中国简报 China Brief
a journal of analysis and information
The JAMESTOWN FOUNDATION

VOLUME XI • ISSUE 14 • JULY 29, 2011

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In a Fortnight

CHINA REACTS TO ADMIRAL MULLEN VISIT
By Peter Mattis

Beijing heralded US Chairman of the Joint Chiefs of Staff, Admiral Michael Mullen, visit to China as an important step forward, signifying the normalization US-China military relations. Chinese magazine Liaowang described military-to-military relations as an important barometer of US-China relations since 1949, whether confrontation, conflict or cooperation (July 18). The official view out of Beijing is the one expressed by the People's Liberation Army (PLA) Chief of the General Staff, Chen Bingde: "we have been glad to witness the rejuvenation of bilateral military relations, as they are often hard-won and should be treasured" (*Xinhua*, July 14). Other commentators in the Chinese press however have expressed disappointment with the Chen-Mullen talks.

Coverage of the South China Sea issue elaborated on the divisions Chen raised in the press conference after his meeting with Mullen. Chen rebuked Washington's repeated intent to avoid disputes in the area, stating "[Washington's] behavior has given some opposite signals" (*Xinhua*, July 11). Chinese press reiterated Beijing's belief that the territorial disputes of the South China Sea should be dealt with bilaterally without US involvement or exercising its military near China, especially when tensions are high. One observer characterized Admiral Mullen's remarks as very proper and diplomatic, but belied US interference in the South

China Brief is a bi-weekly journal of information and analysis covering Greater China in Eurasia.

China Brief is a publication of The Jamestown Foundation, a private non-profit organization based in Washington D.C. and is edited by Peter Mattis.

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China Sea, military exercises to counter China and intelligence collection on sensitive Chinese facilities (*Xinhua*, July 21). This contradiction between words and actions demonstrates, according to Chinese sources, Washington's unwillingness to be transparent (*touming*) about its intentions (*Xinhua*, July 18).

From the Chinese vantage point, the real issues between China and the United States in the South China Sea are US provocations and "freedom of navigation." On the former, Beijing blames the United States for organizing regional pushback against China and exacerbating tensions through military exercises with the Philippines and Vietnam (*Xinhua*, July 21). As Chen stated in the joint press conference, "if the United States truly wants peace and stability in the region, it should adjust the schedule of its military drills" (Xinhua, July 11). On the latter, Chinese sources remain unanimous: freedom for merchant ships to travel directly from port to port is very different than freedom for US warships and surveillance ships to observe Chinese military exercises or sensitive facilities (*Guangzhou Ribao*, July 17; Caixun.com, July 21; *Xinhua*, July 11). The latter, as Ministry of National Defense spokesman Geng Yansheng noted, damages whatever trust the two militaries might build (MOD.gov.cn, July 27).

Chinese scholars panned Mullen's speech at Renmin [People's] University, focusing on his statement that China was no longer a rising power but had already arrived on the world stage. In an interview, Shi Yinhong noted calling China a "great power" (*da guo*) is not a new formulation for dealing with China, but an old one dating back to Richard Nixon. US arms sales to Taiwan, intervention in the South China Sea, and intrusive surveillance in sensitive Chinese military areas suggest Washington actually does not see and respect China as a great power. Calling China a great power is simply a cover for Washington to define and place new responsibilities on China, which are not in China's interests (*Guangzhou Ribao*, July 17).

The Chinese Ministry of National Defense spokesman's characterization of Mullen's visit as providing "positive results" was not entirely undermined by local observers. One scholar believed Mullen's visits to Chinese military bases were good for two reasons. First, they showed a little bit more of China's true capabilities, enhancing deterrence. Second, the visits showed Beijing was transparent—contrary to US accusations—removing an excuse for treating China differently (*Xinhua*, July 21).

Perhaps the best evaluation is the recognition, that while Beijing and Washington view the world in fundamentally different ways, silence and mistrust have consequences. "There are contradictions between China and the United States, some of which are even fundamental. However, neither of the countries can develop well without the other, as the two countries are highly interdependent," said Yao Yunzhu, a researcher with the PLA Academy of Military Science (*Xinhua*, July 14). Renmin University Professor Jin Canrong noted US-China relations are difficult to manage and we should not expect too much from just one meeting; however, it is much better to be able to sit and talk than to ignore each other (*Guangzhou Ribao*, July 17). More optimistically, Cheng Hongliang concluded Beijing and Washington now believe the US-China relationship is more than just "harmony leads both sides to benefit, conflict leads both sides to harm" (*he ze liang li, dou ze liang shang*) and that bad relations have strategic repercussions internationally (*Liaowang*, July 18).

GROWTH IMPERATIVE CHALLENGES EVEN CHINESE SECURITY REGULATIONS

Last month, Beijing launched an inter-ministerial inspection of Chinese military bases in seven provinces and Beijing Municipality to investigate the security environment around these facilities (*Xinhua*, June 9). The inspection teams found urban sprawl a danger to the efficiency of military operations, contrary to initial expectations. The most significant dangers identified by the teams were unlawful interference with the electromagnetic environment and skyscraper construction that limited radar visibility and altered flight patterns (*Xinhua*, July 10). The findings appear to have spurred new security awareness measures that presumably should have been dealt with by Hu Jintao's revision to the law governing the protection of military facilities, casting doubt whether local enforcement of security regulations is possible when civilian economic growth is at stake.

The inspectors found 90 percent of the People's Liberation Army (PLA) facilities maintained a solid security perimeter; however, the *China Daily* reported

a series of urban encroachments on PLA installations. These included illegal hydroelectric projects causing flooding on a PLA shooting range, houses surrounding communications nodes, and new high rises affecting military air traffic (July 12; *Xinhua*, July 10). Meng Guoping, a PLA General Staff Department officer leading the effort, noted in the same interview that illegal construction projects had long impinged on militarily-sensitive areas and had affected military effectiveness. Meng stated "some important bases have effectively lost their ability to be used in war."

The fanfare accompanying the launch of this round of base inspections spoke to the need of identifying foreign espionage and sabotage threats to military installations rather than domestically-generated concerns. Meng commented these inspections would become standard practice for enforcing security measures at military bases. Although led by the PLA, the inspection teams included the ministries of state security, public security and finance as well as other officials in the political-legal system. The teams investigated military facilities in Beijing, Heilongjiang, Qinghai, Henan, Jiangxi, Guangxi and Yunnan (*Xinhua*, June 9).

It is not clear what specifically is driving this round of security concerns that began earlier this year, but Hu Jintao signed new regulations governing military secrets and information handling (*Xinhua*, April 1). The last major round of security concerns were linked clearly to the PLA's precautions around the Taiwanese presidential elections in 2008. The press highlighted China's increasing reliance on information technology systems and telecommunications-related security concerns. Perhaps most interestingly, a public notice about the importance of security regulations from the Fourth Department of the PLA General Staff Department (4PLA), which is responsible for electronic warfare, accompanied the issue of the revised regulations (Hebei.com.cn, April 28). This suggests genuine concern about China's vulnerability to electronic warfare and signals intelligence collection.

The violations of military security regulations suggest yet another contradiction between the economic growth imperative and local government action in other fields, such as environmental regulation and intellectual property protection. The Law on the Protection of National Military Installations passed in 1990 requires local governments to ensure secure military facilities do not face civilian encroachment.

