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**In a Fortnight**

**PLA STEPS UP MILITARY DIPLOMACY IN ASIA**

By L.C. Russell Hsiao

Against the backdrop of an uptick in confrontations over the past two years that punctured China's "charm offensive" in Asia, the People's Liberation Army (PLA) has apparently been tasked to undertake damage control. China's increased assertiveness in territorial disputes with its neighbors has led to a pushback from fellow Asian powers. Followed by a lull in aggressive Chinese behaviors that U.S. officials described as "a temporary, tactical retreat from the assertive stance" (See "China's Maritime Strategy Is More Than Naval Strategy," *China Brief*, April 8), the 2010 White Papers for National Defense and Foreign Affairs (sections were leaked to the Hong Kong press earlier this year) reveal that Beijing is keenly aware of the fundamental changes in its regional security environment (*Wen Wei Po* [Hong Kong], January 11). Seemingly in response, Beijing has moved to assuage its neighbors' concerns about the PLA's growing military capabilities and intentions. Indeed, a string of recent high-level PLA delegations, covering six Asian countries in the span of two months, may serve as evidence of Beijing's increasing use of the PLA as an instrument of statecraft to achieve regional security objectives and to reshape perceptions about China's military rise.

Since mid-March, the PLA had organized five military delegations to visit Vietnam, Nepal, Philippines, Indonesia, Burma (aka Myanmar)—and Kazakhstan to participate in the defense ministers' meeting for the Shanghai Cooperation Organization. These delegations were all headed by senior officials from the Central Military Commission (CMC) or PLA General Department levels. They included one vice chairman, two CMC members and members from all four PLA General Departments, Navy, Air Force and military regions. The organization of these visits were unprecedented (*China Review News*, May 2).

In mid-April, Chinese Communist Party (CCP) Politburo Member and CMC Vice Chairman Guo Boxiong completed a four day visit to Vietnam. Guo met with Vietnamese Defense Minister General Phung Quang Thanh, and the Vietnamese Communist Party Secretary Nguyen Phu Trong and Prime Minister Nguyen Tan Dung. After the meetings, the two sides issued a joint news release. The heads of the two militaries reportedly agreed to continue developments in high-level military exchanges, strengthen strategic communications, and actively develop joint patrols of borders, namely, increasing the scope of joint patrols along the Gulf of Tonkin. Furthermore, the two sides agreed to continue exchanges of mid-to-high level military officers to China for short term training, and also establishing a direct hot line between the two defense ministries (China Review News, May 2).

In mid-March, PLA Chief of Staff Chen Bingde visited Nepal. Chen's visit is the highest level military delegation from China to visit in 10 years, and also the first to Kathmandu after the establishment of a new government there. During the meeting, China pledged more than \$19 million in military aid to Nepal and signed agreements that included funds for equipment and infrastructure for the Nepalese army. Chen met Nepalese Army Chief General Chatraman Singh Gurung during his three-day trip, as well. Also in mid-March, Deputy Director of the PLA General Political Department Jia Tingan visited Burma and the Philippines (China Review News, May 2).

Moreover, PLA Deputy Chief of Staff General Ma Xiaotian attended the defense conference "Jakarta International Defense Dialogue 2011" hosted by Indonesia from March 23-25. Finally, Chinese Defense Minister Liang Guanglie attended the Shanghai Cooperation Organization Defense Minister Summit, which also took place in mid-March, and signed several agreements with the four other defense ministers present (China Review News, May 2).

On balance, the apparent Asia-focus of China's recent diplomatic maneuvers dovetails President Hu Jintao's public pronouncement at the 2011 Boao Forum about putting Asia first in China's external relations. For some analysts, this may be seen as an indicator that the *Asia First* camp, which is the school of thought that seeks to compete with the United States and undermine American influence in Asia, may be gaining currency in China's domestic foreign policy debate (China Review News, May 2). Whether these recent efforts signal a return to 'smile diplomacy' or rather a shift toward propaganda warfare remains to be seen. Nevertheless, the efficacy of the PLA's military diplomacy and its increased role constitutes just one part of an expanding presence that China manifests as a global power. While Beijing has shown that it is increasingly adept at waging military diplomacy, its successful rise will depend much more on its actions.

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## 2010 Census Exposes Fault Lines in China's Demographic Shifts

By Willy Lam

The just-published results of the People's Republic of China (PRC) 2010 Census have shown that just like any other country, the Middle Kingdom has to contend with the sobering limitations of demographics. Perhaps the only good news among the barrage of statistics is that at an average growth rate of 0.57 percent a year, the population was expanding in the 2000s at a markedly slower pace than the 1.07 percent recorded in the previous decade. There were 1.34 billion Chinese as of 2010, up from 1.27 billion in 2000 (Xinhua News Agency, April 28; Wall Street Journal, April 29). Yet the populace is graying faster than expected even as the number of young men and women entering the job force will start declining soon. While the Chinese Communist Party (CCP) administration launched an ambitious "develop the West" program in the late 1990s, one of whose goals is to create more working opportunities for residents in the heartland regions, the speed of migration to the already overcrowded eastern "Gold Coast" has picked up dramatically. Moreover, the size of the national migrant population has reached more than 200 million. Since these "floating" masses of mostly rural-based workers are not allowed to acquire permanent residence status in the cities, they are barred from labor and social-welfare benefits reserved for urban residents. Chronic exploitation of this huge "underclass" by factory owners as well as municipal officials has spawned massive grievances and undermined social stability.

Fast-shifting demographic trends have had the biggest impact on the nation's socio-economic development. The latest findings confirm the now oft-repeated adage that "China is becoming old before it becomes rich." China's demographic dividend—a reference to speedy economic expansion due to an increase of the proportion of Chinese who are working—is forecast by official economists to decline sharply from around 2013. And by 2039, less than two Chinese taxpayers may have to look after one retiree (Xinhua News Agency, May 3; Global Times, September 9, 2010). The census shows that people over 60 years of age account for 13.26 percent of the populace, compared to 10.33 percent in 2000. By 2040, this figure is projected to spike to a stunning 28 percent. In an authoritative study published late last year, the Chinese Academy of Social Sciences (CASS) forecast that by 2030, the proportion of the population that is over 65 will exceed even that of Japan, which has the grayest population in Asia. "By 2050, Chinese society will enter into a phase of severe agedness," CASS indicated (Sina.com, April 29; China News Service, September 11, 2010; *Global Times*, September 12, 2010). A major theme of the 12th Five-year Plan on Economic and Social Development is boosting social-welfare benefits, including those for senior citizens. Yet, it is doubtful whether adequate resources can be provided particularly for old rural residents, who traditionally rely on their children and grandchildren to take care of post-retirement needs (See "Beijing's

Blueprint for Tackling Mass Incidents and Social Management, *China Brief*, March 25).

