An Assessment of China's Defense Strategy in the post-Cold War Era.
What Role for Bilateral Defense Cooperation with Russia?

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Foreword

In the following pages we are going to explore the principal aspects of China's defense strategy in the post-Cold War era, presenting an overview of the Sino-Russian defense cooperation.

In our study the main focus will be placed on the Chinese national defense strategy; the evolution of the operational/tactical doctrine (in particular, the "active defense", and "offshore active defense" doctrines) of the People's Liberation Army (PLA); PLA's plans for the development of regional power-projection capabilities; and, the role of the United States of America and Japan as critical independent variables, influencing China's foreign and defense policies. The description and illustration of China's threat perceptions in the 21st century will be one of our basic goals. Moreover, we will analyze the centrality of the Taiwan issue in the Chinese defense planning, the development of "sea denial" capabilities by the PLA Navy, as well as some of the tactics described in Chinese doctrinal textbooks (such as the "*Zhanyixue*") for the successful prevention or victory over a possible American military intervention in support of Taiwan. PLA Navy's anti-aircraft carrier tactics, and the development of submarine and mine warfare capabilities will constitute another focal point of our research.

In the fourth chapter of our paper we are going to present a concise analysis of the influence exercised on the current Chinese defense and geopolitical planning by Friedrich Ratzel's concept of "living space", and Alfred Thayer Mahan's theory on the importance of naval power. Finally, our intention is to try to portray the bilateral Sino-Russian defense cooperation (developed after Soviet Union's dissolution) as an important dimension of the Chinese national defense strategy in the post-Cold War era. We will attempt at presenting the main dilemmas and challenges posed by this relationship and define the main factors that will determine the future perspectives of the Sino-Russian defense cooperation. Particular focus will be placed on arms transfers[1] and military-technical cooperation between the two states.

In the final part of our monograph we will present three analytical tables depicting all the major contracts providing for arms transfers, concluded between the PRC and the Russian Federation throughout the period 1992-2009, and their implications for the regional security. The drafting of these tables (which constitute an integral part of the present paper, and not an appendix) was based on an original work, using a wide variety of critically reviewed data coming from open sources.

Last, but by no means least, it should be noted that, as the title directly implies, our study does not aspire to provide a comprehensive picture or perspective of China's defense strategy. The scope of the present paper is much more limited and narrow. Our aim is to provide an outline of the main directives and guidelines that shape China's defense strategy in the post-Cold War era (putting emphasis on China's defense cooperation with Russia), without having the ambition of presenting an exhaustive, descriptive, multifaceted analysis of China's contemporary defense policy.

[1] Arms transfers represent "the international transfer (under terms of grant, credit, barter, or cash) of military equipment, usually referred to as 'conventional', including weapons of war, parts thereof, ammunition, support equipment, and other commodities designed for military use". Ming-Yen Tsai, *From Adversaries to Partners: Chinese and Russian Military Cooperation after the Cold War*, Praeger Publishers, Westport, CT, 2003, p. 4.

1. Introduction. The doctrine of the People's Liberation Army (PLA)

> *"Renewing war conceptions is more important than weapon renewal. The overall national power of China in Qing Dynasty during Jiawu War[2] was stronger than that of Japan. Although at that time the most advanced weapon[s] had been introduced into China, we still could not even sustain a war because no advanced notion of war had been introduced to China then. Iraq War showed us again the fearful consequence of a conceptual lag".*[3]
>
> Liu Yazhou, Lieutenant General and Deputy Political Commissar of the PLA Air Force

In all militaries, doctrine consists of the basic principles that guide military commanders and their staff in planning and executing the application of military force to achieve specific military objectives. Doctrine derives from a variety of sources that profoundly affect its development: strategy, history, technology, the nature of the threats the nation and its armed forces face, inter-service relationships, and political decisions that allocate resources and designate roles and missions.

In that context, we can argue that doctrine is the statement of how a country's armed forces, as part of a joint team, intend to conduct war, and operations other than war. It is the condensed expression of the armed forces fundamental approach to fighting, influencing events in operations other than war, and deterring actions detrimental to national interests. Thus, doctrine reflects the strategic context in which combat forces will operate, sets a marker for the incorporation of developing technologies, and optimizes the use of all available resources.[4]

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[2] The Jiawu War (also known as the "First Sino-Japanese War") erupted on August 1, 1894 and officially ended on April 17, 1895 with the conclusion of the treaty of Shimonoseki. It was a war fought between Qing Dynasty China and Meiji Japan over the control of the Korean peninsula. It seems that Lieutenant General Liu Yazhou had in mind the unfortunate (for the Chinese) Battle of the Yalou (September 17, 1894). This battle demonstrated that modern naval equipment can be useless without the appropriate tactics and training that allow forces to efficiently coordinate together as a unit and fully exploit the advantages offered by modern weapon systems. More specifically, while Qing China was willing, albeit grudgingly, to purchase Western naval equipment, it refused to send large numbers of officers abroad to adopt the intellectual processes and the educational system that had made these systems so effective in the West. For an in-depth and concise, at the same time, presentation of China's naval policies and strategy under the Qing dynasty, see Bruce A. Elleman, "The Neglect and Nadir of Chinese Maritime Policy under the Qing", in Andrew S. Erickson, Lyle J. Goldstein, and Carnes Lord, eds., *China Goes to Sea: Maritime Transformation in Comparative Historical Perspective*, Naval Institute Press, Annapolis, MD, 2009, pp. 288-319.

[3] "Interview with Lieutenant General Liu Yazhou of the Air Force of the People's Liberation Army", *Heartland: Eurasian Review of Geopolitics*, no. 1/2005, Gruppo Editoriale l' Espresso / Cassan Press HK, March 19, 2005, p. 28, http://temi.repubblica.it/limes-heartland/china-america-the-great-game/748 .

[4] Headquarters Department of the Army, *FM 100-5 Operations*, Washington, D.C., June 14, 1993, pp. 1-1, 1-2, http://www.dtic.mil/doctrine/jel/service_pubs/fm100_5.pdf .

As succinctly described in the U.S. Army's principal field training manual (Field Manual 100-5): "Never static, always dynamic, […] doctrine is firmly rooted in the realities of current capabilities. At the same time, it reaches out with a measure of confidence to the future. Doctrine captures the lessons of past wars, reflects the nature of war and conflict in its own time, and anticipates the intellectual and technological developments that will bring victory now and in the future".[5]

As a consequence, it should not be surprising that doctrine is fundamental to all facets of China's military modernization. It is far more than the abstract study of warfare; it is central to how the PLA is organized and prepares to apply lethal force. As a matter of fact, over the past three decades, reforming doctrine has been a catalyst for a vast range of PLA reforms, professionalization, and modernization (reconfiguring the force structure, personnel recruitment, military education, training regimens, hardware needs, research and development, weapons procurement, and operational strategy).[6]

China does not make publicly available a unified, single doctrine for guiding military operations. Chinese doctrine must be understood as the combination of several documents and guidelines at different command levels of the armed forces. Based on analysis of available documents, speeches, and writings, we understand that China uses what it calls the "*National Military Strategic Guidelines for the New Period*" as its national military strategy.[7]

That said, and trying to analyze the Chinese military doctrine, it becomes clear that over the past seven decades the doctrine of the People's Liberation Army (PLA) has evolved through roughly five phases:

i) People's war[8] (1935-1979);

ii) People's war under modern conditions (1979-1985);

iii) Limited war (1985-1991);

iv) Limited war under high-technology conditions (1991-2004);

v) Local wars under conditions of informationization (2004-present).[9]

At the beginning of the 21st century, with the important exception of the volatile Taiwan situation, it would seem that China faces no tangible or immediate external military threats. Although the Asian financial crisis of the late 1990s pointed up distinct non-military dangers to China's social stability and national security, and further sensitized China's leaders to the volatile forces of interdependence and globalization and

[5] FM 100-5 is the U.S. Army's keystone war-fighting doctrine. It is a guide for Army commanders, and it describes how to think about the conduct of campaigns, major operations, battles, engagements, and operations other than war. FM 100-5 furnishes the authoritative foundation for subordinate doctrine, force design, materiel acquisition, professional education, and individual and unit training. As the U.S. Army's keystone doctrine, FM 100-5 describes how the Army thinks about the conduct of operations. Headquarters Department of the Army, *FM 100-5 Operations*, Washington, D.C., June 14, 1993, p. v, http://www.dtic.mil/doctrine/jel/service_pubs/fm100_5.pdf .

[6] David Shambaugh, *Modernizing China's Military: Progress, Problems, and Prospects*, University of California Press, Berkeley, Los Angeles and London, 2002, p. 56.

[7] Office of the Secretary of Defense, *Military Power of the People's Republic of China 2006*: *Annual Report to Congress*, Washington, D.C., 2006, p. 13, http://www.fas.org/nuke/guide/china/dod-2006.pdf.

[8] In the 21st century, People's War still remains one of the principal PLA war-fighting doctrinal guidelines. From 1998 on, every White Paper on China's National Defense has declared that the PLA adheres to the "strategic concept" of People's War as part of China's "military strategy" of active defense.

[9] David Shambaugh, *Modernizing China's Military: Progress, Problems, and Prospects*, University of California Press, Berkeley, Los Angeles and London, 2002, p. 60.

their relationship to China's security, from an objective military standpoint China has never been more secure. China is not in any danger of being overrun by a military adversary at the moment.

However, Beijing is concerned about the loss of territory through separatist actions and/or foreign aggression, and seeks to maintain the unity of its national territory. Taiwan and Tibet are the two most prominent examples of territory that the PRC wants to keep integrated with the national centre, but there are also disputes concerning islands and waters in the East China Sea (the Diaoyu/Senkaku Islands) and in the South China Sea (the Spratly Islands), as well as border territories that remain under dispute (such as along the Sino-Indian border). Beijing is also concerned about "unity" in the sense of maintaining social stability under the Communist Party's political leadership.[10]

So, to the rhetorical questions why should the Chinese worry about deterrence, and which foreign power in its right mind would want to attack or invade China, the Chinese would almost certainly point, among others, to the U.S. assaults on Serbia and Iraq, the 1999 U.S. bombing of the Chinese embassy in Belgrade, Washington's avowed wish to institute regime change in "rogue states" and promote the western democratic values through "colour revolutions", frequent aerial reconnaissance and electronic intelligence gathering missions within China's Exclusive Economic Zone (EEZ) carried out by U.S. Signals Intelligence (SIGINT), electronic warfare and reconnaissance aircraft[11], intelligence data gathering operations involving U.S. Navy vessels within the limits of the

[10] The first and foremost mission entrusted to the PLA, and a national military objective, is to be the guardian of the CCP. The PLA remains the party's army. The revolutionary heritage of that army and its roots as a communist insurgent force that saved the fledgling CCP from annihilation in the 1920s and 1930s is not too distant a memory for some of the current PLA leaders. David M. Finkelstein, "China's National Military Strategy", in James C. Mulvenon, Richard H. Yang, eds., *The People's Liberation Army in the Information Age*, RAND Corporation, Project Air Force, Santa Monica, CA, July 1999, p. 109, http://www.rand.org/pubs/conf_proceedings/CF145/CF145.chap7.pdf . Michael R. Chambers, "Framing the problem: Chinas' threat environment and international obligations", in Roy Kamphausen and Andrew Scobel, eds., *Right-Sizing the People's Liberation Army: Exploring the Contours of China's Military*, Strategic Studies Institute, U.S. Army War College, Carlisle, PA, September 2007, p. 24, http://www.strategicstudiesinstitute.army.mil/pubs/display.cfm?pubID=784 .

[11] On April 1, 2001 a mid-air collision between a United States Navy EP-3E ARIES II [Airborne Reconnaissance Integrated Electronic System] signals surveillance aircraft and a People's Liberation Army Navy J-8II interceptor fighter jet occurred about 70 miles (110 km) away from the Chinese island of Hainan, in international airspace above China's 200-mile Exclusive Economic Zone (EEZ). The collision resulted in the crash of the J-8II and the death of the Chinese pilot, Lt. Cdr. Wang Wei. Shirley A. Kan (Coord.), David Ackerman, Richard Best, Christopher Bolkcom, Robert Chapman, Richard Cronin, Kerry Dumbaugh, Stuart Goldman, Mark Manyin, Wayne Morrison, Ronald O'Rourke, *China-U.S. Aircraft Collision Incident of April 2001: Assessments and Policy Implications*, Congressional Research Service Report for Congress, Order Code RL30946, Washington, D.C., October 10, 2001, pp. 1-6, 16, http://www.fas.org/sgp/crs/row/RL30946.pdf .

Chinese EEZ[12], and Washington's ongoing development of a missile-defense system to protect the American soil from attack.[13]

Therefore, it must not be surprising that the assessment of China's security environment by the PLA's security analysts suggests that China lives in a dangerous neighborhood and that the PLA must be prepared for a range of potential threats, both external and internal.[14]

The central guideline for war-fighting within China's military doctrine is the concept of "active defense". Attempts to discern a systematic hierarchy among Chinese war-fighting principles usually identify two interrelated concepts at the top level of PLA's military doctrine: "active defense", and "local wars under conditions of informationization".[15]

[12] In March 2009, the U.S. Department of Defense publicly protested that on March 8, 2009 five Chinese vessels "aggressively maneuvered" around the USNS *Impeccable* "in an apparent coordinated effort to harass the U.S. ocean surveillance ship, while it was conducting routine operations in international waters" 70-75 miles (i.e. 120 km) south of Hainan island. "Chinese ships 'harass' US vessel", *BBC News*, March 9, 2009, http://news.bbc.co.uk/2/hi/asia-pacific/7933171.stm . Jim Garamone, "Chinese Vessels Shadow, Harass Unarmed U.S. Survey Ship", *American Forces Press Service*, Washington, D.C., March 9, 2009, http://www.defenselink.mil/news/newsarticle.aspx?id=53401 .

[13] Steve Chan, "Soft Deterrence, Passive Resistance: American Lenses, Chinese Lessons", *Ridgway Center Working Papers*, University of Pittsburgh, 2005, p. 23, http://www.isn.ethz.ch/isn/Digital-Library/Publications/Detail/?ord516=OrgaGrp&ots591=0C54E3B3-1E9C-BE1E-2C24-A6A8C7060233&lng=en&id=21245 .

[14] According to the Chinese perceptions, domestic stability is always of paramount importance, and external threats are usually perceived in the context of aggravating domestic instability. David Shambaugh, *Modernizing China's Military: Progress, Problems, and Prospects*, University of California Press, Berkeley, Los Angeles and London, 2002, pp. 284-285.

[15] Anthony H. Cordesman and Martin Kleiber, *Chinese military modernization and force development*, Center for Strategic and International Studies, Washington, D.C., September 7, 2006, p. 9, http://www.csis.org/media/csis/pubs/060907_chinesemilitary.pdf .

2. The concept of "active defense" for the PLA, and the PLA Navy. Implications on the development of tactical/operational strategies

For many years, the PLA's operative military strategy, primarily at the campaign level of warfare, has been known as "active defense". "Active defense" is the highest level of strategic guidance for all PLA military operations during war and preparation for war during peacetime. It applies to all PLA services and branches (i.e. PLA Ground Forces, PLA Air Force, PLA Navy). This term has its origins in the Chinese revolutionary war, when Mao proposed a military strategy of "offensive defense or defense through decisive engagements", in which PLA units would proactively engage the enemy, exploiting its weak points and attempting to destroy enemy capabilities and will. Mao contrasted "active defense" with "passive defense", also known as "defensive defense" or "pure defense".

In Mao's opinion, "passive defense" was actually a spurious kind of defense, and the only real defense was active defense, defense for the purpose of counter-attacking and taking the offensive. He viewed "protracted defensive resistance" as a transient measure dictated by an unfavourable balance of forces, not the core of China's national strategy, let alone its strategic preference.[16]

Active defense, as elaborated by Mao, takes place within a broader context of people's war. The Maoist theory of people's war is often regarded as passive warfare or necessity: to "lure the enemy in deep", in order to overcome the enemy's technological superiority by playing to the strengths of geography and the civilian population. But, Mao's writings on active defense make clear that people's war also has an offensive and proactive component, and it doesn't limit military strategy to a purely defensive or passive philosophy.[17]

"*Only a complete fool or a madman*", Mao proclaimed, "*would cherish passive defense as a talisman. […] Our warfare consists of the alternate use of the defensive and the offensive. Defensive warfare, which is passive in form, can be active in content, and can be switched from the stage in which it is passive in form to the stage in which it is active both in form and in content. In appearance a fully planned strategic retreat is made under compulsion, but in reality it is effected in order to conserve our strength and bide our time in order to defeat the enemy, to lure him in deep and prepare for our counter-offensive*".[18]

Though people's war starts from a strategically defensive posture, like Clausewitz and American and Soviet/Russian strategists, Chinese military planners understand the decisive nature of the offense. Chinese doctrine seeks to gain the initiative and take the offensive after the enemy strikes the first blow; however, it also allows for preemptive

[16] James Holmes and Toshi Yoshihara, "Mao Zedong, Meet Alfred Thayer Mahan: Strategic Theory and Chinese Sea Power", *Australian Defence Force Journal*, Issue 171, 2006, p. 38, http://www.defence.gov.au/publications/dfj/dfj171a.pdf . James R. Holmes and Toshi Yoshihara, *Chinese Naval Strategy in the 21st Century: The Turn to Mahan*, Routledge, London and New York, 2008, p. 84.

[17] David Shambaugh, *Modernizing China's Military: Progress, Problems, and Prospects*, University of California Press, Berkeley, Los Angeles and London, 2002, p. 58.

[18] James R. Holmes and Toshi Yoshihara, *Chinese Naval Strategy in the 21st Century: The Turn to Mahan*, Routledge, London and New York, 2008, pp. 84, 85.

action at the tactical and operational levels. As it is stated in the 2001 edition of the *Zhanlüexue* (i.e. *The Science of Military Strategy*), one of the main reference handbooks for senior PLA officers: "*if any country or organization violates the other country's sovereignty and territorial integrity, the other side will have the right to 'fire the first shot' on the plane of tactics*".[19] After conflict has been initiated, Chinese forces will seek to shift to the offensive whenever possible. Therefore, Mao's active defense military doctrine referred to the art of preparing the conditions for a strategic counter-offensive, culminating in a decisive engagement.

In the 21st century, active defense should be understood as an operational guideline for military strategy that applies to all branches of the Chinese armed forces. It means that officially China does not start wars to achieve strategic means, and thus remains committed to only use its armed forces to defend against attacks at its national sovereignty. In that context, any attack by the People's Republic of China against Taiwan would be legitimized by "active defense" as a pre-emptive, defensive act.[20] Not surprisingly, the PRC's intervention in Korea (1950-1953), and border conflicts with India (1962), the Soviet Union (1969), and Vietnam (1979) are all considered "self-defense counter attacks" within authoritative Chinese texts.

Nowadays, as described in the 2008 Chinese Defense White Paper, the revised/updated version of the active defense doctrine aims at winning local wars in conditions of informationization and prepares the military for defensive operations under complex circumstances. Information warfare is a means, not a goal. Thus, the PLA aims to integrate information operations with firepower, manoeuvre, and special operations as it conducts campaigns. Taking integrated joint operations as the basic approach, it is designed to bring the operational strengths of different services and arms into full play, combine offensive operations with defensive operations, and give priority to the flexible application of strategies and tactics. It endeavours to refine the command system for joint operations, and speed up the building of a combat force structure suitable for winning local wars in conditions of informationization. In fact, active duty PLA forces have a variety of electronic warfare and intelligence units that are capable of both offensive and defensive information operations, including cyber operations.[21]

More specifically, China from a strategic point of view adheres to the principle of featuring defensive operations, self-defense, and striking and getting the better of the enemy only after the enemy has started an attack. This guideline lays stress on deterring crises and wars and calls for the building of a lean and effective deterrent force and the flexible use of different means of deterrence. As an element of deterrence, people's war is also a means for Beijing to subdue the enemy without fighting and attain strategic objectives. In *Zhanlüexue*'s words: "*War-fighting is generally used only when deterrence*

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[19] Dennis J. Blasko, "Chinese Strategic Thinking: People's War in the 21st Century", *China Brief*, The Jamestown Foundation, Vol. 10, Issue 6, March 18, 2010, http://www.jamestown.org/programs/chinabrief/single/?tx_ttnews%5Btt_news%5D=36166&tx_ttnews%5BbackPid%5D=25&cHash=0fc6f0833f . [*N.B. This reference to D. Blasko's article was added, after the original version of the present study had been completed*].

