WORST

by Rafael M. Alunan III



Simbad Twin-Missile Mistral used by Norway's armed forces.

The worrisome situation that continues to intensify across the Indo-Pacific theater – India-China border, Taiwan Straits, East China Sea, South China Sea – is subverting diplomatic efforts to restore peace and order, and escalating the prospects of an armed conflict due to clashing core interests of the great powers between China and the US.

While our interdependent foreign policy seeks to push the peace envelope as the rational path towards diplomatic settlement for Human and Ecological Security, we, at the same time, are preparing for the worst, foremost of which is exemplified by the modernization of the Armed Forces.

Our defense buildup has been hobbled by:

1. fund diversions for civil defense due to the pandemic and economic disruptions;
2. lack of government cohesion to remove legal, administrative, attitudinal and behavioral obstacles hindering speedy and trouble-free acquisitions;
3. lackadaisical application of the National Security Policy and Strategy; and
4. the continuing failure to allocate a minimum of 2% of GDP for the AFP's annual modernization and sustainment (parts, repairs, maintenance) needs.

We must resolve these ASAP. All those factors are within our control. Diplomacy must be supported by credible deterrence. There is no excuse for our continued negligence to exercise our duty and responsibility to defend ourselves, protect our people, secure our resources, and uphold national honor.

The government should use a portion of our foreign exchange reserves now reportedly at around US\$110 billion to offset the General Appropriation Act's (GAA) diversion of modernization funds for social amelioration as well as accelerate the building of defense infrastructure and acquisition of air-sea-land weapons, systems and munitions.

If necessary, the National Security Council (NSC) and the Legislative-Executive Development Advisory Council (LEDAC), both chaired by the President, should quickly shepherd the passage of a law warranting the one-time use of US\$10 Billion under "emergency conditions" on top of the annual GAA budget. National security imperatives demand it in the interest of time and for our national survival. These additional funds should be employed for:

- manpower buildup, doctrinal training, and interoperable operations;
- radar, integrated battlefield management systems and tactical data links;

- new bases and islands converted into forward operating combat outposts;
- purchase of optimal quantities of platforms, weapons and munitions; and
- annual sustainment funding to maximize the useful life of capital assets.

Our new platforms, weapons and munitions need to have the quality, quantity, lethality, speed and range to effectively compete in 4th generation warfare, leaving our allies and defense partners to engage in 5th gen warfare. Presently, our assets are qualitatively inadequate and insufficient in number to make a difference.

We need to have sufficient stocks in our inventory – manned and unmanned – to offset the qualitative and numerical advantage of potential adversaries, and to sustain us for at least six (6) months while likely fighting alone for our survival before our allies and defense partners manage to reinforce us.

Furthermore, our new assets on order (and in the pipeline pending approval) will take time for delivery, hence, procuring still in-service assets would be the practical thing to do to **augment** our brand-new assets given the probability of armed conflict amongst the great powers in the near term, and to lower the cost average as well.

For example, Brazil has reportedly the most modernized version of the F-5E Tiger II, known as the F-5EM. It has 4-4.5 generation avionics. Upgrades were done by Embraer from which we sourced the Super Tucanos. South Korea also has its own upgraded version, the KF-5E/F made by KAI, which had supplied us our FA-50s.

I assume that the cost of procuring these potent upgraded 4th-4.5 gen F-5's from either country would be much cheaper per unit than either a brand new FA-50 or the PAF's future multi-role fighter. Make no mistake, I do not mean foregoing the procurement of more FA-50s and the MRF. On the contrary. I mean augmenting, to add quantity with sufficient warfighting qualities, to back up our new jets and future fighters.

As such, we could in the meantime acquire 1 squadron each of the upgraded F-5s from Brazil and South Korea, or 48 aircrafts, since both countries are replacing them with new fighter models. What is critical are the avionics, long range, and penetrating capability of the air-to-air and air-to-surface/ship missiles apart from their fuselage integrity and engine status.

In fact, we could work out package deals with both countries. We are actually buying 18 more brand new Super Tucanos from Embraer. And we could buy at least 12 more FA-50s

*Philippine Navy Wildcat Helicopters.
Photo Credit: Westleigh Bushell of
Spotter Magazine.*

from KAI to complete a squadron. Target the completed deliveries of new and used by 2024.

As for the multi-role fighter program, be it from Sweden or USA, the ideal would be to negotiate a package deal for a bundled capital asset procurement to gain the most bang for our buck. We should apply the same method to other major supplier countries like Israel, Indonesia, Japan, Australia and Poland.

For example, if we select Sweden's Gripen (at least 1 squadron), we could negotiate a package deal to include Visby stealth corvettes, Gotland submarines and Rbs-15 Gungnir SSMs. If the US F-16V Block 72 (at least 1 squadron) is selected, we could negotiate an advantageous package deal to include HIMARS, Naval Strike Missiles, P-3C Orions and precision strike weapons and munitions.

More importantly, whoever we buy defense assets from, we should enlarge the scope of our negotiating envelope to include strategic economic diplomacy. We must cultivate new trading partners and expand trade agreements with existing ones. If our economy is held hostage or crippled by hostile powers, there may be nothing to defend.

It is noteworthy that the Philippine Navy is awaiting delivery of nine (9) sea-going Shaldag Mk V interceptors from Israel equipped with the NLOS SSM for completion, hopefully, within the next two years. It now has six (6) Spike ER SSM-equipped multi-purpose assault crafts (MPACs) for special operations in internal waters, a modest but good start.

Awaiting funding are six (6) OPVs to be built by Leonard (formerly Austal) in-country; two (2) new anti-submarine warfare (ASW) corvettes from South Korea plus two (2) more Pohang corvettes for donation; two (2) more Landing Docks from Indonesia; and (2) new Scorpene submarines from France. Developing a formidable submarine force – at least 6 - should be at the top of the list.

For the Coast Guard, we could exert efforts to negotiate a package deal with Japan for at least three (3) Hayabusa-class; four (4) more new 94-meter or longer Coast Guard OPVs with maritime safety capability, in addition to the first two presently being built for us, and at least three (3) P-3C Orion maritime defense aircraft.

The Philippine Air Force (PAF) is focused on at least a squadron (24 jets) of multi-role fighters; 32 more S-70i Blackhawk helicopters; 18 more Super Tucanos; 5 more C-130H/J heavy transports; at least 10 attack helicopters, and at least 3 P-3C Orions.

It is assuring to know that the AFP has invested in air

defense systems like the SPYDER; standoff shore-based missile systems like the BRAHMOS; and a growing number of UAVs for ISR and EW in aid of all three service branches. It should however also place top priority on a quantum of cost-effective loitering, as well as precision guided, munitions to sustain its warfighting capability.

For example, Excalibur, Paveway, JDAMS and APKWS for precision guided munitions; and mini-Harpy, Harop, Firefly, Skystriker, Warmate, and Switchblade for loitering munitions fired from any platform.

As for our existing defense assets, there is much that we can do to improve their lethality, interoperability and extend the range of their potency. For example, we should accelerate the installation of the remaining weapons systems and munitions delivery for the two (2) Rizal-class frigates, particularly its VLS multi-purpose missile system, SSM missile system and CWIS. Additionally, the twin-missile Mistral Sinbad manual launchers should now be replaced with two 6-missile Sadral Mistral automated launch systems.