In his recent book, *Managing the China Challenge*, Kenneth Lieberthal assessed Chinese political economy was structurally oriented toward producing GDP growth in ways that Beijing found difficult to manage when growth conflicts with other policies—like security. While accelerating urbanization and a large aspiring, but still not yet, middle class population require new construction and economic growth to sustain, Chinese Communist Party (CCP) cadre evaluations make growth a requirement for advancement [1]. This gives ambitious, low- and mid-level officials an incentive to avoid enforcing regulations if and when they inhibit economic growth, which accounts for the largest portion of their annual evaluations.

Since Hu signed the new regulations and the launch of the inspections, Chinese localities have promulgated new security regulations or announcements to address some of the concerns. For example, the Tianjin Municipal Government now requires new construction projects—including new buildings, renovation, and expansions—to be registered with the Tianjin State Security Bureau (*Tianjin Ribao*, May 31). Earlier this month, the Guangzhou Military Region headquarters announced a propaganda effort to inform citizens about the importance of protecting military facilities and secured several vulnerable communication cables (Zhongguang Wang, July 18). In Sichuan, one municipality held a work conference to address how the protection of military facilities supported both national security and development goals (*Yibin Ribao*, July 19). Lastly, the Supreme People's Court issued a circular on July 21 to educate judges on investigating and prosecuting crimes related to the protection of military secrets (*Jiefang Junbao*, July 22).

These efforts may expand on the 1990 law, but they do not resolve the inherent central-local tension inherent where economic growth might be concerned. Central inspections could provide some impetus by shining a light on civilian encroachment of militarily-sensitive areas; however, the question still comes down to routine enforcement. If civilian encroachment is a problem inland of the more prosperous coastal provinces, then logic would suggest the more vital military bases along the coast facing Taiwan may be worse off.

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Notes:

1. Kenneth Lieberthal, *Managing the China Challenge: How to Achieve Corporate Success in the People's Republic*, Washington, DC: Brooking Institution Press, 2011, pp. 12-24.

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Wenzhou Crash Shows the Dangers of China's Nuclear Power Ambitions

By Jianjun Tu and David Livingston

A high-speed train crash near Wenzhou in the coastal Chinese province of Zhejiang took the lives of at least 39 people on July 23 and has raised equal measures of fear, anger and astonishment across the country. Preliminary reports indicate that a bullet train running from Hangzhou to Fuzhou had been struck by lightning, causing it to break down on the tracks. Shortly afterwards another locomotive heading from Beijing to Fuzhou careened into the stalled train, derailing six cars and pushing four of them entirely off the viaduct (*New York Times*, July 24; *21st Century Herald*, July 27). In addition to the fatalities, at least 210 were injured in what is now the highest-profile setback for China's ambitious rail program. While Beijing has moved quickly to control the flow of information (albeit not successfully) surrounding the disaster and disclosed the foreign origin of its bullet train technologies, the Chinese public and the broader international community are unlikely to be satisfied by such dismissals (*Caijing*, July 24). The accident is a "canary in the coal mine", as it were, for a much larger structural challenge facing China. The breadth of Chinese ambitions to indigenize foreign technologies and scale them for mass deployment has simply outpaced its ability to plan, operate and staff these complex undertakings in a safe and sustainable manner. This is true in the case of high-speed rail, and it threatens to become the overarching storyline for the country's nuclear energy program. The tragedy on the tracks in Wenzhou delivers lessons that Beijing would be wise to heed, not only for the management of its rail networks but also for the more critical issue of its 2020 nuclear energy goals.

The Fall of Ministry of Railways (MOR) in China

The crash on July 23 is not the only incident to have blemished the Chinese high-speed rail program. In February of this year, former Railways Minister Liu Zhijun was removed from his post for "severe" disciplinary violations in conjunction with an allegedly ongoing corruption probe that exposed $152 million in bribes associated with railway projects (*Lianhe Zaobao*, Feburary 14). Meanwhile, the deputy chief of the MOR transportation bureau, Su Shunhu, is also under investigation for bribery claims (Bloomberg, July 25; *Jinghua Daily*, July 27). Zhang Shuguang, another Railways Ministry official, has already been removed for similar improprieties (*Jinghua Daily*, March 2). The new Minister of Railways, Sheng Guangzu, has since announced that the top speed for Chinese trains will be reduced from 350 km/h to 300 km/h, largely in response to concerns that the seemingly endemic graft and corruption associated with the construction of new rail lines may have compromised their safety (*Caixun*, April 13; *Financial Times*, April 14).

The Wenzhou collision is not the fault of defective train cars, shoddy tracks or any other physical deficiency. According to An Lusheng, the newly appointed director general of Shanghai Railway Bureau, an ill designed signaling system coupled with inexperienced and undertrained railway staff caused the accident (*Xinhua*, July 28). Not surprisingly, the accident probe's preliminary result further shifts public attention onto China's failure to adequately administer and operate its rail network. The crash indicates a broader deficiency in management capacity. Unfortunately, China's immediate reaction simply to fire three railway chiefs the day following the crash is a symptom of its lack of accountability more than a cure for it (*People's Daily*, July 24). People's Net recently ran an editorial titled "No Development without Safety" that brought attention to a lack of any emergency plans for lightning-debilitated trains despite the fact that the MOR previously acknowledged the vulnerability of the rail system to such lightning strikes. The problems are clearly greater than any three individuals, and, in reacting with such symbolic gestures, Beijing risks obfuscating

the need for a rigorous and comprehensive review of its approach to high-speed rail and other megaprojects.

The model that China has thus far employed in its high-speed rail program is predicated upon acquiring foreign technology through its competitive bidding process. China's uniquely large market has allowed the MOR—in conjunction with state-owned corporations such as China North Car and China South Locomotive & Rolling Stock Co., Ltd.—to attract advanced rail systems and equipment from abroad at attractive prices. Four foreign companies—Siemens of Germany, Alstom of France, Bombardier of Canada and Kawasaki of Japan—have been involved heavily in the development of the Chinese high-speed system since 2004. In its haste to build a stronger domestic industry and ensure that rail development would not benefit only foreign companies, the country has undertaken a concerted effort to indigenize these technologies at a breakneck pace, adding marginal improvements and enhancements along the way (*Xinhua*, March 4 2010). All successful bidders, for example, had to assemble units exclusively through local joint ventures (JV) or cooperation with Chinese manufacturers (*People's Daily*, July 11).

Regardless of the merits or legality of China's highly strategic foreign contracts and technology acquisition, a daunting question remains: how much new high-speed rail technology can the country rapidly absorb and still operate safely with a properly-trained workforce? Before the commissioning of the Beijing-Tianjin Intercity Railway in August 2008, a German expert required drivers of China's first 350 km/h bullet train receive two to three months' intensive training. Nevertheless, to save time ahead of the field test, these drivers were ordered to shorten the duration of their training to only 10 days (*People's Daily*, December 14, 2010). It is here that China's reach has exceeded its grasp and the consequences just are beginning to show. Advanced technology still requires training and occasionally simple human error coupled with hardware failure can nullify even the most redundant safety systems.