The flip side of the coin is that labor shortages, which first became acute in booming hubs of the “World Factory” such as the Pearl River Delta and the Greater Shanghai Region in early 2010, will become more pronounced across China. The census reveals that the country’s future workers—Chinese under 14—make up only 16.6 percent of the population, down from 23 percent ten years ago. Spokesman of the State Statistical Bureau Ma Jiantang indicated that total pool of potential workers—a reference to Chinese aged between 16 to 59—reached 921.48 million last year. Yet this cohort is expected to start declining from 2013 onward (MSN.com, April 29; *New Beijing Post*, April 29). According to Zhong Dajun, head of an economic consultancy in Beijing, at least 10 million new blue-collar workers entered the labor force annually in the mid-to-late 1990s. “Now, this number is down to about 5 million or so,” he said. “After five or six years, new entrants to the labor market may dwindle to a mere one to two million a year.” The situation is likely to worsen, particularly given President Hu Jintao’s recent statement that China would not consider abolishing its much-criticized one-child-family policy (Reuters, April 29; *China Youth Daily*, February 14; *Global Times*, February 14).

The rash of labor incidents in southern China early last year—including protests in the Chinese units of famous multinationals such as Foxconn and Honda—illustrated that the new generation of workers are much less willing to tolerate harsh terms and conditions than their forebears. The CCP leadership was even forced to acquiesce to Guangdong workers adopting some form of collective-bargaining tactics to improve their wages and working environment (China-labor.org, June 9, 2010; *Wall Street Journal*, June 14, 2010). As the labor shortage became more severe, 12 provinces and major cities raised their minimum wage in the first quarter of this year. The increase rate was a whopping 20 percent or more in half of these regions. It is expected that as their bargaining positions continue to improve over the years, Chinese workers may clamor for the right to set up free trade unions, which Beijing deems potentially subversive (Xinhua News Agency, April 5; Apple Daily [Hong Kong] May 3). Indeed, fresh census figures have highlighted the growing political pressure that Beijing faces on different fronts. Foremost is the dramatic increase in the size of the “floating population”—a reference to people who live apart from their domicile as defined by China’s stringent *hukou* or household registration system, which mushroomed from 144 million in 2000 to 261 million last year. Most of these are migrant workers from the heartland provinces who seek opportunities in manufacturing centers such as Guangdong and Shanghai. Under the *hukou* system, however, these rural work hands cannot get urban ID cards, and they are barred from social-welfare benefits ranging from education to health and retirement. Last year, 15 Chinese newspapers ran a joint editorial calling on Beijing to immediately scrap the “inhuman” *hukou* system. Despite Premier Wen Jiabao’s repeated pledges about boosting “social equality and justice,” the central government has refused to budge (*Financial*

*Times*, March 4, 2010; *People’s Daily*, March 6). Thanks to the labor shortage, however, migrant workers may feel emboldened to demand a speedier end to the *hukou* system, which violates the Chinese Constitution.

Yet the relentless migration of the populace to the eastern “Gold Coast” may convince the CCP administration that throwing out the *hukou* regime could lead to more overcrowding in already very populous cities ranging from Beijing and Tianjin to Shanghai and Shenzhen. Through the 2000s, the eastern coast’s share of the population increased by 2.41 percent to reach 37.98 percent, while that of the western and central regions declined respectively by 1.11 percent and 1.08 percent to reach 27.04 percent and 26.76 percent. With 104.30 million people, Guangdong is now the country’s most populous province. That honor used to belong to Henan. With 94.02 million people, the central province has dropped to No. 3, behind coastal Shandong, which boasts a populace of 95.79 million. Pleading that their health, education and social-welfare facilities are stretched to the limit, coastal cadres have vigorously opposed allowing more migrant workers to settle in the east (*Beijing Morning News*, April 30; *Shandong Business News*, April 30; *Ming Pao* [Hong Kong], April 29).

Seen from another perspective, the relentless eastward-migration trend represents a failure of the CCP leadership’s much-ballyhooed “go west” program, which was started in the late 1990s by the administration of former President Jiang Zemin. A central plank of the Hu-Wen team’s “scientific theory of development” is specifically shrinking the gap between eastern and western China. Not only workers but highly educated engineers, entrepreneurs, professors and IT personnel are leaving the relatively poor western provinces for the larger paychecks and glamorous lifestyles of the coast. This migration fad also shows that Beijing has yet to make progress against the country’s fast-deteriorating environment, particularly desertification. Hardest hit are poor and dry provinces such as Ningxia and Qinghai, whose populations have shrunken to respectively 6.30 million and 5.63 million in the past decade (The Guardian, January 4; Sina.com, April 30).

In an article last month in the *Global Times*, an offshoot of the *People’s Daily*, veteran commentator Shan Renping repeated the CCP’s standard line that one-person-one-vote elections and “Western-style democratic politics” are not suitable for China. “China being a complicated and large country, a strong and forceful central government is absolutely necessary for unity and stability,” Shan asserted. Furthermore, in his address to the National People’s Congress earlier this year, parliamentary chief and Politburo Standing Committee member Wu Bangguo reiterated that the CCP would never adopt a “multi-party revolving-door system or other Western-style political models.” Otherwise, he warned, the country “could sink into the abyss of internal disorder” (*Global Times*, April 22; BBC News, March 11; *China Daily*, March 11). The census, however, has demonstrated that China has acquired all the socio-economic criteria that precipitated the development of “Western”



political institutions in countries and regions ranging from South Korea and Taiwan to the Philippines, Malaysia and Indonesia. The recent flare-up of “people power” in numerous countries in the Middle East and North Africa has further demonstrated that the desire for ending one-party dictatorships—and adopting democratic institutions such as popular elections—is universal.