The combat systems of the three (3) Gregorio del Pilar frigates should be upgraded to that of the Rizal-class. That should bring up the total to 5 ships with the same systems and firepower. One (1) AW-159 Wildcat anti-sub helicopter (armed with Blue Shark torpedoes, NLOS SSMs) for each ship would maximize deterrence.



*Sadral 6-Missile Mistral
automated launch system
used by the Royal Thai
Navy.*

The three (3) Apolinario Mabini-class patrol ships and Mariano Alvarez-class Cyclone should be upgraded for anti-submarine warfare (ASW), and mine counter-measure (MCM) warfare, led by the Conrado Yap Pohang-class corvette. Five (5) ASW-MCM ships operating in our SLOCs would be reassuring.

Our two (2) Tarlac-class landing docks and the Coast Guard's five (5) largest vessels should be appropriately armed with defensive weapons and systems –remote weapons systems,

missiles, loitering munitions— against a well-equipped adversary.

The LDs ought to carry (1) AW-159 Wildcat and (1) AW-109 light gunship on board, and two guided missile MPACs in its well decks. The Coast Guard vessels could carry MD-500 light gunships of the PAF on board.

For our Army-Marines forces, let me cite some examples that need fast-tracking:

- ROROs to transport combat elements to the forward edge of their battlespace;
- Brahmos hypersonic SSM and Naval Strike Missile;
- MLRS such as HIMARS;
- additional Spyder air defense batteries;
- unmanned attack drones, suicide drones; precision-guided munitions.

Deployment to selected islands and offshore facilities in strategic areas nationwide converted into EDCA forward operating combat outposts, and capable of repositioning themselves quickly from island to island to defend our SLOCs / EEZ and to interdict / degrade incoming hostile forces.

Special mention for HADR: we need sufficient air and naval transport assets to operate in our high risk environment impacted periodically by typhoons, floods, earthquakes, volcanic eruptions and tsunamis, such as:

- SAR heavy helicopters (Russia)
- SAR amphibious aircraft (Canada)
- SAR vessels, ROROs, Hospital ships (locally built)
- DRRO, Medical and Engineer units (PA, PN, PM, PAF, PCG Ready Reserves).

We should prioritize local manufacturing in joint venture with leading global defense contractors. Defense industrial parks in key locations in the Philippines producing dual-use products

for the civilian and military-security markets will spur national development and sustain national defense efforts.

Other fund-raising and financing initiatives to buy and sustain our defense needs to be stipulated in the National Security Strategy, including the following:

- Sale of long-term bonds in capital markets –local and international;
- Lease of government land for technological, commercial-industrial development; and
- Lend-lease arrangements with allied nations for critical defense requirements.

If we do not demonstrate our resolve to uphold our national interests, there is no justifiable basis to expect our allies and defense partners to do so for us. They will place their own national interests above all else. They will not help a country unwilling to defend itself.

Our interdependent foreign policy places emphasis on being a “friend to all, enemy to none.” While our constitution bars us from waging war, it expects us to defend ourselves against hostile threats –foreign and domestic. In that case, we should do everything we can to wage peace but, at the same time, prepare ourselves for the worst outcomes.

That is what every mature and responsible nation does to survive and progress.



About the Author:

Rafael Alunan III is the Chairman of the Philippine Council for Foreign Relations (PCFR). He was the former Department of Interior and Local Government (DILG) Secretary under the Pres. Fidel V Ramos administration (1992-1996).

DA-BFAR FOCUSES ON RESOURCE SUSTAINABILITY IN WPS AND EXTENDS LIVELIHOOD SUPPORT TO FISHERFOLK

by BFAR

The Department of Agriculture’s Bureau of Fisheries and Aquatic Resources (DA-BFAR) is strongly committed to fulfilling its mandate of ensuring food security especially in this challenging time of the COVID-19 pandemic, alleviating the economic conditions of the fisheries sector especially the fisherfolk, and addressing illegal, unreported and unregulated (IUU) fishing among other challenges that continue to hound the Philippine fisheries sector.

In provinces and coastal communities facing West Philippine Sea, DA-BFAR, through its regional offices, has been providing the necessary interventions under programs like fisheries development, fisheries regulation and law enforcement, and fisheries extension program. More than Php73M of livelihood implements and technology projects were turned over by BFAR Region I to fisherfolk and other fisheries stakeholders in Pangasinan.

BFAR Region III, on the other hand, has been distributing fish aggregating device or “payaos” and fishing vessels to

fisherfolk in the 14 local government units of Zambales since 2016.

In addition, BFAR Region III has an open line with fisherfolk and commercial fishing vessel operators from the provinces of Bataan and Zambales, among others, in order to monitor and assess the situation in these fishing areas. DA-BFAR will continuously enforce programs that will benefit our fisheries and aquatic resources and the fisherfolk in coastal communities along the West Philippine Sea. The Bureau also reiterates Agriculture Secretary William Dar’s statement that encourages unity and whole-of-nation approach to uphold our rights over West Philippine Sea and our Exclusive Economic Zone.

In parting, we remain committed in our mandate to address IUU fishing in Philippine waters in support to the UN Sustainable Development Goal No. 14 in protecting and conserving our oceans while we continuously advocate for a science-based fisheries management and development.

Source: <https://www.bfar.da.gov.ph/BFARnews?id=429>



TREES, MANGROVE PLANTING NOW MANDATORY FOR EVERY PPA CONTRACT OR PERMIT ISSUED

by PPA News

True to its commitment to help promote environmental protection and sustainability, the Philippine Ports Authority (PPA) has ordered the mandatory planting of trees and mangroves for every contract, accreditation and permits issued by the agency.

The order took effect on the 2nd of February after the 15-day publication period reckoning from 19-January-2021.

PPA Administrative Order No. 14-2020, signed by PPA General Manager Jay Daniel R. Santiago, requires the applicants/grantees of contracts, accreditations and permits, among others, to plant 1,000 seedlings of trees or mangroves in coordination with the local office of the Department of Environment and Natural Resources (DENR) within their respective business locations.

The PPA GM said this will be the new norm in the agency in granting contracts in compliance with Republic Act 9729 otherwise known as the 'Climate Change Act of 2009'.

"All grantees or persons or entities applying with the PPA for the issuance of accreditation certificate, certificate of registration (COR), appointment and authorization, including those awarded with contracts for the provision of services in the ports are subject to the condition that the applicant/grantee shall plant trees and/or mangroves," PPA GM Santiago stressed.

"This order will be the PPA's humble contribution to the country's move towards a greener environment which in turn will be beneficial to the future generation," Santiago added.

"Compliance with the requirements shall be made not later than one year after the issuance of the documents or from the effectivity of this order, whichever comes first," Santiago added.

Santiago stressed that non-compliance will be enough ground for the cancellation of accreditation, permit to operate, Certificate of Registration, appointment, contract, or the non-renewal thereof.

In addition to the 1,000 seedlings mentioned, PPA

Administrative Order 14-2020 likewise mandated the different port service providers to plant the following additional number of seedlings: Port Terminal Operator, 100,000; Cargo Handling Operator, 50,000; Passenger Terminal Building Operator, 50,000; Roll On Roll Off Operator, 25,000; Private Port Operator, 500,000; and Harbor Pilot, 10,000.