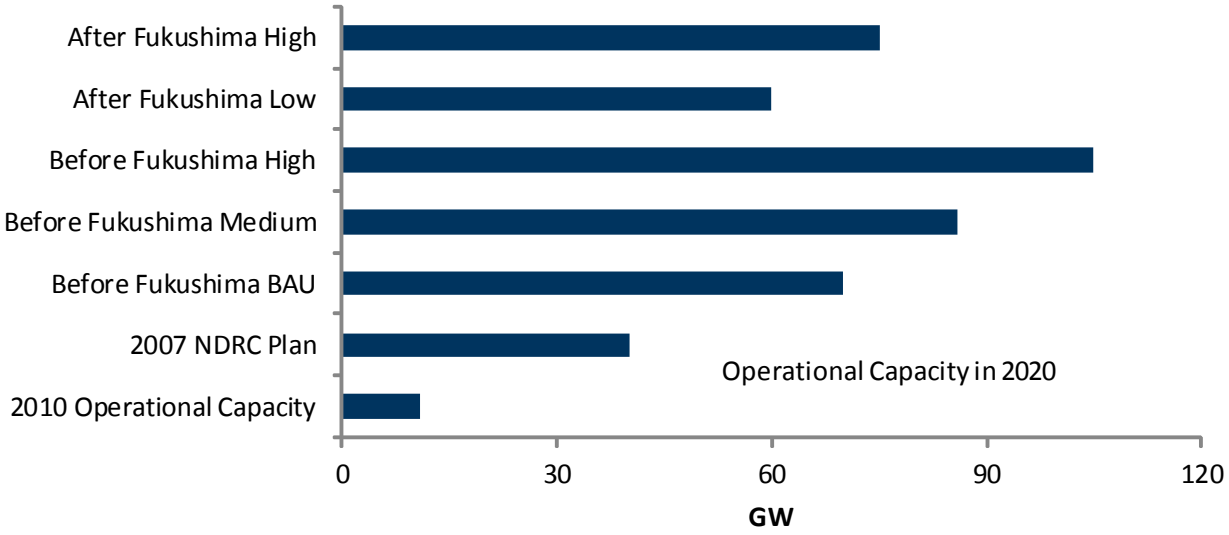
The Implications for China's Nuclear Leap Forward

Personnel, training and safeguards are where the comparison to China's nuclear program is most pertinent. Prior to the Fukushima Daiichi disaster on March 11, the installed operational nuclear capacity in China was only 10.8 gigawatts (GW). Beijing also had been steadily increasing its 2020 nuclear target, as ambitious industry groups and pliant politicians allowed the goals to creep from a 2007 governmental plan at 40 GW of installed operational capacity to suggestions of 70, 86 or even greater than 100 GW [1]. In retrospect, the unfolding of a great nuclear leap forward in China seemed to be inevitable. The severity of Fukushima accident fortunately prompted Beijing to halt approvals of new nuclear power plants pending changes to safety standards. This move signaled a shift toward caution from a country that is embarking on the world's biggest nuclear expansion program but where public fears of nuclear contamination are growing. However, a lack of check and balance in China's political system has gradually shifted the debate to the advantage of nuclear power advocates, which can be demonstrated best by the Ministry of Science and Technology's ambitious plan to indigenize Westinghouse AP1000 and scale its capacity from 1.0 GW to 1.4 GW as early as 2015 [2]. In comparison, a nuclear developer in an OECD country might not be able to finish just the permitting process over a similar length of time.

China's strategy for nuclear energy development and deployment also closely mirrors that for its high-speed rail program. Technology transfer is similarly front and center, with a menu of commercial scale reactors being built through a typical market access in exchange of foreign technology approach to showcase the latest Generation II and Generation III designs from abroad. M310 (France), CANDU 6 (Canada), AES-91 (Russia), Westinghouse AP1000 (U.S) and EPR (France) are all examples of imported technologies at various stages of construction in China [4]. However, from the perspectives of design standardization, operation safety and ease of maintenance, the existence of too many types of nuclear reactors is considered a very risky approach to deploying nuclear power generation technology in any given country.

With the configuration of the state-of-the-art, automated China Train Control System (CTCS) and other redundant anti-collision mechanisms, the Wenzhou crash in theory never should have occurred (*Xinhua*, July 26). The accident once again indicates no amount of technical innovation can eliminate the risk of human-induced errors associated with the design, construction, operation, maintenance, decommissioning and disaster response of nuclear power

Figure 1 – The Impacts of Fukushima Daiichi Crisis on China's Nuclear Development Target in 2020 [3]



plants. In responding to the Fukushima accident, China is expected to shift resources from replicating earlier reactor designs on many sites to more advanced reactors, which include more modern and "passive" safety features that do not require operator actions or electronic feedback in order to shut down safely in the event of a particular type of emergency (*Science and Technology Daily*, March 23). This is a logical development, but Chinese decision makers should avoid being overly confident about new and untried safety technologies. No matter how theoretically sound newer-generation nuclear technologies appear, such technologies may never have been sufficiently tested in any part of the world. All newer-generation nuclear technologies still impose significant risks in terms of design experience, construction safety, and operational reliability.

The widespread anger over the mismanagement of the post-crash rescue work offers another important lesson for Chinese decision makers. In the past, any major accident in China could be easily downplayed or even entirely covered-up by setting restrictions on press coverage. Now, increasingly defiant users of Sina Weibo (a Chinese microblog similar to Twitter) and other social media quickly spread word of the inconsiderate order of clearing the accident site without a thorough search for victims, the hasty burial of wreckage and the prompt resuming of the accident rail line without the completion of the ongoing safety investigation. Internet users also provoked nation-wide outrage toward the MOR, the government as a whole and the ruling Communist Party [5]. While China's sustained GDP growth over three decades has made the country an increasingly formidable economic powerhouse, Beijing nevertheless has failed to reform and stabilize its political system. During the same period, three of the world's four leading nuclear economies (i.e. United States, the former Soviet Union and Japan) have experienced major nuclear accidents that profoundly impacted each country's nuclear industry and political landscape. If Beijing resumes its massive nuclear expansion plan without paying adequate attention to lessons drawn from the failures of its railway safety, any major nuclear accident in one of China's increasingly numerous reactors could create shockwaves that are difficult for China's vulnerable political system to tackle.

Considering energy demand increases due to economic growth, burgeoning air pollution, increasingly vulnerable energy security and mounting political pressure to mitigate climate change, the Chinese government cannot easily resolve these simultaneous challenges. Without further increasing its domestic nuclear power capacity, China will have a much more difficult time meeting its vitally important energy conservation and environmental targets in the years to come. Even so, Chinese nuclear decision makers need to draw lessons from the failures of the country's railway safety. Otherwise, without abandoning an overly aggressive nuclear development plan, a major nuclear disaster that has befallen those leading nuclear economies is likely to not only undermine China's past economic achievements but also destabilize its vulnerable political system in the decades to come.

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Notes:

1. Kevin Tu, "Nuclear Crisis in Japan: Preliminary Policy Implications for China," Carnegie Endowment for International Peace Commentary, April 1, 2011.
2. 12th Five Year Plan of Science and Technology Development, Ministry of Science and Technology, 2011.
3. Tu, "Nuclear Crisis in Japan: Preliminary Policy Implications for China."
4. CSEIRC (various years). Analysis and Investment Outlook on China's Nuclear Equipment and Market. China Social Economic Investigation & Research Center, Beijing. & industrial sources.
5. http://weibo.com/zt/s?k=7765&pos=0&t=tips&page=1&hasori=1 (the discussion portal on the July 23 accident at Sina weibo); http://www.tianya.cn/publicforum/content/free/1/2223987.shtml (online discussion on why the rail wreckage was quickly buried by the rescue authorities); http://www.21cbh.com (an in-depth coverage on the July 23rd crash by a leading online news portal in China); http://nf.nfdaily.cn (another trustworthy news source on this event).