According to the census, the proportion of college-educated Chinese went up from 3.61 percent in 2000 to 8.93 percent last year. 49.68 percent of the population lives in the cities—and the great majority of urban residents have access to the Internet. Moreover, per capita GDP reached a respectable \$4,300 last year (*Ming Pao*, April 30; Huanqiu.com, April 29). Irrespective of apparent spin-doctoring by official commentators about the superiority of the “China model,” more Chinese professionals and entrepreneurs than ever are settling abroad, partly due to dissatisfaction with their home country’s rigid political system (See “China’s Brain Drain Dilemma: Elite Emigration,” *China Brief*, August 5, 2010). Latest polls in China show that at least 60 percent of residents in upper-income brackets had either completed procedures for emigration to Western countries or were about to do so (Huanqiu.com, April 23; Global Times, April 26). Should the CCP leadership continue to drag its feet on political liberalization, more elite members among denizens of the coast may emigrate to the United States, Canada and Europe, even as well-trained talents from central and western regions flock to the eastern metropolises.

There are officials and academics who see fast-changing population trends as an opportunity rather than a threat. The decline in the supply of workers may harden Beijing’s resolve to go high-tech. For example, Mo Rong, a senior researcher of the Ministry of Human Resources and Social Security, indicated that “the labor shortage will force enterprises to go after an innovation and technology-driven strategy.” A central thrust of the 12<sup>th</sup> Five-Year Plan is to restructure the economy by sidelining labor-intensive “sunset” industries and emphasizing cutting-edge sectors such as IT and bio-technology that demand much fewer workers (China Daily, May 3; Xinhua News Agency, March 17). The success of this strategy, however, presupposes that the nation can metamorphose from “world factory” to “global innovative hub” within record time. Moreover, the graying of the population could become such a drain on the resources of most Chinese families that another seminal economic goal for the 2020s and 2030s—boosting consumer spending—may be jeopardized. A decline in economic growth—seen as the prime basis of the CCP’s legitimacy—could prompt more challenges to the party-and-state apparatus particularly given its repeated refusal to entertain political liberalization.

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## China’s Policy Impasse: The Case of the “Green GDP” Initiative

By Eve Cary

China’s environmental problems are apparent to any visitor, and the statistics are striking: China is home to 20 of the world’s 30 most polluted cities, 90 percent of China’s rivers and lakes are polluted, and the Chinese government dealt with 580,000 environmental complaints in 2006 (*South China Morning Post*, December 16, 2008). Yet, the central government’s efforts to mitigate environmental problems through policies and regulation have encountered significant implementation challenges. In an effort to rebalance economic growth and environmental degradation, Beijing launched the Green GDP (*Lüse GDP*) program in 2003. The initiative was intended to quantify environmental degradation and thereby create incentives for local governments to improve environmental standards. Unfortunately, the Green GDP program was doomed from the start and was cancelled by the central government in 2007. Despite initial central government support for the project, local recalcitrance, bureaucratic infighting, and elite party politics eroded support and led to its demise. The bureaucratic and structural issues that Green GDP faced are not exclusive to this case—in fact, their impact on a wide range of policies in China make them relevant to the study and understanding of the various factors that influence the Chinese policy implementation process.

### THE GREEN GDP INITIATIVE

Green GDP assigns a value to the cost of environmental losses (such as pollution and resource consumption) and adjusts GDP accordingly, so that GDP reflects environmental costs. The project began as a joint project between the National Bureau of Statistics (NBS) and the State Environmental Protection Agency (SEPA), which began work on how to quantify Green GDP in the spring of 2004 [1]. The Green GDP program came at a time when leaders were searching for a way to ensure policy implementation and were working to prevent overheating, in large part created by the same resource-sapping factories that cause a significant percent of pollution.

Pan Yue, vice minister of SEPA, emerged as a champion of the Green GDP project in 2004-2005. He gained notoriety by blocking billions of dollars of development projects and warning that China was going to hit an “ecological wall.” He was able to be outspoken as a result of strong family credentials and the support of Prime Minister Wen Jiabao (Guardian Unlimited, March 12, 2009). In May of 2004, Chongqing municipality was named the trial city

for testing the Green GDP program. In August 2004, Shanxi, the first Chinese province to calculate Green GDP, announced their Green GDP figures. According to Dong Jinbin, deputy director of the Academy of Social Sciences in Shanxi Province, though Shanxi's official GDP was 11.2 percent, the cost of pollution was 10.9 percent, leaving a growth rate of just 0.3 percent (*Financial Times*, August 19, 2004).

Support for Green GDP began to wane in the spring of 2005. In March 2005, People's Daily Online, a Chinese official news source, published an editorial entitled "Don't let Green GDP go to your head," warning of the problems with the Green GDP calculation (People's Daily Online, March 7, 2005). In the same month, the five-year national economic development plan neglected to mention Green GDP in its discussion of a "resources-saving and environment-friendly society" (Economist, October 22, 2005).

Based on data collected from a number of provinces, the first complete Green GDP report was released in 2006. The report, which represented the year 2004, showed that as a result of pollution, China had a financial loss of 511.8 billion yuan (\$61.8 billion), or 3.05 percent of the nation's GDP (*China Daily*, April 19, 2007). After the report's release, a number of provinces and municipalities (fearing their own disastrous numbers) threatened to withdraw from the Green GDP pilot program, causing an official to admit that "the pilot project had lost its appeal" (*South China Morning Post*, July 24, 2007).

In March 2007, the Green GDP report for 2005 was blocked from release by NBS—the report was said to show even higher losses and reductions in GDP than the 2004 report, and also included figures on economic losses from pollution for each province, "a sensitive step in a system where maintaining economic growth can be crucial to officials' promotion prospects" (*The Straits Times*, July 23, 2007). In March 2009, the project had been completely sidelined, along with Pan Yue himself. He was passed over for a membership seat at the 17th Party Congress in 2007, became less active and bold in promoting the concept, and lost the power to block development projects and approve environmental impact assessments (Guardian Unlimited, March 12, 2009).

#### WHY GREEN GDP FAILED

##### *Central Local Relations*

Green GDP (and environmental policy implementation as a whole) was significantly impacted by central-local tensions and local recalcitrance. While the Hu-Wen administration has tried to change the "growth at all costs" mentality through such programs as Green GDP, there are substantial incentives for local officials to pursue growth and disregard such programs as Green GDP that seek to moderate growth.

