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China's Naval Aviation and its Prospective Role in Blue Water Capabilities of the PLA Navy

Kamlesh Kumar Agnihotri*

The PLA Navy's aviation branch, officially known as the PLA Navy Air Force (PLAN AF), comprises 25,000 personnel and more than 800 aircraft. It provides the PLA Navy with its own air capability independent of the PLA Air Force. But the Force remains largely land-based. However, the much speculated upon aircraft carrier program will impart a new dimension to the Chinese naval aviation. With the current level of national technological capability and available maritime infrastructure, the PLA Navy will, at best, be able to project power with its carriers within the South and East China Sea only, in the 2020 timeframe. It will find it increasingly hard to project power-using aircraft carriers in the Indian Ocean Region without full-fledged military bases to support logistics and ship and aircraft maintenance/repairs. Thus the credible Chinese power projection capability in the Indian Ocean still appears to be at least two decades away. But the international community must take due cognizance of this inevitability now and commence preparations to face this forthcoming challenge.

*Commander Kamlesh Kumar Agnihotri is a Research Fellow with the China Cell of the National Maritime Foundation, New Delhi. The author can be reached at kkagnihotri@maritimeindia.org

Introduction

China's emergence to pre-eminence in the global arena, particularly since the turn of the 21st century, is the result of widespread reforms initiated in the late 1970s by Deng Xiaoping. The reforms mainly comprised a twin pronged approach, the first being the adaptation of the western economic model into the Chinese framework, and the second laying stress on building the intrinsic national strength by seriously addressing the ''four modernizations'' plan. While the ''National Defence'' modernization started last off the blocks,[1] it is nevertheless progressing in the right earnest and at a brisk pace. Towards this end, China has been following a three-stage Defense modernization strategy,[2] viz. lay a solid foundation by 2010, make major progress by 2020 and be capable of winning wars under conditions of ''informationization''[3] by the middle of the 21st Century.

China now follows a military strategy of ''Active Defense'' so as to ultimately fulfil the third strategic objective mentioned above and has formulated a ''Military Strategic Guideline of Active Defense for the new period''.[4] The guideline strives to increase the PLA's capabilities to accomplish tasks such as counter-terrorism, stability maintenance, emergency rescue and international peacekeeping. ''Military Operations Other than War'' (MOOTW)[5] now form an important part of applying military force.

''Offshore defence''[6] strategy is the naval component of the ''active defence'' strategic guidelines. As this concept has spatial connotations, there has been considerable discussion in the PLA maritime circles as to what should be the outward sea boundary for ''offshore defence''.[7] This can be broadly defined as a function of the ''strategic intentions'' and the ''operational reach''. The PLA Navy has therefore started enhancing its capability to extend ''operational reach'' through sustained modernisation. Admiral Wu Shengli, Chief of the PLA Navy, in a statement during the International Fleet Review at Qingdao in April 2009, affirmed the renewed focus on naval modernisation by stating that

> *"China will accelerate development of warships, stealth submarines, supersonic jet fighters and long-range missiles to boost the ability to fight in regional sea wars, as also the PLA Navy will incorporate the capacity for non-war military actions to support the integrated armed forces' effort, especially anti-terrorism activities."* [8]

If those be the stated objectives of the PLA Navy and the ever increasing outer limit of the Chinese ''offshore defence'' strategy broadly translates to ''far sea operations'', then the aviation wing of the PLA Navy has to play a vital role in this endeavour, especially so when the state power has to be projected beyond the reach of shore based aircraft.

PLA Navy Aviation

The PLA Navy's aviation branch, officially designated as the PLA Navy Air Force (PLAN AF), stands third in the PLA Navy's order of hierarchy, the first two being the surface and submarine forces and the last two comprising the coastal defence forces and the marines. The force comprises about 25,000 personnel and more than 800 aircraft.[9] The major assets of the force include dedicated airfields, anti-aircraft artillery (AAA), radar, maintenance and logistics units and training academies.

Evolution[10]

The PLAN AF was created in accordance with the first ''Three Year Plan'' issued by the PLA Navy subsequent to its setting up in April 1949. The initial plan envisaged the establishment of three air divisions, viz. one bomber, one fighter, and the third comprising two ground-attack regiments and one fighter regiment. The training requirement for the above formations was to have been met by three aviation schools, which would train up to 10,000 pilots and ground support personnel in the first phase. The three divisions would operate from dedicated naval airfields, two or three of which would be built within the PLA Navy's areas of operations. About 360 aircraft and support equipment would be imported from the then Soviet Union.

The operational requirements of the Korean War however, accelerated the above process and the PLA Navy's 1st Aviation School was opened on October 1, 1950 at Qingdao. The 1st Division of PLA Naval Aviation, manned by the trainees from this aviation school became operational at Shanghai airfield on June 27, 1952. This was followed by the commissioning of various naval aviation units, schools, and fleet aviation troops. The PLA Naval Aviation was designated as one of the PLA Navy's five operational branches on September 6, 1952. The naval aviation was also established as one of the six independent administrative departments within the PLA

Navy Headquarters in Beijing. September 6, 1952 is thus commemorated as the founding day of the PLAN AF.

Role

The PLAN AF provides the PLA Navy with its own air capability independent of the PLA Air Force (PLA AF). The role initially catered to providing air cover for naval ships at sea. However, the role is being increasingly transformed to include maritime patrol, anti-submarine warfare, maritime strike, logistical support, and airborne early warning. The PLAN AF currently remains a largely land-based force, though the destroyers, frigates, landing ships and replenishment vessels have ship-borne helicopters on board for operational and logistics air requirements. The much speculated upon Chinese aircraft carrier program will however, impart an altogether new dimension to the PLAN AF.

Aircraft Inventory

The PLA AF inventory can be divided into two main types, viz. the fixed wing aircrafts and the helicopters. The fixed wing component comprises the fighters, bombers, fighter-bombers, patrol and reconnaissance aircraft. Only about 290 aircraft are actually believed to be combat worthy.[11]

- **Fixed-wing Aircraft**.[12] The PLAN AF's main fighters are the indigenous J-8 all-weather aircraft and the Russian Su-30 MK 2 air superiority fighters (ASF). The Su-30s can strike ships at long distances, while still maintaining a credible air-to-air capability. H-6, a licensed variant of ex-Soviet Tu-16 Badger medium jet bomber, is primarily used for maritime strike. It is also armed with anti-ship cruise missiles (ASCMs). Some H-6 bombers have been modified as mid air. The PLAN AF also employs the JH-7, an indigenously produced tandem-seat fighter/bomber with enhanced radar and weapon carrying capacity. The PLAN AF also has Maritime Patrol Aircraft (MPA) and Airborne Early Warning & Control (AEW&C) aircraft. Several Y-8 airframes have been modified for MPA, and AEW&C roles. KJ 2000[13] Airborne Warning and Control (AWACS) aircraft, based on the Russian IL 76 airframe is the latest force multiplier available in the PLAN AF.