[20] Office of the Secretary of Defense, *Military Power of the People's Republic of China 2006*: *Annual Report to Congress*, Washington, D.C., 2006, p. 13, http://www.fas.org/nuke/guide/china/dod-2006.pdf.

[21] Information Office of the State Council of the People's Republic of China, *China's National Defense in 2008*, Beijing, January 2009, pp. 8, 9, http://www.fas.org/programs/ssp/nukes/2008DefenseWhitePaper_Jan2009.pdf .

fails and there is no alternative; strategic deterrence is also a means for attaining the political objective".[22]

If deterrence fails to lead to success, the updated concept of active defense provides that, under the premise of a general defensive strategy, the PLA should primarily possess a powerful counterattack capability (praised by Mao Zedong himself in the passage quoted above -in p. 10-), rather than a purely defensive capability. That is, taking tactically offensive action within a basically defensive strategy. Thus, the defending forces undertake offensive operations to wear down the adversary, while he is strategically on the offensive and attacking.[23] As the PLA Lieutenant General Liu Yazhou stated in 2005: "We will only stop war by way of conducting counterattacks. In the Mechanization Age we were defending linearly. We could station troops along the borders, or to increase the depth of resistance, so that resistance would continue one after another".[24]

As far as the implementation of the active defense doctrine to the PLA Navy is concerned, we have to mention that in 1985 the Chinese Communist Party Central Military Commission approved a PLAN component of the active defense strategic guidelines known as "*Offshore [or Near-Seas] Active Defense*". Since then, Chinese strategists have consistently reformulated Mao's dictums for application in the nautical realm.

Adopting offshore active defense represented a significant strategic paradigm shift for both PLAN operations and naval modernization efforts. It revised the strategic-level operational guidance to the PLAN, directing it to shift from reactive coastal defense, that is preparing for operations close to Chinese shores, to preparing for maritime operations in the seas off the Chinese littoral, giving therefore greater emphasis to operational and tactical offensive action.[25]

The principal elements of the offshore active defense strategy were initially (in the 1980s) defined as a stubborn defensive posture near the shore, mobile warfare at sea, and

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[22] Dennis J. Blasko, "Chinese Strategic Thinking: People's War in the 21st Century", *China Brief*, The Jamestown Foundation, Vol. 10, Issue 6, March 18, 2010, http://www.jamestown.org/programs/chinabrief/single/?tx_ttnews%5Btt_news%5D=36166&tx_ttnews%5BbackPid%5D=25&cHash=0fc6f0833f . [*N.B. This reference to D. Blasko's article was added, after the original version of the present study had been completed*].

[23] In contrast, "passive defense" means that the defending forces simply resist without attempting to weaken the adversary as he prepares to attack or is actually on the offensive. Ken Allen, "PLA Air Force Organization", in James C. Mulvenon, Richard H. Yang, eds., *The People's Liberation Army in the Information Age*, RAND Corporation, Project Air Force, Santa Monica, CA, July 1999, p. 368.

[24] To wage micro-level offensives within a macro-level defensive campaign, Mao Zedong, advised commanders to position their forces at strategic points, where they could deplete and exhaust enemy forces and vanquish them piecemeal. "Interview with Lieutenant General Liu Yazhou of the Air Force of the People's Liberation Army", *Heartland: Eurasian Review of Geopolitics*, no. 1/2005, Gruppo Editoriale l' Espresso / Cassan Press HK, March 19, 2005, p. 28, http://temi.repubblica.it/limes-heartland/china-america-the-great-game/748 . James R. Holmes and Toshi Yoshihara, *Chinese Naval Strategy in the 21st Century: The Turn to Mahan*, Routledge, London and New York, 2008, p. 85.

[25] The PLAN's previous strategic concept of "coastal defense" focused planning and operations on a close-in defense of China's coast in support of a major land war. Specifically, coastal defense addressed an anticipated Soviet land invasion from the north supported by operations against the Chinese coast by the Soviet Pacific Fleet. Hence, the PLAN was landward-focused and was expected to play a supporting role in China's most likely assessed future contingency. Office of Naval Intelligence, *China's Navy 2007*, Washington, D.C., 2007, pp. 24-25, http://www.fas.org/irp/agency/oni/chinanavy2007.pdf .

surprise guerrilla-like tactics at sea. However, since the 1995-1996 Taiwan Strait crisis, the aim of China's maritime strategy is no longer to lure the enemy deep into Chinese territorial waters to engage it in a people's guerrilla war, but to confront the enemy in the outer approaches and stop its advance well before it reaches coastal waters.

In that context, offshore active defense is directly linked with the concept of "sea denial", itself a critical tenet of sea power. The concept of sea denial furnishes perhaps the best indicator of how China will put its Mao–inspired naval strategy into practice. The Chinese Navy having adopted a sea denial strategy, seeks to establish conditions that deter or prevent its adversaries (mainly the U.S., the Japanese and the South Korean Navies) from operating for an extended period of time within a nautical expanse, that includes: the first "island chain"[26], Yellow Sea, East China Sea and South China Sea, or the three near seas within the inner rims of the first island-chain, and sea areas adjacent to the outer rims of this island-chain and those of the North Pacific.[27]

Certainly, sea denial is generally considered a strategically defensive stance taken by inferior naval powers. But, the operations and tactics involved are often offensively oriented; an approach philosophically in tune with Mao, whose famous essay "*On Protracted War*" recommended using offensive means to achieve defensive ends, and with A.T. Mahan's injunction for even inferior navies to impose command of the sea in waters of vital interest.[28]

As a matter of fact, the offshore active defense doctrine requires the PLAN to acquire the offensive capabilities for capturing and sustaining local and temporary sea-control for sea-crossing and amphibious-landing operations, for establishing such control of major sea lanes of communication in the near seas, and for nuclear retaliation.[29]

More specifically, the current PLA Navy doctrine for maritime operations focuses on six offensive and defensive tactical campaigns:

i) Blockade campaign;
ii) Anti-sea lines of communication campaign;
iii) Maritime-land attack campaign;
iv) Anti-ship campaign;
v) Maritime transportation protection campaign;
vi) Naval base defense campaign.[30]

So, according to PLAN writings, the current interpretation of the offshore active defense doctrine differs to a large extent from the previous, 1980s, interpretation of the

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[26] The first island chain is usually described as a line through the Kurile Islands, Japan, the Ryukyu Islands, Taiwan, the Philippines, and Indonesia (Borneo to Natuna Besar).

[27] Nan Li, "China's evolving naval strategy", *EAI Background Brief*, No. 343, 26 July 2007, p. 6, http://www.eai.nus.edu.sg/BB343.pdf .

[28] James Holmes and Toshi Yoshihara, "The Best Defense is a Good Offense for China's Navy", *In The National Interest*, June 2005, http://www.inthenationalinterest.com/Articles/June%202005/June2005Holmes.html . James Holmes and Toshi Yoshihara, "Mao Zedong, Meet Alfred Thayer Mahan: Strategic Theory and Chinese Sea Power", *Australian Defence Force Journal*, Issue 171, 2006, p. 40, http://www.defence.gov.au/publications/dfj/dfj171a.pdf .

[29] Nan Li, "China's evolving naval strategy", *EAI Background Brief*, No. 343, July 26, 2007, p. 7, http://www.eai.nus.edu.sg/BB343.pdf .

[30] Office of the Secretary of Defense, *Military Power of the People's Republic of China 2009*: *Annual Report to Congress*, Washington, D.C., 2009, pp. 11-12, http://www.defenselink.mil/pubs/pdfs/China_Military_Power_Report_2009.pdf .

same doctrinal concept. During the last 15 years, offshore active defense has been transformed into an overarching strategic concept that directs the PLAN to be prepared to accomplish its "*three key missions for the new period*" by engaging in maritime operations out at sea, and building a naval service that is capable of sustaining operations out at sea. Those three key missions are to:

- Keep the enemy within limits and resist invasion from the sea/seaborne aggression.
- Protect the nation's territorial sovereignty.
- Safeguard the motherland's unity and maritime rights.[31]

In other words, the offshore active defense is the general strategic concept that aims at fulfilling the three main missions assigned by the Communist Party's Central Military Commission to the PLA Navy. The six aforementioned tactical campaigns are serving, therefore, as the main means in the tactical level for the successful realization of the three strategic missions.

To recapitulate, it becomes all the more obvious that the interaction of the current security environment (no threat of a Soviet invasion, but many potential peripheral conflicts), and the new operational environment (highly lethal local wars under modern, high-tech conditions) have influenced to a considerable extent the way the PLA is thinking about employing force on the 21st century's battlefield. The three service branches of the PLA have gradually started being transformed: from an army preparing to fight local wars under ordinary conditions to an army preparing to fight and win local wars under modern, high-tech conditions; from an army based on quantity to an army based on quality; from an army that is personnel intensive to one that is science and technology intensive.[32]

In the tactical/operational level, the characteristics of the active defense doctrine are constantly evolving. For instance, in the PLA Navy (since roughly 2004) some officers have started evoking a new, updated interpretation of the active defense doctrine, which is called the "*Far Sea Defense*" concept.[33] Nevertheless, as it has already become apparent, a representative list of common characteristics of the notion of active defense (especially for the Ground Forces) is warranted, and we could briefly present these characteristics, indicating also the previous maxims (of the 1970s-1980s), so as to fully appreciate the magnitude of the change in operational thinking that is currently going on inside the PLA:

- From luring deep to fighting forward.
- From a war of annihilation to a campaign against key points.
- From a war of attrition to a decisive campaign with a decisive first battle.
- From waiting for the first blow to deterring the first blow by force.

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[31] Office of Naval Intelligence, *China's Navy 2007*, Washington, D.C., 2007, p. 25, http://www.fas.org/irp/agency/oni/chinanavy2007.pdf .

[32] Office of Naval Intelligence, *China's Navy 2007*, Washington, D.C., 2007, p. 24, http://www.fas.org/irp/agency/oni/chinanavy2007.pdf .

[33] The Far Sea Defense doctrine emphasizes multi-dimensional precision attacks beyond the first island chain, and operations outside China's claimed 200 nautical mile Exclusive Economic Zone to defend Chinese national interests, adding a layer of strategic depth within which to defend China's coastline. Nan Li, "China's evolving naval strategy", *EAI Background Brief*, No. 343, July 26, 2007, p. 12, http://www.eai.nus.edu.sg/BB343.pdf . Office of the Secretary of Defense, *Military Power of the People's Republic of China 2009*: *Annual Report to Congress*, Washington, D.C., 2009, p. 18, http://www.defenselink.mil/pubs/pdfs/China_Military_Power_Report_2009.pdf .

- From a defensive campaign to an "offensive defense" campaign.
- From "advance and retreat boldly" to checking the initial enemy advance.
- From a "front army campaign" to a "war zone" campaign.
- From the principle of mass to the principle of concentration of firepower.
- From four single service campaigns to joint campaigns.[34]

Evolution of the PLA's Operational/Tactical Doctrine and Strategies

Periods	Scale	Length	Posture	Dynamics	Manpower/ Technology	Arms/Services
Pre-1979: People's war	Early, total, nuclear war	Protracted	Defense dominant	Mobile, "lure enemy in deep"	Manpower-intensive, "inferior fighting superior"	Combination of regular, local and militia
Post-1979: People's war under modern conditions	Major, total war	Less protracted	Defense dominant	Positional defense of borders and cities	Less manpower-intensive	Combined arms (infantry, armour, artillery, engineering, etc.)
Post-1985: Local war under modern conditions	Local war	"Quick battle, quick resolution"	Offense: "gain initiative by striking first"	Mobile, forward deployment	"Elite forces and sharp arms"	Combined arms
Post-1991: Local war under high-tech conditions	War zone campaign	"Quick battle, quick resolution"	Offense dominant	Mobile, forward deployment	Mechanized "elite forces and sharp arms"; "local and temporary superiority"	Joint services operations (ground, naval, air, missile services)
Post-2002: Local war under information conditions	Campaign and battle	"Quick battle, quick resolution"	Offense dominant	Mobile, power-projection	Mechanized and informationized "elite forces and sharp arms"	Integrated joint operations

Source: Nan Li, Eric McVadon, Qinghong Wang, "China's Evolving Military Doctrine", *Pacific Forum CSIS Issues and Insights*, Vol. 6, No. 20, Honolulu, Hawaii, December 2006, p. 6, http://www.isn.ethz.ch/isn/Digital-Library/Publications/Detail/?ots591=0C54E3B3-1E9C-BE1E-2C24-A6A8C7060233&lng=en&id=30442 .

[34] David M. Finkelstein, "China's National Military Strategy", in James C. Mulvenon, Richard H. Yang, eds., *The People's Liberation Army in the Information Age*, RAND Corporation, Project Air Force, Santa Monica, CA, July 1999, pp. 128-129, http://www.rand.org/pubs/conf_proceedings/CF145/CF145.chap7.pdf .

3. What type of wars is the PLA prepared to fight? The centrality of the Taiwan issue in the Chinese military planning; the adoption of tactics aimed at preventing or thwarting a possible American intervention in support of Taiwan; and, the development of sea denial capabilities by the PLA Navy

In the 1980s, PLA theorists and planners began considering how to cope with sudden, from multiple directions, attacks against targets deep inside China's territory. They identified four possible scenarios:

i) Small wars (presumably at the frontiers);
ii) Medium-sized conventional wars;
iii) Full-scale conventional wars, under the condition of nuclear deterrence;
iv) Nuclear war.

Deng Xiaoping's adoption of a peacetime strategy in 1985 was based on the premise that the 3rd and 4th of these types of war would not occur in the 20th century, and thus investments in forces for limited retaliation against a nuclear first strike could be lowered and the people's militia (essential for waging a People's War) substantially reduced.

China's 2004 White Defense Paper states that the People's Republic must be able to win "local wars under conditions of informationization".[35] This stands in contrast to the term "limited wars under high-tech conditions" (or War Zone Campaigning), which was a previous guideline from 1991-1993 until about 2002-2004.

Limited wars under high-tech conditions can be defined as conflicts with limited political objectives and geographical scope and short in duration but with decisive strategic outcomes. They are usually fought over territorial claims, economic disputes, or ethnic rivalries. These wars are not region-wide, much less global conflicts, but they can be very large in scale and intensity. In such limited conflicts, a single campaign may decide an entire war. These conflicts consist of high-intensity operations, based on mobility, speed, and deep reach; they employ high-technology weapons that produce high lethality rates. Fought in all the battle space dimensions simultaneously (air, land, sea, electromagnetic spectrum, and outer space), these wars are information intensive and critically dependent on C4ISR.[36]

The PLA believes that the initial campaign in a limited, local war under high-tech conditions will likely be the decisive campaign. Once a state of hostility exists, the PLA's operational-level guidance calls for the unrelenting prosecution of offensive operations. The objective of the campaign might be to defend against an attack, but the military action is offensive.[37]

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[35] Information Office of the State Council of the People's Republic of China, *China's National Defense in 2004*, Beijing, December 2004, http://english.peopledaily.com.cn/whitepaper/defense2004/defense2004.html .

[36] Harold Brown, Joseph W. Prueher, Adam Segal, *Chinese Military Power*, Council on Foreign Relations, New York, 2003, pp. 38, 39, http://www.cfr.org/content/publications/attachments/China_TF.pdf .

[37] Harold Brown, Joseph W. Prueher, Adam Segal, *Chinese Military Power*, Council on Foreign Relations, New York, 2003, p. 39, http://www.cfr.org/content/publications/attachments/China_TF.pdf .

The adoption and the increased use of the term "local wars under conditions of informationization" means that the PLA has started according the same priority to the building of information systems and systems integration technology, as it currently does with the development of conventional weapon systems. Information systems technology includes command, control, communications, computing, intelligence and information systems, information security capabilities, communications networking and switching infrastructure, high-performance computing and software capabilities. Nevertheless, it is worth mentioning that despite the high-level pronouncements in official PLA documents about the importance of information-based warfare, the PLA has yet to develop a formal military doctrine to guide the development of capabilities and operations in this area.

Some analysts have pointed to an emerging aspirational "active offense" doctrine of achieving information superiority through the use of electronic warfare, computer network operations, psychological warfare and intelligence gathering.[38] With regard to the development of credible information era, network centric capabilities in the PLA forces, South Korean scholars estimate that if the PRC acquires its military ability of winning local wars under conditions of informationization, the PLA will certainly play a much more active role in the region. For example, its submarines will emerge more frequently in the blue waters of the West Pacific Ocean; more intercontinental ballistic missiles (ICBMs) will be deployed; more satellites will be threatened by ballistic missiles; more networks will be hacked, etc. Obviously, the military strategy of the PRC will automatically be shifted from "defensive in nature" to "active in nature".[39]

The increased use of the concept of "local wars" not only in the War Zone Campaigning doctrine, but also in the latest (published in 2009) Chinese White Paper on National Defense are indicating that, even though the concept of "People's War" (traditionally meaning the mobilization of large numbers of the population with very limited military skills and equipment, in order to resist a foreign occupation) isn't totally abandoned[40], however it enjoys decreasing importance in China's current strategic contingency planning.[41]

It seems that the 1991 Gulf War and the 1995-1996 Taiwan Strait crisis have convinced the PLA strategists that a likely war scenario for which the PLA should be prepared to deter or fight is a medium-sized local war (under informationized, high-tech conditions), comparable to a PLA war zone (a region that encompasses several adjacent provinces) campaign.[42]

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[38] "Chinese puzzle: Beijing pieces together an industry revival", *Jane's Defence Weekly*, Vol. 41, Issue 3, January 21, 2004, p. 29.

[39] Yang-Cheng Wang, "China's Defense Policy and Military Modernization", *The Korean Journal of Defense Analysis*, Vol. XIX, No. 2, Summer 2007, pp. 98-100, http://www.kida.re.kr/eng/publication/pdf/07_02_05.pdf .

[40] The 2009 Chinese Defense White Paper explicitly states that: "*China always relies on the people to build national defense and the armed forces, combines a lean standing force with a powerful reserve force, and endeavours to reinforce its national war potential and defense strength*". Information Office of the State Council of the People's Republic of China, *China's National Defense in 2008*, Beijing, January 2009, p. 9, http://www.fas.org/programs/ssp/nukes/2008DefenseWhitePaper_Jan2009.pdf .

[41] Anthony H. Cordesman and Martin Kleiber, *Chinese military modernization and force development*, Center for Strategic and International Studies, Washington, D.C., September 7, 2006, p. 10, http://www.csis.org/media/csis/pubs/060907_chinesemilitary.pdf .

[42] Nan Li, Eric McVadon, Qinghong Wang, "China's Evolving Military Doctrine", *Pacific Forum CSIS Issues and Insights*, Vol. 6, No. 20, Honolulu, Hawaii, December 2006, p. 7,

According to PLA military theorists, local wars under modern, high-tech, informationized conditions are characterized by:

- Limited geographic scope.
- Limited political objectives.
- Short in duration.
- High-intensity operational tempo.
- High mobility and speed (war of maneuver).
- High lethality weapons and high destruction.
- High in resource consumption and intensely dependent upon high speed logistics.
- Highly visible battlefield (near-total battlefield awareness).
- High speed C2 (Command and Control) and information intensive.
- Non-linear battlefields.
- Multi-dimensional combat (all battle space dimensions: land, aerospace, surface, sub-surface, informational).[43]

Several PLA strategists, however, are convinced that China could confront direct military threats of the 3rd kind (i.e. full-scale conventional wars), should mainland-Taiwan relations deteriorate.