After fiscal reforms in 1994, local government revenues declined,

but demand for public services remained, resulting in financial pressures that incentivized short-term revenue and rapid growth (which can have significant environmental repercussions).

Growth and investment are the best ways to close the revenue gap. Revenue coming from commercial and residential land leasing and sales are crucial: They account for 30-50 percent of rural government revenues and 50-60 percent of city government revenues [2]. Green GDP figures would reflect the environmental impact of these sales and dampen growth figures, as well as pressure local officials to move away from environmentally-harmful short-term growth. The significant revenue pressure means that local officials have serious incentives to maintain and increase growth and thus have no reason to follow along with the Green GDP program.

Additionally, promotion of local officials also remains chiefly based on the rate of economic growth in their areas. Local officials are promoted based on hard targets, which are easily measurable, and soft targets, which are more nebulous. Economic growth is a hard target, which makes it a higher priority, and is easily quantifiable. As James Q. Wilson notes, "work that produces measurable outcomes drives out work that produces unmeasurable [*sic*] outcomes" [3].

Green GDP's potential impact on promotion was a key sticking point for local officials. They had pursued economic growth without regard for the environment, and knew that their GDP figures, and thus their potential for promotion, would be dramatically lower if environmental degradation was accounted for. They also feared that Green GDP numbers would force them to address environmental degradation, which would necessitate a cool-down in growth, and a lower chance for promotion.

In addition to being judged by their supervisors based on their growth rates, local officials also live and die career-wise by the level of social unrest in their territory. Local officials can face demotion or firing if their locality posts high protest figures, and local officials understand the state's overwhelming desire to keep social unrest under wraps [4]. This often translates into support for local enterprises and resistance to environmental policies (that often call for taxes and fines on polluting companies), as unemployment is a key instigator in social instability. Based on these counterincentives, local officials launched a successful pressure campaign on the central government to drop Green GDP.

##### *Bureaucratic infighting and Elite Party Politics*

Top officials from the NBS and the Beijing Bureau of Statistics came out against the project in the spring of 2006, noting that it was too difficult to find a formula, and isolating SEPA. NBS chief Xie Fuzhan even rejected the term Green GDP, saying that "we would never call it Green GDP. There is no international standard for GDP calculations in this regard, and no country in the world has ever made such calculations" (*South China Morning Post*, July 13, 2007). Targeting SEPA directly, an NBS official commented that

SEPA was not able to “appreciate the problems in producing a single, simple figure which reflected all the complexities of measuring environmental impact” (*Financial Times*, May 10, 2006). The NBS backed up its criticisms through its actions. In Anhui province, the NBS sent environmentalists, not economists, to gather economic data and in March 2007, as noted above, NBS asked SEPA not to release the most recent Green GDP figures (*Economist*, October 22, 2005). Wang Jinnan, chief engineer with the Chinese Academy of Environmental Planning, commented that bureaucratic infighting had “made the project almost impossible” (*South China Morning Post*, July 23, 2007).

Elite party politics and the timing of the 17th Party Congress in the fall of 2007 may also have played a role. President Hu Jintao’s planned political reshuffling ahead of the Congress required the support of local officials, and Hu did not want the Green GDP project to get in the way. His support of Green GDP may have been significantly dampened by his desire to keep local officials happy and satisfied. Despite the initial support of the center, the environment, and thus Green GDP, was too low on the totem pole to merit an expenditure of Hu’s political capital.

#### CONCLUSION

Green GDP was weak to begin with because the environment remains a tertiary priority behind growth and social stability. As long as growth continues to generate wealth and social stability, the central leadership will have very little motivation to prioritize the environment, and local governments will have even less motivation to follow central environmental policies. In the end, the Green GDP program was effectively a strawman set up to appease the global audience and the critics of China’s environmental record. While the initiative initially made the Chinese government look progressive and proactive, the numbers that came out of the program revealed a shocking level of environmental degradation, leading Beijing to cancel the program, rather than face the embarrassment of more damning statistics.

It is possible that there will be a reemergence of some aspects of the Green GDP program. In December 2008, the NBS held a consultation meeting in Beijing on “China’s resources and environmental statistic index system,” with experts from various ministries, eventually resulting in an agreement by 7 ministries to restart discussions on resource and environmental accounting (*World Finance Report*, January 14, 2009). In February 2010, *Southern Weekend* reported on the project, noting that the index system would result in a yearly report including indicators on climate change, ecology, and the environment (*Nanfang Zhoumo* [Southern Weekend], February 9, 2010).

Most recently, the 12th Five-Year Plan (released in March 2011) has made an effort to address China’s environmental issues, with a number of sections promoting “green development” and environmental conservation. More specifically, the plan includes the

following provisions: a 16 percent reduction in energy consumption per unit of GDP, the creation of a “green, low-carbon development concept,” support of international climate change efforts, a focus on “ecological security,” monitoring and enforcement systems for energy use and pollution output, and strengthening environmental protection laws and regulations. Though there is no mention of anything akin to the Green GDP program, the environmental focus of the plan indicates an increased recognition of China’s significant environmental challenges. Yet many of the bureaucratic characteristics that killed Green GDP are still present. Thus, in order for these initiatives to succeed in the future, there must be a sea-change in the central government’s, and local governments’ conception of environmental issues. Though only time will tell, the contents of the latest Five-Year Plan may be a step in that direction.

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#### NOTES:

1. Wang, Jinnan, Jiang Hongqiang, and Yu Fang, “Green GDP Accounting in China: Review and Outlook.” Chinese Academy for Environmental Planning, 5-6, [http://unstats.un.org/unsd/envAccounting/londongroup/meeting9/china\\_country\\_report\\_2004.pdf](http://unstats.un.org/unsd/envAccounting/londongroup/meeting9/china_country_report_2004.pdf)
2. Tao, Ran and Dali L. Yang, The Revenue Imperative and the Role of Local Government in China’s Transition and Growth. Prepared for conference on China’s Reforms, July, 2008, 16-17.
3. O’Brien, Kevin and Lianjiang Li. Selective Policy Implementation in Rural China. *Comparative Politics*, Vol. 31, No. 2, January, 1999, 173-174.
4. Bernstein, Thomas P. “Unrest in Rural China: A 2003 Assessment,” Irvine, Center for the Study of Democracy, 2004.