The order also provides that contractors of the agency for the supply of goods and services, shall be required to plant at least 1,000 seedlings for contracts amounting to Php5 million and another 1,000 seedlings for every additional Php5 million contract amount or fraction thereof.

The applicant/grantee, meanwhile, shall coordinate with the local Community Environment and Natural Resources Office (CENRO) or concerned office or unit of the Department of Environment and Natural Resources (DENR) for the type of seedlings to be planted and the location where the seedlings shall be planted.

Once completed, the grantee shall secure a certificate of completion from the said office which shall be submitted to the PPA where the document was secured or awarded.

To ensure that the order is strictly followed, all PPA Port Management Offices and Head Office Responsibility Centers shall monitor compliance and coordinate with the CENRO.

"This is a big step for the agency. With guidance from the Department of Transportation, we can help in slowing down Climate Change and its negative effects particularly for an emerging economy like the Philippines," Santiago said.

"Climate change has really affected us the past couple of years, and this endeavor is one good proactive measure to ensure comfortable lives for Filipinos for years to come," Santiago added.



Source: <https://www.ppa.com.ph/content/tree-mangrove-planting-now-mandatory-every-ppa-contract-permit-issued>



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DRAGGING ANCHOR: IS MORE ALWAYS BETTER?

by Yrhen Bernard S. Balinis

“The more we work together, the merrier we’ll be.” Or so the popular lullaby goes.

However this does not ring true for the Philippine domestic ships with an overwhelmingly large number of cadets onboard. The **European Maritime Safety Agency (EMSA)** Report conducted last year states, *“The team found cases in which 11, 16 or even 37 deck cadets were onboard those [inter-island] ships, on which there were only two deck officers and the master.”*

This report was revealed during the virtual workshop held 11-12 March 2021 spearheaded by the **Maritime Industry Authority (MARINA)**. This event is geared to consult with industry stakeholders and their technical expertise especially in the fields of maritime training and maritime higher education institutions (MHEIs) to address the EMSA concerns. The Europe-based agency found 13 shortcomings and three observations in its inspection last year. One of these is the overwhelming quantity of cadets serving on a Philippine domestic ship.

The EMSA team proposed a “review and revision of **Marina Advisory 2020-11** in the categorization of ships registered regarding the number of cadets to be accommodated on domestic ships as stipulated in MA 2020-11 in the conduct of structured training in the training ship consistent with **Maritime Labor Convention (MLC) 2006.**” This will yield a reduction in the number of cadets that domestic ships could accommodate for on board training (OBT).

This strategy, however, was denounced by **Philippine Association of Maritime Institutions (PAMI)** President Sabino Czar Manglicmot II saying that many maritime schools *“would likely cease operations if the government will restrict the number of cadets who will undergo OBT” on inter-island vessels. “I heard there was a recommendation for limiting the berths for a cadetship. I would object to it. We would like to have it increased. There should always be partnership between private maritime education and the shipping companies to also include the government,”* he emphasized.

With only two officers and a master supervising the cadets, is “on board training” (OBT) adequate? Is there sufficient support for their education and is it being monitored properly? Or are these young sailors just being used as cheap labor?

The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978 (STCW), as amended, *“recommends that Administrations make arrangements to ensure that shipping companies encourage all officers serving on their ships to participate actively in the training of junior personnel.”* (source: Resolution 7, paragraph 4, subparagraph 3 of the STCW Convention.)

Sadly, this is an unbelievable reality in some ships. There are domestic vessels with more cadets than experienced seafarers. The main reason is obviously to reduce wages. Consequently, the tasks supposedly for able-bodied seamen have been streamlined and delegated to cadets.

One of the frequently asked questions is: Are cadets considered seafarers despite their relative newness in the profession? MLC 2006’s response: *“On the assumptions that cadets are performing work on the ship, although under training, they would be considered as ‘seafarers.’ Emphasis should be given on ‘under training.’ Their primary purpose is to acquire practical knowledge in application of what they were taught in college. They are new to the shipping industry and are still in need of guidance. They need to be integrated in the maritime operations both theoretically and in application.”*

Per STCW Circular 2017, Responsibility of the Company in Shipboard Training, #10: The proposed ratio of onboard training officer for deck or engine to the candidates is 1:12 to have an effective training and assessment.

But what happens when there are more than a dozen cadets on a ship? Is mentoring still present or have they become substitute workforce doing the tasks of more experienced seafarers? Can the officers still “monitor carefully and review frequently the progress made by junior personnel in the acquisition of knowledge and skills during their service onboard ship” as recommended by STCW?

To efficiently train, it will be most beneficial if it follows the APEM system of effective voyage planning — appraise, plan, execute, and monitor.



The figure below gathered its information from *Training and Assessment On Board* by L.A. Holder, with the additional APEM subdivisions, which I added.

Then observe the trainees' progress and employ assessment methods. The STCW Code Part B/II 17 offers guidance on some techniques on how to assess competence. *"The arrangements for evaluating competence should be designed to take account of different methods of assessment which can provide different types of evidence about the candidate's competence."*

Others may still be hesitant, arguing: *"what will they gain from training and coaching others? Is it not just an additional workload for them; after all they are not paid to become teachers? These cadets will just learn after prolonged exposure in the ship operations!"* Those are the mindsets that the industry has to let go.

STCW Resolution 13 states: *"the lack of adequate accommodation for trainees on board ships constitutes a significant impediment to properly training them and subsequently retaining them at sea, thus adding to the aforementioned shortage"* [of qualified officers to effectively man and operate ships engaged in international trade]. To supply this inadequacy and to keep up with global standards, Manglicmot asked help from MARINO partylist Cong. Macnell Lusotan, who was present at the workshop.

"I am very happy that Cong. Lusotan is here; maybe MARINO partylist could introduce some sort of economic benefits to domestic shipping companies that would accommodate cadets [on their ships]," Manglicmot said.

"We need to compete with our neighbors in manpower. One way that we could compete with them is to send out more cadets, more officers. This is the way we should go," he added.

There was no response from Cong. Macnell Lusotan.

This year, the theme for the International Day of the

Seafarers as decided by the International Maritime Organization (IMO) will be "Fair Future for Seafarers."

In the discussion of fairness, may we remember the cadets and early maritime professionals who will be the future of the seafaring industry. Years from now, these 64 cadets that the EMSA noted, along with many others, will be the officers steering at the helm. Questions loom. Have we prepared them enough for what may lie ahead? Or are we more focused on quantity over quality? Is more always better?

Private shipping companies who only look at bottom line profits and put cost savings as primary, are what will drag the ships down, at the expense of the cadets and junior seafarers who are denied the proper practical training by experienced seafarers onboard.

Decisions affect our cadets and seafarers well into the future. High quality education and training are crucial to preserve the quality, caliber of maritime skills and technical competence of qualified seafarers in keeping sea-going vessels safe, protecting the environment, and keeping trade flowing.