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Assessing the Grade Structure for China's Aircraft Carriers: Part 2

By Kenneth W. Allen and Aaron Shraberg

This is the second of a two-part series about the grade (*zhiwu dengji*) system of the People's Liberation Army (PLA), and how China's forthcoming carrier might fit into the fleet structure of the PLA Navy (PLAN). Part 1 provided an overview of the PLA's Table of Organization and Equipment (TO&E), discussed possible grades for the carrier, and what on-shore organization the carrier might be subordinate to. The carrier's placement within the PLA's on-shore organizational structure (*jidi fangyu zuozhan zhihui tizhi*) will affect personnel duties, training, and ship supply and maintenance. This part examines the possible at-sea task force structure (*haishang jidong zuozhan biandui zhihui tizhi*) of a PLAN carrier task force by discussing the differences and similarities between a U.S. Navy (USN) carrier strike group and a possible PLAN carrier task force group [1].

Why Focus on PLA Grades?

Every organization within the PLA, including PLAN vessels (i.e. an organization), is assigned one of 15 grades that start at the Chairman and Vice Chairmen of the Chinese Communist Party's Central Military Commission (*junwei zhuxi fuzhuxi*) and go down to platoon leader (*paizhang*). With only a few exceptions in the PLA, the commander/leader and political officer of every organization are co-equals and hold the same grade as the organization. In addition, every officer within an organization is assigned one of the 15 grades. Unlike the U.S. military that has 10 officer grades and 10 equivalent ranks, the PLA has 15 grades and 10 ranks. As such, each grade has two ranks (a primary and a secondary rank), and officers rarely receive a grade and rank promotion simultaneously. Therefore, the officer's grade, not his rank, defines his position and authority. Equally, the PLA's grade, not rank, structure defines its command and control (C2) and coordination structure within and between organizations.

Because no PLA organization can command another organization at the same level, command is organized within a vertical structure (i.e. higher and lower organizations) and coordination is organized by a horizontal structure (i.e. at the same level), which can be within the same service or between services. As the PLA implements greater use of information technology to more effectively communicate throughout the chain of command, it has increasingly implemented a skip echelon (*kuaji*) C2 structure, whereby an organization two or more levels higher can command a lower echelon.

Where Does the PLAN's Carrier Fit?

In 2004, the PLA implemented what it calls "integrated joint operations" (*yitihua lianhe zuozhan*). The goal was to provide a strong vertical C2 and horizontal coordination structure among all of the PLA's services and branches using information technology as the foundation [2]. The organizational structure of the PLA, based on the grade system, will affect the at-sea task force structure of any future PLAN carrier task force, and will influence the extent to which it is "authoritative, lean, agile and efficient" [3]. Modifications to the grade system will influence China's ability to meet its security requirements both regionally and abroad.

USN Strike Groups

Although one should not "mirror image" the organizational structures of a USN carrier strike group and a possible PLAN carrier task force, many of the same basic concepts apply to both militaries because all navies, particularly carriers, face similar logistical and operational challenges.

According to the USN's official website, there is no real definition of a strike group, which is formed and disestablished on an ad-hoc basis; however, all strike groups have a similar composition. The same can be said of a modernizing PLAN. Typically, a USN carrier strike group might have a carrier, a guided missile cruiser, two guided missile destroyers (used primarily for anti-air warfare or AAW), an attack submarine (used to seek out and destroy hostile surface ships and submarines) and a combined ammunition, oiler and supply ship. A PLAN task force group will likely employ similar vessels.

According to correspondence with Rear Admiral (Retired) Michael McDevitt, a USN strike group includes aircraft assigned to an air wing, which is a separate major command. A USN air wing has four F/A-18 squadrons, one E-2 squadron, a helicopter squadron, and one EA-18 or E/A-6B squadron. During a deployment, the air wing embarks on the carrier as a separate entity, and debarks at the end of a deployment as a separate entity. It exists as a unit whether on shore or at sea. USN carriers are built with the berthing and life-support systems to accommodate an air wing and all of its sailors, but the air wing does not stay on the carrier when the ship is in homeport. As noted in Part 1, it is not yet clear how the PLAN will organize its carrier aircraft (fixed wing and helicopters) while on shore and at sea, yet similar practices probably will apply to a PLAN carrier air wing.

Personnel Are the Key Link for Future PLAN Task Forces

The Commander of a USN carrier strike group is a rear admiral lower half (O-7) or rear admiral upper half (O-8). In addition to the Strike Group Commander, the aircraft carrier has a Commanding Officer (CO) and an Air Wing Commander or "CAG" (carrier air group), both of whom are captains with the rank of O-6 [4]. It is not yet clear what the primary and secondary ranks of a PLAN carrier's CO and political commissar (PC) will be.

RADM McDevitt also says that, when deployed, the CAG reports to the Strike Group Commander, as does the CO of the carrier. The division of labor between the CO of the carrier and the CAG has evolved over the years so that the CO of the carrier "owns" the "airport" and all the activities that take place on or around the ship. For example, the officer running the "airport tower" (i.e. the "air boss" who is a different officer from the CAG) reports to the CO of the ship. The CAG has administrative control of the squadrons, including all the sailors assigned to the squadrons, and is responsible for the planning and operations of the aircraft once they are launched. In addition, the CAG is responsible for aircraft maintenance, but the CO of the ship is responsible for aircraft servicing, including weapons, gas, deck handling, and launch and recovery. A PLAN carrier will clarify these relationships as it learns to manage its officers and operate its equipment.

Prior to 2004, each PLAN fleet had separate destroyer *zhidui* and frigate *zhidui*, and they rarely trained together. It appears the PLAN began restructuring its fleets in 2004 in order to allow more cross-vessel coordination and training, and to prepare for the acquisition and deployment of new vessels such as aircraft carriers. It then combined some destroyers and frigates into hybrid *zhidui*, and all combat zhidui were made directly subordinate to the fleet headquarters. Also in 2004, each fleet consolidated all of its support and service vessels into a "combat support vessel *zhidui*" (*zuozhan zhiyuanjian zhidui*). Over the past decade, the PLAN has

been conducting more combined-arms training between its surface vessels and submarines; however, most of the training appears to have been opposition force in nature rather than working together against a common target [5]. Who commands the PLAN's carrier may depend on the missions it sets out to accomplish.

PLAN At-Sea Task Force Organizational Structure

When PLAN fleets conduct at-sea task force operations, the following three-tiered at-sea command structure (*haishang jidong zuozhan biandui zhihui tizhi*) applies [6]:

- PLAN Headquarters
- Fleet Headquarters
- *Zhidui*

The composition of the task force and its missions will help determine who is selected as the task force commander. When the PLAN creates a carrier task force and assigns its commander, it will likely select an officer with the appropriate grade who already has experience managing task force operations and training at the fleet level. Depending on whether the carrier is assigned the grade of division leader or corps deputy leader, the task force commander must be at least one grade higher. As such, the three possible grades from which to select possible task force commanders and positions assigned to each grade are as follows [7]:

- Military Region deputy leader
  - One of the PLAN Headquarters' Deputy Commanders

- Corps leader-grade officer
  - One of the PLAN Headquarters' Deputy Chiefs of Staffs
  - One of the Fleet Headquarters' Deputy Commanders
  - The Fleet Headquarters' Chief of Staff

- Corps deputy leader-grade officer
  - One of the Fleet Headquarters' Deputy Chiefs of Staff

The number of carrier task forces the PLAN has at the time and their missions probably will narrow the options further as will whether the fleet can afford to have its chief of staff at sea for any length of time. As such, the most likely person to be selected for a combat mission is one of the fleet deputy commanders. This person is already the key link for combat operations between the Fleet Commander and his Chief of Staff. While deployed at sea, the task force commander's responsibilities in the Fleet Headquarters will be assumed by one of the other deputy commanders or someone with the same grade who is deployed on a temporary basis from PLAN Headquarters [8].