The deterioration of the Sino-Taiwanese relations since 1996, and especially since the beginning of 2001, the acceleration of the Taiwanese movement towards the proclamation of de jure independence, as well as Taipei's open defiance of Beijing, have convinced both the leadership and the general Chinese populace that in all likelihood there could hardly be a viable political solution to the cross-strait impasse satisfying the main Chinese political objectives and aspirations. President Chen Shui-bian's moves toward gradual independence before Taiwan's March 2004 presidential election, which were met by warnings and threats from the mainland, are a reminder that the Taiwan issue remains a potential source of instability.[44]

Moreover, the infusion of relatively sophisticated U.S. weapons and other military equipment to Taiwan has measurably strengthened the deterrence capability of the island's Armed Forces, and obliged the Chinese Communist Party Central Military Commission to reevaluate the very plans for the feasibility of a full-scale amphibious landing against Taiwan. The result was a deepening debate between Chinese military officials on how to stage a successful invasion against Taiwan in the foreseeable future and how to force a successful outcome.[45]

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http://www.isn.ethz.ch/isn/Digital-Library/Publications/Detail/?ots591=0C54E3B3-1E9C-BE1E-2C24-A6A8C7060233&lng=en&id=30442 .

[43] David M. Finkelstein, "China's National Military Strategy", in James C. Mulvenon, Richard H. Yang, eds., *The People's Liberation Army in the Information Age*, RAND Corporation, Project Air Force, Santa Monica, CA, July 1999, pp. 127-128, http://www.rand.org/pubs/conf_proceedings/CF145/CF145.chap7.pdf .

[44] Michael A. Glosny, "Strangulation from the Sea? A PRC submarine blockade of Taiwan", *International Security*, Vol. 28, No. 4, Spring 2004, p. 125.

[45] John Wilson Lewis and Xue Litai, *Imagined Enemies: China Prepares for Uncertain War*, Stanford University Press, Stanford, CA, 2006, p. 266.


ROCAF
6650


2024
EI24
Mirage 2000-5

A Republic of China (i.e. Taiwan) Air Force (RoCAF) F-16A Block 20 (no. 6650) fighter jet is on final approach to Taoyuan Air Base in January of 2006, armed with two pairs of AIM-9 and AIM-120 air-to-air missiles. In the second picture, a RoCAF Mirage 2000-5EI (no. 2024 EI24) is taking off from Hsin-chu Air Base in January 2005 for a Combat Air Patrol (CAP) mission armed with a pair of R550 Magic-2 SRAAMs and a pair of MICA-EM MRAAMs. In the last picture, a Mirage 2000-5EI (no. 2005 EI05) is taking off from Hsin-chu Air Base in June 2008. The aircraft carries an ASTAC ("*Analyseur de Signaux TACtiques*") ELINT/ESM pod and a pair of R550 Magic-2 SRAAMs.

It is worth noting that in the 1990s Taiwan took delivery of 150 F-16A/B Block 20 fighters (contract signed in 1992; deliveries were completed in 1999/2001), and 60 Mirage 2000-5EI/DI fighter jets (contract signed in 1992; deliveries were completed in 1998). As of 2009, the presence in the inventory of the RoCAF of i) 56 Mirage 2000-5EI/DI, armed with 960 MICA-EM medium-range and 480 R550 Magic-2 short-range air-to-air missiles[46], and ii) 144 F-16 fighter jets, armed with 120 AIM-120C-5 Advanced Medium-Range Air-to-Air Missiles (AMRAAMs)[47], 600 AIM-7M MRAAMs and 900 AIM-9L/M SRAAMs; if combined with the expected delivery of another iii) 218 AIM-120C-7 AMRAAMs, iv) 235 AGM-65G-2 air-to-ground Maverick missiles, and v) 110 AGM-84L air-to-surface anti-ship Harpoon missiles[48], constitute a credible means of deterrence against Mainland China and PLA's plans aiming at the revision of the balance of forces in the Strait of Taiwan and the subsequent modification of the current territorial status quo.

Sources: i) http://www.f-16.net/gallery_item100817.html [Asia Sky Image Archives; Photograph by Rossi T.]; ii) http://www.asia-image.com/modules.php?name=Gallery&file=displayimage&pos=-7018 [Asia Sky Image Archives; Photograph by Rossi T.]; iii) http://www.asia-

[46] Bernard D. Cole, *Taiwan's Security: History and Prospects*, Routledge, London and New York, 2006, pp. 109, 189.

[47] Bernard D. Cole, *Taiwan's Security: History and Prospects*, Routledge, London and New York, 2006, p. 109.

[48] The sale will probably include 60 AGM-84L Harpoon missiles, 30 lugs for air-launched missiles, and 50 kits to upgrade the AGM-84G version to the AGM-84L standard. Furthermore, in October 2008 was announced that the U.S. Government approved the sale of 32 UGM-84L submarine-launched Harpoon Block II missiles and two exercise missiles to the Republic of China Navy for a total cost of 200 million dollars. Charles Snyder, "US offers Taiwan huge missile package", *Taipei Times*, March 2, 2007, p. 1, http://www.taipeitimes.com/News/front/archives/2007/03/02/2003350599 . "U.S. Congress notified of possible sale of missiles", *Taipei Times*, August 10, 2007, p. 3, http://www.taipeitimes.com/News/taiwan/archives/2007/08/10/2003373497 . Charles Snyder, "Taiwan supporters laud weapons sale", *Taipei Times*, October 5, 2008, p. 1, http://www.taipeitimes.com/News/front/archives/2008/10/05/2003425092 .

image.com/modules.php?name=Gallery&file=displayimage&album=45&cat=0&pos=1696 [Asia Sky Image Archives; Photograph by Rossi T.].

Observers of the military balance across the Strait generally agree that an invasion of Taiwan will continue to elude the PLA for the next decade. Despite the steady upgrading of the PLA Air Force, the revamping of Chinese special forces, and particularly the fielding of a vast array of short-range missiles, the paucity of modern amphibious landing craft among other factors makes a full-scale invasion an unlikely, if still conceivable, possibility.[49]

Two American analyses suggest that in the short to medium term, the PRC is more likely to attempt to coerce Taiwan than it is to launch an invasion. Without sufficient military capability to conquer Taiwan, the PRC would have to rely on inflicting enough damage to force capitulation. The PLA's recent modernization efforts seem to focus on developing coercive capabilities, while deterring U.S. military intervention.[50] Enhanced submarine capabilities and numbers increasingly give credence to an alternative strategy for coercing Taiwan: the naval blockade.[51]

Thus far, Beijing has eschewed a military confrontation, preferring to count on long-term trends in political and economic transformation to improve its bargaining position. It has pursued a series of blocking actions, having generally succeeded in isolating Taiwan diplomatically in the international community, and the United States militarily in sponsoring any prospective opposing "coalition of the willing", even though Washington has continued to provide arms to Taipei. Instead of contesting superior U.S. military forces, Beijing has sought to demonstrate that it has a higher stake and greater resolve in the matter of Taiwan's status, a matter that probably will continue to be the principal irritant and a dangerous flashpoint in its bilateral relations with Washington.[52]

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[49] China's marines lack the personnel and naval assets to overcome the challenges of an opposed landing against a prepared Taiwan defensive shoreline. Lyle Goldstein and William Murray, "Undersea Dragons: China's Maturing Submarine Force", *International Security*, Vol. 28, No. 4, Spring 2004, p. 179. James C. Bussert, "China Builds Modern Marine Corps Force", *SIGNAL Online*, April 2006, http://www.afcea.org/signal/articles/templates/SIGNAL_Article_Template.asp?articleid=1115&zoneid=181 .

[50] Michael A. Glosny, "Strangulation from the Sea? A PRC submarine blockade of Taiwan", *International Security*, Vol. 28, No. 4, Spring 2004, pp. 126-127. David A. Shlapak, David T. Orletsky, Barry A. Wilson, *Dire Strait? Military Aspects of the China-Taiwan Confrontation and Options for U.S. Policy*, RAND, Santa Monica, CA, 2000, p. xii, http://www.rand.org/pubs/monograph_reports/2007/MR1217.pdf .

[51] As an island with few resources, Taiwan may be uniquely vulnerable to this form of coercion. The volatility of Taipei's stock market during the 1995-1996 crisis indicates that Taiwan's entire economy could face a meltdown, if confronted with determined mainland efforts to subvert it. Moreover, Kuomintang has been critical of the Democratic Progressive Party's tendency toward pro-independence rhetoric. This suggests a strong possibility that the mainland could succeed in exploiting Taiwan's internal political fissures in a crisis. In other words, Washington probably cannot count on a united front within Taiwan. Therefore, it has been argued that speedy capitulation may be conceivable, if Beijing confronts Taipei with a sophisticated strategy of sticks and carrots. Lyle Goldstein and William Murray, "Undersea Dragons: China's Maturing Submarine Force", *International Security*, Vol. 28, No. 4, Spring 2004, p. 180.

[52] Steve Chan, "Soft Deterrence, Passive Resistance: American Lenses, Chinese Lessons", *Ridgway Center Working Papers*, University of Pittsburgh, 2005, pp. 23-24, http://www.isn.ethz.ch/isn/Digital-Library/Publications/Detail/?ord516=OrgaGrp&ots591=0C54E3B3-1E9C-BE1E-2C24-A6A8C7060233&lng=en&id=21245 .

Nevertheless, we can't avoid highlighting the fact that since the Clinton administration's move to deploy two U.S. Navy carrier battle/strike groups[53] in the vicinity of Taiwan during the March 1996 PLA exercises off the coast of Fujian[54], which were intended to intimidate Taiwanese from voting for the independence-leaning President (seeking a second four-year term) Lee Teng-hui[55], the PLA has worked to steadily acquire the means to prevent future U.S. military support for Taiwan. More specifically, Chinese leaders realized that in order to lend credibility to their "one China" policy[56] towards Taiwan, the PRC should be able to present a permanent and reliable threat to use military force to prevent the Taiwanese from declaring their independence from China.

As a consequence, since the mid-1990s the challenge for China's political and military leadership is to find the means to deter Taiwan's bid for independence in the short term, while developing longer-term capabilities both to seize the island if necessary, and hold

[53] The American President's decision to order the deployment of two U.S. Navy aircraft carrier battle/strike groups during the 1996 PLA exercises was an apparent warning to Beijing not to take further military action against Taipei. The deployment of the USS *Independence* (CV-62) and *Nimitz* (CVN-68) carrier battle/strike groups in the Taiwan Strait was a move that the PLA could not counter at that time. Andrew S. Erickson, "Chinese ASBM Development: Knowns and Unknowns", *China Brief*, The Jamestown Foundation, Vol. 9, Issue 13, June 24, 2009, http://www.jamestown.org/programs/chinabrief/single/?tx_ttnews%5Btt_news%5D=35171&tx_ttnews%5BbackPid%5D=459&no_cache=1 .

[54] The PLA drills included firing ballistic missiles on the high seas, into shipping lanes located very close (less than 50 miles) to Taiwan's two main harbours (Kaohsiung Harbour in the southern, and Keelung Harbour in the northern part of the island). More specifically, we can discern three different phases in the military exercises that took place from March 8 to 21, 1996 in the Taiwan Strait (in Nanjing Military Region): a) during the first phase, 2nd Artillery Corps units fired DF-15 (CSS-6, M-9) short-range ballistic missiles off Keelung and Kaohsiung harbours; b) during the second stage, the PLAAF and the PLAN conducted air attack and missile firing exercises, electronic warfare, low-level penetration air attacks, sea blockade, and air-sea combined exercises; and, c) in the last phase of the manoeuvres, PLA, PLAAF, and PLAN forces conducted joint amphibious landing exercises on Pingtan island. PLA Aviation helicopters, Su-27SK/UBK fighters, and airborne troops were also deployed. All in all, some 40 PLAN ships, 260 aircraft, and an estimated 150,000 troops participated in the exercises. During the same period, from March 12 to 20, 1996, a missile and artillery live-fire exercise was held on Nan'ao island (in Guangdong Province, in the Guangzhou Military Region). Nuclear and diesel-electric submarines and destroyers from the North Sea Fleet, the East Sea Fleet, and the South Sea Fleet were deployed to the exercise zone. The PLA Navy-Air Force collaborated with PLAN vessels in conducting missile attacks, ECM, and anti-submarine warfare drills. Andrew N. D. Yang, Milton Wen-Chung Liao, "PLA Rapid Reaction Forces: Concept, Training, and Preliminary Assessment", in James C. Mulvenon, Richard H. Yang, eds., *The People's Liberation Army in the Information Age*, RAND Corporation, Project Air Force, Santa Monica, CA, July 1999, pp. 53, 54, http://www.rand.org/pubs/conf_proceedings/CF145/CF145.chap4.pdf . Andrew Scobell, *Show of Force: The PLA and the 1995-1996 Taiwan Strait Crisis*, Shorenstein Asia-Pacific Research Center, Stanford, CA, January 1999, p. 5, http://iis-db.stanford.edu/pubs/10091/Scobell.pdf .

[55] In the 1996 presidential election, Lee Teng-hui called on the populace to stand firm and unite behind democracy and the KMT. The results were an overwhelming victory for Lee, who won 54% of the vote. Most experts estimated that the mainland's threats gave Lee between 5 and 10 more percentage points in the popular vote. Michael A. Glosny, "Strangulation from the Sea? A PRC submarine blockade of Taiwan", *International Security*, Vol. 28, No. 4, Spring 2004, p. 152.

[56] The March 14, 2005 China's anti-secession law clearly states: "*There is only one China in the world. Both the mainland and Taiwan belong to one China. China's sovereignty and territorial integrity brook no division. Safeguarding China's sovereignty and territorial integrity is the common obligation of all Chinese people, the Taiwan compatriots included. Taiwan is part of China*". "Text of China's anti-secession law", *BBC News*, March 14, 2005, http://news.bbc.co.uk/2/hi/asia-pacific/4347555.stm .

off external intervention by denying U.S. forces the ability to intercede effectively in such a conflict.[57] Geography dictates that naval forces are necessarily an essential component of this threat. One of the PLA Navy's most important tasks, therefore, is to draw up plans for the use of naval forces against Taiwan.

In that context, it becomes apparent that China's military threat against Taiwan presents also an implicit threat to U.S. forces, as a result of tacit U.S. defense assurances to Taiwan, particularly those contained in the *Taiwan Relations Act* enacted in 1979. That act states that the United States will "provide Taiwan with arms of a defensive character" and will "maintain the capacity of the United States to resist any resort to force or other forms of coercion that would jeopardize the security, or the social or economic system, of the people on Taiwan."[58]

On the other side of the Pacific, the U.S. Department of Defense seems to be persuaded that China's main foreign policy goal is the reunification of the mainland with Taiwan under Beijing's terms and conditions. The 2006 Report to Congress of the U.S.-China Economic and Security Review Commission echoed these concerns by stating that: "Currently, Beijing focuses on bolstering military capabilities to address Taiwan Strait scenarios. China aims to prevent Taiwan from obtaining legal recognition as an entity independent from the People's Republic of China, and resolutely adheres to its ambition for unification with Taiwan in the long term under the rubric of 'one China.' This objective is of such significance that the Chinese government continues to threaten to achieve it (and prevent any substantial contrary movement) by force if that is necessary. In March 2005, China promulgated the *anti-secession law*, a legal document that codified the authority to use force to counter Taiwan's moves toward further separation."[59]

As a matter of fact, the March 14, 2005 China's anti-secession law explicitly threatens the use of military force if Taiwan seeks to achieve de jure independence from the mainland. The law states that: "*The state shall never allow the 'Taiwan independence' secessionist forces to make Taiwan secede from China under any name or by any means. […] In the event that the 'Taiwan independence' secessionist forces should act under any name or by any means to cause the fact of Taiwan's secession from China, or that major incidents entailing Taiwan's secession from China should occur, or that possibilities for a peaceful re-unification should be completely exhausted, the state shall employ non-peaceful means and other necessary measures to protect China's sovereignty and territorial integrity*".[60]

Trying to lend credibility to its foreign policy, PLA's ground force training and exercises are heavily oriented towards amphibious training and promoting

[57] John R. Landry, "The Military Dimensions of Great Power Rivalry in the Asia-Pacific Region", in P.D. Taylor, ed., *Asia and the Pacific: US Strategic Traditions and Regional Realities*, Naval War College Press, Newport, Rhode Island, 2001, p. 86. Peter Howarth, *China's Rising Sea Power: The PLA Navy's Submarine Challenge*, Frank Cass, London and New York, 2006, p. 48.

[58] "2006 Report to Congress of the U.S.-China Economic and Security Review Commission", One Hundred Ninth Congress Second Session, U.S. Government Printing Office, Washington, D.C., November 2006, p. 129, http://www.uscc.gov/annual_report/2006/annual_report_full_06.pdf .

[59] "2006 Report to Congress of the U.S.-China Economic and Security Review Commission", One Hundred Ninth Congress Second Session, U.S. Government Printing Office, Washington, DC, November 2006, p. 128, http://www.uscc.gov/annual_report/2006/annual_report_full_06.pdf .

[60] "Text of China's anti-secession law", *BBC News*, March 14, 2005, http://news.bbc.co.uk/2/hi/asia-pacific/4347555.stm .

interoperability between infantry, armoured, marine, airborne, and special operations units. Since the early 2000s, the PLA has been conducting two major amphibious exercises annually that simulate operations against Taiwan. A number of these involve beach-head assaults on Dongshan island[61] (150 miles away from Taiwan's Penghu islands) off the Fujian coast, which closely resembles potential landing areas on Taiwan. Joint amphibious training areas have also been established in several other islands off the south-east Chinese coast.[62]

That's why American officials do not hesitate to publicly express their profound concern about any developments taking place in the Taiwan Strait, and reaffirm their commitment to assist Taiwan against a PLA's assault or provocation. In 2006, Admiral William J. Fallon, Commander of the U.S. Pacific Command, testifying before the U.S. House of Representatives Armed Services Committee clarified that: "*The PRC has continued to acquire new hardware and expand military capabilities. While not constituting a capability near that of the U.S., the increasing sophistication and size of modern military equipment, coupled with the lack of clear national intent with regard to this military capability, merits our close attention. Until the PRC renounces any intention of using force to resolve the Taiwan issue, we will maintain sufficient military capability in the region to meet our obligations under the Taiwan Relations Act (TRA) of 1979*".[63]

Besides, the 2006 Report to Congress of the U.S.-China Economic and Security Review Commission noted with concern that Taiwan is growing increasingly dependent on the threat of intervention from the United States to deter China from initiating hostile action against Taiwan, and on U.S. intervention to survive any attack or invasion China launches. The PLA Navy's surface vessel and submarine force is capable of considerably delaying the arrival of any naval force that might attempt to intervene in a Taiwan crisis and degrading its combat power.[64]

On the other hand, Chinese officials believe that it is the certainty of the U.S. commitment to defend Taiwan that girds the island's leaders to behave as the leaders of a de facto independent country and inspires Taiwanese citizens to believe that they can have a future free from Chinese political control. The Taiwanese National Security Bureau estimates that it would take the United States 10 to 14 days to respond to a large-

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[61] Military exercises, carried out by units assigned to the Nanjing Military Region, are frequently hosted on Dongshan island. For example, during the 1996 Taiwan Strait crisis, a PLA airborne battalion was parachuted to Dongshan island, supporting a PLA Marine Corps amphibious landing exercise. Andrew N. D. Yang, Milton Wen-Chung Liao, "PLA Rapid Reaction Forces: Concept, Training, and Preliminary Assessment", in James C. Mulvenon, Richard H. Yang, eds., *The People's Liberation Army in the Information Age*, RAND Corporation, Project Air Force, Santa Monica, CA, July 1999, p. 53, http://www.rand.org/pubs/conf_proceedings/CF145/CF145.chap4.pdf . "PLA to conduct manoeuvre at Dongshan Island this month", *People's Daily Online*, July 9, 2009, http://au.china-embassy.org/eng/wgc/t142512.htm .