- **Helicopters.**[14] The Z-9C, the Z-8, and the Russian Kamov 28 are the three main helicopters operating in the PLAN AF. The Z-9C, a licensed version of French "AS365 Dauphin" is the primary naval helicopter, used mainly for Anti Submarine Warfare (ASW) and search and rescue (SAR) operations. It can also be used in the ship detection role by fitting surface search radar. The Kamov-28 *Helix* helicopters operate from the Sovremenny and Luyang class of destroyers for ASW operations. The Z-8 helicopter is a licensed production of the French "SA-321 Super Frelon". It is a medium lift transport helicopter and can also be modified to carry out ASW and mine laying missions.
- The PLAN AF's main aircraft inventory[15] is tabulated in Figure 1.

Sl.	Aircraft	Type	Quantity
Fixed Wing Aircraft			
1.	H-5/H-5B	Bomber	20
2.	H-6D	Bomber	30
3.	J-7	Fighter	36
4.	J-8/J-8F/I/B/D	Fighter	48
5.	JH-7	Fighter Bomber	84
6.	Sukhoi-30Mk2	Fighter Bomber	24
7.	Q-5	Fighter Bomber	30
8.	Y-8/SH-5	Recce/Patrol/AEW	13
9.	HY-6	Air Refueller	3
10.	J-6/J-7/PT-6/K-8	Trainers	122
Helicopters			
11.	Z-9C	ASW/ASUW	25
12.	Z-8/Z-8A	SAR, Medium Lift	20
13.	Kamov28	ASW	10

Fig. 1. Inventory of the PLA Navy Air Force (source: *Jane's Fighting Ships 2009–10*, pp. 127–161).

Organisation

The PLANAF is organised into air divisions and regiments, under operational control of the three Fleet Headquarters. There are currently seven[16] air divisions, as shown in Figure 2.

The air divisions under the North Sea Fleet have H5 bombers, J-6, J-7, J-8 fighters and Y8 aircraft. East Sea Fleet aviation wing is the best equipped, with Su30MK2, JH-7s and Y-8 AEW&C aircrafts as it is expected to play a major role in the cross strait scenario. The South Sea Fleet divisions are armed with the H6D bombers, H6 aerial refuelling aircraft, J-6, J-7, J-8 fighters, some old Q5 attackers and JH7A fighter-bombers.

The PLAN AF's air divisions and regiments are assigned to the following airbases located under the area of responsibility (AOR) of the three sea fleets:

- North Sea Fleet: Anyang, Changzhi, Dalian, Jiaoxian, Jinxi, Jiyuan, Laishan, Laiyang, Liangziang, Qingdao, Shanhaiguan, and Xingtai
- East Sea Fleet: Daishan, Danyang, Ningbo, Luqiao, Shanghai, and Shitangqiao
- South Sea Fleet: Foluo, Guiping, Haikou, Jialaishi, Lingling, Lingshui, and Sanya

An eighth air division, namely the 2nd ''Specialised'' Division[17] has been reported under the North Sea Fleet. Its main role is Anti Submarine Warfare (ASW),

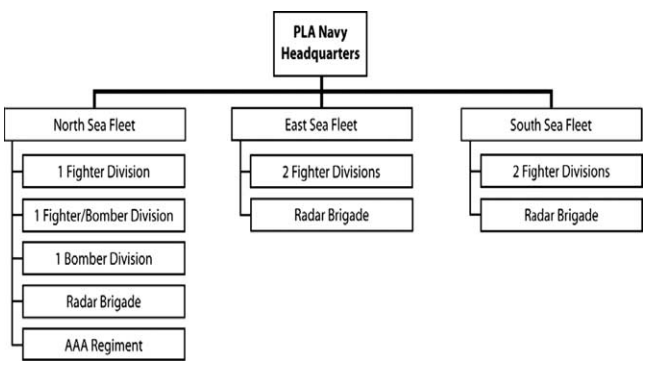

Fig. 2. Organisation of the PLA Navy Air Force (source: US Office of Naval Intelligence, *China's Navy 2007*).

Electronic Intelligence (ELINT) gathering and other Electronic Warfare (EW) related missions. It comprises Y-8 airframe based variants viz. Y8J Airborne Early Warning, Y8GX2 ELINT, Y-8X Maritime Patrol Version and SH-5 ASW flying boats, all organised into three regiments – the 4th, 5th and the 6th.

Limitations

The PLAN AF has been undergoing incremental reforms since 2001. The traditional attackers are being replaced by newer types of aircraft. But the greatest limitation is that it still remains shore based and hence the operational reach is restricted to the maximum combat range of the fighter aircraft. The coverage of offshore operations can be increased by carrying out mid air refuelling, but the PLAN AF's capability in this regard is severely restricted. The IL78 based aerial refuellers are not yet available, and the existing three in number modified H6D refuellers, based in Hainan Island, can only refuel J-8 and J-10 aircrafts, but are not compatible with the Sukhoi fighters.[18] The combat ranges of the main PLAN AF aircraft are shown in Figure 3.

The PLAN Air Force, though, is in a position to extend its coverage further seawards in the South China Sea by operating its combat aircraft from the Woody Island airfield. The island lies about 180 Nautical miles south-east of Hainan Island and is part of the disputed Paracel group of Islands (Fig. 4). Currently there are no aircraft based at the island, but a runway length of about 8000 Feet and the logistical infrastructure including ship berthing facilities under development will be highly useful in extending aerial coverage area by another 200 Nautical miles.

But even this extended sea coverage area can hardly be considered adequate, especially when the Chinese maritime aspirations expect that "... *the PLA Navy must move from coastal waters to Oceans and shoulder the tasks of safeguarding territory, development of national economy and overseas interests*...".[19] This impediment to the Chinese ambitions can only be overcome by the flexibility, maneuverability and mobile air coverage, offered by the aircraft carriers and their embarked air wings.