Although the Fleet Chief of Staff is a possibility, he cannot be absent for a lengthy period of time. The reason for this is that the Chief of Staff, who basically serves the same function as a USN Director of Operations (N3), is the director of the PLAN's Headquarters Department and serves concurrently as the director of the command post at the Fleet Headquarters. As such, he is the primary officer responsible for implementing the Commander's decisions [9].

The PLAN also will have to select the task force's executive officer (XO), who most likely will be one of the fleet deputy chiefs of staff.

The Task Force Commander will have discretion to establish the task force command center on his preferred vessel, which, while most likely the carrier, could also be a destroyer or frigate. Of note, when a senior PLAN officer, such as a Fleet Deputy Commander or the Fleet Chief of Staff, embarks on a vessel as the Task Force Commander, the grade of the vessel is not raised to that of the senior officer. Regardless of which vessel he embarks on, it is the task force commander's grade, not that of the vessel, that is important in terms of C2 and coordination [10]. As such, he will be responsible for commanding all of the task force's missions for the Fleet Commander; the Military Region or War Zone Commander; PLAN Headquarters; and the General Staff Department. Because he cannot be on duty 24 hours a day, the PLAN most likely will deploy a second officer of the same grade to fill in when he is not available [11]. The grade structure suggests this officer could be a PLAN Headquarters' Deputy Chief of Staff.

As with a USN carrier, the CO of this and any future PLAN carriers will most likely serve as the "airport" commander who is responsible for all the activities that

take place on or around the ship, including launching the aircraft. The Fleet Naval Aviation Headquarters from the Fleet Headquarters that "owns" the carrier will most likely send an air regiment commander, or possibly an air division commander or one of his deputy commanders, from the deployed aircraft unit to the carrier to serve as the equivalent of a USN CAG. This officer will coordinate his units' missions and tasks with the Task Force Commander, the carrier CO, the Operations Director on the carrier, and the carrier's probable Aviation Branch Chief (*hangkong bumenzhang*).

Conclusions

While we have speculated on the grade of the PLAN's aircraft carriers, there are only a couple of viable options—division leader or corps deputy leader—that do not generate disastrous C2 relationships. Each option raises certain questions, such as what will be the grade for every person and billet onboard, and what will be the organization of the carrier's on-shore headquarters. Although the grade of the carrier and the carrier's CO is important, it is the grade of the carrier task force group that will define the C2 and coordination structure of the task force. The at-sea task force structure provides the combat and support leadership, command, control and coordination that brings all of the on-shore components together as a group to fight a campaign.

Even after the carrier finds its way into the grade system, what is written on paper can become a different story upon implementation when many new challenges can arise. The PLAN has likely already assigned a grade to its first aircraft carrier and associated aviation units, but it may have not fully determined or established the necessary leadership, command, control and coordination structure for on-shore and at-sea activity. Once the exact organizational structure becomes public, it will be easier to determine how the carrier will prepare itself on a daily basis and how it will fit into future task forces.

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Notes:

1. Although PLA Navy sources translate *biandui* as "ship formation," this article uses the term "task force," which refers to two or more vessels in formation while at sea. The composition of each task force is determined according to its missions, which includes combat, training, patrol, navigation, and/or port visits. See Shi Yunsheng, ed., *Zhongguo haijun baike quanshu* [China Navy Encyclopedia], Beijing: Haichao Publishing House, December 1998, p. 705; Zhang Xusan, ed., *Haijun Da Cidian* [Navy Dictionary], Shanghai: Shanghai Dictionary Publishing House, October 1993, p. 252.
2. Information Office of the State Council of The People's Republic of China, *China's National Defense in 2004, 2006, 2008,* and *2010*.
3. *China's National Defense in 2010*.
4. RADM McDevitt is currently a senior fellow at CNA and, while in the USN, he served as the commander of a carrier strike group.
5. *China's Navy 2007*, Office of Naval Intelligence, Chapters 5 and 6. This document can be found at http://www.fas.org/irp/agency/oni/chinanavy2007.pdf.
6. *China's Navy 2007*, Chapter 1.
7. Each level in the PLAN has multiple deputy commanders and deputy chiefs of staff, each of whom has a different portfolio. Each level has only one chief of staff, who is the Director of the Headquarters department and has the same grade as the deputy commanders.
8. Interview with PLA officials in November 2009.
9. Sun Ruling, *Zuozhan zhihui jichu gailun* [Introduction to Basic Operational Command], Beijing: National Defense University Press, May 2011, pp. 152-159.
10. Interviews with PLA officials in 2006 and 2010.
11. Ding Bangyu, ed., *Zuozhan zhihui xue* [Study of Combat Command], Beijing: Academy of Military Science Press, 2004, pp. 166-182. Jiang Fangran, ed., *Siling bu gongzuo gailun* [Introduction

to Headquarters Department Work], Beijing: Academy of Science Press, 2005, Chapter 15, pp. 297-330. *Yitihua Lianhe Zuozhan Zhihui Yanjiu* [Integrated Joint Operations Command Research], Beijing: Academy of Military Science Press, 2006, Chapter 3, pp. 45-70.

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Revising the Border: China's Inroads into Tajikistan

By Stephen Blank

The foundation of China's policies toward Russia and Central Asia since 1991 lies in the border treaties it signed with these states over this period. Those treaties demarcated the borders between China and all the post-Soviet successor states: Russia, Kazakhstan, Kyrgyzstan and Tajikistan. These treaties not only eliminated border disputes among these states, but also provided for confidence-building measures and reciprocal, though not bilateral, measures of disarmament along the Russo-Chinese border. Consequently, these treaties laid the foundation for the Russo-Chinese amity since 1991, China's subsequently flourishing commercial and political relationships with Central Asian states and the original basis for the Shanghai Treaty of 1996, which established the framework for the Shanghai Cooperation Organization.

Yet in the last several years, we see repeated instances of China "rectifying" these border treaties, primarily, but not exclusively, with Central Asian states, to reclaim previously conceded territory. At the time of the original treaties, China's position had been quite concessionary. The most recent example of this process is the Sino-Tajik agreement that was ratified in January 2011. This agreement—allegedly based on a prior accord between the two governments in 2002 that was reiterated in 2010—cedes about 1,000 square kilometers, or about one percent of Tajikistan, in the sparsely populated Pamir Mountains to China (Bhavna Singh, "Sino-Tajik Border: Settlement or Entrapment?" Institute of Peace and Conflict Studies, January 28, 2011; Eurasia Insight, January 28; Asia Times Online, January 2). Tajikistan's government hailed this as a victory because China previously claimed some 28,000 square kilometers and settled for only about three and a half percent of its claims. Moreover, Shukhrob Sharipov, Director of the Presidential Center for Strategic Studies, argued "If we hadn't decided to transfer the land [at this time], we would not have been able to resist China's pressure" (Associated Press, January 14; CentralAsiaOnline.com, January 29). Accordingly, this "rectification" of the borders ensures the inviolability of Tajikistan's border, definitively solves its border problems with China and ensures its stability "for decades to come" (Interfax, January 14, 18 and April 28).

This deal however triggered a strong and public nationalist backlash to the surrender of Tajik territory to China, even if the disputes about it go back to Tsarist times. Perhaps this backlash was triggered more by the fact that between 1,500-2,000 Chinese farmers will settle another 2,000 hectares of land beyond the border agreement (Eurasia Insight, January 28). According to the opposition, Tajikistan is becoming increasingly dependent on China economically due to its large investment in the area. The opposition also alleges the value of the raw material resources in the land ceded by Tajikistan equal the entire Chinese investment in Tajikistan to date. If true, China has recouped its investment at no cost to itself and has both the land and its resources as well as maintaining its investments and penetration of Tajikistan (Singh, "Sino-Tajik Border: Settlement or Entrapment?"). Tajikistan represents only the latest example of such border rectifications in China's relationships with Central Asia.