[62] Timothy Hu, "Marching Forward: China is working hard to transform its capabilities and become a credible regional military power", *Jane's Defence Weekly*, Vol. 44, Issue 17, April 25, 2007, p. 28.

[63] William J. Fallon, "Statement of Admiral William J. Fallon, U.S. Navy Commander U.S. Pacific Command, before the House Armed Services Committee on U.S. Pacific Command Posture", U.S. House of Representatives Armed Services Committee, Washington, D.C., March 7, 2006, http://www.shaps.hawaii.edu/security/us/2006/3-9-06Fallon.html .

[64] "2006 Report to Congress of the U.S.-China Economic and Security Review Commission", One Hundred Ninth Congress Second Session, U.S. Government Printing Office, Washington, D.C., November 2006, p. 10, http://www.uscc.gov/annual_report/2006/annual_report_full_06.pdf .

scale, surprise Chinese military attack against Taiwan.[65] Therefore, for China, victory over Taiwan entails not just defeat of its military, but also success at delaying, preventing, or defeating U.S. military forces that may come to Taiwan's rescue.[66]

The main coercive (vis-à-vis Taiwan) and area denial (vis-à-vis the U.S. forces) strategies that Beijing could employ are based on the use of submarines, naval mines, and short-range ballistic missiles. More specifically, although China has an avowed aim of developing a blue-water navy by the middle of this century, its maritime strategy for now can only realistically be based on the fact that its sea power is weak compared to that of its principal potential adversaries. For at least the next 10 years, the reality for China's strategic planners is that its naval power is that of a coastal state confined to the narrow seas enclosed by the first island chain along the edge of the Asian continental shelf.[67] The new priority accorded to Taiwan prompted a switch in the PLA Navy's general and more positive aim of acquiring the capabilities to enable it to exercise control of the seas out to the first island chain, to the less ambitious and more negative aim of being able to effectively deny the control of these seas to hostile forces.

The classical principles of maritime strategy suggest that a land power, which aims to consolidate and extend its influence in a predominantly maritime region at the expense of the pre-eminent sea power must attempt to challenge the dominant sea power for command of the sea. The most decisive way of doing this is to destroy the opponent's fleet in battle or, failing this, neutralize it by means of a blockade. Only if the challenger has the resources, the will and the expertise to construct a fleet capable of doing this can it hope to secure command of the sea by seeking out and destroying the adversary's fleet in a decisive battle.

Today, Chinese strategists face the challenge of securing regional hegemony, knowing that command of the sea is probably beyond their reach. Maritime strategic theory's answer to this problem is to say that a weaker naval force, lacking the capability to secure command of the sea for itself, and therefore compelled to avoid decisive action, can at least hope to achieve its strategic objectives by successfully holding the command of the sea in dispute.[68]

The imbalance of naval forces between China and the United States (now and in the foreseeable future) is such that prudent PLA Navy commanders could entertain no realistic hope of attempting to dispute U.S. command of the sea by means of a general

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[65] Besides, we should mention that the speed and force with which a U.S. force could respond to a Taiwan crisis will be affected by the degree to which it can secure access to bases and ports in the region. Access to such facilities in Japan, Singapore, and Philippines would be especially important for the rapid deployment of U.S. forces. "2006 Report to Congress of the U.S.-China Economic and Security Review Commission", One Hundred Ninth Congress Second Session, U.S. Government Printing Office, Washington, D.C., November 2006, p. 11, http://www.uscc.gov/annual_report/2006/annual_report_full_06.pdf . "Taiwan would have to fight alone: NSB", *The China Post*, April 26, 2007, http://www.chinapost.com.tw/news/archives/taiwan/2007426/108078.htm .

[66] Richard D. Fisher, Jr., *China's Military Modernization: Building for Regional and Global Reach*, Praeger Security International, Westport, CT-London, September 2008, pp. 162-163.

[67] Peter Howarth, *China's Rising Sea Power: The PLA Navy's Submarine Challenge*, Frank Cass, London and New York, 2006, p. 73. P. Howarth's study is arguably the single most complete and comprehensive analysis currently available on the development and the employment of the PLAN's submarine fleet as a means for the achievement of China's geostrategic objectives in the Asia-Pacific region.

[68] Peter Howarth, *China's Rising Sea Power: The PLA Navy's Submarine Challenge*, Frank Cass, London and New York, 2006, p. 69.

fleet action. Instead, they are likely to adopt the time-honoured strategy of weak naval powers of seeking to deny command of the sea to the naval forces of the superior power by conducting a war of attrition against U.S. naval forces.

The relative strengths of China's armed forces and those of the United States place China in the position described by J.S. Corbett: "Where a Power is so inferior in naval force that it could scarcely count even on disputing command by fleet operations, there remained a hope of reducing the relative inferiority by putting part of the enemy's force out of action".[69] PLA Navy Admiral Liu Huaqing had once said that the PLAN doctrine of offshore active defense does not necessarily call for the procurement of long-range weapons and the capability of performing global operations, but instead depends on the ability to keep China's territories "free of infringement".[70]

This shift in goals from sea control to sea denial (within an area of at least 200 nautical miles off the Chinese coast) is reflected in the apparent loss of momentum in China's interest in acquiring an aircraft carrier capability, long-range land-based bombers and transport aircraft, and its reinvigorated interest in acquiring the instruments of sea denial in the form of advanced weapons platforms, such as the Russian-made Sovremenny-class destroyers (Project 956E/M), the diesel-electric Kilo-class submarines (Projects 877EKM, 636, 636M)[71], and a combat aircraft airborne-refuelling capability.[72]

[69] Peter Howarth, *China's Rising Sea Power: The PLA Navy's Submarine Challenge*, Frank Cass, London and New York, 2006, p. 56.
[70] Karl W. Eikenberry, "Does China Threaten Asia-Pacific Regional Stability?", *Parameters*, U.S. Army War College Quarterly, Spring 1995, http://www.carlisle.army.mil/USAWC/parameters/1995/eiken.htm .
[71] In the two World Wars the submarine very nearly proved to be a decisive strategic weapon against Great Britain. It also came close to inflicting a strategic defeat on Japan in WW II.
[72] Peter Howarth, *China's Rising Sea Power: The PLA Navy's Submarine Challenge*, Frank Cass, London and New York, 2006, pp. 44-45.

The four People's Liberation Army Navy (PLAN) Sovremenny-class destroyers. In the first picture are depicted the first two Project 956E Sovremenny-class destroyers delivered to the PLAN in 1999-2000: *Hangzhou* (No. 136), and *Fuzhou* (No. 137). In the second and third pictures we can discern the two Project 956EM Improved Sovremenny-class destroyers delivered to the PLAN in 2005-2006: *Taizhou* (No. 138), and *Ningbo* (No. 139). Sources: i) http://www.china-defense.com/smf/index.php?topic=176.800 ; ii) http://www.china-defense.com/smf/index.php?topic=176.725 ; iii) http://www.china-defense.com/smf/index.php?topic=176.650 .

As a matter of fact, Chinese proponents of a revolution in military affairs believe that because of their high radar and electromagnetic visibility, and their vulnerability to precision-guided missiles, submarines, and mines, aircraft carriers are becoming obsolete. They argue that in modern warfare aircraft carriers have become "floating coffins" [73],

[73] Peter Howarth, *China's Rising Sea Power: The PLA Navy's Submarine Challenge*, Frank Cass, London and New York, 2006, p. 67. Lin Chuan, "Why does China still have no Aircraft Carrier?", *Zhongguo Tongxun She*, June 26, 2005, FBIS ID: CPP2005062600004.

because they are vulnerable to heavy losses if hit, since they carry huge quantities of ammunition, aircraft fuel, and ship fuel.[74]

Furthermore, according to this point of view, a Chinese aircraft carrier would negatively impact China's security environment in a number of ways. The acquisition of an aircraft carrier by the PLAN would no doubt have widespread geopolitical consequences, giving credence to the "China threat" abroad, and increasing tension in Sino-ASEAN and Sino-U.S. relations. Such tension would damage Beijing's ability to rely on regional support to rein in potential Taiwanese moves toward independence. Additionally, the astronomical cost of such a programme would siphon-off key, limited resources that could be better spent on other programmes of greater immediate necessity. There are also serious questions regarding China's technical ability to build and maintain many of the necessary components and subsystems vital to an aircraft carrier and its defense. That's why, according to this Chinese school of thought, the hurdles and drawbacks created by the acquisition of an aircraft carrier outweigh the potential benefits.[75]

On the contrary, we observe that since roughly 2000 China has expanded its arsenal of anti-access and area-denial weapons, presenting and projecting increasingly credible, layered offensive combat power across its borders and into the Western Pacific. China has or is acquiring the ability to:

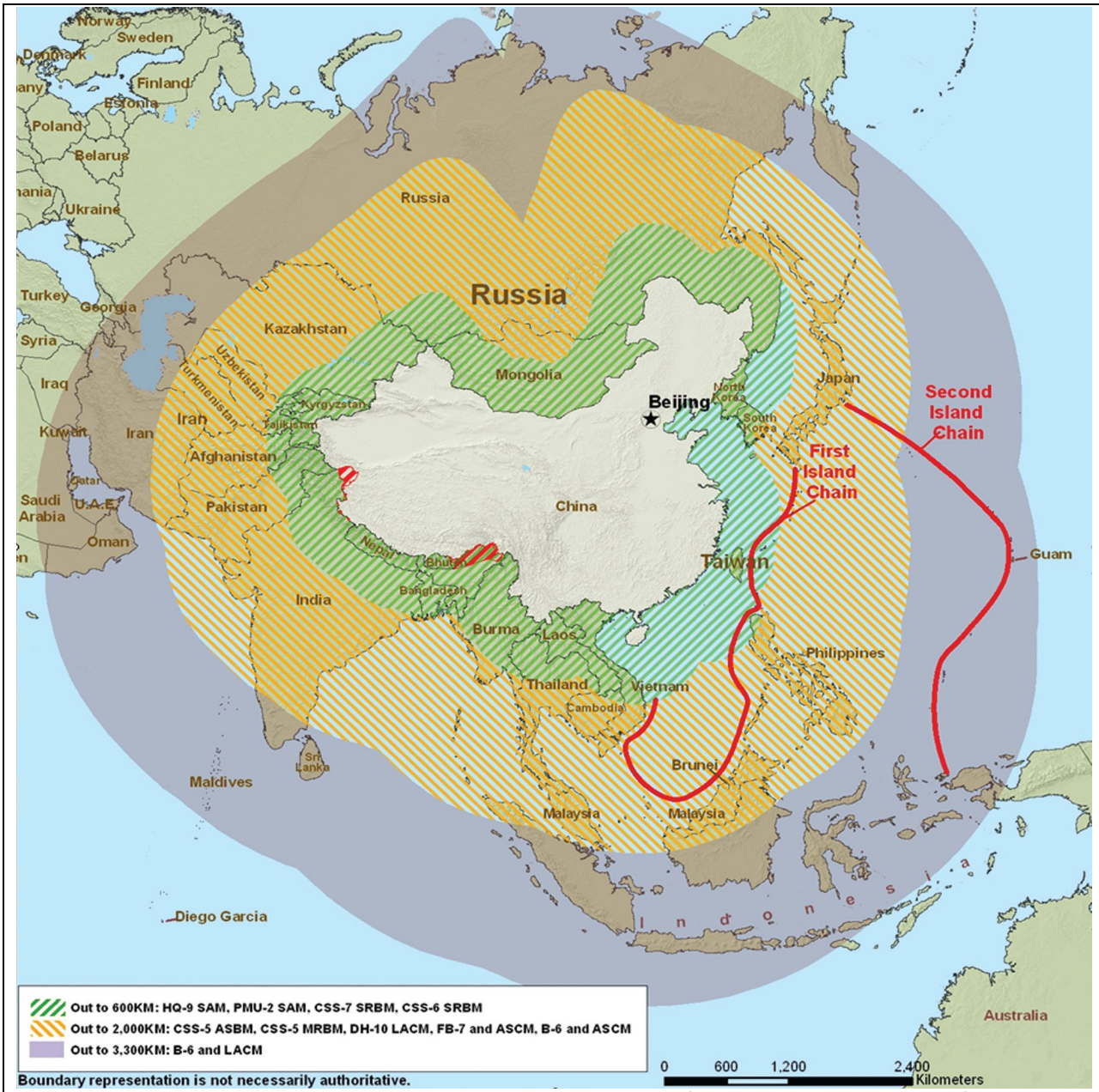
- Hold large surface ships, including aircraft carriers, at risk (via quiet diesel-electric submarines, advanced anti-ship cruise missiles, wire-guided and wake-homing torpedoes, modern naval mines, or long-range anti-ship ballistic missiles);
- Deny the use of shore-based airfields, secure bastions and regional logistics hubs (via conventional ballistic missiles with greater ranges and accuracy, and land attack cruise missiles);
- Hold aircraft at risk over or near Chinese territory or forces (via imported from Russia and domestically built fourth generation fighters, S-300PMU-1/2 advanced long-range surface-to-air missile systems, air surveillance systems, and shipborne air defenses).[76]

[74] Lyle Goldstein and William Murray, "Undersea Dragons: China's Maturing Submarine Force", *International Security*, Vol. 28, No. 4, Spring 2004, p. 194.

[75] Andrew F. Diamond, "Dying with Eyes Open or Closed: The Debate over a Chinese Aircraft Carrier", *The Korean Journal of Defense Analysis*, Vol. XVIII, No. 1, Spring 2006, pp. 35, 39, http://cns.miis.edu/other/diamond060426.pdf .

[76] Office of the Secretary of Defense, *Military Power of the People's Republic of China 2009*: *Annual Report to Congress*, Washington, D.C., 2009, p. vii, http://www.defenselink.mil/pubs/pdfs/China_Military_Power_Report_2009.pdf .

Nikolaos Diakidis, *An Assessment of China's Defense Strategy in the post-Cold War Era. What Role for Bilateral Defense Cooperation with Russia?*, Piraeus, December 2009



PLA's Conventional Anti-Access Capabilities. The PLA's conventional forces are currently capable of striking targets well beyond China's immediate periphery. In the map are not included the ranges of naval surface- and submarine-launched weapons, whose employment at distances from China would be determined by doctrine and the scenario in which they are employed. Office of the Secretary of Defense, *Military Power of the People's Republic of China 2009*: *Annual Report to Congress*, Washington, D.C., 2009, p. 23, http://www.defenselink.mil/pubs/pdfs/China_Military_Power_Report_2009.pdf .

3.1. A possible contingency over Taiwan and the development of sea denial capabilities by the PLA Navy

The triple (U.S.-PRC-Taiwan) deterrence dynamic is composed of the measures taken by Beijing to deter Taipei from declaring Taiwan's independence from China; Washington's efforts to deter Beijing from resorting to armed force to secure the reunification of Taiwan with China; and, Beijing's attempt, in response to American threats, to deter Washington from coming to Taipei's assistance in the event of a crisis or conflict. The 12 Kilo-class submarines, the 4 Sovremenny-class destroyers, the 76 Su-30MKK and the 24 Su-30MK2 fighter jets, sophisticated sea mines, ballistic missiles, shore-based cruise missiles, and, ultimately, China's nuclear forces, all contribute to a system of deterrence designed to raise the potential costs of American intervention to a level where they would outweigh the value of American interests in preserving Taiwan's autonomy. China's emerging local sea-denial capabilities provide a supporting layer of defense for its long-range anti-access systems. Acquisition and development of the Kilo-, Song-, Shang-, and Yuan-class submarines illustrates the importance the PLA places on undersea warfare for sea denial.[77] It is China's evolving submarine force that is set to play an increasingly important role in the trilateral deterrence relationship, which structures strategic interaction in the Taiwan Strait.

Indeed, given the United States' ability to assert at will its control of the surface of the marginal seas of the western Pacific and the airspace above them, the only way left open to the PLA Navy to conserve any freedom of action is to operate beneath the surface, beyond the view of American maritime surveillance satellites, aircraft and surface combatants. This merely reflects the fact that in the modern era, particularly since the introduction of submarines and mines, absolute sea control is very difficult, if not impossible, to attain, even in the open oceans.[78]

As a consequence, the most important asset on the PLAN's sea denial strategy seems to be the development of a modern, well-trained and well-equipped submarine force. As a matter of fact, since the German submarine U-21 sank the British cruiser HMS Pathfinder in the North Sea on September 3, 1914, providing the first practical evidence of its formidable qualities as means for inferior naval powers to dispute and deny the command of the sea exercised by superior powers, the submarine has been the instrument of choice for this strategic role.[79]

The Chinese submarine fleet, spearheaded by the 12 Russian-made Kilo-class (Project 877EKM, 636, 636M), the 16 Chinese-made Song-class (Type 039G/G1), and the 4

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[77] Office of the Secretary of Defense, *Military Power of the People's Republic of China 2009*: *Annual Report to Congress*, Washington, D.C., 2009, pp. 21-22, http://www.defenselink.mil/pubs/pdfs/China_Military_Power_Report_2009.pdf .

[78] Peter Howarth, *China's Rising Sea Power: The PLA Navy's Submarine Challenge*, Frank Cass, London and New York, 2006, p. 69.

[79] At the end of the 19th century, France, as the principal challenger of British naval supremacy, had become the most advanced designer and operator of submarines. At naval arms control conferences during the 1920s and 1930s, France persistently vetoed British and American proposals for an international ban on submarines. French delegations opposed the proposed ban on the grounds that the submarine was the weapon of the weak against the strong, and to ban it outright would give an unfair advantage to states, which already enjoyed a superiority in surface combatants. Peter Howarth, *China's Rising Sea Power: The PLA Navy's Submarine Challenge*, Frank Cass, London and New York, 2006, pp. 56, 71-72.

Chinese-made Yuan-class (Type 039A/B) boats, provides Beijing with its most effective sea-denial instrument, well suited to preventing the U.S. Navy from approaching the Chinese littoral, or at least depriving it of its freedom of action in the zone which extends at least up to 200 nautical miles from the Chinese coast.

It is worth mentioning that the Kilo-class submarines are well known for their low acoustic signature employing a variety of advanced noise-reduction measures including sound-dampening tiles, a raft-like shock absorbing base, and a seven-blade propeller to achieve their noteworthy stealth. They are considered to be as quiet as the improved version of the U.S. Los Angeles-class nuclear attack submarines. Double-hulled, they can dive to 300 metres, they have a maximum underwater speed of 17 knots, and they carry a crew complement of 52 sailors. China's Kilos can launch Russia's wire-guided, electric-propulsion, anti-submarine Test-71/96 ME torpedoes, as well as 53-65KE wake-homing, gas-turbine propulsion, anti-ship torpedoes.[80] Furthermore, the eight Project 636M submarines, delivered to the PLAN in 2004-2007, incorporate a number of significant upgrades when compared to the older Project 877EKM and 636 boats. They possess superior batteries achieving increased reliability (thus, correcting a long-standing problem of the exported Kilos[81]), an enhanced digital sonar system, and quitter main engines. Moreover, their weaponry is state of the art. They are equipped with the versatile and potent Klub weapon control system[82] that allows them to fire their 3M-54E/1 and 3M-14E Novator Alfa Klub-S (SS-N-27/B "Sizzler") anti-ship and land-attack missiles. The Chinese Kilos may also deploy Russia's super-cavitating VA-111 Shkval torpedo.[83] Therefore, they represent a formidable threat to any ship operating within their range.