About the author:

Yrhen Bernard Balinis is an ordinary seaman (with extraordinary goals) and a promising maritime journalist. His articles have been published by international maritime-related journals including Seaways, Navigation News, and Safety4Sea. He is currently serving as a member of The Royal Institute of Navigation (RIN); an associate member of The Nautical Institute (NI); and a student-member of The Institute of Marine Engineering, Science and Technology (IMarEST). Yrhen Bernard envisions a more inclusive, sustainable and technologically-advanced maritime industry. You may contact him via www.linkedin.com/in/ybsbalinis.



NEW AGE OF SAIL LOOKS TO SLASH MASSIVE MARITIME CARBON EMISSIONS

by Andrew Willner



A modern sailing vessel passes a fossil-fueled container ship. Photo credit: Visualhunt.

- ⊕ *If ocean shipping were a country, it would be the sixth-largest carbon emitter, releasing more CO₂ annually than Germany. International shipping accounts for about 2.2% of all global greenhouse gas emissions, according to the U.N. International Maritime Organization.*
- ⊕ *But change is on the way. Wind, solar electric, and hydrogen-powered ships offer innovative low- or no-carbon alternatives to fossil fuel-powered cargo vessels, with wind about to make a huge comeback in shipping, say experts. New experimental sail designs include hard sails, rotating vertical cylinders, and even kites.*
- ⊕ *Today, startup companies like Fair Transport (with its retrofitted wooden vessels Tres Hombres and Nordlys); modest sized proof-of-concept firms, with purpose-built vessels like Grain de Sail; and large cargo ship retrofits and purpose-built vessels like Neoline's new large cargo vessels, are starting to address CO₂ emissions.*
- ⊕ *Through the late 1940s, huge steel sailing ships carried cargos on some ocean routes. By 2030 — less than 100 years since the end of the last great era of sail — fossil fuel-powered cargo vessels may give way to high- and (s)low-tech sailing ships thanks to a revolution in energy technology, that reduces shipping costs with less emissions.*



The engineless modern cargo transport sailing ship Tres Hombres. Image courtesy of Fair Transport. Sails that don't look like sails: Wallenius Marine is developing the Oceanbird, able to ship 7,000 cars and trucks across the Atlantic propelled only by high-tech wing sails. Image courtesy of Wallenius Marine.

An economic and climate driven sea change

Despite the present dominance of fossil-fueled cargo ships, it's well understood by industry insiders that the current maritime logistics system is both aging and fragile.

Fossil fuel transport today is up against a grim carbon reality: if ocean shipping were a country, it would be the sixth-largest carbon emitter, releasing more CO₂ annually than Germany. International shipping accounts for about 2.2% of all global greenhouse gas emissions, according to the U.N. International Maritime Organization's most recent data.

This annual surge of atmospheric carbon released by ocean going ships not only worsens climate change — one of nine scientifically defined planetary boundaries (PBs) we now risk overshooting — it also contributes to ocean acidification (a second planetary boundary) which is beginning to seriously impact biodiversity (a third PB). And add to that significant chemical pollution (a fourth PB) that is emitted from ship smokestacks.

All of these planetary boundaries interrelate and influence one another (negatively and positively): for example, reducing black carbon (or soot), the fine particulate matter emitted from fossil-fueled ocean-going vessels could slow global warming somewhat, buying time to implement further steps to reduce carbon emissions.

In January 2010, an “unpowered” wooden sailing vessel more than 70 years old, the Tres Hombres, arrived in Port-au-Prince carrying desperately needed earthquake relief supplies from Dutch humanitarian organizations for the people of Haiti. Although not the first contemporary version of “green logistics,” Tres Hombres — propelled by a trio of clean energy technologies: sails, wind turbines and recycled vegetable oil — epitomized the entrepreneurial spirit of today's retro-revolutionary sail freight movement.

To many maritime experts, Tres Hombres' cross-ocean journey stands out as a symbol of the rebirth of cargo-carrying wind power — incorporating a marriage of old and new technologies becoming a viable alternative to fossil fuel-powered ships on the open sea.

Today's gigantic diesel fuel-reliant container ships, decks overloaded with cargo, are still a common sight in harbors from New York to Hong Kong. But the days of these gargantuan vessels, driven by massive internal combustion engines, may be numbered.



Another problem with today's vessels: when cargo ships dock, they use auxiliary engines that generate SO_x, NO_x, CO₂ and particulate discharges, while also creating noxious noise and vibrations. (Innovators are already solving this problem with cold ironing, providing shoreside electrical power to ship berths, allowing main and auxiliary engines to be shut down.)

Today's cargo industry is plagued not only by environmental issues, but by a difficult logistical and economic problem: its current fleet of fossil-fueled container ships are mostly behemoths — with immense carrying capacities. However, the "overcapacity" of these giant ships leaves them without the nimbleness to adapt to unexpected shifts in global supply and demand; the world's ports and specialized markets could likely be better served, say experts, by smaller, far more fuel-efficient cargo ships.

The current sea cargo system — reliant upon high-priced carbon-based fuels and unstable energy markets; interwoven inextricably into long-distance, globalized world trade; and designed for just-in-time delivery that requires precisely scheduled shipments — is increasingly vulnerable to the vagaries of fossil fuel shortages, price shocks and surges, as well as geopolitical conflict and volatility in the Middle East, Venezuela and elsewhere.

Equally problematic, today's fossil-fueled ships depend upon an ability to avoid paying for negative externalities such as carbon emissions and environmental pollution, while also being governed by lax international labor, environmental, health, and other agreements.

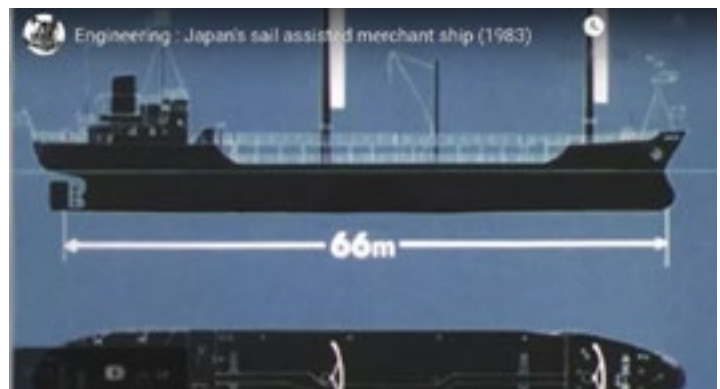
Winds of change, especially triggered by new international commerce and climate pacts and policies, could soon push us rapidly beyond carbon into a New Age of Sail, with the need for a planet-wide cargo fleet rebuilt from the keel up.



Airbus plans to equip one of its large cargo ships with the Airseas "Seawing," a sky sail that uses wind power to reduce fossil fuel costs and cut emissions. Image courtesy of AIRSEAS.

Birth pangs for a New Era of Sail

As far back as the 1970s, the global shipping industry began struggling with both its business models and environmental issues. Oil embargoes in 1973-74, the failure of US Lines in 1986, and surging fuel prices in the 1970s and '80s led some transport companies to start experimenting with sail-assisted technology on tankers and container ships to save costs and reduce emissions. By the 1980s, Japanese shippers had designed new and retrofitted sail-assisted merchant ships.