China's Other Border "Rectifications" and the Central Asian Response

China approached Kazakshtan in late 2009 with a request to allow Chinese farmers to use one milliion hectares of Kazakh land to farm soya and rape seed (Asia Times Online, December 24, 2009). Earlier in 2004, the Kazakh autonomous region of Ili in Xinjiang obtained permission to rent 7,000 hectares of agricultural land—which had been abandoned since the 1990s—for ten years from the governor of the Kazakhstan border district, Lake Alakol. The roughly 3,000 Chinese renters now grow soya beans and wheat on the land. This transaction provoked scathing attacks in the media against the government, apparently out of concern that the country was being carved up at Beijing's behest. The media recalled that the Russian Far

East also was becoming increasingly fragmented through Chinese purchases of agricultural land and wooded areas. Such deals, however, have not been repeated, precisely because Sinophobe social pressures, which are quite palpable on the issue of land possession, have quelled the ambitions of local politicians [1].

In Kyrgyzstan, political life has been profoundly structured by the process of settling border issues with China, an issue that provoked the largest popular demonstrations seen in the country since independence. The first border agreement, which ceded approximately 30,000 hectares to China, was signed by the president in 1996 and ratified by the parliament (Jogorku Kenesh) two years later in 1998. In the second, signed in 1999, more than 90,000 hectares of the Uzengi-Kuush region were ceded to China. This provoked the opposition's wrath. Tapping into national sentiment, Kyrgyz opposition groups used the settlement to try to topple the government. In fall 2001, some MPs refused to ratify the treaty, arguing the final text of the agreement had not been made known to them, no maps with precise geographical boundaries had been attached and it did not have any assessment of the value of the lands [2].

In all of these cases, China's actions triggered a substantial domestic reaction against the government. China's demands confirmed the findings of Marlene Laruelle and Sebastien Peyrouse that attitudes toward China, even if not loudly articulated in Central Asia, are clearly a factor in the domestic politics of Central Asian governments [3]. They further argue:

"Contrary to widespread opinion the ostenisble Sinophilia of Central Asian statesought to be qualified, The reason that the heads of states and their foreign ministers make so much publicity about their friendly foreign relations with Beijing is precisely because they do not view their troublesome neighbor as simply a power *like the others*. Central Asia cannot afford to endorese policies that are contrary to Chinese interests" (italics in original) [4].

China's Changing Approach to Resolving Sovereignty Disputes

China's more recent pattern of behavior appears to bear out the warning of Allen Carlson in his book on China's approach to sovereignty issues in international politics. Despite increased trade and economic relations between China and Central Asia and development in Xinjiang; disagreements over China's domestic policy, it's overbearing requests for land and other instances of Chinese assertiveness suggest Beijing's demands have only aggravated tensions. Central Asian resentments about the border negotiations and uncertainty about Chinese intentions remain close to the surface [5].

Beyond these signs of China's growing ascendancy over Central Asian governments, we see a comparable pattern of rectification of borders and land leases for farmers in Russia. Chinese companies are buying up vast swathes of agricultural land in the Russian Far East (850,000 acres as of mid-2010) that the shrinking population there has abandoned and encouraging Chinese migrants to work there on a seasonal basis [6]. Moreover, the Chinese are driving hard bargains regarding the terms of trade between the Russian Far East and China. Andrew Kramer of the *New York Times* reported:

"The Chinese are pressing for discounts from world prices because of the remoteness of the border region. They argue that the Russian commodities should be cheap because of their abundance—and because without China as a near and ready buyer, the vast reserve in eastern Siberia would be far less valuable. The Russians, on the other hand, argue that without their commodities, buyers in northeast China would have to pay much higher prices to suppliers from farther away" (June 10, 2010).

From these border issues, we can see a much greater assertiveness on China's part even if Beijing professes moderation and has acquired a reputation for not demanding excessive concessions. According to M. Taylor Fravel, who wrote a book about China's negotiation and resolution of territorial disputes, China's foreign policies as expressed in these talks were to a large degree governed by domestic considerations. Fravel also observes in his book, where China's internal security is a paramount issue, Beijing makes concessions on border issues to stabilize its domestic base [7]. Accordingly, in the negotiations with Central Asian states, we see a pattern of Chinese compromises on several disputed issues. Regardless of the exchange, however, China still ultimately got what it wanted. On the conclusion of a boundary agreement with Kazakhstan in 1994 Kazakh President Nursultan Nazarbayev openly attacked national

splittism, stating Kazakhstan "will never allow factions of 'East Turkestan' to involve themselves in activities here against China that will hurt Sino-Kazakhtani relations" [8]. In this and subsequent accords with Kazakhstan, China gained only about one third of the disputed territories while Kazakshtan claimed neither to have lost or gained territories. Meanwhile its policy of non-support for Uyghur activities in China continued. We see a similar pattern in China's border negotiations and subsequent agreements between 1994 – 2002 with Kyrgyzstan and Tajikistan [9].

Conclusion

This new pattern of assertiveness vis-à-vis Russia and Central Asia seems to indicate China's growing confidence in its ability to suppress Uyghur unrest in Xinjiang and in its overall rising power and wealth Srikanth Kondapalli, an Indian expert on China, suggests that these episodes illustrate China's approach to handling disputed border issues. He claims that, if the other side appears weak, China moves quickly to resolve the issue but drags its feet with stronger adversaries, hoping to defer resolution until China is in a stronger position. Growing Chinese strength will lead China to dig in on its position, since, based on Fravel's analysis, Beijing assesses China is not as threatened as it was twenty years ago by internal instability in its border provinces. China also will claim more before settling for less so that the other side can say it achieved a victory. China can then parade its seeming moderation, even though territorial revisions still have been duly effected (Asia Times Online, January 27).

Other Indian experts also are concerned that rising Chinese nationalism may inhibit future governments from making concessions in disputes with India that are still outstanding. Given how Chinese nationalism might further solidify China's border rectification campaign, they and Kondapalli are relatively pessimistic about the resolution of Indo-Chinese border issues anytime soon (Ibid; Singh, "Sino-Tajik Border: Settlement or Entrapment).

Arguably, China's "rectifications" of its border treaties represent another example of its increasingly assertive—if not aggressive—behavior in its neighborhood. With this experience, Central Asian governments should have no illusions about China's demanding posture, but Tajikistan's government said that its security is now guaranteed for "decades to come." A cynic however might say Tajikistan's security and that of its neighboring Central Asian states is only guaranteed until such time as China demands further border adjustments. We may not have the seen the last of Chinese demands, territorial or other, upon Central Asia.

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Notes:

1. Marlene Laruelle and Sebastien Peyrouse, *China as a Neighbor: Central Asian Perspectives and Strategies*, Stockholm: Institute for Security, Development and Policy, 2009, p. 80.
2. Ibid., p. 82.
3. Ibid., p. 111.
4. Marlene Laruelle and Sebastien Peyrouse, "Central Asian Perceptions of China," *China Eurasia Forum Quarterly*, Vol. 7, No. 1, 2009, p. 3
5. Allen Carlson, Unifying *China, Integrating With the World: Securing Chinese Sovereignty in the Reform Era*, Ithaca, NY: Cornell University Press, 2004, p. 237.
6. Ibid., Paul Goble, "Beijing 'Renting' Russian Border Area for Chinese Farmers," *Window on Eurasia Blog*, June 1, 2010, < http://windowoneurasia.blogspot.com>.
7. M. Taylor Fravel, *Strong Borders Secure Nation: Cooperation and Conflict in China's Territorial Disputes*, Princeton, NJ: Princeton University Press, 2008, p. 127.
8. Ibid., p. 161.
9. Ibid., pp. 160-166.