Moreover, the newest version (Type 039G1) of the Chinese Song-class submarine has received a massive injection of foreign technologies, such as German MTU 16V396SE84

[80] Wire-guided torpedoes allow the shooting ship to guide the torpedo toward updated target positions, which can increase the probability of achieving a hit. Wake-homing torpedoes greatly simplify the problem of sinking surface ships by submarines. These are "fire-and-forget" torpedoes that detect and follow a ship's wake until they reach the ship itself. Increasing their lethality, they attack ships from the rear, where the target ship's propulsion machinery masks the torpedo's sound. Additionally, they are immune to towed acoustic decoys. Lyle Goldstein and William Murray, "Undersea Dragons: China's Maturing Submarine Force", *International Security*, Vol. 28, No. 4, Spring 2004, p. 166.

[81] The PLAN's experience with Russian batteries revealed that in South-East Asia's tropical water conditions and temperatures, the evolution of hydrogen when recharging the batteries was much greater than in the cooler Russian waters (i.e. in the Pacific and Atlantic Oceans, the Baltic, the Black and the North Seas, etc). Mixing additives to the electrolyte solved this problem partially. A basic design problem, however, was the inability of the electrolyte cooling system in the Russian battery to cope with high tropical temperatures. It has been reported that other Navies operating 877EKM and 636 Kilo-class submarines, such as India and Iran, have faced similar problems. "Chapter 15: The Submarine Arm", in G. M. Hiranandani, *Transition to Eminence: The Indian Navy 1976-1990*, http://indiannavy.nic.in/t2t2e/trans2emins/15_submarine_arm.htm .

[82] The Klub weapon control system is the element of the submarine's weapon system which prepares and launches the Klub family of anti-ship and land-attack missiles. The weapon control system is interoperable with communications, navigation, and other weapon systems.

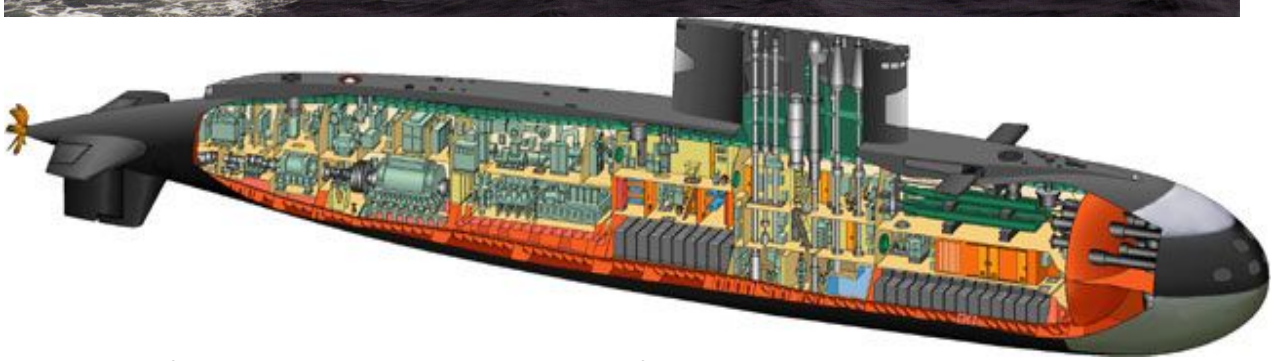
[83] The VA-111 Shkval torpedo weighs 2.7 tonnes (fitted with a warhead weighing 210 kg), is 8.2 m long, and has a range of 6-12 km. The speed is given as in excess of 200 knots (the VA-111 Shkval exits the torpedo tube at 50 knots, and shortly afterwards its liquid-fuel rocket ignites and propels it to speeds of up to 200-250 knots), which is roughly 3-4 times faster than any torpedo carried by Western submarines. Lyle Goldstein and William Murray, "Undersea Dragons: China's Maturing Submarine Force", *International Security*, Vol. 28, No. 4, Spring 2004, pp. 166-167. Yuri Babushkin (ed.), *Russia's Arms: 2001-2002*, Military Parade, Moscow, 2001, p. 504.

diesel engines and batteries and a sonar suite based on French Thomson-CSF/Thales designs (on TSM-2233 and TSM-2255 designs), which have significantly improved the submarine's effectiveness. These are also the first Chinese-made boats capable of launching anti-ship missiles (YJ-82/C-802[84] missiles) from underwater, and they are also fitted with a spherical bow sonar and a low frequency passive flank array.[85]

Diesel-electric submarines are intended to implement the concept of "Great Wall at Sea", denying thus access to the waters of Chinese interest to any invasion force. Therefore, in any crisis or conflict involving the United States and its allies, the PLA Navy's submarine fleet would play a leading role in an anti-access strategy designed to keep United States naval forces away from the Chinese coast. Chinese naval theorists seem to conclude that in the modern battlefield the submarine is a valuable asset and a difficult to defeat weapon. They argue that the extensive application of information technology improves the transparency of the sea battlefield and increases the deterrence potential of vessels and aircraft. Such deterrence is multi-directional but much less serious to submarines, because submarines are more difficult to track. Submarines can fulfill combat tasks and attack land targets according to information obtained from the command post, while keeping their movement concealed, and they can move under water for a long time without being discovered. The Chinese conclude that the prospect for using submarines is good, because of their covertness and power. Even without attacking targets, submarines are menaces existing anywhere at any time. Therefore, "the role of submarines in future information warfare will be very important".[86]

As three PLAN officers indicated in an article appeared in 1995 in the *China Military Science* journal: "*We can conclude that during the First World War, the dominant vessel was the battleship, and in World War II, it was the aircraft carrier. In future global wars, the most powerful weapon will be the submarine*".[87]

[84] U.S. DoD/NATO reporting names: CSS-N-8 "Saccade".
[85] Massimo Annati, "China's PLA Navy: The (R)Evolution", *Naval Forces*, Mönch Publishing Group, Issue 6/2004, p. 70.
[86] Shen Zhongchang, Zhang Haiyin, Zhou Xinsheng, "The Military Revolution in Naval Warfare", in Michael Pillsbury, ed., *Chinese Views of Future Warfare*, National Defense University Press, Washington, D.C., September 1998, pp. 277-278.
[87] Shen Zhongchang, Zhang Haiyin, Zhou Xinsheng, "The Military Revolution in Naval Warfare", in Michael Pillsbury, ed., *Chinese Views of Future Warfare*, National Defense University Press, Washington, D.C., September 1998, p. 283.



i) Photograph of a Chinese Kilo-class submarine (probably of the Project 636/M). In May 2002, China signed a contract calling for the delivery of eight Project 636M submarines. All units are fitted with: a) the 3M-54E Klub-S (SS-N-27B "Sizzler") supersonic (at the final stage of the flight), long-range (220 km) anti-ship missile fitted with a 200 kg warhead; and, b) the 3M-54E1 Klub-S (SS-N-27 "Sizzler") subsonic (roughly similar to the U.S. RGM/UGM-109B Tomahawk in appearance and performance), long-range (300 km) anti-ship missile that features a 400 kg warhead. The eight vessels were delivered to the PLA Navy between the years 2004-2007. In principle, these quiet[88], low signature boats are considered rather difficult to defeat.

[88] According to L. Goldstein and W. Murray, the noise levels of the Kilo-class submarines (105 dB for the Project 636/M, and 117 dB for the Project 877EKM) are comparable to those of a Los Angeles-class nuclear-powered attack submarine. Isabelle Facon and Konstantin Makienko, *La coopération militaro-technique entre la Russie et la Chine: bilan et perspectives*, Fondation pour la Recherche Stratégique, Paris, July 2006, p. 57, http://www.frstrategie.org/barreFRS/publications/rd/RD_20060701.pdf . "Appendix 1: What is known about the character of noise created by submarines?", in E. V. Miasnikov, *The Future of Russia's Strategic Nuclear Forces: Discussions and Arguments*, Center For Arms Control, Energy, and Environmental Studies at MPTI, Dolgoprudny, 1995, http://www.fas.org/spp/eprint/snf03221.htm . Gabriel Collins, Andrew Erickson, Lyle Goldstein, and William Murray, "Chinese Evaluations of the U.S. Navy Submarine Force", *Naval War College Review*, Vol. 61, No. 1, Winter 2008, p. 75, http://www.usnwc.edu/getattachment/c19e33d4-7654-448e-b17a-cd070dff8f12/Chinese-Evaluations-of-the-U-S--Navy-Submarine-For . Lyle Goldstein, William Murray, "China Emerges as a Maritime Power",

ii) Sectional view/internal layout of a Kilo-class (Project 636) submarine.
Sources: i) http://www.china-defense.com/smf/index.php?topic=175.25 ; ii) "Non-Nuclear Submarines: Diesel-Electric Submarines of Project 636", *Central Design Bureau for Marine Engineering "Rubin" website*, http://www.ckb-rubin.ru/eng/project/submarine/noatompl/index.htm .

The importance of the role of the PLA Navy's submarine fleet in China's anti-access strategy would be all the greater for the fact that the other components of Chinese sea power which could theoretically contribute to this strategy, particularly the PLA Air Force, the PLA Navy-Air Force and the PLA Navy surface units, would have difficulty competing with even second-rank regional military forces, let alone a first-class maritime power, such as the United States. Furthermore, submarines would be the most effective asset in a Chinese offensive mine-laying campaign against Taiwan.[89]

With its stealth, a submarine could approach a port covertly, lay mines through its torpedo tubes, and return without detection. Sea mines are cheap and widely available, even in sophisticated forms, and the countermeasures are both expensive and time consuming.[90] After World War II, China purchased a large number of mines from the Soviet Union, in addition to producing its own. Bernard Cole estimates that in 2001 China had about 100,000 mines, but a Taiwanese naval officer puts the number closer to 50,000. Although more than 90% of China's mines may be old contact mines, the Chinese have domestically produced bottom mines, moored mines, and controlled mines, as well as mines with ship counters and delay mechanisms.[91]

Jane's Intelligence Review, October 1, 2004, pp. 34-38, http://www.militaryphotos.net/forums/archive/index.php/t-25695.html .

[89] Kilo-class submarines can carry 24-36 mines, Yuan-class submarines 18-24 mines, and Song-class submarines 24-36 mines. "Diesel-Electric Submarines", *Sino Defense*, http://www.sinodefence.com/navy/vessel.asp .

[90] Mines are usually classified according to their position in the water (drifting, moored, or bottom), and according to their method of actuation (contact or influence). The methods of influence actuation are acoustic, magnetic, or pressure, which is the most difficult to simulate and counter. "Controlled" mines can be turned on and off.

[91] Michael A. Glosny, "Strangulation from the Sea? A PRC submarine blockade of Taiwan", *International Security*, Vol. 28, No. 4, Spring 2004, pp. 139, 140, 141.

Republic of Korea minesweeper *YMS-516* is blown up by a magnetic mine during sweeping operations west of Kalma Pando, Wonsan harbour, on October 18, 1950. Half of the minesweeper's crew went down with her. This ship was originally the U.S. Navy *YMS-148*, which had served in the British Navy (ex *BYMS-2148*) in 1943-1946. Source: Department of the Navy, Naval Historical Center, "Online Library of Selected Images: The Korean War, 1950-1953. Wonsan Mine Clearance, October-November 1950", *U.S. Navy website*, http://www.history.navy.mil/photos/images/g420000/g423625.jpg [Photograph: 80-G-423625; Official U.S. Navy Photograph, now in the collections of the National Archives].

Parenthetically, we should mention that an important document in our effort to understand the Chinese plans providing for the implementation of a successful deterrence strategy across the Taiwan Strait and control of escalation, if such a conflict were to occur, is the PLA doctrinal textbook titled "*Zhanyixue*" [i.e. Campaign Studies/Science of Campaigns], co-edited by Lieutenant General Wang Houqing and Major General Zhang Xingye, providing inputs from 29 military doctrine specialists, and published by PLA's National Defense University Press in 2000.

Interestingly enough, the *Zhanyixue* authors envision heavy reliance on sea mines in blockade scenarios, delivered by multiple methods from submarines, surface navy ships, airplanes, and, if necessary, assembled civilian maritime craft. The laying of sea mines is considered the main mission of a blockade force. Sea mines are notoriously difficult to clear under the best of conditions and mine-clearing is a recognized weakness of the U.S. Navy, particularly when one consider the organic capabilities of forward-deployed battle groups rather than those stationed in ports on the east coast of Texas (as it was largely the case till September 2009) or south-western California (near the city of San Diego), far from Taiwan.[92] The *Zhanyixue* authors explain the relative primacy given the laying of

[92] America's general weakness in minesweeping is widely recognized. Although the United States recently has developed improved minesweeping and mine-hunting equipment, much of this new equipment is kept

sea mines in blockade scenarios: "*[…] the stealthiness of maritime mines is good, they function for a relatively long time, are inexpensive and durable, are easy to lay, and are hard to sweep*". The authors also report that all countries pay careful attention to sea mines and that there have been important recent improvements in sea mine technology, that make mines even harder to detect and counter.[93]

In their exercises, military journals, and internal debates, PLA officers clearly show an understanding that any engagement with U.S. forces for whatever reason would, as a minimum, pit their entire arsenal against American aircraft carrier battle groups, and as a consequence they recognize the urgent need to modernize and restructure their forces, strategy, and command and control networks.[94]

According to sources from Singapore, since the 1996 missile crisis over the Taiwan Strait, during which the United States sent two aircraft carrier battle groups (headed by the USS *Independence* and the USS *Nimitz*) to the area, China has been working on the tactics required to neutralise a carrier battle group. Since then, the PLA is reported to have conducted seven major exercises codenamed "*Project 968*", simulating the sinking of aircraft carriers.[95]

The PLA Navy's most effective conventional weapon against a U.S. aircraft carrier is likely to be the Kilo-class submarine's wake-homing torpedoes. Large, armoured warships are inherently difficult to sink or disable with hits above the waterline, unless the missiles manage to penetrate a vital area of the ship, such as its magazine or combat information center. Hits above the waterline (i.e. most missile hits) may never directly sink a large ship. Multiple hits could nevertheless cause significant damage and casualties.[96] Underwater weapons, however, are inherently far more lethal than their above-water counterparts, because usually they carry a larger warhead and they can flood, and, thus, sink a ship. Torpedoes are also generally less susceptible to countermeasures than missiles.[97]

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in bases in the United States and would require a significant amount of time to be sent to the theatre of conflict. A new naval plan, the "*fleet engagement strategy*", backed by former Secretary of Defense William Cohen, calls for increased organic mine-hunting and minesweeping capabilities within battle/strike groups that would involve airborne (helicopters), surface, and submarine-based capabilities. It is unclear how effective these initiatives will be in providing American forces in East Asia with readily available capability in a crisis. Thomas J. Christensen, "Coercive Contradictions: Zhanyixue, PLA Doctrine, and Taiwan Scenarios", in James Mulvenon and David M. Finkelstein, eds., *China's Revolution in Doctrinal Affairs: Emerging Trends in the Operational Art of the Chinese People's Liberation Army*, The CNA Corporation, Alexandria, VA, December 2005, pp. 307, 315.

[93] Thomas J. Christensen, "Coercive Contradictions: Zhanyixue, PLA Doctrine, and Taiwan Scenarios", in James Mulvenon and David M. Finkelstein, eds., *China's Revolution in Doctrinal Affairs: Emerging Trends in the Operational Art of the Chinese People's Liberation Army*, The CNA Corporation, Alexandria, VA, December 2005, pp. 315-316.

[94] John Wilson Lewis and Xue Litai, *Imagined Enemies: China Prepares for Uncertain War*, Stanford University Press, Stanford, CA, 2006, p. 270.

[95] Ching Cheong, "China revamps top military command (anti-carrier experts promoted)", *Straits Times*, August 10, 2004, http://www.freerepublic.com/focus/f-news/1189884/posts .

[96] The inherent strength of modern U.S. aircraft carriers was demonstrated in 1969, when the USS Enterprise suffered a catastrophic accident in which 9 of its 150-pound bombs detonated, with the explosive power roughly equivalent to 6 Soviet/Russian cruise missiles. Despite 27 deaths and 314 injuries among the crew members, the USS Enterprise resumed strike operations within hours.

[97] Peter Howarth, *China's Rising Sea Power: The PLA Navy's Submarine Challenge*, Frank Cass, London and New York, 2006, p. 99.

The spectacular, destructive power of a torpedo's hit. Torpedoes and naval mines are inherently far more lethal than their above-water counterparts, because, in most of cases, they carry a larger warhead and they can flood and, thus, sink a ship. The photographs cited above come from the "*Thyella [i.e. storm] III/2004*" exercise of the Hellenic (i.e. Greek) Navy in the Aegean Sea on June 24, 2004. The ship used as a target was the decommissioned Landing Ship Tank HS *Kos* (L-116). The two torpedoes were fired by two Type 141 Seeadler-class[98] fast attack craft/torpedo boats: i) HS *Lailaps* (P-54), and ii) HS *Typhon* (P-56). During the first phase of the same exercise (on June 22, 2004) was present also a Type 209/1200 diesel-electric submarine, the HS *Pontos* (S-119). It is worth explaining that a torpedo's explosive power is maximized when the warhead detonates below the keel of the target ship, as opposed to striking it directly. When the detonation occurs below the keel, the resulting pressure wave of the explosion "lifts" the ship and can break its keel in the process. As the ship "settles", it is then seemingly hit by a second detonation, as the explosion itself rips through the area of the blast. This combined effect often breaks smaller targets in half and can severely disable larger vessels.[99] Source: http://www.hellenicnavy.gr/news_old_press.asp [Photos courtesy of the Hellenic Navy].

A characteristic of the current U.S. Navy nuclear-powered aircraft carriers is that they are considered to be relatively lightly armoured. In fact, U.S. Navy super-carriers are far more vulnerable to shell and missile attack than battleships were seven decades ago during World War II. That happens because well-built American, British, German, French, Italian and Japanese battleships carried thousands of tons of the most low-tech, but effective defensive naval weapons system ever devised: steel armour. Of course, that didn't make them invincible. The 72,000-ton[100] *Yamato* and *Musashi*, the two biggest, most powerful, most heavily armoured and armed dreadnoughts ever built, proved helpless against the blizzard of U.S. attacking aircraft and submarines that made funeral pyres of them both in 1944 and 1945. But, it still took a lot of punishment to sink,

[98] The last Type 141 Seeadler-class (and not Jaguar-class, as these ships are erroneously designated in the official website of the Hellenic Navy) fast attack craft/torpedo boats were decommissioned from the Hellenic Navy in late December 2004. "Paroplismoi Naftikon Monadon", *Hellenic Navy's website*, December 29, 2004, http://www.hellenicnavy.gr/new_details_old_press.asp .

[99] "Mark-48 Torpedo War-Shot: Power Point presentation prepared by Northern Connecticut Submarine Library and Museum", *U.S. Naval Sea Systems Command Code 05P14 website*, http://dcfpnavymil.org/mc/presentations/Mark-48.ppt#269,1,Mark-48 Torpedo War – Shot .