China's Aircraft Carrier Program

If the role of the carrier strike group in providing integrated power projection capabilities is considered to be inescapable, then China has to work towards inducting them as soon as feasible. The naval operations concept of US describes the aircraft

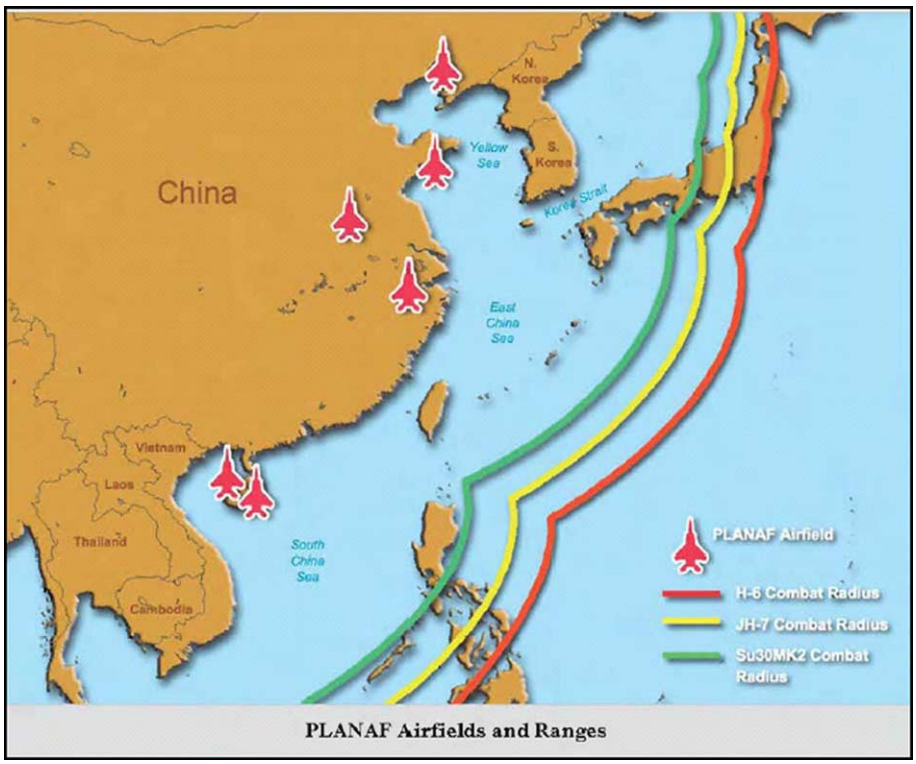

Fig. 3. The combat ranges of the main PLA Navy Air Force aircraft (source: US Office of Naval Intelligence, *People's Liberation Army Navy: A modern navy with Chinese Characteristics*, August 2009).

carrier as the "...'*centerpiece' of the Carrier Strike Group (CSG) during power projection operations, in that along with its embarked air complement, it provides responsive, flexible and sustainable strike capability which does not require diplomatic access*...".[20]

History

The genesis of the Chinese aircraft carrier ambitions dates back to 1970 when Liu Huaqing, later to become the Commander of the PLA Navy from 1982 to 1986 and the Vice Chairman of the Central Military Commission (CMC) from 1989 to 1997, organised a special feasibility study for building aircraft carriers. He was the first PLA officer to visit an American aircraft carrier, USS Kitty Hawk in May 1980. As

Fig. 4. Woody Island in South China Sea (source: maps from Microsoft Encarta 2007 and Google Earth).

Commander of the PLA Navy, he championed the cause of the PLA Navy having its own aircraft carrier and was quoted to have stated that "*despite our long coastal defence line, we had only small and medium-sized warships and land-based air units, which were merely capable of short-distance operations. But by developing aircraft carriers, we could solve this problem successfully*".[21] He averred, though, that the Chinese national strength at that time was insufficient do undertake such a project and suggested that the year 2000 perhaps would be the best time to consider it after having carried out extensive feasibility studies and technical research.

Speculation and Conjectures

It is not apparent whether Admiral Liu's strong convictions about building an aircraft carrier and his concerted effort in conceptualizing the program, actually influenced PLA Navy's thought process. Admiral Liu Huaqing himself underscored the realistic compulsions by stating that "*the development of an aircraft carrier is not only a naval question, it is also a major question of national strategy and defence policy*".[22] However, the imperatives of safeguarding its expanding maritime interests have generated considerable debate amongst the Chinese strategic circles towards building aircraft carriers.[23]

Liang Guanglie, the Chinese Defence Minister was quoted to have remarked to his Japanese counterpart in March 2009 that "*amongst the big world powers, only China does not have an aircraft carrier, so it cannot be without one forever*".[24] The

testimony of Admiral Robert Willard, Commander of the US Pacific Command, during a March 2010 US congressional hearing that "*Varyag is expected to become operational by 2012 after undergoing a 10-year refit and is likely be used by the PLA Navy to develop basic carrier skills*",[25] may be treated as a measured assessment of the US intelligence community and analysts after due diligence.

Meanwhile, the news about an inter-agency task force, "Project 048",[26] has been in circulation for some time. This project has supposedly been established to oversee the development of the so-called "special large military ships", a possible euphemism for aircraft carriers. Although the firm existence of this project is open to conjecture, the report suggests that the control of "Project 048" may be under a PLA Navy deputy commander, or even higher.[27]

Another aspect being speculated upon is whether China will procure or indigenously develop its own carrier-borne aircraft. There was considerable discussion in media and strategic circles about China having signed a deal with Russia for importing 50 in number Su-33 aircraft, which presently operate from Russia's aircraft carrier, *Admiral Kuznetsov*, the sister ship of *Varyag*. Amidst conflicting reports of the deal having been cancelled and China again making efforts to salvage the same, Jane's group of publications quoting Russian industry sources has reported that while the negotiations are indeed going on, "*. . . it is obvious that they [Chinese] are trying to build their version of Sukhoi-33 or some type of carrier aero plane.*"[28]

The assumption that China may be building a carrier-borne aircraft gains further credence with Kanwa Asian Defense Review reporting that Shenyang Aircraft Corporation had produced the first prototype J-15 ship-borne aircraft in November 2009 by imitating an experimental variant of Su-33 fighter called T10K. China had obtained No.3 T10K fighter prototype of Su-33 from Ukraine and the Shenyang factory had reverse engineered it to produce its own prototype J-15 aircraft.[29]

There have also been reports of Chinese naval pilots and technical personnel being trained in Ukraine. The Chinese pilots have reportedly been given extensive training on a ski-jump ramp at Flying Training Centre at Nitka, "*a training facility for aircraft-carrier pilots of the erstwhile Soviet Union*".[30] Another report also indicates that a program to train 50 pilots to operate fixed-wing aircraft from a carrier has been initiated by the PLA Navy. This initial program would be followed by ship-borne training on board the *Varyag* in about four years' time.[31]

Present Status

So while the western strategists, security experts, and media have convincingly tried to project that the Chinese aircraft carrier program is well underway, the Chinese have not officially acknowledged it as such. In fact, the Chinese Ministry of Defence issued a denial in January 2010, wherein it was stated that:

> *"In view of the publicity report by some media that the Chinese military will establish two aircraft carrier formations two years later, related personnel from the Chinese military said that it was entirely groundless and completely fabricated, and was also extremely irresponsible".*[32]

However, the reality on the ground is that between 1998 and 2002, China purchased two decommissioned aircraft carriers, namely the *Kiev* and *Minsk* from Russia and one unfinished *Kuznetsov* class carrier called *Varyag* from Ukraine.[33]

While *Kiev* and *Minsk* were converted as museums and tourist attractions, *Varyag* has undergone extensive refit and refurbishment in dry docks. It has been painted in PLA Navy colours and named as "Shi Lang" with "83" as its pennant number.[34] It is currently berthed at Dalian.