In 2018, in response to environmental concerns, the International Maritime Organization (IMO) adopted mandatory measures under an umbrella of policies to reduce greenhouse gas emissions produced by international shipping: under the IMO's pollution prevention treaty (MARPOL); the Energy Efficiency Design Index (EEDI), which is mandatory for new ships; and the Ship Energy Efficiency Management Plan (SEEMP). Many of these mandated changes go into effect by 2030, less than 10 years from now.

An embrace of old technologies, made new

Facing these many challenges, the big question for the cargo industry is: how does it get to a new age of post-carbon shipping and sailing, with the least amount of economic pain?

In fact, change is happening now — fast — as sailing vessels get put on the water by startup companies, like Fair Transport, with its retrofit wooden vessels; by modest sized proof-of-concept companies like the Schooner Apollonia; and by firms with newly built ocean-crossing sailing ships like Grain de Sail; and lastly by large cargo ship companies launching innovative retrofits and purpose-built vessels like Neoline's new large cargo vessels.

CLEAN MARINE TECHNOLOGY

All of these innovators embrace different technological approaches to address the same problems of CO2 emissions, the high cost of fossil fuels, and new global economic and regulatory realities.

Wind propulsion systems cover a wide spectrum in modern commercial shipping. These range from wind-assisted fossil-fueled vessels (where wind provides auxiliary power), to purely wind-driven ships without auxiliary power, to sailing-hybrid ships where the primary propulsion comes from the wind but is augmented by engines to ensure schedules are maintained.

Internationally, the growth in small- to medium-sized sail freight companies has been exponential, with old sailing vessels brought up to modern standards and new ones built. The New Dawn Traders website, for example, includes links to several startup sail cargo ventures:

Fair Transport's 32-meter (105-foot) schooner *Tres Hombres* has been sailing emissions-free since December 2009. She maintains a sustainable oceangoing general cargo route between Europe, Atlantic and Caribbean islands, and the Americas. Her cargo capacity tops 35 tons, and she can accommodate a crew of seven professionals and eight trainees. (Training is vital, as today's sailors need to be taught a combo of yesteryear and cutting-edge sailing skills).

Fair Transport has added to its sailing fleet: *Nordlys* is a 25-meter (82-foot) ketch, built in the Isle of Wight in 1873 as a fishing trawler; she now carries up to 30 tons of cargo between European ports.

Avontuur-Timbercoast is a two-masted gaff-rigged schooner built in 1920 in the Netherlands, and regarded as one of the last true cargo sailing ships of the 20th century. Its goal today: *"Mission Zero — to eliminate pollution caused by shipping cargo."*

The Sailing Vessel *Kwai* was built in 1950 as a herring fishing vessel in Bremen, Germany. Refitted, she is 43 meters (140 feet) long and can carry 250 tons. She presently serves as a packet vessel in the tropics, sailing between Hawai'i and the Cook Islands.

Ceiba-Sail Cargo Inc. transports freight using a sustainable carbon-neutral sailing system. Its first ship, *CEIBA*, will offer something special to exporters and importers: an eco-friendly means of moving their most important organic, sustainable products.

The *Hawila Project* also offers an environmentally friendly way of shipping organic goods between small coastal communities, especially European producers. The vessel can transport 55 tons of cargo using only wind power. *Grain de Sail* combines the best of old and new. It is a freshly built 24-meter (80-foot), 35-ton-capacity schooner with a state-of-the-art climate- and stability controlled hull for maintaining fragile goods. Sail powered, it is equipped with cutting-edge navigation technologies and made out of aluminum for a better weight/performance ratio and greater durability. In December 2020, *Grain de Sail* unloaded a shipment of wine and cognac at the Brooklyn Navy Yard, becoming the first ocean-crossing sail cargo ship to unload cargo in New York since the schooner *Black Seal* delivered cocoa beans by sail to Mast

Brothers chocolate makers in 2011.

Of these startups and proof-of-concept vessels, *Jorne Langelaan*, a veteran of Fair Transport's sail cargo venture, may possess the boldest old-new sailing concept. *Ecoclipper*, when built, will be a big new "square rigger" and full-sized replica of the Dutch cargo ship *Noach*, built in 1857 — with an equally big mission. *"She is to be operated in the deep-sea trade: Trans-Atlantic, Trans-Pacific and around the world,"* says her promoter. She'll be rigged with three square-rigged masts, boasting 930 square meters (10,000 square feet) of sail, *"traveling without mechanical propulsion,"* and able to transport up to 4,000 gross register tonnage (GRT) of cargo.



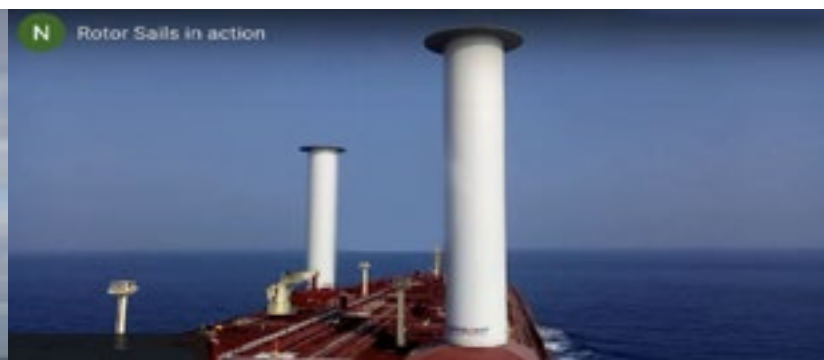
The Alcione, Jacques Cousteau's turbo sail ship, a research vessel launched in 1985, and precursor of today's rotor sail cargo ships. Image courtesy of Cousteau. org.

High-tech innovations

Maybe among the most unique innovations in the cargo shipping sector today are sails that look less and less like traditional sails. Known as sail-assisted or wind-assisted propulsion devices, the concept often is to fit existing fossil-fueled vessels with a variety of new sail technologies that offer a boost in power while cutting carbon emissions.

These cutting-edge approaches include wing sails, which are inflatable; "hard sails" which look like an airplane wing set up vertically; *"Flettner" vertical rotor sails that resemble smokestacks (but which use the Magnus effect, a force acting on a spinning body in a moving airstream); the Dynarig, "a state-of-the-art, modern, high-tech rig, relying on the use of cutting edge, high-strength materials currently used on high-performance racing yachts"* and sail-assist kites or sky sails that look and act like hang gliders, launched from a ship's bow with a cable to help pull the vessel downwind.

Neoline is a company capitalizing on new sail technology it says is "immediately available and [a] powerful enough solution to propel cargo ships." The firm is already finding its eco-niche, establishing shipping contracts with tiremaker Michelin and automaker Renault, along with other companies looking to reduce their carbon footprint. The Viking Grace ferry, which sails the Baltic Sea, is equipped with Norsepower's Flettner rotor sail, which provides clean, auxiliary power. Wallenius Marine is developing the *Oceanbird*, able to ship 7,000 cars and trucks



AUXILIARY PROPULSION
Diesel-electric: 4000 kW
Fully controlled transit-times

across the Atlantic propelled only by high-tech wing sails. These and other innovators have joined together in the International Windship Alliance, a gathering of new technology companies, ship builders, and shippers of all sizes who are changing the face of ocean shipping, replacing smoky fossil-fueled “dinosaurs” with nimble, “back to the future” sailing, sail assist, solar, electric and alternative fuel vessels.