[100] The tonne or metric ton is a unit of mass equal to 1,000 kg. It is not to be confused with the U.K. long ton, which is 1,016 kg or 2,240 pounds, or the U.S. short ton, which is defined to be 907 kg or 2,000 pounds. A ship's displacement is its mass at any given time, generally expressed in metric tons or long tons.

especially from above surface weapons. Armour plate went out of fashion after World War II among naval designers around the world, and it has never come back.[101]

Contemporary U.S. Navy aircraft carriers rely on their own speed, the size of their protective support groups, and their ability to stay far out in the ocean, launching their aircraft to strike from long distance, to keep them out of harms way. But, that may not always be enough. On October 26, 2006, a Chinese Song-class diesel-electric submarine was able to sneak up on USS *Kitty Hawk* aircraft carrier task force and surface within firing range of its torpedoes and missiles before being detected. In fact, the PLAN submarine surfaced within 5 miles off *Kitty Hawk*, before it was spotted by a routine surveillance flight by one of the carrier group's airplanes.[102] The ability of the Song-class submarine to remain undetected suggests the PLAN was able to anticipate the location of the American carrier, which also suggests the PLAN may be investing in a more efficient ocean surveillance system.[103]

In one of the most detailed, authoritative analyses of how to meet the U.S. aircraft carrier threat, a PLA writer emphasized the urgent need to acquire a vast array of land, sea, air, and space assets and to forge them into an integrated, information-age strike force that would utilize advanced target detection and assessment measures; sneak and powerful attack technologies; jamming and deception; concealment; stealth and disinformation tactics; and tri-service joint operations.[104]

Ironically, U.S. super-carriers are now far more vulnerable to this kind of attack than they were a few years ago, because the U.S. Navy no longer uses its Lockheed Martin S-3B Viking jet aircraft in their traditional ASW role to protect the gigantic ships.

Since the mid-1990s the PLA has been seeking to assemble the necessary space, missile, air, and naval forces to deter or attack U.S. carrier battle/strike groups that may come to Taiwan's aid. There may even be sentiment in the PLA that by sinking a U.S. carrier, the PLA could succeed in deflating the American will to contest Taiwan. In May 2002, Major General Huang Bin professor at the PLA's National Defense University told a Hong Kong newspaper: "*Missiles, aircraft, and submarines all are means that can be used to attack an aircraft carrier. We have the ability to deal with an aircraft carrier that dares to get into our range of fire. Once we decide to use force against Taiwan, we*

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[101] Some analysts, attempting to make a comparison between the current status of the U.S. Navy aircraft carrier fleet and the historic experience of World War II, are claiming that the nuclear reactors that power U.S. Navy's super-carriers could be the modern equivalent of the HMS *Hood*'s inadequately protected ammunition, or powder magazines. And the modern Russian-designed torpedoes and supersonic anti-ship missiles could be the equivalent of *Bismarck*'s 15-inch (380 mm) naval guns. Martin Sieff, "Defense Focus: Subs vs Carriers (Part 3)", *United Press International*, April 10, 2008, http://www.upi.com/Security_Industry/2008/04/10/Defense-Focus-Subs-vs-carriers-Part-3/UPI-27611207855048/ . Martin Sieff, "U.S. nuclear super-carriers have glass jaws", *United Press International*, March 24, 2009, http://www.upi.com/Security_Industry/2009/03/24/US-nuclear-supercarriers-have-glass-jaws/UPI-83151237926301/ .

[102] "China sub stalked U.S. fleet", *The Washington Times*, November 13, 2006, http://www.washingtontimes.com/news/2006/nov/13/20061113-121539-3317r/ . "Chinese Submarine Stalks US Carrier", *Agence France-Presse*, Washington, D.C., November 13, 2006, http://www.spacedaily.com/reports/Chinese_Submarine_Stalks_US_Carrier_999.html .

[103] Martin Sieff, "Defense Focus: Subs vs Carriers (Part 3)", *United Press International*, April 10, 2008, http://www.upi.com/Security_Industry/2008/04/10/Defense-Focus-Subs-vs-carriers-Part-3/UPI-27611207855048/ .

[104] John Wilson Lewis and Xue Litai, *Imagined Enemies: China Prepares for Uncertain War*, Stanford University Press, Stanford, CA, 2006, p. 270.

definitely will consider an intervention by the United States. The United States likes vain glory; if one of its aircraft carriers should be attacked and destroyed, people in the United States would begin to complain and quarrel loudly, and the U.S. President would find the going harder and harder. [In 1996] U.S. aircraft carriers arrived but suddenly fell back by 200 nautical miles, because Chinese nuclear submarines were operating close to the U.S. aircraft carriers. […] Once [the carriers are] threatened, [the United States] will run away".[105]

Although the Chinese Major General's expectation that such a loss will deter the United States may be gravely mistaken, the PLA has made great progress in gathering the very forces and capabilities he mentions.[106]

So, in that context, the PLA Navy seems to have adhered to the tactics exercised by the Soviet Navy in the 1970s and 1980s. The Soviet anti-carrier exercises featured orchestrated attacks by submarines, land-based aircraft and surface combatants against enemy surface forces designed to overwhelm the carriers' point-defense systems. According to some sources, Chinese planners, in the Soviet/Russian tradition, believe that a carrier battle group can be destroyed with multi-wave and multi-vector saturation attacks with cruise missiles. One recent PLA Navy analysis calculates that: "In order to paralyze a carrier, there must be 8 to 10 direct hits by cruise missiles […] and nearly half of the escort vessels have to be destroyed. This requires the launch of 70 to 100 anti-ship cruise missiles from all launch platforms in a single attack". The same analysis concludes by observing that: "This is Russia's asymmetrical and economical answer to the threat of United States aircraft carriers. In the Russian armed forces, no other force could surely fight this threat except submarines".[107] According to another Chinese analyst: "Submarines are the maritime weapons posing the greatest threat to an aircraft carrier formation. Submarines are also our Navy's core force."[108]

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[105] Thomas Woodrow, China's "Tsushima" anti-carrier strategy", *China Brief*, The Jamestown Foundation, Vol. 3, Issue 1, January 14, 2003, http://www.jamestown.org/programs/chinabrief/single/?tx_ttnews%5Btt_news%5D=20601&tx_ttnews%5BbackPid%5D=193&no_cache=1 . Richard D. Fisher, Jr., "To take Taiwan, first kill a carrier", *China Brief*, The Jamestown Foundation, Vol. 2, Issue 14, July 8, 2002.

[106] Once targets are located, the PLANAF's 24 Su-30MK2 fighter-bombers, the PLAAF's 76 Su-30MKK, the growing numbers of Xi'an JH-7A in the PLAAF and PLANAF inventories, the Shenyang J-11B and Chengdu J-10 fighters, as well as Xi'an H-6M bombers could potentially coordinate with submarines to launch volleys of long-range anti-ship missiles. New PLAN air-defense destroyers can also provide some degree of air cover to allow submarines to get closer to U.S. Navy ships. Should the PLAN purchase Su-30MK fighters with active electronically scanned array (AESA) radars, more powerful AL-31FP, AL-41 or 117C/S (also designated as the AL-41F-1S, rated at 14,500 kgf with afterburning) engines, and anticipated long-range air-to-air missiles, they would be superior to the U.S. F/A-18E/F fighter, the dominant U.S. carrier combat aircraft for many years to come. Richard D. Fisher, Jr., *China's Military Modernization: Building for Regional and Global Reach*, Praeger Security International, Westport, CT-London, September 2008, p. 166.

[107] Peter Howarth, *China's Rising Sea Power: The PLA Navy's Submarine Challenge*, Frank Cass, London and New York, 2006, p. 66.

[108] Lyle Goldstein and William Murray, "Undersea Dragons: China's Maturing Submarine Force", *International Security*, Vol. 28, No. 4, Spring 2004, p. 162.

Estimated PLA anti-carrier weapons by 2015-2020

Space/ISR	Attack Aircraft	Missiles	Surface Warships	Submarines
• Direct-ascent anti-satellite (ASAT) weapons • Laser anti-satellite weapons • Radar satellites • Electro-optical satellites • Electronic Intelligence (ELINT) and Signals Intelligence (SIGINT) satellites • Over-the-Horizon (OTH) radar • Long-range high-altitude UAVs and UCAVs • Underwater sonar networks	• New 4++/5th generation multirole fighter aircraft • 15 Su-33K • 76 Su-30MKK • 24 Su-30MK2 • 220 J-11A/B • 170 JH-7A • 250 J-10 • 40 H-6M/K	• Anti-ship ballistic missiles • YJ-62-derived long-range anti-ship cruise missiles • YJ-82-derived anti-ship missiles • 3M-54E1, 3M-54E, 3M-14E Klub submarine-launched anti-ship and land-attack missiles • 3M-80E/MBE Moskit supersonic anti-ship missiles • Kh-31-derived anti-ship/anti-radar missiles • New indigenously designed and produced supersonic anti-ship/anti-radar missiles • Conventional radio-frequency warheads	• 1 Aircraft carrier • 4 Sovremenny-class Guided Missile Destroyers (DDGs) • 6-8 New Type air-defense DDGs • 2 Luyang II-class "Aegis"-like[109] DDGs • 2 Luyang I-class DDGs • 2 Type 051C DDGs • 12 Type 054A Guided Missile Frigates (FFGs) • 12 New Type FFGs	• Type 097 Nuclear-Powered Fast Attack Submarines (SSNs) • 3 Type 095 SSNs • 3 Type 093 SSNs • 3 Type 091 SSNs • 12 Yuan-class AIP, diesel-electric, Hunter-Killer/ASW Submarines (SSKs/SSIs) • 12 Kilo-class SSKs/SSIs • 13 Song-class SSKs/SSIs • 15 Ming-class SSKs/SSIs

Source: Richard D. Fisher, Jr., *China's Military Modernization: Building for Regional and Global Reach*, Praeger Security International, Westport, CT-London, September 2008, p. 165.

[109] An "Aegis-like" warship is defined here as a major surface combatant (i.e. frigate, destroyer, cruiser) used as an escort vessel that incorporates the following into its design: i) Phased Array Radar System (PARS); ii) Vertical Launch System (VLS) for it's primary surface-to-air missile battery; and, iii) a digitally-controlled, fully-integrated battle management system capable of controlling all phases of combat, potentially digitally linked to other vessels for cooperative engagements.

The Project 956E *Hangzhou* (No. 136) destroyer of the PLA Navy firing a 3M-80E Moskit (SS-N-22 "Sunburn") supersonic surface-to-surface missile. Source: http://www.china-defense.com/smf/index.php?topic=176.0 .

To sum up, according to PLA military thinking, the battle for Taiwan must be won quickly and decisively, preferably before the American aircraft carriers could enter the fray. Should a cross-strait confrontation escalate and draw in the United States, the PLA strategy that prevails is a modern version of the active defense. Yet the most likely scenarios of a future war highlight just how contingent these estimates can be, how dependent they are on whether and how Taiwan resists, and how much and how quickly the United States would be prepared to act, if at all. According to the now-modified active defense strategy, a high-tech conventional war with the United States would probably become large-scale and employ the most sophisticated conventional weapons of each side.[110]

Taiwanese sources argue that China is of the view that with the unceasing improvement of stand-off striking capabilities in modern maritime force, if China fails to intercept or attack enemies beyond 1,000 nautical miles, national security is hardly warranted. In light of drawing up a maritime strategy fit for the 21st century, China is currently building up a maritime force capable of sheltering the whole West Pacific Ocean.

In conclusion, even though PLA's leadership is primarily focused on conventional war scenarios, we must not neglect the fact that a significant part of China's strategy to deter U.S. intervention has been to occasionally threaten to use nuclear weapons against the United States if it aids Taiwan. It is no surprise that nowadays the PLA is modernizing its nuclear missile forces to make such threats even more credible. A second element of PLA deterrence strategy has been to gather information on submarine, aircraft, and missile forces to enable it to attack U.S. aircraft carrier groups that come within threatening range of Taiwan. A third element has been to begin to develop power-projection capabilities that could potentially challenge significant U.S. interests, which may make Washington more willing to allow China a sphere of influence in East Asia.[111]

[110] John Wilson Lewis and Xue Litai, *Imagined Enemies: China Prepares for Uncertain War*, Stanford University Press, Stanford, CA, 2006, p. 271.

[111] Richard D. Fisher, Jr., *China's Military Modernization: Building for Regional and Global Reach*, Praeger Security International, Westport, CT-London, September 2008, p. 163.

4. The theory of "living space" (*lebensraum*) as an integral part of China's foreign policy and military thinking. The influence of F. Ratzel's and A.T. Mahan's theories on the evolution of China's defense strategy

Undoubtedly, China's economic interests are nowadays expanding beyond its own territory. China is since 2004 the third largest trading power in the world, and, since 2005, the fourth largest economy. Its booming economy is highly dependent on trade for its success, and the PRC has become heavily dependent on the sea lines of communication.[112]

Following the disintegration of the Soviet Union and the improvement of relations with Russia, the thesis about the "*military threat from the North*" has lost its topicality for China. Meanwhile, the country's economic growth rates started increasing rapidly, mainly in its maritime provinces, where industrial growth centers emerged, playing a role as the driving force behind China's economic development. This new situation has increased the country's need for raw materials and energy resources, making it more dependent on the shipment of these resources from abroad by sea.

Attempting a flashback, we remark that since at least the 4th century B.C., when the Xiong-nu nomadic tribes on China's north-eastern borders started raiding China's settled farmlands, the need to defend the interior Chinese heartland against threats coming from an alien periphery has provided the basic conceptual framework for structuring Chinese approaches to national strategic and foreign policy.[113] Hence, since almost the 3rd century B.C. the defense of the Chinese heartland required efforts by the Chinese state to directly control, influence or neutralise a very large periphery surrounding it.[114] So, it is not surprising that since the early 1990s, the Chinese military and political lexicon has adopted such terms as "*strategic borders*" and "*living space*".

Enhancing its role in the Asia Pacific region, Beijing's officialdom believes, requires not only an appropriate material basis, internal stability, social unity, and a peaceful international environment. Amid the ongoing globalization, it is just as important to have a certain exclusive zone of influence or, in Chinese terminology, "living space" (inspired by the German theory of *Lebensraum*, first developed and proclaimed by Friedrich Ratzel), which can be used for economic, scientific, and technological development as well as in the interest of ensuring the country's security. According to Chinese military

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[112] Michael R. Chambers, "Framing the problem: Chinas' threat environment and international obligations", in Roy Kamphausen and Andrew Scobel, eds., *Right-Sizing the People's Liberation Army: Exploring the Contours of China's Military*, Strategic Studies Institute, U.S. Army War College, Carlisle, PA, September 2007, p. 25, http://www.strategicstudiesinstitute.army.mil/pubs/display.cfm?pubID=784 .

[113] Peter Howarth, *China's Rising Sea Power: The PLA Navy's Submarine Challenge*, Frank Cass, London and New York, 2006, p. 42.

[114] Throughout most of Chinese history, the pacification or control of this periphery was usually regarded as essential to prevent attacks on the heartland and, during various periods of the imperial era, to secure Chinese dominance over significant nearby inland (and, to a much lesser extent, maritime) trade routes. Michael D. Swaine and Ashley J. Tellis, *Interpreting China's Grand Strategy: Past, Present and Future*, RAND Corporation, Project Air Force, Santa Monica, CA, 2000, pp. 24-25, http://www.rand.org/pubs/monograph_reports/MR1121/mr1121.ch3.pdf .

experts, this living space requires the delimitation of the so-called "strategic borders" (in contrast to state borders), wherein the state will be able to reliably protect its interests with military force.[115]

In that point, it is important to explain that Chinese theoreticians believe that the strategic borders of the living space of major powers go far beyond their state borders, while the living space of many weak states sometimes has strategic borders that do not correspond to their "aggregate power", which can lead to a loss of territory.[116]

In the words of an important *PLA Daily* editorial: "China's national interests are spreading beyond its geographic borders, everywhere in the world, into the open seas, outer space, and even into cyberspace". On the same wavelength and formulating in a more analytical way the same theories, Zhang Wenmu, professor at the Centre for Strategic Studies at the Beijing University of Aeronautics and Astronautics, wrote that: "China's national interests are especially relevant to the nation's economic development, and may not only involve all the regions of the world, but could even include outer space. This gives rise to the concept of a nation's 'security boundary', which is a nation's security concerns over all of its national interests, including those beyond its own borders. Many of China's political and economic interests have been widely integrated into the world, and therefore its security boundary is much more broadly defined than its border security."[117]

Thus, China's claimed strategic frontiers now extend beyond its immediate borders into its regional periphery. They have always included Taiwan and countries contiguous to Chinese boundaries.[118] Some have also thought of China's sphere of interests as extending to the whole of Mongolia, into Central Asia, and along the ancient Silk Road. However, concomitant with the post-1977 redefinition of active defense and abandonment of the strategy of "luring the enemy in deep", China's national security strategists began to define their strategic frontiers in more flexible ways. As one article bluntly emphasized: "strategic frontiers are far greater than geographic boundaries".[119]

Therefore, it is claimed that China not only has a territorial frontier, but also an "interest frontier", "a security boundary", "a strategic boundary" that is much more extended and it is not strictly confined or limited by the national, officially recognized territorial boundaries.[120] For that reason, China's definition of sovereignty is much broader than just the sanctity of its internationally recognized territorial borders. The PLA defense of China's sovereignty also includes being capable and prepared to employ force to achieve national unification and assert Beijing's maritime rights.

One indication of the PRC's aspiration to expand its living space is the fact that the Chinese leadership is putting forward such a task as "completing the unification of the

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[115] A.F. Klimenko, "The evolution of China's military policy and military doctrine", *Military Thought*, April – June 2005, http://findarticles.com/p/articles/mi_m0JAP/is_2_14/ai_n15623000 .

[116] A.F. Klimenko, "The evolution of China's military policy and military doctrine", *Military Thought*, April – June 2005, http://findarticles.com/p/articles/mi_m0JAP/is_2_14/ai_n15623000 .

[117] Zhang Wenmu, "Sea Power and China's Strategic Choices", *China Security*, World Security Institute, Summer 2006, p. 21, http://www.wsichina.org/cs3_2.pdf .

[118] Hence the Chinese sensitivity to American military actions in Korea and Vietnam during the Cold War.

[119] David Shambaugh, *Modernizing China's Military: Progress, Problems, and Prospects*, University of California Press, Berkeley, Los Angeles and London, 2002, pp. 66-67.

[120] David Lai, "Chinese Military Going Global", *China Security*, World Security Institute, Vol. 5, No. 1, Winter 2009, p. 4, http://yaleglobal.yale.edu/about/pdfs/chinaGlobal.pdf .

Motherland". In practice, this task presupposes the annexation of Taiwan to the PRC on Beijing's terms and conditions and the establishment of control over the disputed island territories in the South China Sea (essentially, the Paracel Islands and the Spratly archipelago) and in the East China Sea (the Diaoyu/Senkaku Islands).

There are also other reasons that China will be bent on building up its military presence in the region. One of them is that Beijing endeavors to strengthen its naval capability to ensure shipping and navigation in the Strait of Malacca, a transportation route for more than half of the oil that China imports today. It should be noted that the Malacca Strait is also used by many vessels moving from the Indian Ocean to the Pacific and back. Thus, the Chinese Navy and Air Force capabilities can be effectively used also to block the straits between the Indian and the Pacific Oceans, should the military-political situation demand the hindering of the passage of warships or the shipment of oil to Taiwan and Japan.

So, to sum up, according to Beijing, in order to attain its main political objective (i.e. securing, by the middle of the 21st century, a dominant position in East Asia) the People's Republic of China needs to affirm its influence over its living space, a broader geographical area which can be used in the interest of China's national security and the provision of vital resources. Living space encompasses all spheres of state activity on land, at sea, under water, in the air, and in space, its size being determined by the China's economic, scientific, technological, social, and military capabilities.

4.1. Alfred Thayer Mahan and the development of the PLA Navy's capabilities

Chinese leaders increasingly view command of the sea as vital to their national interests. To fuel China's booming economy, large volumes of imported energy resources, as well as a growing volume of exports must pass through the South China Sea's shipping lanes. China is now the world's third largest economy (trailing the United States and Japan), and third largest trading nation (behind the United States and about to surpass Germany); its products are reaching every corner of the world. At the same time, China has also become heavily reliant on the outside world for much of its natural resources and energy supply. The flow of these vital commodities or "life supplies of China," mostly comes by sea, with over 90% of China's trade and energy supply delivered by sea transport.[121]

As a result, with an increasingly successful economy and greater reliance on foreign energy resources, China has now started perceiving the sea also as a potentially critical national security vulnerability. As it has been appositely remarked: "China's offshore national security concerns (Taiwan, the South China Sea, and the sea lines of communication) are the problems whose resolution will require the ability to prevail in a

[121] David Lai, "Chinese Military Going Global", *China Security*, World Security Institute, Vol. 5, No. 1, Winter 2009, p. 4, http://yaleglobal.yale.edu/about/pdfs/chinaGlobal.pdf .

maritime environment".[122] In an effort to defend these vulnerabilities, China is investing to acquire a larger, more modern and capable Navy.