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## China and the Philippines: Implications of the Reed Bank Incident

By Ian Storey

Following the flare up of tensions over the territorial dispute in the South China Sea last year, there was a hope and expectation among security analysts that in 2011 the claimants would recalibrate their policies, adopt more flexible and conciliatory positions, and prioritize the search for a diplomatic breakthrough to better manage the dispute (See “China’s Missteps in Southeast Asia: Less Charm, More Offensive,” *China Brief*, December 17, 2010). In the first quarter of 2011, however, the dispute continued to trend in a negative direction. Most notably there was an uptick in tensions between Manila and Beijing after two Chinese patrol boats harassed



a seismic survey vessel operating in Philippine-claimed waters. The incident underscored China's continued willingness to apply limited coercion in disputes with Southeast Asian countries over maritime resources such as energy resources and fisheries.

The skirmish at Reed Bank has provoked the administration of Philippine President Benigno Aquino to adopt a harder line toward Beijing in the South China Sea, including moves to strengthen the presence of the Philippine Armed Forces (AFP) in the disputed Spratly Islands and lodge formal objections to China's sovereignty claims. Meanwhile, despite the political rhetoric from members of the Association of Southeast Asian Nations (ASEAN) and China that they remain committed to implementing cooperative confidence building measures (CBMs) contained in the 2002 Declaration on the Conduct of Parties in the South China Sea (DoC), the negotiation process remains stymied with no sign that the impasse will be broken any time soon.

#### THE REED BANK INCIDENT

On March 2, two Chinese patrol boats aggressively approached the survey ship MV Veritas Voyager near Reed Bank forcing it to withdraw. Reed Bank lies west of Palawan Island and within the Philippines-declared exclusive economic zone (EEZ). The survey ship was chartered by Forum Energy, a UK-based oil and gas company, which had been awarded a contract by the Philippine government in 2005 to conduct seismic studies in the Sampaguita gas field located inside Reed Bank. That survey indicated the presence of 3.4 trillion cubic feet of gas and thus a potentially significant source of income for the Philippine government. In February 2010, Manila extended the contract and in March the Veritas Voyager began work to identify locations for appraisal wells to be sunk [1]. According to Major-General Juancho Sabban, head of Western Command whose area of responsibility includes Philippine claims in the Spratlys, the Chinese vessels had ordered the survey ship to cease its activities because the area was under Chinese jurisdiction (AFP, March 3).

The Philippines' response was immediate and fairly robust: Western Command deployed an OV-10 light attack aircraft and an Islander observation aircraft to Reed Bank (by which time the Chinese vessels had departed); two coastguard vessels were subsequently dispatched to escort the Veritas Voyager until its survey activities had been completed. In describing the incident Sabban warned: "It's clearly our territory. If they bully us, well even children will fight back" (AP, March 3). Defense Secretary Voltaire Gazmin and Chief of the Armed Forces of the Philippines (AFP) Lieutenant-General Eduardo Oban later visited Western Command headquarters in a show of support. During the visit Gazmin revealed that the government had lodged a protest note with the PRC Embassy in Manila over the incident but had yet to receive a reply. China finally responded on March 24 when a Foreign Ministry spokesman reiterated that: "China owns indisputable sovereignty over the [Spratly] Islands and their adjacent waters. Oil and gas exploration

activities by any country or company in the waters under China's jurisdiction without permission of the Chinese government constitutes violation of China's sovereignty, rights and interests, and thus are illegal and invalid" [2].

In addition to sending patrol aircraft and escort vessels for the Veritas Voyager, the Aquino administration took two additional courses of action in reaction to the Reed Bank incident: first, it announced measures to strengthen the AFP presence in the Spratlys, and second, after an interval of two years, protested the bases of China's sovereignty claims in the South China Sea.

Vis-à-vis its territorial dispute with the PRC, Manila has always been disadvantaged by its weak armed forces. Although a defense modernization plan was promulgated in 1995 following China's occupation of Mischief Reef, it was never implemented due to lack of funds and political will. Post-9/11, the United States provided significant financial support to help modernize the AFP, but the focus was on helping the army counter radical Islamic groups in the south of the country. As a consequence the navy and air force have been unable to provide a credible deterrent in the Spratlys. The AFP's top brass has long bemoaned this fact and repeatedly called on successive post-Marcos governments to address shortcomings in air and naval power. Senior AFP officers have been brutally honest about the armed forces' inadequacies. In August 2010, for instance, in a joint press conference with visiting Pacific Command (PACOM) Commander Admiral Robert Willard, AFP Chief Ricardo David conceded: "Our capability in the South China Sea is almost negligible" and that if it came to a "shooting match" the AFP "had nothing to shoot with" (Philippine Daily Inquirer, August 19, 2010). In March, the recently appointed head of the Philippine Navy, Rear Admiral Alexander Pama, admitted that of the 53 ships under his command, only 25 were operational and that their average age was 36 years old (some date from World War II). As Pama noted: "For us to be taken seriously by other claimants, we have to back our claim with credibility. We cannot rely on mere words" (Philippine Star, March 27).

Moreover, in sharp contrast to Vietnam, China and Malaysia, all of whom have significantly upgraded their military infrastructure on occupied islets, Philippine facilities have fallen into disrepair. This was highlighted in November last year when a C-130 transport plane carrying Defence Secretary Gazmin and General David was embarrassingly forced to abort a landing on Philippine-occupied Pag-asa Island because of the poor state of the landing strip. Ironically, Gazmin had come to inspect the condition of facilities (Philippine Daily Inquirer, November 10, 2010).

Prompted by Chinese actions at Reed Bank, Aquino has promised an additional \$255 million for the AFP on top of the 2011 defense budget (Reuters, April 13). According to reports, the extra budgetary resources will come from royalties generated by the sale of gas from the offshore Malampaya field which lies close to Sampaguita but is not claimed by China. The AFP has asked that the extra money be

used to purchase air defense radars, communication facilities, long-range patrol aircraft and fast patrol boats. As a priority, \$700,000 has been allocated to upgrade the runway on Pag-asa (Philippine Daily Inquirer, March 29).