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Beijing Confronts Long-Standing Weakness in Anti-Submarine Warfare

By Lyle Goldstein

Observers of China's naval development generally accept that Chinese anti-submarine warfare (ASW) remains an Achilles' Heel of the otherwise highly methodical and quite remarkable evolution of Chinese maritime power. While Beijing will soon be able to boast about its first aircraft carrier and continues to upgrade an already respectable array of lethal anti-ship cruise missiles (ASCMs), the Chinese fleet nevertheless remains acutely vulnerable to submarine attack. The July 2011 issue of *Xiandai Jianchuan* [Modern Ships] ran under the cover story of "The ASW Crisis of China's Aircraft Carrier," suggesting Chinese naval analysts appreciate this weakness. Moreover, a Chinese Navy captain writing in the same journal demonstrated the PLA Navy's concern with the U.S. Navy submarine force when he described the deployment of one of America's newest nuclear attack submarines to the western Pacific as an "event of no small significance" for the regional security situation [1].

Symbolic of China's major weakness in ASW, Beijing seems to have less than a dozen maritime patrol aircraft (MPA)—the ASW workhorse of most advanced navies. No wonder the submarine market in East and South Asia has been so dynamic over the last decade, as smaller neighbors, such as Vietnam, and other regional competitors, such as Australia, reach for an answer to China's naval buildup. Based on recent Chinese naval writings, Chinese defense analysts are quite concerned about the challenge foreign submarines may pose to Chinese maritime interests and ambitions. Indeed, available evidence suggests China is laying the foundation for a considerably more advanced ASW capability that could emerge one or two decades hence.

Unconventional ASW Alternatives

At present, China's most effective ASW tools might be termed as "unconventional," in the sense that these are not necessarily the standard tools, such as the MPA capability highlighted above, that the leading navies have applied to the ASW problem. However, mine warfare, already a strength of the Chinese navy, does give Beijing certain extant options with regards to ASW, especially given the shallow waters and constrained passageways that tend to characterize East Asian maritime geography. Mine barriers could be used in defensive ASW operations, such as creating cordons for Chinese surface vessels and merchant traffic in proximate areas, such as in the Yellow Sea or the Taiwan Strait. Chinese naval analysts also frequently discuss the use of offensive mine warfare against submarines [2]. Such operations could include deploying mines—perhaps even clandestinely using converted merchant vessels—into sea areas where hostile submarines might operate. Historically, mines have threatened submarine operations [3].

Chinese sources also offer hints at how other unconventional operations could be used to implement ASW operations in the future. For example, a senior Chinese naval officer at the Beijing Naval Research Center recently wrote that in the future unmanned underwater vehicles (UUVs) may be used to deploy sea mines—thus enhancing Chinese mine warfare capabilities for ASW [4]. Other Chinese sources have suggested mobilizing either fishermen or fisheries enforcement vessels into any prospective ASW fight. In fact, one recent line drawing of a fisheries enforcement cutter, refit for war-time duty, shows the cutter equipped with an ASW helicopter, ASW torpedoes and a towed array sonar [5]. If future Chinese coast guard cutters—now being built in large numbers—are being designed to accept such upgrades before or during hostilities and thus play a role in an ASW campaign, that may indicate a new level of seriousness in China's overall ASW effort.

Conventional ASW Options

While China has long deployed a large fleet of small displacement "sub-chasers" (Type 037), Beijing has lacked a modern ASW-oriented surface combatant, even as it has built both respectable air defense frigates (Type 054) and destroyers (Type 052) over the last decade. An apparent indicator of ASW's low priority is that the hull-mounted sonars in China's new surface combatants, even on the newest hulls, are simply too small for long-range detection. China's towed sonar array program however may be more developed than was believed previously. Towed array technology was apparently part of a sonar

technology package that France exported to China in the early 1980s. At the time, one or more Type 037s were reportedly equipped with towed sonar arrays. If true, the Chinese Navy now has almost three decades of experience working with towed-array sonars in a limited experimental capacity, even if it is not fully proficient. The same source claims that China's latest surface combatants are deployed with indigenous H/SJG-206 sonar suites, including towed arrays, that under some conditions could enable an approximate detection range of up to 100km—a standard comparable to surface combatants of the leading navies [6]. Towed sonar arrays have become one of the key technologies for modern ASW, because they can be deployed at considerable distance away from the ship and thus do not suffer the self-generated noise interference that plagues hull-mounted systems.

A second, related major development is the high likelihood that China will deploy a modern ASW corvette in the coming years—discussed in the Chinese media as the Type 056 corvette. According to one recent appraisal, its future dimensions could be about 90 meters long with an approximate displacement of 1,500 tons. The armament of ASW torpedoes and rocket-thrown depth charges is not surprising and the sonar suite is unknown. The fact that it will almost certainly have both an embarked helicopter and a hangar to support the helicopter over extended periods suggests a major advance over Type 037, since helicopters are now considered the most important ASW defense deployed by surface vessels. In overhauling the Type 052 destroyers with new ASW weaponry and sensors, the Chinese Navy also may take advantage of the fact that this older mid-1990s design actually has two hangars for helicopters. Indeed, this overhaul also may demonstrate the PLA Navy's enhanced commitment to ASW [7].

Observers have long considered naval helicopters a critical weakness of the Chinese Navy and an essential part of its ASW vulnerability. Indeed, Chinese naval analysts have roundly criticized the Z9C, China's standard ship-borne helicopter, as inadequate to the challenge of airborne ASW, primarily because it lacks the heavy lift capacity to carry on-board processors, sono-buoys and ASW weaponry. The larger Z8 has adequate capacity, but is far too large to fit aboard most Chinese surface combatants. Therefore, the Chinese Navy has had to settle for importing the Russian Ka-28 Helix in significant numbers. While the Chinese Navy appears to have developed a new comfort level with this platform, they also realize that it also may not be the ideal ASW helicopter [8]. Nevertheless, China appears to be steadily improving its proficiency in ship-borne helicopter operations. For example, naval helicopters have played an ever larger role in China's anti-piracy operations in the Gulf of Aden and new roles are being explored seriously for Chinese naval helicopters, such as early warning and anti-surface missions. A new level of professionalism also is evident in how Chinese pilots view and train for ASW [9]. Overall, a significantly improved Chinese naval aviation component will certainly influence the trajectory of Chinese ASW capabilities.

If questions have dogged Chinese naval helicopter development, the paucity of large, fixed-wing ASW aircraft is perhaps even more puzzling. For other leading world navies, such as the Japanese Navy, the U.S. Navy or the Royal Navy, the MPA is a cornerstone of the ASW effort. The chief advantage of the MPA for ASW is its great mobility, long loiter time, large payload and near invulnerability to submarine-deployed weaponry as well as the especially large search area they can cover. Given these advantages, why has Beijing deployed just a handful of Y-8 MPA? Actually, the answer could be hiding in plain sight: why build a platform that could not be adequately defended? Since its founding, the Chinese Navy (and Air Force) could not realistically contend for air superiority in the "near seas" much less at greater distances from the homeland. Over the last decade, the situation has changed, especially near China, and so MPA may now become a viable ASW platform. Indeed, substantial speculation surrounds the eventual serial production of a new Chinese MPA with at least one design showing a radical departure from the Y-8, featuring ASCM launch capability and a large aerial refueling pod over the cockpit (similar to a UK Nimrod) [10]. While the Chinese Navy may depart from the U.S. Navy model in its MPA force structure, for example constrained by its lack of foreign bases to fly MPA missions over distant blue water zones, the problem is nevertheless recognized by Chinese naval analysts and it is possible that this gap will be at least partially filled in the coming decade with a new buildup once a design is finalized. On the other hand, Beijing also could invest more heavily in unmanned airborne ASW systems as well [11].