Limitations of Building A Carrier

Two American scholars, Nan Li and Christopher Weuve, have recently argued that the Chinese aircraft carrier program can be broadly viewed through four facets of national relevance, viz. the leadership endorsement, financial affordability, appropriate naval strategy defining the role of carriers and finally, the availability of the technological support base.[35]

The program seemed to have taken a back seat due to renewed focus on Taiwan in 1996 and post the retirement of Admiral Liu Huaqing as vice Chairman of the Central Military Commission in 1997. However, fresh political will to continue the same has been discerned since 2004 after President Hu Jintao endorsed the concept of "far sea operations" which implied that the PLA Navy must aim towards attaining power projection capabilities.[36]

The financial outlay to the tune of $ 10 billion[37] as an initial investment for a single carrier strike group and the recurring annual operating and maintenance cost

of US$200 million is considered quite affordable, mainly on the assumption that this one time investment would be spread over a development period of ten years and the increased defence budget allocations will be able to absorb this additional expenditure. If the unofficial estimate of the defence budget is considered, then the financial constraints become even lesser.[38] It can be assumed that China is already working towards incorporating the role of its carrier in its naval strategy, as indicated from the articulation of its intent to "*develop its naval capabilities of conducting operations in distant waters and countering non-traditional security threats*...".[39] Then the only major limiting factor that China has to overcome towards realisation of its carrier program is the availability of the technological support base.

China has no experience in building aircraft carriers and is also constrained at the same time in not being able to acquire an operational or semi operational one from any other country. It is therefore being compelled to follow a twin-pronged approach viz. gain technological know-how from studying the *Varyag* carrier and concurrently prepare the technological infrastructure for construction of its indigenous medium sized carrier with a STOBAR (Short Take off But Arrested Landing) capable deck, in a decade-long timeframe.[40]

A few indicators suggesting the above Chinese approach are mentioned below:

- The construction of a large shipyard complex at Changxing Island off Shanghai which has a dry dock capable of undertaking construction of an aircraft carrier of up to 70000 tons displacement is reportedly completed.[41] The largest dock, capable of taking a *Varyag* size carrier, is 580m long and 120m wide.
- A full-scale land based model of *Varyag* carrier has been constructed at Wuhan in the central Chinese province of Hubei, probably with the assistance of the Ukrainian specialists,[42] to enable static airmanship training and testing of technical equipment.
- ROSOBORONEXPORT, Russia's national arms import and export corporation, provided certain technological consultation services on building of aircraft carrier and had also exported some subsystems to China for this program.[43]

However, the technological challenges in operationalising an old carrier for the first time are going to be immense. The Indian experience in this regard shows that despite the availability of technology, training and the basic platform, it has not been an easy task. With China facing hurdles on all the above counts, some analysts believe that the PLA Navy may not be able to operate a carrier at sea by 2020.[44]

In the short-term context though, the biggest challenge to the carrier program will be the engine and the propulsion machinery. It is assumed that *Varyag* would have been designed for steam propulsion, as is its sister ship, *Admiral Kuznetsov*. However, the presence of propulsion machinery on the ship continues to remain a mystery. As the machinery forms a major portion of a ship's standard displacement and in fact contributes to the stability of the ship itself, it is quite possible that some components of this machinery remain onboard, as the ship appears to be stable enough by its outward appearance. The other possibility is that an equivalent amount of ballast has been placed to balance the weight of the machinery which may have been totally removed.[45]

The other equally daunting challenge is the production and flight test of carrier-borne aircraft. China has reportedly manufactured the first prototype of its indigenous imitation of Su-33, named J15, the flight tests of which are being planned in 2010. This is a critical issue as the PLA Navy has no test pilots. As such, the Navy must establish its own Flight Test Center and train its own test pilots.[46]

Limitations of Operating and Maintaining a Carrier Force

Even though the PLA Navy may eventually have aircraft carrier/s by 2020, it will have to overcome many operating hurdles before it can effectively operate a carrier force at sea for power projection. Firstly, aircraft carriers have to be supported by escorts for impregnable defence and require frequent replenishment. For instance, a standard US Carrier Strike Group (CSG) consists of a nuclear powered carrier, its aviation complement, at least five surface ships, a nuclear attack submarine in direct support, and a logistics replenishment ship.[47] Assembling large number of specialised ships and submarines dedicated to carrier escorting duties would require longer lead time, substantial financial outlay and appropriate scale of infrastructure, back up support and redundancy.

On a narrower tactical front, the carriers invariably rely on logistics support ships when operating on prolonged missions. But the PLA Navy at present has only five

ocean-going replenishment ships to support the entire naval assets. The maximum fuel that the best of them can carry is 10,500 Tons. Discounting the carrier's own fuel carrying capacity, the fuel of one tanker will just suffice for a mission of about 20 days. This figure will invariably be reduced by half, as the tanker will also have to refuel the escort vessels. The details of the PLA Navy's ocean going replenishment ships are tabulated in Figure 5.[48]

At current force level, there are just not enough tankers to support long distance operations of the aircraft carriers, while meeting the requirements of the three fleets at the same time.

The other limiting factor appears to be that the aircraft carriers and their escorts are always vulnerable to the underwater attack by submarines because of their visibility in spatial, electromagnetic and acoustic realm. In specific terms, the Russian conventionally powered kilo class submarine with wake homing torpedoes is considered to be the most effective weapon against the aircraft carriers.[49] These submarines are quieter than all nuclear powered submarines and fare comparatively better than most other conventional ones also.

It is considered that the capability of PLA Navy to counter the submarine threat has still not matured to a degree that would provide a reasonably secure protection to its aircraft carrier[50] and it is acutely conscious of this weakness. It is now investing heavily in anti-submarine helicopters and maritime patrol aircraft. Nevertheless, at the current force level, Chinese vessels still remain vulnerable to submarine-launched attacks.[51]

Integrating the air wing with the carrier will also present new set of challenges to the PLA Navy. Assuming that *Varyag* will carry an air complement of 18xSu-33s or

Name	Number	Class	Full load Displacement	Fuel Cargo	Fleet allocation
Hongzhu	881	Fuqing	21,500 Tons	10,500 Tons	East Sea Fleet
Fengcang	882	Fuqing	21,500 Tons	10,500 Tons	North Sea Fleet
Qinghai hu	885	Nanyuan	37,000 Tons	9,630 Tons	South Sea Fleet
Qiandao hu	886	Fuchi	23,000 Tons	10,500 Tons	East Sea Fleet
Weishan hu	887	Fuchi	23,000 Tons	10,500 Tons	South Sea Fleet

Fig. 5. Details of the PLA Navy's replenishment ships (source: *Jane's Fighting Ships 2009–10*, pp. 127–161).