Yet at the same time Aquino has pledged to increase funding for the military, he has put the AFP on notice that the problem of systemic corruption must be stamped out. A Philippine Senate investigation last year found evidence of massive corruption within the AFP, and that senior officers had siphoned off millions of dollars from funds intended for new equipment, combat operations and salaries (*New York Times*, January 30). The revelations led to the suicide of former AFP chief General Angelo Reyes in February who had been implicated in the scandal. Endemic corruption in the AFP suggests that monies earmarked for the Spratlys could end up lining the pockets of senior officers.

In addition to Aquino's assurances of extra funding, the United States has promised to accelerate maritime capacity building support for the AFP. This policy was first outlined by Deputy Assistant Secretary of Defense Robert Scher in 2009, in testimony before Congress on how Washington aimed to "prevent tensions in the South China Sea from developing into a threat to U.S. interests" [3]. In January, Assistant Secretary of State Kurt Campbell said he was examining ways the United States could help "increase the Philippines' maritime capacity" and a month later Admiral Willard promised PACOM would continue to cooperate with Manila in "safeguarding its territorial integrity and security" (AFP, January 27 and Manila Bulletin, February 20). As part of these efforts, later this year the United States will transfer a refurbished 3,250-ton cutter to the Philippine Coast Guard. The vessel will be deployed to the Western Command area and will boost the Philippines' monitoring and interdiction capabilities in the South China Sea (Manila Bulletin, April 14). The United States also seems to have provided political support to the Aquino government in its dispute with the PRC. According to press reports, following the Reed Bank incident, U.S. Secretary of State Hillary Clinton telephoned her Philippine counterpart, Albert del Rosario, to discuss how to improve maritime security in Asia. At a press conference shortly thereafter, China's ambassador to the Philippines, Liu Jianchao, retorted that U.S. "meddling" would only "complicate" the South China Sea dispute (Philippine Daily Inquirer, March 17).

The Aquino government's second response to the March 2 incident was to formally object to the map that China lodged with the United Nations Commission on the Limits of the Continental Shelf in May 2009 in protest at the joint Vietnam-Malaysia submission (see *The South China Sea Dispute: Increasing Stakes, Rising Tensions*, November 2009). The map shows nine discontinuous lines encompassing almost the entire South China Sea, and Beijing's refusal to explain what the map means and how it can be justified under international law has generated concern across the Asia Pacific. In a letter dated April 5, the Philippines asserted that the Kalayaan Island Group (the name Manila gives to the islets it

claims in the Spratlys) is an integral part of the Philippines, that it exercises sovereignty over the waters surrounding them and that China's 9-dash line map has "no basis under international law" [4]. Beijing responded that the contents of the Philippines' note verbale were "totally unacceptable" to the Chinese government. Beijing claimed that since the 1970s Manila had moved to "invade and occupy" islets over which China had "indisputable sovereignty" [5]. President Aquino had planned to visit China on May 23 – 25, but as a result of the spat his trip has been postponed until later in the year (Philippine Star, April 15).

#### THE DoC PROCESS FAILS TO GAIN TRACTION

Increasingly fractious and potentially dangerous incidents at sea, such as that which occurred at Reed Bank, once again highlight the urgent need for conflict avoidance mechanisms in the South China Sea. In this regard the DoC contains some useful CBMs. Yet, talks between ASEAN and China on implementation guidelines remain deadlocked over modalities, primarily because Beijing insists that ASEAN members should not discuss the dispute prior to meeting with Chinese officials. A meeting of the Joint Working Group (JWG) on the DoC in Kunming on December 22 – 23, 2010 yielded no progress, prompting Foreign Minister Marty Natalegawa of Indonesia who, as the current chair of ASEAN, has promised to make the South China Sea dispute a priority to acknowledge the need to move the stalled discussions forward by involving senior officials. Noting the importance of the issue to regional peace and security, Natalegawa stressed that "a breakthrough is necessary" (Jakarta Post, January 17). Yet the dispute was only briefly touched on at a meeting of foreign ministers from China and ASEAN in January (Straits Times, January 26), and in March a planned meeting of the JWG failed to eventuate. Worryingly, Natalegawa has indicated that while the November 2011 East Asia Summit will for the first time address security issues, the South China Sea dispute will not necessarily be on the agenda, presumably due to opposition from China (VOA, April 11).

The positions and behaviors of the key players in the Spratlys dispute remained unchanged in the first quarter of 2011, and efforts to build trust and cooperation through dialogue have been disappointing. Symptomatic of this discouraging situation was the Reed Bank incident, which prompted the Philippines to push back against continued Chinese assertiveness by protesting Beijing's expansive jurisdictional claims and announcing plans to beef up its military presence in the Spratlys. China also intends to augment its presence in the South China Sea with the addition of 36 new patrol boats over the next several years (*Jakarta Globe*, May 3). As a consequence, tensions are unlikely to subside for the foreseeable future.

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## NOTES:

1. See Forum Energy's website, <http://www.forumenergyplc.com/>.
2. Foreign Ministry Spokesperson Jiang Yu's Regular Press Conference on March 24, 2011, <http://www.mfa.gov.cn/eng/xwfw/s2510/2535/t810015.htm>.
3. Testimony of Deputy Assistant Secretary of Defense, Robert Scher, Asian and Pacific Security Affairs, Office of the Secretary of Defense before the Subcommittee on East Asian and Pacific Affairs, Committee on Foreign Relations, United States Senate, July 15, 2009, <http://foreign.senate.gov/testimony/2009/ScherTestimony090715p.pdf>.
4. See [http://www.un.org/Depts/los/clcs\\_new/submissions\\_files/mysvnm33\\_09/phl\\_re\\_chn\\_2011.pdf](http://www.un.org/Depts/los/clcs_new/submissions_files/mysvnm33_09/phl_re_chn_2011.pdf).
5. See [http://www.un.org/Depts/los/clcs\\_new/submissions\\_files/mysvnm33\\_09/chn\\_2011\\_re\\_phl\\_e.pdf](http://www.un.org/Depts/los/clcs_new/submissions_files/mysvnm33_09/chn_2011_re_phl_e.pdf).