As Chinese planners develop a naval strategy to address their interests in these waterways, many have consulted the writings of Alfred Thayer Mahan, America's "evangelist of sea power", who at the end of the 19th century furnished the intellectual rationale for an expansive U.S. maritime strategy.

Writing around the turn of the 19th century, Alfred Thayer Mahan exhorted an America long disdainful toward foreign political entanglements to amass a kind of "sea power" built on six "principle conditions", and three "pillars".

More specifically, Mahan provided six "principle conditions" that affect the ability of a nation to project sea power:

- Geographic position;
- Physical conformation;
- Extent of territory;
- Number of population;
- Character of the people;
- Character of the government.

His six principles suggest that to become a great sea power a nation must possess these principle conditions and, additionally, it clearly demonstrates the importance maritime geostrategy plays in a country's potential for power and wealth.

In addition to these conditions, he identified three "pillars" of sea power, namely:

- Overseas commence;
- Naval and merchant fleets;
- Naval bases required to support deployed warships that are necessary to exercise command of the sea.[123]

In China advocates of a strong Navy take Alfred T. Mahan's teachings to heart, believing that a strong navy is a precondition for the rise of a great nation with global reach. They see that China has the capacity to become a global power. However, they claim that China cannot reach its potential without a strong navy, or put more bluntly, China's development will have no future without a strong navy.[124]

As Zhang Wenmu, a professor at the Centre for Strategic Studies at the Beijing University of Aeronautics and Astronautics, put it: "China's dependence on international energy imports is rapidly changing from a relationship of relative dependence to one of absolute dependence. China cannot have control over development goals without corresponding control over the resources to fuel the economy. The simple fact is that China does not possess that control. More than half of U.S. oil imports are shipped via the sea lanes. The crucial difference is that China is almost helpless to protect its overseas

[122] J. A. Clarke, "China's Naval Modernization in the Mahanian Mirror: Reconsidering Real Force Capacity in the Medium and Longer-Term Perspective", *Canadian Forces College*, JCSP 34, April 2008, p. 23, http://wps.cfc.forces.gc.ca/papers/csc/csc34/mds/clarke.doc .

[123] J. A. Clarke, "China's Naval Modernization in the Mahanian Mirror: Reconsidering Real Force Capacity in the Medium and Longer-Term Perspective", *Canadian Forces College*, JCSP 34, April 2008, pp. 7-8, http://wps.cfc.forces.gc.ca/papers/csc/csc34/mds/clarke.doc . Toshi Yoshihara and James R. Holmes, "Japanese Maritime Thought: If not Mahan, Who?", *Naval War College Review*, Vol. 59, No. 3, Summer 2006, p. 26, http://www.nwc.navy.mil/press/review/PressReviewPDF.aspx?q=102 .

[124] David Lai, "Chinese Military Going Global", *China Security*, World Security Institute, Vol. 5, No. 1, Winter 2009, p. 7, http://yaleglobal.yale.edu/about/pdfs/chinaGlobal.pdf .

oil import routes. This is an Achilles heel to contemporary China, as it has forced China to entrust its fate (stable markets and access to resources) to others. Therefore, it is imperative that China, as a nation, pay attention to its maritime security and the means to defend its interests through sea power (a critical capability in which China currently lags behind)".[125]

Certainly it is true that throughout the past five decades Chinese leaders argued that using military force abroad was a sign of imperial conduct. They have repeatedly criticized the United States' military presence in many parts of the world and the force it projected in international affairs, meanwhile proudly proclaiming that China does not have a single soldier deployed on foreign soil (as maintained by the Chinese, all PLA soldiers deployed overseas participate in missions covered by a U.N. Security Council mandate). These views, however, started gradually changing when China's national interests expanded and became closely tied to events and developments beyond its borders.[126]

Professor Z. Wenmu expressed accurately this school of thought when he wrote that: "Wherever China's interests lead, there too must follow China's capabilities to protect those interests. And as the nation's economic interests expand into the global market, China must consider the problem of safeguarding its global and regional interests. The most crucial conduit connecting China with the region and with the rest of the world is the sea lanes, and therefore, China must have a powerful navy. The oil imports that China consumes from Africa, the Middle East and Central Asia will mainly pass through these sea lanes. China's trade is 90% dependent on sea lane transport".[127]

In that political and financial context, in recent years a vocal school of thought in Beijing has noticed that Mahan's works furnish both the logic and the vocabulary with which to argue for the development of assertive sea power capabilities. Certainly, Chinese leaders argue that "building up a strong naval power is not contradictory with China's consistent principle of peace and development"[128], but the fact is that the gradual acquisition of a modern fleet, capable of promoting and defending the Chinese economic and geopolitical interests abroad is directly linked and related with the theory of the "living space", the "offshore active defense" doctrine, and the need for projection of military power overseas when necessary. However, the main focus of the new Chinese strategy is the protection of critical sea lanes, through which is passing the majority of the Chinese trade and imports of raw materials.

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[125] Zhang Wenmu, "Sea Power and China's Strategic Choices", *China Security*, World Security Institute, Summer 2006, pp. 19-20, http://www.wsichina.org/cs3_2.pdf .

[126] David Lai, "Chinese Military Going Global", *China Security*, World Security Institute, Vol. 5, No. 1, Winter 2009, pp. 3-4, http://yaleglobal.yale.edu/about/pdfs/chinaGlobal.pdf .

[127] Zhang Wenmu, "Sea Power and China's Strategic Choices", *China Security*, World Security Institute, Summer 2006, p. 22, http://www.wsichina.org/cs3_2.pdf .

[128] Ni Lexiong, "Sea Power and China's Development", *The Liberation Daily*, April 17, 2005, p. 7, http://www.uscc.gov/researchpapers/translated_articles/2005/05_07_18_Sea_Power_and_Chinas_Development.pdf .

China's Critical Sea Lanes. Like many other industrialized East Asian countries, China is heavily dependent upon critical sea lanes for its energy imports. Over 80% of China's crude oil imports transit the Strait of Malacca. Source: Office of the Secretary of Defense, *Military Power of the People's Republic of China 2009*: *Annual Report to Congress*, Washington, D.C., 2009, p. 4, http://www.defenselink.mil/pubs/pdfs/China_Military_Power_Report_2009.pdf .

"Communications", wrote Mahan, "is the most important single element in strategy, political or military. […] The eminence of sea power lay in its ability to control the sea lines of communication. The power to insure these communications to one's self, and to interrupt them for an adversary, affects the very root of a nation's vigour".[129]

Invoking Mahan, Chinese scholars contend that economic prosperity hinges on stationing naval forces at strategic locations to assure Chinese shipping of safe passage

[129] James Holmes and Toshi Yoshihara, "Mao Zedong, Meet Alfred Thayer Mahan: Strategic Theory and Chinese Sea Power", *Australian Defence Force Journal*, Issue 171, 2006, p. 38, http://www.defence.gov.au/publications/dfj/dfj171a.pdf .

through the sea lanes. They tend to argue that it is extremely risky for a major power such as China to become overly dependent on foreign imports without adequate protection. In line with this point of view, they argue that Beijing needs to assemble a powerful PLA Navy as swiftly as possible, girding itself for the "sea battle that is the ultimate way for major powers to resolve an international [economic] dispute".[130]

Major General Jiang Shiliang, director of the Military Communications and Transportation Department of the PLA's General Logistics Department, invoked Mahan's writings to justify China's control of maritime communications in the seas adjacent to China's coasts: "In modern times securing the absolute control of communications [is] turning with each passing day into an indispensable essential factor in ensuring the realization of national interests". According to Major General Jiang Shiliang, economic development depends on "the command of communications on the sea, which is vital for the future and destiny of the [Chinese] nation".[131]

Another PLA Navy officer, Senior Captain (the equivalent of a Commodore in Western Navies) Xu Qi, deputy director of the Strategic Research Office of the Naval Affairs Science Research Institute in Beijing, studying the U.S. rise as a great power with global ambitions in the beginning of the 20th century pointed out that: "[the United States] benefited from the guidance of Mahan's theories of sea power, and unceasingly pressed forward in the maritime direction, capturing in succession Hawaii and the Marianas Islands in the Pacific Ocean, expanding its strategic depth on its maritime flank, securing an advantageous maritime geostrategic posture, [and thus] establishing a firm foundation for its move into the world's first-rank powers".[132]

In fact, Mahanian logic is not merely used in a purely abstract, theoretical context by the Chinese officials. The Mahanian way of thinking has already started influencing China's policies on issues related with the security of the sea lines of communication that traverse the South China Sea. This would be in keeping with longstanding traditions: Beijing has long regarded the South China Sea as something of a national preserve. Indeed, it laid claim to the entire sea in 1992, in effect codifying its position in domestic law. In recent decades China has signalled its willingness to use naval force to back up its maritime claims. In 1976, Chinese forces wrested the Paracel Islands from Vietnam. In 1988, the PLA Navy pummelled a Vietnamese flotilla and occupied several of the strategically placed Spratly Islands, subsequently stationing anti-ship missiles on Woody Island, an island in the archipelago. In 1995, following the U.S. withdrawal from the Philippine Islands, Beijing seized Mischief Reef, an islet located within the Philippines' 200-mile exclusive economic zone, and it fortified Mischief Reef in 1998. In short, China has obtained outposts that extend its outer defense perimeter, flank vital sea-lanes, and

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[130] James R. Holmes and Toshi Yoshihara, "China's 'Caribbean' in the South China Sea", *SAIS Review*, Johns Hopkins University, Vol. 26, No. 1, Winter-Spring 2006, http://www.kabar-irian.com/pipermail/kabar-indonesia/2006-June/007919.html ; http://www.kabar-irian.com/pipermail/kabar-indonesia/2006-June/007918.html .

[131] James R. Holmes and Toshi Yoshihara, "China's 'Caribbean' in the South China Sea", *SAIS Review*, Johns Hopkins University, Vol. 26, No. 1, Winter-Spring 2006, http://www.kabar-irian.com/pipermail/kabar-indonesia/2006-June/007919.html ; http://www.kabar-irian.com/pipermail/kabar-indonesia/2006-June/007918.html .

[132] Xu Qi, "Maritime Geostrategy and the Development of the Chinese Navy in the early Twenty-First Century", *Naval War College Review*, Vol. 59, No. 4, Autumn 2006, p. 48, http://www.nwc.navy.mil/press/review/documents/NWCRAU06.pdf .

give it a measure of control over the approaches to the Strait of Malacca (the conduit for one-sixth of world trade, not to mention vital oil and gas shipments bound for China, Japan, South Korea, Singapore, and other East Asian economic powers).

China Fisheries Law Enforcement Command vessel "*China Yuzheng 311*" (former PLA Navy Type 922-II/Dalang-class submarine salvage and rescue ship "*Nanjiu 503*"), the country's largest fishery patrol ship, is heading towards the port of Sanya, on the island province of Hainan, on March 19, 2009, after finishing the first phase of its fishery protection and maritime surveillance mission in the South China Sea (in the waters around the Paracel and the Spratly islands).
China intends to intensify patrols in the South China Sea to protect its economic interests, following a rising tide of disputes with neighbouring countries in this maritime region.[133] In that context, there may be, in the medium term, a push by China to build larger non-navy (i.e. Coast Guard; Marine Surveillance; and, Fisheries Law Enforcement Command) sovereignty enforcement ships to impose its claims, and promote and defend its economic interests in the waters and the continental shelf of the South China Sea. Source: Zhang Xin, "Change tack with sea strategy: China experts", *China Daily*, May 13, 2009, http://www.chinadaily.com.cn/china/2009-05/13/content_7771886.htm [China News Service].

As it is expected, these Chinese theories, which are accompanied by tangible efforts to undermine the regional status quo through the use, or the threat of use, of force, have not passed unnoticed and they have alarmed other East Asian regional powers. In an article published in 2005, Hideaki Kaneda, a retired Japanese Navy Vice Admiral, explicitly linked China's emerging maritime strategy to Mahan. Vice Admiral Kaneda argued that China meets three of Mahan's "principle conditions" for the development of considerable maritime capabilities: i) favourable geography, ii) a large population, and iii) the national will to compete on the high seas. He observed that the Chinese are constructing strategic relationships and military bases along the sea lanes stretching from the South China Sea to the Persian Gulf and the Middle East, sea lanes that convey the energy resources and other commodities that sustain China's economic well-being. Under Mahanian logic, this

[133] "China charts course toward secure South China Sea", *People's Daily Online*, July 1, 2009, http://english.people.com.cn/90001/90776/90786/6690696.html .

emerging diplomatic and defense infrastructure, accompanied by the establishment of a network (also known as a "string of pearls"[134]) of alliances and strong diplomatic and economic ties with other Asian nations, would permit larger-scale military deployments in the future to protect Chinese commerce. The Japanese Vice Admiral concluded his article by stressing that: "*All of Asia must wake up to the arrival of Chinese-style aggressive 'sea power.' Japan, in particular, must reformulate its national maritime strategy with this in mind*".[135]

[134] The Chinese "string of pearls" strategy includes a new naval base under construction at the Pakistani port of Gwadar. Beijing already has set up electronic eavesdropping posts at Gwadar. The post is monitoring ship traffic through the Strait of Hormuz and the Arabian Sea. Other "pearls" in the sea-lane strategy include: Bangladesh, Burma, Cambodia, and Thailand. "China builds up strategic sea lanes", *The Washington Times*, January 17, 2005, http://www.washingtontimes.com/news/2005/jan/17/20050117-115550-1929r/ .

[135] Hideaki Kaneda, "The rise of Chinese sea power", *Daily Times*, September 15, 2005, p. 43, http://www.dailytimes.com.pk/default.asp?page=story_15-9-2005_pg3_5 .

5. Developing a power-projection doctrine for the PLA? The "*Peace Mission*" 2005 and 2007 military exercises as a case study of the Sino-Russian defense cooperation

"*All power comes from the barrel of a gun*".
Mao Zedong

In its February 2006 "Quadrennial Defense Review" the American Department of Defense warned that China has the greatest potential to compete militarily with the United States and field disruptive military technologies that could over time offset traditional U.S. military advantages absent U.S. counter strategies.[136]

On the same wavelength, during the February 28, 2006 hearings of the Senate Armed Services Committee, Chairman Senator John W. Warner openly noted that China is "creating a military force far beyond what it needs to protect [its] own security interest. [Beijing appears set to] project influence and perhaps even force elsewhere in the region".[137] At that same hearing principal deputy director of National Intelligence, General Michael Hayden, observed of China: "There is almost a momentum in Chinese thinking that […] great powers need certain things, and they aren't necessarily tied to a specific military event, either proposed or expected, but simply become the trappings of their global legitimacy".[138] According to General Hayden, China "is focusing its military buildup on a conflict over the Republic of China [i.e. Taiwan] and the expansion of influence regionally".

Likewise, an editorial appeared in the official newspaper of the PLA, *Jiefangjun Bao*/*PLA Daily*, to commemorate the paper's 50th anniversary noted that conceptions of national interests had already extended from national territory, seas, and airspace to include further out into the deep seas, outer space, and the electromagnetic sphere, arguing that the PRC needs to develop the capabilities to secure these interests. The *Jiefangjun Bao* editorial then nailed down its point: "In order to accelerate national development and safeguard national security, China has great strategic interests in the deep seas and in outer space".[139]

As a matter of fact, the estimate that China is gradually and methodically developing or building long-range power-projection forces amounts to a new view of Chinese intentions and capabilities that flies in the face of recent conventional assessments. In the 1990s and the early 2000s it was more usual to describe China's military modernization ambitions

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[136] "Quadrennial Defense Review Report", United States Department of Defense, February 6, 2006, p. 29, http://www.defenselink.mil/qdr/report/Report20060203.pdf .

[137] "Expanded influence seen as Chinese military goal", *The Washington Times*, March 1, 2006, http://www.washingtontimes.com/news/2006/feb/28/20060228-110029-3691r/ .

[138] "Expanded influence seen as Chinese military goal", *The Washington Times*, March 1, 2006, http://www.washingtontimes.com/news/2006/feb/28/20060228-110029-3691r/ .

[139] Michael R. Chambers, "Framing the problem: Chinas' threat environment and international obligations", in Roy Kamphausen and Andrew Scobel, eds., *Right-Sizing the People's Liberation Army: Exploring the Contours of China's Military*, Strategic Studies Institute, U.S. Army War College, Carlisle, PA, September 2007, pp. 25-26, http://www.strategicstudiesinstitute.army.mil/pubs/display.cfm?pubID=784

as largely "defensive" or "limited" for the purpose of solving the Taiwan issue or exercising influence in its immediate East Asian region. Many scholars had overtly underestimated not only the pace of the PLA modernization efforts, but also the very existence of a power-projection military doctrine.[140]

However, throughout the last 5-6 years China has started exhibiting some of the needed elements of a robust power-projection capability in terms of doctrine, deployable Army forces, and robust deployable Naval forces. It is apparent that China is working to increase its military's reach in the Asia-Pacific region and beyond. This involves not only the acquisition of new naval and air force weapon systems and capabilities, but also greater integration of forces in the PLA to improve its coordination and extend its reach beyond green-water territories. This is not surprising given China's growing international commercial and diplomatic involvement. According to the retired U.S. Navy Admiral Eric McVadon, "an emerging China wants to build a military appropriate to the country that it is becoming".[141]

Certainly, China's main ambition in the current era is still to resume its traditional role as the leading power in Asia. But, in recent years Chinese military officials have issued statements indicating that China may be considering the development of a larger military force, able to play a role in global strategic affairs and commensurate with China's growing leadership role in global political and economic affairs.

In late 2004, Hu Jintao began to develop the concept of "*the historical mission of the army*", with a component that the PLA "*must offer powerful strategic backup for defending the national interests*".[142] This apparently goes beyond participation in U.N. peacekeeping operations and foreign military exercises, which the PLA is also doing. The Chinese leadership appears to increasingly consider missions aiming at protecting sea-lanes of communication, assuring access to natural resources, and permitting the projection of Chinese power into outer space.

An impressive, unexpected by most Western observers, manifestation of the growing Chinese capabilities for power-projection on outer space took place on January 11, 2007. On that day, Beijing conducted its first successful direct-ascent, anti-satellite (ASAT) weapons test, launching a ballistic missile armed with a kinetic kill vehicle (i.e. not an

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[140] For instance, in 2004 D. Shambaugh in a descriptive analysis published on the authoritative "*International Security*" emphatically noted that: "The PLA does not seem to have made much progress in enhancing its power projection capabilities, nor do these seem to be a priority. No aircraft carrier battle groups are being constructed; few destroyers capable of operating in the open ocean have been built; no military bases are being acquired abroad; training over water or far from China's shores is minimal; no long-range bombers are being manufactured; and no airborne command and control aircraft have been deployed. […] The PLA has not adopted a doctrine that would guide such a forward force projection capability. Thus, there is scant, if any, evidence of the PLA developing capabilities to project power beyond China's immediate periphery. What the PLA has done, and is of considerable concern to China's neighbors, is to build up a variety of military capabilities for the potential use of force against Taiwan". David Shambaugh, "China engages Asia. Reshaping the regional order", *International Security*, Vol. 29, Issue 3, Winter 2004-2005, pp. 85, 86, http://www.brookings.edu/~/media/Files/rc/articles/2005/winter_china_shambaugh/20050506.pdf .