their indigenous equivalents, 15xKa-27ASW helicopters and 2xKa-31 AEW helicopters, akin to *Admiral Kuznetsov*, the PLA Navy will have to learn many facets of carrier-borne air operations *ab-initio.* A few of these are mentioned below:

- It will have to train its naval pilots on taking off and landing from carriers. There are currently no trained pilots with this skill and the prospects of Chinese pilots gaining this expertise appear remote at the moment mainly on account of non-availability of platform, trainers and appropriate international collaboration. Though there are reports that the Chinese pilots may undergo carrier- borne air operations training on the Brazilian carrier,[52] the fruitfulness of training on the CATOBAR[53] (Catapulted Take off But Arrested Recovery) platform when they will eventually have to operate from a STOBAR deck is debatable.
- The organic co-ordination between the AWACS, AEW platforms, both of PLA Navy and PLA Air Force, and the carrier borne fighters will have to be achieved in a graduated manner by operations at sea.
- Similarly the air element-submarine (AIR-SUB) cooperation integral to the safety of the carrier strike group itself from underwater threat will have to be learnt. Joint operations doctrines between the carrier borne air complement, shore based PLA naval aviation and the PLA Air Force, for operations over sea, will have to be formulated and practised.
- The carrier group's own air defence umbrella will have to be drawn up on the basis of the detection ranges of the ships' and AEW aircraft's sensors, their tracking and assigning capabilities, combat range of interception aircraft, ranges and capabilities of weapon systems and the availability factor of all air assets. This factor in turn, is a function of the aircraft maintenance and servicing schedules, turn around time and crew fatigue. It is said that the US carrier strike group is able to establish an outer air-defence perimeter of more than 300 km with the detection capabilities of E-2C Hawkeye AEW aircraft and the combat ranges of its strike aircraft.[54] The PLA carrier's coverage umbrella could probably be based on the capabilities of the Ka-31 AEW helicopter which has a mission endurance of up to two and half hours and a detection range of 100 km for an air target and 150 km for a surface vessel.[55]

Future Prospects

Admiral Liu Huaqing limited the scope of the Chinese carrier aspirations by mentioning that "*the objective for us to acquire aircraft carriers is not to compete against the US and the Soviet Union*".[56] By implication, the acquisition of a medium-sized, conventionally powered platform for limited, air defence-dominant missions, instead of a large, nuclear-powered one for expansive, sea/land-attack-dominant missions would be more suited for the Chinese requirement. It therefore follows that even if China possesses two or three aircraft carriers with their integral air complement, they would still be of no match to the US carrier strike groups in combat capabilities. In that case, they could possibly perform roles like SLOC protection, overseas deployment for countering non-traditional threats, EEZ and territorial claim enforcement, humanitarian aid, disaster relief and play a limited role in delaying US response during cross-strait contingency.[57]

Considering the above role, China is likely to construct one or two 60,000-ton conventional propulsion STOBAR carriers modelled on *Varyag* itself. In the meantime, *Varyag* is likely to be made operational and be used for aviation training, gaining basic carrier skills and useful technical experience.[58] A representative comparison of the Russian carrier of same class, the three Indian carriers (present, under acquisition and construction) vis-à-vis *Varyag* (Fig. 6) provides a general idea about what capabilities China will gain from its carrier program. The US carrier has been included in the table just to highlight the vast difference between its capabilities and those of the rest.

The requirements of air complement for its future carriers would also have to be calculated and provided for. The air wing will also have to be capable of longer maritime strike ranges, robust anti submarine warfare capability and sustainable air surveillance. Fig. 7 shows the projected PLA Navy force level till the year 2020.

It can be seen that the forecasted increase in the number of aircraft in the next decade would be quite substantial, with the PLA Navy projected to possess about 100 carrier-based fighters, nearly 150 helicopters and more than 220 land-based maritime strike aircraft by 2020.

CARRIER (COUNTRY)	DISPLACEMENT (TONS)	AIR COMPLEMENT	FLIGHT DECK STRUCTURE	PROPUL-SION
Admiral Kuznetsov (Russia)	45900 (Std)	18 x SU 33 Flanker (Capacity 60) 15x Ka 27 Helicopters 2 x Ka 31 Helicopters	14° Ski Jump 4 Arrester wires STOBAR	Steam
Varyag (China)	45900 T (Std) 58500 (Full Load)	Air complement not known	14° Ski Jump STOBAR	Steam??
Viraat (India)	23900 T(Std)	12 x Sea Harriers (Capacity 30) 6xseaking Helicopters	12° Ski Jump VSTOL	Steam
Vikramaditya (India)	45400 (Full Load)	12 x MIG 29K 6 x Ka 27/28/31 Helicopters	14.3° Ski jump 3 Arrester wires STOBAR	Steam
IAC I (India)	37500 (Std)	12 x MIG 29K	14° Ski Jump STOBAR	Gas Turbine
Nimitz (US)	100000 (Std)	44 x F-18E/F Hornet 4 x EA 6B Prowler 4 x E 2C Hawkeye 15 x Sea Hawk Helicopters	Flat Deck CATOBAR	Nuclear

Fig. 6. Representative Aircraft Carriers Comparison (source: *Jane's Fighting Ships 2009–10*, p. 134, pp. 328–329, p. 664 and p. 917).

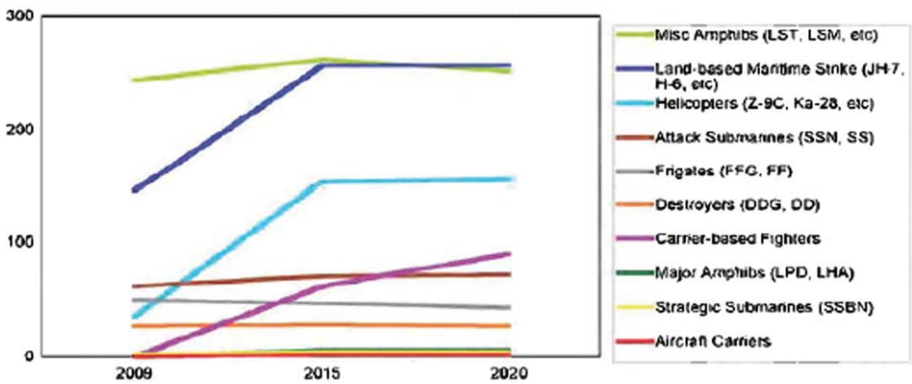

Fig. 7. Estimated PLA Navy Air Force levels in 2002 (source: US Office of Naval Intelligence Report August 2009).