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## An Initial Assessment of China's J-20 Stealth Fighter

By Carlo Kopp

The maiden test flight in January 2011 of China's J-20 stealth fighter prototype is an important strategic milestone in several different respects, and is part of an ongoing effort by China to develop advanced military technology [1]. The J-20 is the first combat aircraft developed by China that qualifies as "state of the art" by Western measures. It also shows that China has mastered "stealth shaping" technology—the essential prerequisite for developing stealth aircraft. Finally it shows that China has managed to integrate its strategic planning with the functional definition of a modern combat aircraft. Once fully developed, the J-20 has the potential to alter the regional balance in the Asian air power strategic game, by rendering nearly all regional air defense systems ineffective.

The People's Liberation Army (PLA) has yet to disclose any of the intended performance parameters of this fighter aircraft, or its intended avionics systems and weapons fit. As a result, analysts are left with one choice only, which is to apply analytical criteria such as size, shape and configuration to draw an estimate of the aircraft's characteristics. If applied with rigor, this technique can produce highly accurate results [2].

Scaling the dimensions of the J-20 against proximate ground vehicles of known types in photographs does yield very accurate dimensions, showing that the J-20 is a large fighter, in the size class of the United States F/FB-111 family of aircraft, or the proposed but never built FB-22A "theater bomber." This in turn indicates an empty weight in the 40,000 – 50,000 lb class, depending on construction technique used in the design, and an internal fuel load of up to 35,000 lb. Inevitably, this yields subsonic combat radius

figures in the 1,000 – 1,500 nautical mile class, subject to the thrust specific fuel consumption of the production engine in subsonic cruise. The J-20 is therefore a fighter built for reach, and would be competitive in range performance against the F/FB-111 series, the F-15E Strike Eagle series, and the new Russian Su-35S Flanker series. The implications of this will be discussed further.

### J-20 CAPABILITY ASSESSMENT

The shaping of the J-20 prototype has important implications from the perspectives of aerodynamic performance and stealth.

The delta canard configuration of the J-20 design is common to the earlier Chengdu J-10, the European Eurofighter Typhoon, the French Rafale and the prototype of the Russian MiG I.42 supercruise fighter. This configuration provides for high supersonic performance, excellent supersonic and transonic turn performance, and better short field landing performance than conventional delta wing designs. If equipped with suitable engines, a J-20 would be very efficient in supersonic cruise regime, with excellent close combat maneuver performance. The intended engine fit has not been disclosed, although there has been speculation that the prototype may be fitted with imported Russian Al-41F1S or Item 117S engines common to the Su-35S and T-50 PAK-FA prototypes. The Al-41F1 is an evolution of the supersonic cruise engine developed for the MiG I.42, with a more powerful Item 129 engine in development for the production T-50 [3].

There has been some media speculation about an indigenous engine for the J-20, designated the WS-15, but no substantial official disclosures to date [4].

The detail airframe stealth shaping design of the J-20 is clearly based on shaping design rules developed by the United States, and employed primarily in the F-22A Raptor, but with an engine inlet design closer to the F-35 Joint Strike Fighter. This is important insofar as most radar signature improvement in stealth designs is a result of shaping, with radar absorbent materials and detail design employed primarily to "clean up" unwanted reflections that could not be suppressed by shaping. Qualitative and quantitative analysis performed by the author indicates that the J-20 has the potential to yield much better stealth performance from the front and sides than the F-35 Joint Strike Fighter, and possibly as good as the F-22A Raptor, should Chinese designers master materials and detail design techniques adequately. The design has only two apparent weaknesses, which are the curvature in the slab side shaping, which provides broader reflection lobes than necessary, and the circular exhaust nozzle, a weakness common to the F-35 and T-50. Both may be artifacts of the prototype and may not be features of a future production aircraft.

The shaping design will be highly effective against radars operating above the 1 GigaHertz L-band, but much less effective below this band. This band coverage encompasses most surface based and

airborne search, acquisition and fire control radars used by the United States and its allies in Asia.

A survey of twenty-six unclassified English language Chinese research papers on radar absorbent materials indicates a high level of research effort in the area, but mostly for materials not suitable for aircraft applications. Research in this area is usually not published in the West and there is no reason to believe China would do differently [5].

The available data supports the proposition that the J-20, once fully developed, will be a high performance stealth aircraft, arguably capable of competing in most cardinal performance parameters (i.e. speed, altitude, stealth, agility) with the United States F-22A Raptor, and superior in most if not all cardinal performance parameters against the F-35 Joint Strike Fighter.

The intended role of the J-20 has not been disclosed officially, and widely varying views have been expressed by various observers.

The suitability of this design for various roles will depend primarily upon what engines are installed, and whether faceted stealthy exhaust nozzles modeled on the F-22 design are employed, the latter being important for deep penetration through air defense systems.

If the engines deliver 40,000 – 50,000 lb class thrust performance, the J-20 will be viable as an air combat fighter, air defense interceptor and deep strike fighter. If thrust performance falls below this benchmark, the aircraft would lack the agility for close air combat, but still be very effective as an interceptor or bomber.

What this suggests is that if Chinese engine technology has not matured enough by the latter half of this decade, when IOC is planned for the J-20 [6], early variants could be employed as strike aircraft, or interceptors, with later variants “growing” into the air combat role as more powerful engines become available.

China has deployed or developed a range of new guided weapons suitable for internal carriage by the J-20. While no imagery as yet exists showing the configuration of the J-20 internal bays, the aircraft layout could permit a similar arrangement to the F-22A, but with a longer and deeper fuselage bay capable of carrying larger bombs, or even more weapons.

Richard Fisher at the International Assessment and Strategy Center has detailed a number of Chinese 5<sup>th</sup> Generation Air-Air Missiles, including evolved variants of the PL-12, modeled on the United States AIM-120 AMRAAM, the ramjet powered “PL-13” modeled on the European MBDA Meteor, and the agile thrust vectoring PL-ASR/PL-10, modeled on the A-Darter and Iris-T missiles [7].

Guided bombs suitable for strike against surface targets are also abundant. At the Zhuhai and CIDEX 2010 arms expos, Luoyang/CASC (China Aerospace Science and Technology Corporation)

displayed a range of new guided bomb designs. These include the “Lerting” (Thunderbolt) LT-3, which is modeled on the US GBU-55/56(V)/B Laser JDAMs, the FT-1, FT-3 and FT-5 modeled on the U.S. GBU-32/35/38 JDAM satellite aided bombs, and the winged FT-2, FT-4, FT-6 and LS-6 planar wing glide bomb variants, broadly modeled on the Australian JDAM-ER glide bomb family. The LS-6 family also includes 50 kg and 100 kg small bombs, modeled on the U.S. Small Diameter Bomb series, but with cruciform strakes rather than planar wings [8].