To learn more about the New Age of Sail, look into Jan Lundberg’s Sail Transport Network, Dmitry Orlov’s insightful writings, Gavin Allright and the International Windship Association, Madadh MacLaine and the Zero Emissions Ship Technology Association, and Di Gilpin’s Smart Green Shipping.



The New Age of Sail isn’t only evolving on the high seas: Lane Briggs’ Tugantine, Erik Andrus and Vermont Sail Freight, and Maine Sail Freight, are all forerunners of an epochal change underway in the way goods and people are moved along inland rivers and in coastal waters in a post-carbon era.

As fossil fuels grow scarce and expensive, sailing ships and alternatively powered vessels will replace fossil-fueled shipping,

and the new ideas are seemingly endless: hemp and other cellulose-based plastics can replace fiberglass and other synthetic hull and sail materials; ships will ride above the waves on hydrofoils, maybe replacing airline high-speed passenger service; and many more small river, estuary and ocean ports will be renovated and updated to create an “internet” of coastal and island-linked small-to mid-sized shipping lanes.

New vessels will also require a different type of port: electric and people-powered first- and last-mile logistics, with old skills of seafaring, ship-keeping, and shipbuilding preserved, renewed and intermixed with 21st century know-how.

We are fast entering a world of sail, battery, and hydrogen; cargo shipping beyond carbon.

Before he died in 1947, Gustaf Erikson, who ran a fleet of Baltic Sea windjammers in the Åland Islands, “was fond of telling anyone who would listen that a new golden age for sailing ships was on the horizon: sooner or later, he insisted, the world’s supply of coal and oil would run out, steam and diesel engines would become so many lumps of metal fit only for salvage, and those who still knew how to haul freight across the ocean with only the wind for power would have the seas, and the world’s cargoes, all to themselves.” That imagined day has nearly arrived.

About the Author:

Andrew Willner is a former boatbuilder, sailing vessel master, and retired NY-NJ Baykeeper, who in 2013-14 was recruited as a volunteer aboard the Vermont Sail Freight sailing barge *Ceres* built by Erik Andrus in his Vermont barn. The *Ceres* made two successful voyages from Burlington on Lake Champlain, traveling down the Hudson River to New York City with a shelf-stable cargo of high-value farm products, sold at pop-up markets at ports along the way and at the New Amsterdam Market final destination. **Willner** is also executive director of the Center for Post Carbon Logistics.

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Source: <https://southafricatoday.net/environment/new-age-of-sail-looks-to-slash-massive-maritime-carbon-emissions/>

THE SAGA OF Q-111 LUZON - THE SECOND PHILIPPINE MOTOR TORPEDO BOAT THAT SERVED THREE NAVIES

by CDR Mark R Condono

On June 1939, the second Philippine Q-Boat arrived in Manila and was named Luzon after one of the three main Island groups of the country, and was given hull number Q-111. She is 10 feet longer than Q-112 and has a cruising speed of 41 knots with a crew of 2 Officers and 4 Enlisted Personnel. Q-111 was the squadron flagship.



Q-111 Luzon

Three months earlier on 02-March-1939 the First Philippine Motor Torpedo Boat arrived in Manila aboard the Steamship SS Mecklenburg from Antwerp, Belgium. She was christened "ABRA" after the Province of Abra and with Hull Number Q-112.

Thus begun the Q-Boat mystery of the Philippine Navy, eventually through the years "Q" stood for Quest for Mystery but would also signify as the Quezon Boat for President Quezon as the Off-shore Patrol (OSP), the naval arm of the Philippine Army activated during his tenure.

From 08-December-1941 to 08-April-1942, the Q-Boats of the Off-shore Patrol would be in the thick of action against the Japanese Invasion of the Philippines.

The five (5) Q-Boats of the Off-shore Patrol, the 44-ship Navigation Division of the Philippine Coast Guard under the Bureau of Customs, and Ships of the Philippine Merchant Marine were commissioned into the OSP Reserve. These seagoing forces formed part of the Philippines Naval Defense along with the US Navy's Motor Torpedo Boat Squadron 3 under LT John D Bulkeley USN along with the US Asiatic Fleet Submarine Tender USS Canopus.

As the dark clouds of Japanese conquests hovered over the archipelago, the Q-Boat Squadron made one final sortie with the plan of escaping the Japanese blockade of Manila and proceeding to Australia to join the other allied forces thereat.

At 2400H on 08-April-1942, preparations were undertaken as the squadron made its final bid for freedom,

coming out from Sisiman Cove in the Province of Bataan.

MAJ Enrique L Jurado (USNA'34) commanded the Squadron aboard Q-111 Luzon, with CPT Alberto Navarette as Skipper, LT Heracleo Alano as Executive Officer, and LT Abraham Campo as Navigator, with SGT Claro Jimenez, PFC's Andres Gaceta, Felipe Donato, Florencio Inigo and Jose Villanueva as crew.

The primary objective was to sortie out of Manila and proceed to Corregidor, then to Iloilo, and head for Australia, leaving in echelon formation when the first sign of trouble appeared as the engines of Q-112 Abra gave up, making LT Ramon A Alcaraz (PMA'40) withdraw from the formation, scuttling the gunship near Navotas.

The Q-115 Baler was also having engine problems as it was only making 12 knots from its usual 30 knots. All was well, but upon approaching the mouth of Manila Bay, Japanese Land based Naval Aircraft of the 1st Kokutai engaged the Q-Boats. In the ensuing melee, one of the Japanese planes was shotdown.

As per LT Campo's narration, the remaining Japanese planes circled the squadron as if waiting for something and a few minutes later, a lookout on one of the Q-Boats' crew shouted "Ships ahead!"



HIJMS Samidare



HIJMS Murasame

These ships were the Imperial Japanese Navy Destroyers HIJMS SAMIDARE and MURASAME, part of the Japanese blockade and already veterans of earlier engagements in the Pacific.

LT Campo's narration of the battle where the Q-boats were embroiled gave a good account of the officers and crew but

the Japanese naval gunners were good in deflection. The Q-boats guns counter-fired and Mark 14 Torpedoes were launched though missing their target for lack of range to reach the enemy.

In a few seconds, Q-111 Luzon was on fire, and was scuttled off to Looc, Cavite headed for Nasugbu, Batangas.

The fate of the Q-Boats on that day is as follows:

Q-111 Luzon was scuttled on 09-April-1942- between Looc, Cavite and Nasugbu, Batangas.

Q-112 Abra was scuttled on 09-April-1942 off Navotas.

Both Q-111 Luzon and Q-112 Abra were British-built 55 FT and 65 FT Motor Torpedo Boats, with a max speed of 41 Knots and armed with 2 Anti-Aircraft .50 calibre Guns, 2 Mark 14 Torpedoes, and 2 depth charges. They were the first and second Motor Torpedo Boats used by the Philippine OSP.



Q-113 in the foreground, Q-112 behind.

Q-113 Agusan was scuttled on 09-April-1942 as part of the United States Armed Forces in the Far East (USAF) OPERATION PONTIAC whereby no allied equipment should be taken advantage of the enemy, Agusan's crew joined the Coast Artillery Corps, while its anti-aircraft weapons were incorporated into the beach defense force.