Role in Furthering PLA Navy's Blue Water Capabilities

Power Projection Abilities of a Carrier Force

The US Department of Defense (DOD) defines Power Projection as:

> *"the ability of a nation to apply all or some of its elements of national power – political, economic, informational, or military – to rapidly and effectively deploy and sustain forces in and from multiple dispersed locations to respond to crises, to contribute to deterrence, and to enhance regional stability".*[58]

While China may not be able to "project power" in the all encompassing manner as suggested in the above US definition even with three carrier groups in the 2020 timeframe, its intentions do indicate that trend, as reflected from its articulation in the White Paper of 2008. In the meantime, it will, at the most, be able to undertake modest force projection in support of its territorial claims in the South China Sea.[60]

Power Projection in South China Sea

Admiral Liu Huaqing was largely instrumental in envisioning the PLA navy's future power projection aspirations within the framework of the "island chains". His concept required the PLA Navy to be able to deter the potential adversary in China's three "near seas" – the South China Sea, East China Sea, and Yellow Sea. He believed that the aircraft carrier had a major role in the resolution of the Spratly islands dispute in this maritime area by providing Fleet air defence and air attack.[61]

In the present context the Chinese carrier may be used primarily to alter the balance of combat capabilities in the South China Sea. An aircraft carrier operating from Hainan Island base would be able to assert the Chinese sovereignty over the distant reefs by making it "off limits" to other coastal countries of the region.[62]

A Vietnamese viewpoint supports this possibility by stressing that if a conflict situation involving the carriers arises, there is a great chance that it would be around the Spratlys. The Vietnam Navy is in fact, preparing to face this contingency by having ordered six in number *Kilo* class conventional submarines from Russia. It plans to leverage the existing weaknesses in anti submarine warfare capabilities of the PLA Navy to its advantage when the situation so warrants.[63]

Power Projection up to Central Pacific including the Second Island Chain

Admiral Liu Huaqing had also envisioned the Second Island Chain[64] as being fully within the scope of future PLA Navy activities, the ultimate objective being that its navy would be able to undertake sea denial and calibrated power projection up to these island chains.[65] Operating at these distances would also enable the PLA Navy to encircle the adversary, if such adversary threatens the Chinese coastline or its maritime interests. China though recognises its current capability deficit in this regard.

The PLA navy would also seek to demonstrate area dominance by developing and implementing the tactics of close co-operation between its carrier-borne ASW aircraft and nuclear powered attack submarines. The PLA Navy is already carrying out joint exercises with its submarines, warships and their ASW helicopters beyond the first island chain. Ten Chinese warships and submarines, including the newly acquired Sovremenny class destroyers conducted ASW exercises in the waters off Okinawa and Miyako islands in April 2010.[66]

Increase Muscle Flexing vis-à-vis US Navy

Yet another viewpoint suggests that the PLA Navy needs to develop capabilities that can enable effective operations in the more distant western Pacific and the eastern Indian Ocean as part of its ''Far-seas strategy''. This implies that the PLA Navy may come in direct confrontation with the US Navy in the western Pacific during Taiwan crisis.[67] The Chinese aircraft carrier and its air complement may not play a primary role in the Taiwan scenario, but the US Navy will have to factor in their presence and allocate resources to counter them, while formulating its operational plans.

The presence of aircraft carriers could well provide another direction of attack from seaward during the Taiwan scenario while the other components of ''anti access'' strategy like the anti ship ballistic missiles (ASBMs) and long range cruise missiles hold the US carrier strike groups at bay long enough. The key supporting role of the Chinese carrier was in fact foreseen by Admiral Liu Huaqing long back, wherein he surmised that ''*without carriers, air operations over Taiwan could be more costly because more airfields and land-based combat aircraft are needed due to the reduced loitering time in the air*''.[68]

Power Projection in the Indian Ocean Region

As the Chinese economy continues to expand rapidly, its requirements for energy and other raw material is also growing apace. China relies heavily on its energy imports from the Middle-East Asia and western Africa. Similarly, the African nations are a major source of the mineral and other raw material for China. But these ingredients so vital to the sustenance of its economy must transit the Indian Ocean sea lanes and exit through the Malacca straits. China feels acutely vulnerable in this regard and has therefore been laying additional emphasis on augmenting the capabilities of its Navy to undertake the protection of its sea lanes in the Indian Ocean region. As an extension of its SLOC security imperative, China also decided to dispatch its naval task force for the first ever anti-piracy mission off Somalia in December 2008. The PLA Navy continues to sustain its presence at a great distance from its coast. At present the sixth task force is conducting its mission.

It is however considered that while the existing force level is capable of mounting limited operations like the ongoing anti-piracy missions during peacetime, the absence of tactical air defence will leave the force totally exposed in a hostile environment. It is here that an aircraft carrier along with its air complement can play a major role in plugging this critical vulnerability.

However, operating a carrier at extended ranges presents additional challenges and the most obvious one is of sustainability. Assuming that the range of the first Chinese operational carrier, *Varyag* may be 8500 nautical miles (NM) at a cruising speed of 18 knots,[69] it can theoretically just come to the central Arabian Sea from Hainan naval base and return immediately with no available time for its mission. But the carriers groups invariably have the logistics support ships with them. If a carrier of *Varyag's* displacement is estimated to consume about 500 Tons of fuel per day at cruising speed, then the accompanying tanker will be able to sustain it and its escort forces for not more than ten days.

Sparing more than one tanker for carrier support may not be feasible at current holdings unless the PLA Navy compromises on its operational efficiency back home. It is pertinent to point out that only two tankers, namely Qiandaohu and Weishanhu have been alternately supporting the Chinese anti-piracy task forces in Gulf of Aden, with each having an extended tenure of six to eight months on task.

China is thus considering building logistics supply bases for its forces to engage in operations over prolonged period in the Indian Ocean. It would therefore initially look for setting up a logistic supply base at one of the ''pearls'' in its so-called ''String of Pearls'' in the Indian Ocean. Extensive discussion has been going on in the Chinese strategic and academic circles on this requirement. The debate gained strength after one Chinese retired Admiral pointed out that the PLA Navy was facing difficulties in effective conduct of anti-piracy mission in the Gulf of Aden (which it has been sustaining for more than two years now), in the absence of a logistics support base. The Chinese government has however clarified that it is not pursuing this option at the moment.

Conclusion

In consonance with the ''offshore defence strategy'', the PLA Navy is making efforts to augment its combat capability in offshore operations scenario through sustained modernization initiatives. In pursuance of the MOOTW concept, it has increased its maritime activities such as participation in bilateral and multilateral joint exercises, increased frequency of transits through various straits in East China Sea, sometimes even beyond Japan. The PLA Navy ships have sailed across Tsugaru Straits in October 2008 and transited between Okinawa and Miyako islands in April 2010, also indulging in maritime ''shadow play'' with the Japanese naval ships. The PLA Navy has been conducting regular patrols in South China Sea in support of its territorial claims in the disputed islands in Paracels and Spratlys. In the Indian Ocean, its activities include the participation in the ''Aman'' series of maritime exercises off Karachi in 2007 and 2009 and the anti-piracy mission off Somalia since December 2008.