Submarines also are invaluable for ASW—a mission set perfected during the Cold War. Conventional wisdom has long held that the Chinese submarine force was optimized for anti-surface warfare and had little ASW capability. The rather gradual development of the Chinese nuclear submarine force reinforced this view, because of the relatively slow search speeds that Chinese submarines could achieve in combat for the foreseeable future. Nevertheless, diesel submarines might have some advantages in shallow littoral waters and China probably is perfecting air-independent propulsion for its diesel fleet, substantially enhancing their capabilities. Moreover, a recent survey of Chinese ASW capabilities made the claim that the *Song*-class submarine in the mid-1990s carried China's first heavyweight ASW torpedo as well as rocket-thrown ASW weapon (*qianshe fanqian daodan*—termed ASROC in Western navies) [12]. If this report is true, it suggests ASW has been a mission set for the Chinese diesel submarine force from a relatively early point. Chinese analysts also show a keen interest in submarine-deployed towed sonar arrays—another key ASW technology [13]. There are genuine reasons to doubt the proficiency of Chinese submariners in a direct contest with a hypothetical adversary's submarines, such as those of the U.S. Navy, which gained invaluable experience over decades and put extraordinary resources behind submarine ASW during the Cold War. Despite the disadvantage in experience, the employment of Chinese submarines for ASW cannot be dismissed entirely. Chinese submariners also will have certain advantages, such as their probably greater familiarity with bathymetric and oceanographic conditions in the sea areas close to China. Moreover, the Chinese submarine force understands the need to employ "asymmetric strategies" against adversary submarines, like the sea mines discussed above [14]. Finally, no navy is likely to have a monopoly on submarine ASW prowess, in part, because no such campaign has ever been fought, suggesting significant uncertainty will continue to surround this enigmatic yet crucial domain of future naval warfare.

Conclusion

For now at least, Chinese naval development remains weak in ASW. It has been suggested, moreover, that China could simply ignore adversary submarines—their weapons load outs, while extremely lethal for the respective targets, are not especially large. Moreover, ASW is an extremely expensive mission. However, available evidence does not suggest either cost or technical challenges have dissuaded China from pursuing significant ASW capabilities. To the contrary, the Chinese Navy appears to understand that a massive national effort will be required, entailing new platforms, training infrastructure and research efforts that go well beyond the scope of existing navy laboratories and institutes [15]. For Washington, the major implication of this research is that future undersea superiority cannot be taken for granted. In that regard, the recent announcement that in 2030 the number of U.S. Navy nuclear attack submarines would fall below 40 is not at all reassuring [16].

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Notes:

1. Li Jie, "You wen shuixia helang sheng" [Once Again the Undersea Nuclear Wolf Can Be Heard], *Xiandai jianchuan* [Modern Ships], November 2010, p. 62.
2. Fu Jinzhu, "Shuilei zuozhan shiyong de N ge huanjie" [The N Link in Employment of Sea Mine Warfare], *Jianchuan zhishi* [Naval and Merchant Ships] October 2008, pp. 60-63.
3. For example, eight U.S. submarines are thought to have been destroyed by mines in WWII. "U.S. Submarine Losses – WWII" at http://www.ibiblio.org/hyperwar/USN/SubLosses/SS_losses-Intro.html.
4. Li Jie, "Wu ren qianhang qi: neng chengwei haidi shashou ma?" [UUVs: Can They Become the Assassin's Mace of the Ocean Depths?] *Dangdai haijun* [Modern Navy], January 2010, pp. 63-65.
5. On deploying Chinese fishermen in the undersea battle, see Liu Wei, "Wei yingdui zhongguo qianting: mei dali fazhan wu ren qianhang qi ["In Order to Cope with Chinese Submarines: the United States is Energetically Developing UUVs"] *Jianchuan zhishi* [Naval and Merchant Ships], November 2010, pp. 58-61. For the line drawing, see "Wartime Refit of FLEC 310"

Jianzai wuqi [Shipborne Weapons], March 2011, p. 37.
6. Xiao Feizhu, "Jianting sheng na yu zhongguo haijun fanqian" [Warship Sonars and the Chinese Navy's Anti-Submarine Capabilities] *Jianzai wuqi* [Shipborne Weapons], p. 37.
7. See photos, graphics and discussion of this refit on "PLAN Activity Outside of Varyag" July 3, 2011 at the website http://china-pla.blogspot.com/.
8. Tian Ying, "Hangkong fanqian duidang qian zhongguo haijun de zhongyao yiyi" [The Vital Significance of Airborne Anti-Submarine Capabilities for Today's Chinese Navy], *Jianzai wuqi* [Shipborne Weapons], March 2008, p. 52.
9. Xie Jing, "Mubiao: shuixia qianting, kai huo! caifang ren: hangkong fanqian zhuanjia, haijun hangkong gongcheng Qingdao fenyuan jiaoshou sun mingtai" [Target: Submerged Submarine, Open Fire! An Interview with Airborne Anti-Submarine Expert, Qingdao Naval Aeronautical Engineeering University Professor Sun Mingtai], *Hangkong zhishi* [Aerospace Knowledge] February 2008, p. 15.
10. Tian Yi, "Dui yun-8 gai zhongguo anji xunluoji de tantao" [Prospects for an Upgraded Y8 Land-Based Patrol Craft], *Jianzai wuqi* [Shipborne Weapons] January 2006, p. 25.
11. See, for example, abstract for Xu Teng, Zhuang Huaping, and Xu Jie, "jiyu wuqi xietong gongyong de wurenji fanqian zuozhan xiaoneng yanjiu" [Research on the Effectiveness of Anti-Submarine Wafare Using UCAV Based on the Cooperation and Sharing of Weapons], *Zhihui kongzhi yu fangzhen* [Command, Control and Simulation] (January 2008).
12. Chen Guangwen, "Bu sheng zhuo ying: zhongguo haijun fanqian zhanli de fazhan" [Catching a Sound to Seize a Shadow: Development of China's ASW Combat Power] *Jianzai wuqi* [Shipborne Weapons], December 2010, p. 25.
13. "Focal Point: Submarine Deployed Towed Arrays of Russia and the US] *Jianchuan zhishi* [Naval and Merchant Ships], August 2010, pp. 22-25.
14. Zhang Yunhai, "Shuilei xin shiming zhanwang" [Prospect of Sea Mines' New Missions], Shuilei zhan yu jianchuan fanghu [Mine Warfare and Ship Self-Defense], Vol. 18, No. 1 (2010), pp. 1-2.
15. Yang Liping and Wu Zhimin, "Zhucheng fenxi fa zai hangkong fanqian jixing neng pinggu zhong de yingyong" [Application of Principal Components Analysis in Evaluating the Maneuverability of Typical Anti-Submarine Aircraft], *Hangkong gongcheng daxue xuebao* [Journal of the Air Force Engineering University], (April 2007), pp. 14-17.
16. RADM Michael Connor, "Investing in the Undersea Future," *USNI Proceedings* (June 2011), p. 18.