Q-113 Agusan was the First PURELY PHILIPPINE BUILT TORPEDO BOAT patterned after the British Torpedo Boats. She was built at Engineer Island in Navotas under the supervision of Naval Architect/Civil Engineer Bernardo Abrera.

Q-114 Danday named after the wife of MAJ Jurado was the former MV Carmen which was salvaged and refloated by the OSP through the assistance of the MV Carmen's Marine Engineer Vicente Ty Dela Cruz. She was later burned to escape Japanese capture in Lamao, Bataan. She was the special operations craft of the OSP as she always handled agents and landing spies behind enemy lines.

Q-115 Baler was the former Presidential Launch which was taken over by the OSP in December 1941. She was captured by the Japanese off Cabra Island with the whole crew and passengers totaling about 23 Filipinos and Americans.

The curtain would not be drawn with the defeat of the Q-Boats as the Island Fortress of Corregidor would hold on until 6-May-1942 as the Japanese completed their conquest of the Philippines.

Though the saga of Q-111 Luzon ended off Batangas waters and to many, lost in history after she was scuttled.

Unknown to many, she was re-floated and refurbished by the Imperial Japanese Navy and re-commissioned into the IJN on 12-April-1943 as Patrol Boat 114, but was again sunk by US Naval aircraft during their return to the Philippines in 1944.



IJN Motor Torpedo 114, the former Q-111.

Q-111 Luzon holds a distinction of serving three Navies: the British Royal Navy as prior to delivery she was tested by British Crews, the Philippine Navy, and the Imperial Japanese Navy.

These small Q-boats were also known as "Suicide Boats." Officers were taught how to ramrod enemy ships, sacrificing themselves, if necessary to ensure that torpedoes miss. About 66% of the officers and men received the Silver Star from General Douglas MacArthur in January 1942, making this small unit one of the most recognized for heroism and gallantry in action.



Sources:

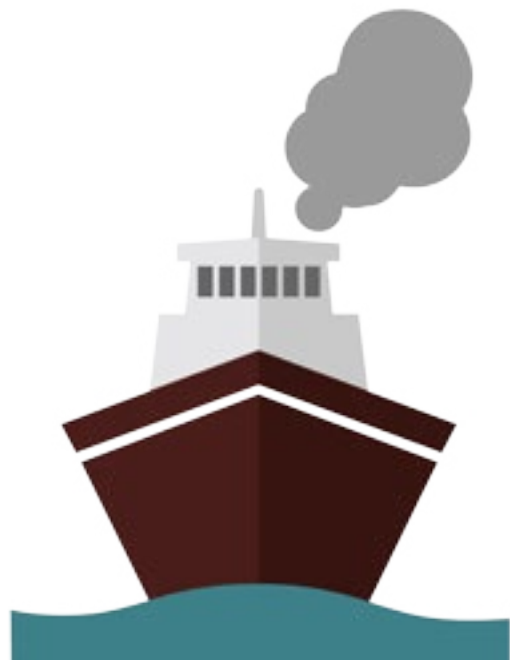
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Photograph Credits:

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IMO STUDY: SHIPPING EMISSIONS ROSE BY ALMOST 10% DURING 2012-2018 PERIOD

by IMO



The Fourth IMO GHG Study Executive Summary has been published. This study is the first iteration since the adoption of the Initial IMO Strategy on Reduction of greenhouse gas (GHG) Emissions from Ships in 2018, under which IMO Member States have pledged to cut GHG emissions from international shipping and to phase them out as soon as possible.

The study estimates that total shipping emitted 1,056 million tons of CO₂ in 2018, accounting for about 2.89% of the total global anthropogenic CO₂ emissions for that year. Under a new voyage-based allocation method, the share of international shipping represented 740 million tons of CO₂ in 2018.

According to a range of plausible long-term economic and energy business-as-usual scenarios, shipping emissions could represent 90%-130% of 2008 emissions by 2050.

For the first time, the study includes estimates of carbon intensity. Overall carbon intensity has improved between 2012 and 2018 for international shipping as a whole, as well as for most ship types. The overall carbon intensity, as an average across international shipping, was between 21% and 29% better than in 2008.

IMO has been actively engaged in a global approach to further enhance ship's energy efficiency and develop measures to reduce GHG emissions from ships, as well as provide technical cooperation and capacity-building activities.

Highlights of the 4th GHG Study can be viewed at:

<https://www.imo.org/en/OurWork/Environment/Pages/Fourth-IMO-Greenhouse-Gas-Study-2020.aspx>.

Fourth Greenhouse Gas Study 2020: Emissions inventory

The greenhouse gas (GHG) emissions —including carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O), expressed in CO₂e— of total shipping (international, domestic and fishing) have increased from 977 million tons in 2012 to 1,076 million tons in 2018 (9.6% increase). In 2012, 962 million tons were CO₂ emissions, while in 2018 this amount grew 9.3% to 1,056 million tons of CO₂ emissions

The share of shipping emissions in global anthropogenic emissions has increased from 2.76% in 2012 to 2.89% in 2018.

Under a new voyage-based allocation of international shipping, CO₂ emissions have also increased over this same period from 701 million tons in 2012 to 740 million tons in 2018 (5.6% increase), but to a lower growth rate than total shipping emissions, and represent an approximately constant share of global CO₂ emissions over this period (approximately 2%), as shown in Table 1. Using the vessel-based allocation of international shipping taken from the Third IMO GHG Study, CO₂ emissions have increased over the period from 848 million tons in 2012 to 919 million tons in 2018 (8.4% increase).

Due to developments in data and inventory methods, this study is the first IMO GHG Study able to produce greenhouse gas inventories that distinguish domestic shipping from international emissions on a voyage basis in a way which, according to the consortium, is exactly consistent with the IPCC guidelines and definitions.

Projecting the same method to 2008 emissions, this study estimates that 2008 international shipping GHG emissions (in CO₂e) were 794 million tons (employing the method used in the Third IMO GHG Study, the emissions were 940 million tons CO₂e).

Carbon intensity 2008, 2012 – 2018

Carbon intensity has improved between 2012 and 2018 for international shipping as a whole, as well as for most ship types. The overall carbon intensity, as an average across international shipping, was 21% and 29% better than in 2008, measured in AER and EEOI respectively in the voyage-based allocation; while it was 22% respectively 32% better in the vessel-based allocation (Table 2). Improvements in carbon intensity of international shipping have not followed a linear pathway and more than half have been achieved before 2012. The pace of carbon intensity reduction has slowed since 2015, with average annual percentage changes ranging from 1% to 2%.