The relevance and increasing necessity of the ''far-sea operations'' for PLA navy has been explained in terms of the increasing vulnerability of the Chinese energy flow through the Indian Ocean and the South China Sea as also the need to secure the Chinese maritime zones, outlying islands and the long coastline. Thus the implied theatres of power-projection capabilities associated with such ''Far-seas operations'' strategy appear to be the outlying western Pacific Ocean and the eastern Indian Ocean Region. In such an operational scenario, the role of the PLA Navy's aviation, particularly the aircraft carrier based air wing, assumes great salience. Though the

aircraft carrier group has tremendous role in the power projection abilities of a nation, its distant area operations involve many challenges and also impose certain limitations.

With the current level of national technological capability, available maritime infrastructure, international relations and influence building status, the PLA Navy will, at best, be able to project power with its carriers within the South and East China Sea only in the 2020 timeframe, that too after recognising the maritime counter capabilities of states like Japan, Republic of Korea, and Vietnam.

Going by the above argument, the Chinese power projection intent with the aircraft carrier group, in the Indian Ocean still appears to be some time away, at least till 2030. By this time China will presumably have gained the relevant technical experience and expertise in carrier and aircraft construction, learnt the highly specialised art of carrier-borne air operations and acquired one or two military bases to support such a force at extended range of more than 4000 nautical miles.

The above projected timeline may appear to be far away, but the international community must take due cognisance of this inevitability now and commence preparations to face the forthcoming challenge. Since India and its interests are likely to be the most affected on geographical, strategic and economic parameters, the modernisation of the PLA Navy with specific focus on the Chinese aircraft carrier program must be carefully watched and strategies must be formulated to deal with the future reality of the permanent Chinese presence in the Indian Ocean.

Notes

1. The agricultural, industrial and science and technology modernisations took higher precedence over Defence modernization in the ''Four Modernisations'' plan.
2. See Ministry of National Defense of Peoples Republic of China, ''Chapter II-National Defense Policy'' in *White Paper on China's National Defense in 2006*, http://eng.mod.gov.cn/Database/WhitePapers/ 2007-01/15/content_4004364.htm (accessed June 7, 2010).
3. The term ''informationisation'' describes China's military effort to incorporate modern technology into all aspects of operations and includes means to protect one's own information such as own command and control systems and the means to disrupt the information of the adversary such as cyber attacks and electronic jamming. See US Office of Naval Intelligence, *The People's Liberation Army Navy: A Modern Navy with Chinese Characteristics,* August 2009, p. 7. The term generally connotes the integration of all

communication, radar, nuclear, C4ISR, space and satellite systems with strategic and tactical command platforms to achieve net-centric joint warfare capability.

4. This guideline aims at winning "local wars under conditions of informationization" by way of joint operations, training and support, optimising the force structure and composition, and building the capabilities suitable for such warfare. It professes close co-ordination between military actions and diplomatic, economic and legal efforts towards attainment of the same aim. See "Section II-National Defence Policy" in *White Paper on China's National Defense in 2008*, http://www.china.org.cn/government/central_government/2009-1/20/content_17155577_4.htm (accessed June 07, 2010).
5. *Ibid*.
6. According to some PLA Navy writings, "Off shore Defense Strategy" is a concept that directs the PLA Navy to "keep the enemy within limits and resist invasion from sea, protect the Nation's territorial sovereignty and safeguard its maritime rights" by engaging in maritime operations out at sea.
7. See US Office of Naval Intelligence, *China's Navy 2007*, pp. 23–24, for the changing definition of the word "offshore".
8. "*Navy Admiral: China to develop sophisticated marine weapon systems*", *China View*, April 15, 2009, http://news.xinhuanet.com/english/2009-04/15/content_11191749.htm (accessed June 14, 2010).
9. *Jane's Fighting Ships 2009–10*, p. 127.
10. US Office of Naval Intelligence, *China's Navy 2007*, Chapter 7, p. 45.
11. International Institute of Strategic Studies (IISS). *The Military Balance 2009* (London: IISS, 2009), p. 385.
12. *The People's Liberation Army Navy: A Modern Navy with Chinese Characteristics*, pp. 23–25.
13. The presence of two AWACS in PLA Navy Air Force has also been corroborated by the *Jane's Fighting Ships 2009–10*, p. 147.
14. See *The People's Liberation Army Navy: A modern navy with Chinese Characteristics*.
15. See *the Military Balance 2009*. The quantity of aircraft varies from source to source. For instance, the figures of Z-9 and Kamov 28 helicopters reported in the US Office of Naval Intelligence publication, *The People's Liberation Army Navy* are 10 and 8 respectively, while *Jane's Fighting Ships 2009–10,* p. 147, gives the figures as 15 Z-8s, 11 Z-9s and 10 Ka-28s.
16. The number of divisions again varies from source to source. While the US Office of Naval Intelligence publication, *China's Navy 2007* mentions 7 divisions, the *Jane's Fighting Ships 2009–10*, p. 127 quotes eight divisions with 27 air regiments.
17. "PLANAF 2nd 'Specialized' Division", china-defence blogspot, April 25, 2009, http://china-defence.blogspot.com/2009/04/planaf-2nd-specialized-division.html (accessed June 18, 2010).

18. *Hong-6U Tanker*, Sinodefence.com, http://www.sinodefence.com/airforce/airlift/h6tanker.asp (accessed June 14, 2010).
19. The statement of Chen Mingyi, member the National Committee of the Chinese People's Political Consultative Conference, the top Chinese political advisory body, in March 2009, as reported by the China Internet Information Center: ''Chinese navy urged to go from coastal waters to oceans'', http://www.china.org.cn/government/NPC_CPPCC_2009/2009-03/07/content_17397799.htm (accessed August 19, 2009).
20. ''Chapter 10: Future Force Structure'' in *US Naval Operations Concept 2010 (NOC 10*), p. 83.
21. The quotation ascribed to Admiral Liu Huaqing has been taken from the article by Andrew S. Erickson and Andrew R. Wilson, ''China's Aircraft Carrier Dilemma'', *Naval War College Review* 59, no. 4 (Autumn 2006): 13–45. The authors in turn, quote the *Memoirs of Liu Huaqing* (Beijing: People's Liberation Army Press, 2004). The original work was in Chinese language and the authors claim to have checked all the translations of the quotes against the translations provided by the US Government translator, the Foreign Broadcast Information Service (FBIS).
22. *Ibid*.
23. Erickson and Wilson, *China's Aircraft Carrier Dilemma*, p. 19.
24. ''China confirms plans to build aircraft carrier'', *RIA Novosti*, March 23, 2009, http://en.rian.ru/world/20090323/120692506.html (accessed June 18, 2010).
25. Ronald O'Rourke, ''China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress'', CRS Report for Congress, April 9, 2010, p. 46, http://www.fas.org/sgp/crs/row/RL33153.pdf (accessed June 24, 2010).
26. Russel Hsiao, ''In a Fortnight: Project 048: China's Secret Aircraft Carrier Command?'', *China Brief*, The Jamestown Foundation, April 2, 2009, http://www.jamestown.org/uploads/media/cb_009_7_04.pdf (accessed on June 25, 2010).
27. *Ibid*.
28. Reuben F. Johnson, ''Talks twist and turn as Chinese navy eyes Su-33'', *Jane's Defense Weekly*, March 18, 2009, p.4.
29. ''China making first J15 ship-borne fighter'', *Kanwa Defense Review News*, March 30, 2010.
30. Andrei Chang, ''Analysis: Ukraine aids China carrier plan'', *Space War*, December 10, 2008, http://www.spacewar.com/reports/Analysis_Ukraine_aids_China_carrier_plan_999.html (accessed on June 25, 2010).
31. See US Department of Defense Annual Report to Congress, *Military Power of Peoples Republic of China* (2009), p. 40.
32. ''Chinese Military: Report Concerning China's Aircraft Carriers Groundless'', Chinese Ministry of National Defense online English edition, January 12, 2010,