The heavy emphasis placed by Luoyang/CASC on glide bombs is important, as these can be released by stealth aircraft from ranges well outside the detection range of the aircraft itself, which can thus remain unseen through the whole delivery maneuver, effecting complete surprise.

The strategic impact of a mature production J-20, even if limited to strike roles alone, would be profound. With sufficiently good stealth performance to defeat air defense radars in the L-band through Ku-band, the aircraft could easily penetrate all air defense systems currently deployed in Asia. Even should the aircraft be tracked by a counter-stealth radar, the high altitude supersonic cruise penetration flight profile makes it extremely difficult to engage by fighter aircraft and Surface to Air Missiles. The only fighters deployed in the Pacific Rim with the raw performance to reliably intercept a supersonic J-20 are the F-22A Raptor and Russian MiG-31 Foxhound.

The size of the J-20 and resulting fuel fraction indicate that the aircraft will be able to cover the “First Island Chain” without aerial tanker support, and with tanker support, reach targets across the “Second Island Chain” on subsonic cruise profiles. Nearer targets would be accessible on supersonic cruise profiles [9].

#### THE IMPACT OF THE J-20

There can be no doubt at this time that a mature production J-20 with fully developed stealth and supersonic cruise capability would qualify as a “game changer” in the Asia-Pacific region.

The J-20’s combination of stealth and supersonic cruise—the cardinal design feature of the F-22A Raptor—provides the capability to defeat nearly all extant Integrated Air Defense Systems. Defeat is effected by denying detection, and should detection occur, by kinetically defeating launched missiles, which cannot close with the target before it exits radar tracking range. Even without stealth, high altitude supersonic aircraft are challenging targets for all but the largest and longest ranging Surface to Air Missiles. Interceptor aircraft without a capability for sustained supersonic flight are typically ineffective against high altitude supersonic targets.

The development of the J-20 around the combination of stealth and supersonic cruise results in a design, which will be undetectable at range by almost all air defense radars operated by the United States and its numerous allies in the Asia-Pacific region. In practical terms,

this results in the “block obsolescence” of most Asian air defense systems.

Another important consideration is that the J-20 is a large fighter and therefore, if flown on fuel efficient subsonic cruise profiles, will be able to reach targets at ranges of around 1,000 nautical miles without aerial refueling tanker support.

If flown from PLA airbases along the eastern seaboard of mainland China, the J-20 will thus be able to comfortably reach any target within China’s “First Island Chain,” unrefueled. These targets include airfields in Japan, South Korea, and former US Air Force airbases in the Philippines.

With modest aerial refueling support, the J-20 will be able to reach most targets situated along China’s “Second Island Chain,” including the strategically critical Guam facilities.

The strategic choices available to the United States and its allies for dealing with the J-20 are very limited; such is the potency of all aircraft combining stealth and supersonic cruise capabilities. These distill down to the deployment of large numbers of F-22A Raptor fighters in the region, and the development and deployment of “counter-stealth” radars operating in the HF, VHF, and UHF radio-frequency bands. Funding for the production of the F-22A was stopped in 2009, following an intensive political effort by Secretary of Defense Robert M. Gates. There is no program to fund the development and volume production of “counter-stealth” radars.

The incumbent U.S. Administration has thus committed itself politically to a path in developing air power for the U.S. armed services and allied air forces, predicated wholly on future opponents operating obsolete Soviet era air defense weapons and fighters. The unveiling of the Russian T-50 PAK-FA and Chinese J-20 over the last two years has not produced any significant changes in U.S. planning, which may challenge the United States and its Pacific Rim allies’ strategic advantage in conventional air power.

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#### NOTES:

1. Military talents build-up to be enhanced: Hu, People’s Daily Online, April 20, 2011, <http://english.peopledaily.com.cn/90001/90776/90786/7356841.html>.
2. Kopp C. and Goon P.A., *Chengdu J-XX [J-20] Stealth Fighter Prototype; A Preliminary Assessment*, Technical Report APA-TR-2011-0101, Air Power Australia, January, 2011, <http://www.ausairpower.net/APA-J-XX-Prototype.html>.

3. “Изделие 129” для ПАК ФА создадут раньше срока (“Item 129” for the PAK-FA will arrive ahead of schedule), News report, *Lenta.ru*, <http://www.lenta.ru/news/2011/04/13/pakfa/>.

4. Fisher, R., Jr, *October Surprises In Chinese Aerospace*, International Assessment and Strategy Centre, December, 2009, [http://www.strategycenter.net/research/pubID.219/pub\\_detail.asp](http://www.strategycenter.net/research/pubID.219/pub_detail.asp).

5. Refer supplementary list of papers. Available upon request.

6. In November, 2009, the Deputy Commander of the PLAAF cited 2018-2019 as an IOC, refer L.C. Russell Hsiao, CHINA’S FIFTH-GENERATION FIGHTERS AND THE CHANGING STRATEGIC BALANCE, CHINA BRIEF, VOLUME IX, ISSUE 23, NOVEMBER 19, 2009, Jamestown Foundation, [http://www.jamestown.org/uploads/media/cb\\_009\\_64.pdf](http://www.jamestown.org/uploads/media/cb_009_64.pdf).

7. Fisher, R, Jr, *China’s Emerging 5th Generation Air-to-Air Missiles*, International Assessment and Strategy Centre, February, 2008, [http://www.strategycenter.net/research/pubID.181/pub\\_detail.asp](http://www.strategycenter.net/research/pubID.181/pub_detail.asp); also Kopp C., *PLA Air to Air Missiles*, Technical Report APA-TR-2009-0802, Air Power Australia, August, 2009, <http://www.ausairpower.net/APA-PLA-AAM.html>.

8. Kopp C. and Andrew M., *PLA Guided Bombs*, Technical Report APA-TR-2009-0808, Air Power Australia, August, 2009, <http://www.ausairpower.net/pla-air-pwr.html>.

9. Kopp C., *The Strategic Impact of China’s J-XX [J-20] Stealth Fighter*, APA NOTAM #70, Air Power Australia, January, 2011, <http://www.ausairpower.net/APA-NOTAM-090111-1.html>.

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