Annual carbon intensity performance of individual ships fluctuated over years. The upper and lower quartiles of fluctuation rates in EEOI of oil tankers, bulk carriers and container ships were around ±20%, ±15% and ±10% respectively. Quartiles of fluctuation rates in other metrics were relatively modest, yet still generally reaching beyond ±5%. Due to certain static assumptions on weather and hull fouling conditions, as well as the non-timely updated AIS entries on draught, actual fluctuations were possibly

Table 1 – Total shipping and voyage-based and vessel-based international shipping CO₂ emissions 2012-2018 (million tonnes)

| Year | Global anthropogenic CO ₂ emissions | Total shipping CO ₂ | Total shipping as a percentage of global | Voyage-based International shipping CO ₂ | Voyage-based International shipping as a percentage of global | Vessel-based International shipping CO ₂ | Vessel-based International shipping as a percentage of global |
|------|--|--------------------------------|--|---|---|---|---|
| 2012 | 34,793 | 962 | 2.76% | 701 | 2.01% | 848 | 2.44% |
| 2013 | 34,959 | 957 | 2.74% | 684 | 1.96% | 837 | 2.39% |
| 2014 | 35,225 | 964 | 2.74% | 681 | 1.93% | 846 | 2.37% |
| 2015 | 35,219 | 991 | 2.81% | 700 | 1.99% | 859 | 2.44% |
| 2016 | 35,380 | 1,026 | 2.90% | 727 | 2.05% | 894 | 2.53% |
| 2017 | 35,880 | 1,064 | 2.97% | 746 | 2.08% | 929 | 2.59% |
| 2018 | 36,573 | 1,056 | 2.89% | 740 | 2.02% | 919 | 2.51% |

Table 2 – Estimates on carbon intensity of international shipping and percentage changes compared to 2008 values

| Year | EEOI (gCO ₂ /t/nm) | | | | AER (gCO ₂ /dwt/nm) | | | | DIST (kgCO ₂ /nm) | | | | TIME (tCO ₂ /hr) | | | |
|------|-------------------------------|--------|--------------|--------|--------------------------------|--------|--------------|--------|------------------------------|--------|--------------|--------|-----------------------------|--------|--------------|--------|
| | Vessel-based | | Voyage-based | | Vessel-based | | Voyage-based | | Vessel-based | | Voyage-based | | Vessel-based | | Voyage-based | |
| | Value | Change | Value | Change | Value | Change | Value | Change | Value | Change | Value | Change | Value | Change | Value | Change |
| 2008 | 17.10 | — | 15.16 | — | 8.05 | — | 7.40 | — | 306.46 | — | 350.36 | — | 3.64 | — | 4.38 | — |
| 2012 | 13.16 | -23.3% | 12.19 | -19.6% | 7.06 | -12.7% | 6.61 | -10.7% | 362.65 | 18.3% | 387.01 | 10.5% | 4.32 | 18.6% | 4.74 | 8.1% |
| 2013 | 12.87 | -24.7% | 11.83 | -22.0% | 6.89 | -14.8% | 6.40 | -13.5% | 357.73 | 16.7% | 360.68 | 6.7% | 4.18 | 14.6% | 4.57 | 4.1% |
| 2014 | 12.34 | -27.9% | 11.29 | -25.6% | 6.71 | -16.9% | 6.20 | -16.1% | 360.44 | 17.6% | 382.09 | 9.1% | 4.17 | 14.4% | 4.54 | 3.5% |
| 2015 | 12.33 | -27.9% | 11.30 | -25.5% | 6.64 | -17.8% | 6.15 | -16.9% | 366.56 | 19.8% | 388.62 | 10.9% | 4.25 | 16.6% | 4.64 | 5.7% |
| 2016 | 12.22 | -28.6% | 11.21 | -26.1% | 6.58 | -18.6% | 6.09 | -17.7% | 373.46 | 21.9% | 397.05 | 13.3% | 4.35 | 19.3% | 4.77 | 8.7% |
| 2017 | 11.87 | -30.6% | 10.88 | -28.2% | 6.43 | -20.4% | 5.96 | -19.3% | 370.97 | 21.0% | 399.38 | 14.0% | 4.31 | 18.2% | 4.79 | 9.2% |
| 2018 | 11.67 | -31.8% | 10.70 | -29.4% | 6.31 | -22.0% | 5.84 | -21.0% | 376.81 | 23.0% | 401.91 | 14.7% | 4.34 | 19.1% | 4.79 | 9.2% |

more scattered than estimated, especially for container ships.

Emission projections 2018 – 2050

Emissions are projected to increase from about 90% of 2008 emissions in 2018 to 90-130% of 2008 emissions by 2050 for a range of plausible long-term economic and energy scenarios (Figure 1).

Emissions could be higher (lower) than projected when economic growth rates are higher (lower) than assumed here or when the reduction in GHG emissions from land-based sectors is less (more) than would be required to limit the global temperature increase to well below 2 degrees centigrade.

Although it is too early to assess the impact of COVID-19 on emission projections quantitatively, it is clear that emissions in 2020 and 2021 will be significantly lower. Depending on the recovery trajectory, emissions over the next decades maybe a few percent lower than projected, at most. In all, the impact of COVID-19 is likely to be smaller than the uncertainty range of the presented scenarios.



Source: <https://www.hellenicshippingnews.com/imo-study-shipping-emissions-rose-by-almost-10-during-2012-2018-period/>



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MAAP Profile

Geographic destiny has given the Filipino the innate talent to be an excellent seafarer. To enhance this natural skill, the Maritime Academy of Asia and the Pacific (MAAP) was established on January 14, 1998. The Academy stands on a 103-hectare property in Kamaya Point, Mariveles, Bataan.

The Associated Marine Officers' and Seamen's Union of the Philippines (AMOSUP) founded by the late Capt. Gregorio S Oca, capitalized and developed the Academy. The new AMOSUP President, Dr. Conrado F. Oca, heads the Academy's board of governors. The board is comprised of representatives from the private sector, the International Transport Workers Federation, the Filipino Association of Maritime Employers, the International Transport Workers Federation, the All Japan Seamen's Union, the International Mariners Management Association of Japan, the Norwegian Seafarers' Union, the International Maritime Employers' Committee, the Danish Shipowners' Association, the Norwegian Shipowners' Association, and the Japanese Shipowners' Association.

MAAP conducts shipboard training aboard T/S Kapitán Felix Oca, a 5020 DWT dedicated training ship capable of accommodating 180 midshipmen and 9 instructors in 30 air-conditioned cabins and six berths.

MAAP students are all scholars who are entitled to free tuition, board and lodging. They receive a comprehensive, up-to-date and well-rounded education that fully complies with the requirements of STCW 95 and the Commission on Higher Education (CHED). To ensure the highest standards of quality, MAAP adheres to a Quality Standards System that has been certified to comply with ISO 9001 version 2008, the Det Norske Veritas (DNV) Rules for Maritime Academies, and the Productivity and Standard Board (PSB) of Singapore.

The Academy offers three main programs: the Bachelor of Science in Marine Transportation (BSMT), Bachelor of Science in Marine Engineering (BSMarE) and the Bachelor of Science in Marine Transportation and Engineering (BSMTE). The curricula for the three courses were designed with the help of the United States Merchant Marine Academy at Kings Point, New York. Courses are four-year courses with sea phases scheduled in the third year. The BSMT curriculum requires a total of 192 units: 152 at MAAP, 40 practicum/shipboard units on board T/S Kapitán Felix Oca and/or a shipping company sponsorship. The BSMarE curriculum requires a total of 193 units: 153 at MAAP, 40 practicum/shipboard units on board T/S Kapitán Felix Oca and/or a shipping company sponsorship.

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