http://eng.chinamil.com.cn/news-channels/china-military-news/2010-01/12/content_4115529.htm (accessed June 24, 2010).

33. Erickson and Wilson, *China's Aircraft Carrier Dilemma*, p. 21.
34. *Jane's Fighting Ships 2009–2010*, p. 134.
35. Nan Li and Christopher Weuve, ''China's Aircraft Carrier Ambitions: An Update'', *Naval War College Review*, 63, no. 1 (Winter 2010), http://www.thefreelibrary.com/China's aircraft carrier ambitions: an update.-a0218877250 (accessed June 28, 2010).
36. *Ibid.*
37. For detailed calculations, see Li and Weave, ''China's Aircraft Carrier Ambitions''. The estimates are also based on the American experience of operating aircraft carriers over a long period.
38. *Ibid.* The official Defence budget for the year 2010 is $76.3 billion, up 7.5% from 2009 budget of $70.3 billion and the US DOD estimates place the figure between $120–180 billion.
39. See ''Section V: PLA Navy'' in White Paper on *China's National Defense in 2008*, *ibid.*
40. Li and Weuve, *China's Aircraft Carrier Ambitions.*
41. ''All Things Ready at Changxing Island Shipyard'', *Kanwa Defense Review*, May 2010.
42. ''Wuhan Aircraft Carrier Shocks Russian & Western Radar Experts in Dubai'', *Kanwa Defense Review*, March 2010.
43. Andrei Chang, ''Kanwa's questions to Rosoboronexport's General Technological Adviser Dr. Anatoly Aksenov'', *Kanwa Defense Review News*, June 30, 2009. These remarks have been attributed to Dr. Anatoly Aksenov, Rosoboronexport's General Technological Adviser.
44. Admiral Arun Prakash (Retd), ''The Challenge of China's Maritime Power'', http://www.maritimeindia.org/pdfs/China's_Maritime_Challenge.pdf (accessed on June 30, 2010).
45. Li and Weuve, *China's Aircraft Carrier Ambitions.*
46. ''China making first J15 Ship-borne fighter'', *Kanwa Defense Review News,* March 30, 2010.
47. US *Naval Operations Concept 2010 (NOC 10*), Chapter 10, Future Force Structure, p. 83.
48. *Jane's Fighting Ships 2009–2010*, p. 160.
49. For detailed capabilities of Kilo class submarines against aircraft carriers, see Peter Howarth, *China's Rising Sea Power: The PLA Navy's Submarine Challenge* (New York: Routledge, 2006), pp. 99–103.
50. Erickson and Wilson, *China's Aircraft Carrier Dilemma*, p. 26.
51. Iskander Rehman, ''The Implications of China's Aircraft Carrier Plans for Vietnam in the Spratlys'', BBC World, http://www.bbc.co.uk/vietnamese/vietnam/2010/05/100509_seastrategy_iskander.shtml (accessed June 4, 2010). The English version of the broad issues covered in this Vietnamese language article is available at http://indiangeopolitics.blogspot.com/2010_04_01_archive.html.

52. ''An update on the training of PLAN officers in Brazil'', *China-DefenseBlogspot*, November 16, 2009, http://china-defense.blogspot.com/2009/11/update-on-plan-officers-to-train-on.html (accessed June 30, 2010).
53. Brazil has the *Sao Paulo* aircraft carrier with 33,673 Tons displacement and operates Sky-Hawk aircraft from its flat top by means of catapulted take off but arrested recovery (CATOBAR) system. See *Jane's Fighting Ships 2009–2010*, p. 72.
54. For other details on the capabilities of the E-2C Hawkeye aircraft, See Li and Weuve, *China's Aircraft Carrier Ambitions*.
55. ''Ka-31 Radar picket naval helicopter'', *airforce-technology.com*, http://www.airforce-technology.com/projects/ka31/ (accessed on June 30, 2010).
56. Erickson and Wilson, ''China's Aircraft Carrier Dilemma'', pp. 13–45 (cf. note 21).
57. Li and Weuve, *China's Aircraft Carrier Ambitions*.
58. CRS Report for Congress, April 09, 2010, *ibid*, pp. 11–12.
59. US *Naval Operations Concept 2010 (NOC 10*), Annex B, Glossary, p. 99.
60. Erickson and Wilson, *China's Aircraft Carrier Dilemma*, p. 29.
61. Li and Weuve, *China's Aircraft Carrier Ambitions*. The First Island Chain extends from Kurile Islands through the main islands of Japan, the Ryukyu Archipelago, Taiwan, and the Philippines to Borneo.
62. Howarth, *China's Rising Sea Power*, p. 45.
63. Rehman ''The Implications of China's Aircraft Carrier Plans for Vietnam in the Spratlys'', *ibid*.
64. The Second Island Chain ranges from the Japanese archipelago south to the Bonin and Marshall islands, including Guam.
65. Erickson and Wilson, *China's Aircraft Carrier Dilemma*, p. 16.
66. Editorial. ''China-Japan frictions at sea'', *The Japan Times*, May 25, 2010, http://search.japantimes.co.jp/cgi-bin/ed20100525a1.html (accessed June 04, 2010).
67. Li and Weuve, *China's Aircraft Carrier Ambitions*.
68. Erickson and Wilson, ''China's Aircraft Carrier Dilemma'', pp. 13–45 (cf. note 21).
69. The endurance estimate is based on that of its sister ship, Admiral Kuznetsov. Further the endurance of the carrier decreases substantially to 3850 NM at full speed of 29 kts. A nautical mile is equal to 1.8 kilometers and Knot is the unit of ship speed in terms of nautical miles per hour. For endurance figures, see *Jane's Fighting Ships 2009–2010*, p. 664.