[141] "2006 Report to Congress of the U.S.-China Economic and Security Review Commission", One Hundred Ninth Congress Second Session, U.S. Government Printing Office, Washington, D.C., November 2006, p. 129, http://www.uscc.gov/annual_report/2006/annual_report_full_06.pdf .

[142] "Xu Caihou calls on the army to implement Chairman Hu's important remarks on PLA's historical mission", *PLA Daily*, September 21, 2005, http://english.chinamil.com.cn/site2/militarydatabase/2005-09/22/content_300826.htm .

exploding conventional or nuclear warhead) to destroy an aging, decommissioned Chinese Feng Yun-1C-type weather satellite (with a mass of approximately 750 kg) at about 865 km up in low earth orbit in space. China reportedly used a multistage, solid-fuel, medium-range ballistic missile, traveling with a speed of 8 km/second, which was launched from a mobile transporter erector launcher (TEL) vehicle. The Chinese anti-satellite system has been identified by the director of the U.S. Defense Intelligence Agency, Lieutenant General Michael Maples, in a Senate Armed Services Committee hearing, as the SC-19.[143]

Although more of a "policy weapon" at this time, the test signaled Beijing's readiness to join the militarization of space and showed that the Chinese military can threaten the imaging reconnaissance satellites operated by the U.S, Japan, Russia, Israel, and European countries.[144] Moreover, this test raised questions about longer-term China's capability and intention to attack U.S. satellites. Pentagon officials are claiming that intelligence estimates indicate that China might have produced enough satellite interceptors by 2010-2011 to destroy most U.S. low-earth orbit satellites.[145] It is useful to keep in mind that several declarations and statements delivered by PLA officers and Chinese civilian analysts have justified the ASAT test as needed to counter perceived U.S. hegemony in space and target the vulnerability of U.S. Armed Forces dependence on satellites. For instance, a PLA Air Force Colonel wrote in late 2006 that: "U.S. military power, including long-range strikes, have relied on superiority in space. Leveraging space technology can allow a rising power to close the gap with advanced countries more rapidly than trying to catch up."[146]

The overall pattern of Chinese power-projection efforts in outer space, that began with the destruction of the decommissioned weather satellite, was followed by the country's successful effort on October 24, 2007 to put a Chinese-made satellite into the moon's orbit. The satellite, called *Chang'e 1*, was lifted into space atop a Long March 3A rocket, and entered lunar orbit on November 5, 2007. The launch of the Chang'e 1 satellite was obviously part of the ambitious Chinese national program to send more men into space, build a space station, and eventually land Chinese astronauts on the moon.[147] In about 2012, China plans an unmanned lunar landing with a rover. In the third phase, about five

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[143] The SC-19 has been described as being based on a modified DF-21 ballistic missile. More specifically, the DF-21 provided the basis for the four-stage KT-1 mobile solid fuel space launch vehicle, which in turn, forms the basis for the SC-19 direct-ascent anti-satellite (ASAT) missile. A more capable ASAT missile may be derived from the KT-2, which Chinese sources at the 2002 Zhuhai Airshow stated was based on the DF-31 ICBM. Richard Fisher, Jr., "New Chinese Missiles Target the Greater Asian Region", *International Assessment and Strategy Center*, July 24, 2007, http://www.strategycenter.net/research/pubID.165/pub_detail.asp .

[144] Craig Covault, "Chinese Test Anti-Satellite Weapon", *Aviation Week & Space Technology*, January 17, 2007, http://www.aviationweek.com/aw/generic/story_channel.jsp?channel=space&id=news/CHI01177.xml .

[145] Bill Gertz, "China mum on Pace query on anti-satellite system", *The Washington Times*, April 6, 2007, http://www.washingtontimes.com/news/2007/apr/05/20070405-114828-9453r/ .

[146] Shirley Kan, *China's Anti-Satellite Weapon Test*, Congressional Research Service Report for Congress, Order Code RS22652, Washington, D.C., April 23, 2007, p. 3, http://www.fas.org/sgp/crs/row/RS22652.pdf .

[147] Edward Cody, "Chinese Satellite Heading for Lunar Orbit Showcases Ambitious Space Program", *The Washington Post*, October 25, 2007, p. A16, http://www.washingtonpost.com/wp-dyn/content/article/2007/10/24/AR2007102400443.html .

to eight years later (around 2017-2020), another rover is to land on the moon and be returned to Earth with lunar soil and stone samples.[148] While, according to a bilateral Russo-Chinese agreement signed on March 26, 2007, in 2011-2012 the *Yinghuo-1*[149], a small Chinese satellite, is expected to be launched along with Russia's Phobos-Grunt Explorer spacecraft heading towards Mars. After entering Mars' orbit the Chinese satellite will then detach from the Russian spacecraft and probe the Martian space environment.[150]

The Chinese intentions for the development of power-projection capabilities matching the Chinese economic growth was manifested once more in early 2005, when PLAAF Lieutenant General Liu Yazhou, one of China's leading military theorists and deputy Political Commissar in the PLAAF, stated in an interview given to the *Eurasian Review of Geopolitics*: "*When a nation grows strong enough, it practices hegemony. The sole purpose of power is to pursue even greater power*".[151] And, with regard to the Sino-American relations, he went on arguing that: "*The more solid and credible our strategy deterrence becomes to the United States, the more careful it would be in considering forceful intervention. […] We cannot limit our war concepts on the ground any longer. The frontiers of our national interests are expanding. Our military strategy should embody characteristics of the time. […] China must achieve the means that can match its national position and protect the expansion of its national interests*".[152]

Then, in Autumn 2007, PLAN Rear Admiral Yang Yi, director of the Institute for Strategic Studies of the PLA's National Defense University, wrote an article, which appeared on *China Security*, the journal of the World Security Institute. In that article the Chinese Rear Admiral noted that though China's interests around the world are continually expanding, its influence to help safeguard those interests remains insufficient. According to the Chinese Rear Admiral, China lacks the strategic power to actively influence and shape the direction and process of major international affairs. In other words, China military power lags far behind its political, diplomatic and cultural power to

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[148] Henry Sanderson, "Chinese satellite enters orbit around moon", *Associated Press*, May 11, 2007, http://www.usatoday.com/tech/science/space/2007-11-05-china-satellite-moon_N.htm .

[149] The exact title of the Sino-Russian agreement is "Cooperative Agreement between the China National Space Administration and the Russian Space Agency on joint Chinese-Russian exploration of Mars". The *Yinghuo-1* Mars probe will be 75 cm long, 75 cm wide, and 60 cm high. Weighing 110 kg, it is designed for a two-year mission.

[150] We should not overlook the fact that the display of China's new-found achievements in weaponry and aeronautics serves to strengthen internal cohesiveness, a long-standing Communist Party goal. As Premier Wen Jiabao put it on November 26, 2007, while displaying the first close-up satellite pictures of the moon: the astronautic feat is a "*major manifestation of the increase in our comprehensive national strength and the ceaseless enhancement of our innovative ability […]. [The project] will have a tremendous significance toward boosting the cohesiveness of the people*". Willy Lam, "China's Secret War Games and the Kitty Hawk Affair Flip-Flop", *China Brief*, The Jamestown Foundation, Vol. 7, Issue 22, December 3, 2007, http://www.jamestown.org/single/?no_cache=1&tx_ttnews%5Btt_news%5D=4580 . Peter Harmsen, "China and Russia plan Mars mission", *Agence France-Presse*, March 29, 2007, http://www.cosmosmagazine.com/news/1131/china-and-russia-plan-mars-mission .

[151] "Interview with Lieutenant General Liu Yazhou of the Air Force of the People's Liberation Army", *Heartland: Eurasian Review of Geopolitics*, no. 1/2005, Gruppo Editoriale l' Espresso / Cassan Press HK, March 19, 2005, p. 6, http://temi.repubblica.it/limes-heartland/china-america-the-great-game/748 .

[152] "Interview with Lieutenant General Liu Yazhou of the Air Force of the People's Liberation Army", *Heartland: Eurasian Review of Geopolitics*, no. 1/2005, Gruppo Editoriale l' Espresso / Cassan Press HK, March 19, 2005, p. 26, http://temi.repubblica.it/limes-heartland/china-america-the-great-game/748 .

better protect its national interests in the world. Therefore, he reached the conclusion that China needs to build a powerful military that is commensurate with its international position. This is necessary, in order to be able to "*protect both China's interests of national security and development as well as world peace, and development of all*".[153]

Official government statements and statements pronounced by PLA officials indicate that the PLA develops a concrete doctrine of power-projection. Although the content of this doctrine may never be fully explained publicly, the first indication that the PLA is considering "distant" missions for its armed forces came in the December 2006 National Defense White Paper. More recently, in January 2009, the latest, updated version of the Chinese National Defense White Paper noted:

"The PLA gives priority to developing informationized weapons and equipment which can meet the requirements of integrated joint operations. […] It has basically established an army equipment system featuring high mobility and three-dimensional assault, a naval equipment system with integrated sea-air capabilities for offshore defensive operations, an air force equipment system with integrated air-land capabilities for both offensive and defensive operations, a surface-to-surface missile equipment system for the Second Artillery Force comprising both nuclear and conventional missiles with different ranges, and an electronic information equipment system featuring systems integration and joint development."

"[…] In recent years, in line with the strategic requirements of mobile operations and three-dimensional offence and defense, the Army has been moving from regional defense to trans-regional mobility. […] It is accelerating the development of aviation, light mechanized and information countermeasure forces, and gives priority to the development of operational and tactical missile, ground-to-air missile and special operations forces, so as to increase its capabilities for air-ground integrated operations, long-distance manoeuvres, rapid assaults and special operations."

"[…] In line with the requirements of offshore defense strategy, the Navy takes informationization as the orientation and strategic priority of its modernization drive, and is endeavouring to build a strong navy. It […] highlights training in maritime integrated joint operations, and enhances integrated combat capability in conducting offshore campaigns and the capability of nuclear counterattacks. […] The Navy has gradually deployed new types of large integrated supply ships, medical ships and ambulance helicopters."

"[…] To meet the requirements of informationized warfare, the Air Force is working to accelerate its transition from territorial air defense to both offensive and defensive operations, and increase its capabilities for carrying out reconnaissance and early warning, air strikes, air and missile defense, and strategic projection, in an effort to build itself into a modernized strategic air force."[154]

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[153] Yang Yi, "Engagement, Caution", *China Security*, World Security Institute, Vol. 3, No. 4, Autumn 2007, pp. 33, 34, http://www.defence.org.cn/aspnet/vip-usa/UploadFiles/2008-02/20080207140641328 1.pdf .

[154] Information Office of the State Council of the People's Republic of China, *China's National Defense in 2008*, Beijing, January 2009, pp. 15, 20, 21, 24, 25, 27, http://www.fas.org/programs/ssp/nukes/2008DefenseWhitePaper_Jan2009.pdf .

As is characteristic of these documents, neither the 2006 nor the 2009 White Papers offer any definition for these new highlighted terms. For the Army, "long-distance manoeuvres" and "trans-regional mobility" could mean missions across the expanse of just China itself, or it could mean operations between China and the Persian Gulf. For the Navy, "gradual extension of strategic depth" may have a limit, perhaps an East Asian regional limit (i.e. the first island chain), or it may not. For the Air Force, however, "strategic projection" would have a clearer meaning: the ability to project force a long distance. When considering the long-range-capable air and naval forces that the PLA is developing, these terms begin to suggest China's intention to develop operational concepts of power projection in the sense of sending significant military force well beyond China's borders.[155]

As far as the maritime dimension of Chinese aspirations is concerned, we have to mention that building maritime projection capabilities is not just an issue of defense, it is also perceived through the lens of nationalism. It constitutes an affirmation of Chinese determination to reverse the "humiliation" of the era of European and Japanese dominance, while asserting China's claim to regional leadership. The programme aiming at the construction of an aircraft carrier[156]; the development of means that enable amphibious projection; as well as, the design and the construction of conventional cruise missiles to be delivered by nuclear submarines, testify to Chinese leadership's aspirations to intervene in distant regions by using military force, in order to efficiently protect Chinese national interests. Carriers, amphibious forces, and large medical navy ships also allow for the projection of soft power[157]; be it shows of force, high profile exercises with allies, or participation in peacekeeping and humanitarian missions.[158]

Besides, it is worth bearing in mind that the PLA Navy's main strategic concept of offshore active defense (inspired by the PLA Ground Forces' doctrine of active defense)

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[155] Richard D. Fisher, Jr., *China's Military Modernization: Building for Regional and Global Reach*, Praeger Security International, Westport, CT-London, September 2008, pp. 170-172.

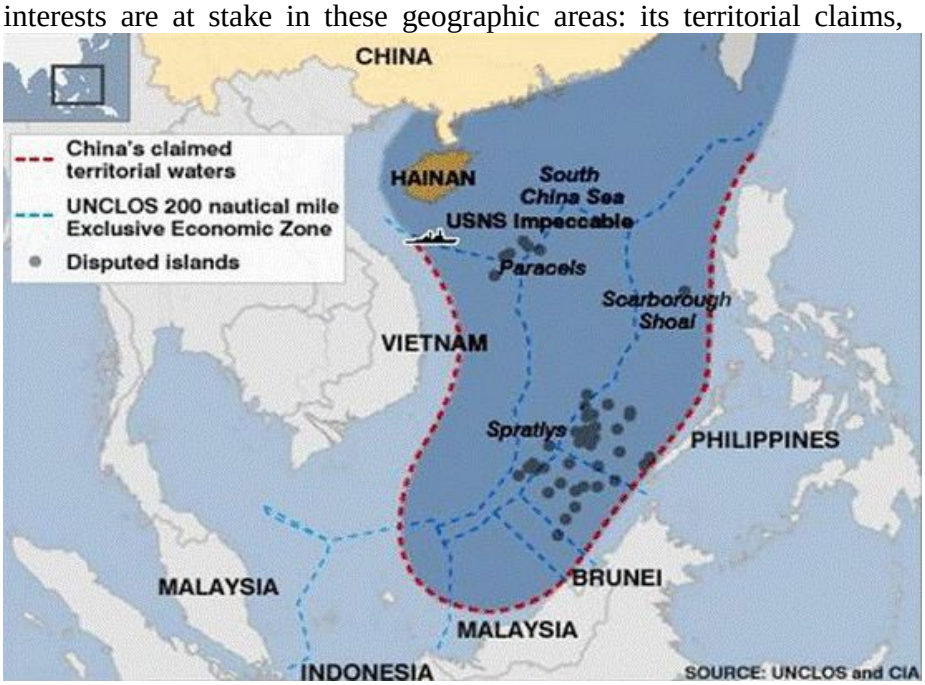
[156] According to information circulated in the Chinese media, during the meeting between Chinese Defense Minister, General Liang Guanglie, and Japanese Defense Minister, Yasukazu Hamada, on March 20, 2009 General Liang confirmed China's intent to develop aircraft carriers stating: "*China cannot be without an aircraft carrier forever*". Present in this meeting between the Chinese and the Japanese Defense Ministers were officers of the "048 Engineering Command", which is purportedly an inter-agency task force within the PLAN, responsible for developing "special large military ships" or aircraft carriers. Russell Hsiao, "Project 048: China's Secret Aircraft Carrier Command?", *China Brief*, The Jamestown Foundation, Vol. 9, No. 7, April 2, 2009, http://www.jamestown.org/programs/chinabrief/single/?tx_ttnews[tt_news]=34789&tx_ttnews[backPid]=25&cHash=6724be9735 .

[157] The first indigenously designed Chinese medical navy ship, named "*866 Daishandao*", was put into service in Zhoushan, eastern China's Zhejiang Province, on December 22, 2008. This ship makes China one of the few countries in the world to possess long-range medical rescue capabilities. A large hospital ship is considered an important means for the projection of soft power overseas, since this kind of vessels may participate in international peace-keeping missions and provide humanitarian aid and relief in developing nations or in countries hit by severe natural disasters. China's hospital ship is a shallow-draft modern high-speed vessel that can more easily dock in places, where U.S. medical ships cannot because of their large displacement. "Chinese New Naval Power: First Medical Ship", *China Radio International*, 23/12/2008, http://english.cri.cn/6909/2008/12/23/2001s435645.htm . "A Softer Side to China's Military Edge", *National Defense*, April 2008, http://www.nationaldefensemagazine.org/ARCHIVE/2008/APRIL/Pages/WashPulse2285.aspx .

[158] Richard D. Fisher, Jr., *China's Military Modernization: Building for Regional and Global Reach*, Praeger Security International, Westport, CT-London, September 2008, pp. 183-184.

has nowadays evolved beyond the question of geography or geographic reach. Today, the term offshore defense does not imply any geographic limits or boundaries. In fact, it does not appear that there is today any official minimum or maximum distances out into the oceans associated with the offshore defense concept.

Admiral Liu Huaqing, PLA Navy's Commander-in-Chief from 1982 till 1988, had identified two maritime zones which the Chinese Navy should be capable of controlling. The first zone, the control of which represented the first phase of Liu's strategy, encompasses the Yellow Sea opposite Japan and the Korean Peninsula; the western part of the East China Sea, including Taiwan; and the South China Sea. China's vital national interests are at stake in these geographic areas: its territorial claims, its maritime natural resources, and its coastal defense. Chinese strategists describe this zone as delimited by the "first island chain": a north-south line, which passes through the Aleutian Islands, the Kurile Islands, the Japanese Archipelago, the Ryukyu Islands, Taiwan, the Philippines, and Indonesia.



Overlapping Territorial Claims in the South China Sea.[159] Sources: David Lai, "China's Maritime Quest", Op-Ed, *Strategic Studies Institute*, U.S. Army War College, June 2009, p. 3, http://www.strategicstudiesinstitute.army.mil/pubs/display.cfm?pubID=923 . "China hits out at US on navy row", *BBC News*, March 10, 2009, http://news.bbc.co.uk/2/hi/asia-pacific/7934138.stm .

In his revision of China's maritime strategy, Liu determined that the PLA Navy should aim to be capable of controlling this zone by the year 2000. In the 1980s, Liu Huaqing indicated that the area to be safeguarded by the PLA Navy extended out to 200 nautical miles from the coast. He reportedly increased this distance later to 600 nautical miles.

[159] The map makes a reference to the March 8, 2009 incident between Chinese Coast Guard vessels and the U.S. Navy Ocean Surveillance Ship *Impeccable* (T-AGOS-23) in the South China Sea (approximately 75 miles south of Hainan island).

Admiral Liu Huaqing was the foremost military leader and theorist calling for the development of the PLA's naval capabilities. His influence on the development of a modern Chinese naval strategic thinking was catalytic, and his legacy remains still visible nowadays (mostly through Chinese doctrinal textbooks).
Source: James Holmes, Toshi Yoshihara, "A Chinese Turn to Mahan?", *China Brief*, The Jamestown Foundation, Vol. 9, Issue 13, June 24, 2009, http://www.jamestown.org/programs/chinabrief/single/?tx_ttnews%5Btt_news%5D=35172&tx_ttnews%5BbackPid%5D=25&cHash=4b06ac06a9 .

The second maritime zone, and the second phase of Liu's maritime strategy, is delineated by the "second island chain". This is a north-south line which goes through the Kurile Islands and Japan, and then takes a more eastern course through the Bonin, Mariana, and Caroline Islands. The control of this geographic zone, which Liu determined the PLA Navy should aim to achieve by 2020, would secure for the PRC control of the whole of East Asia's oceanic area. The achievement of this goal implicitly assumes the withdrawal of the United States' military presence from the region.[160]

In 1997, Jiang Zemin provided guidance to the PLAN that it should focus on raising its offshore comprehensive combat capabilities within the first island chain, should increase nuclear and conventional deterrence and counterattack capabilities, and should gradually develop combat capabilities for distant ocean defense.

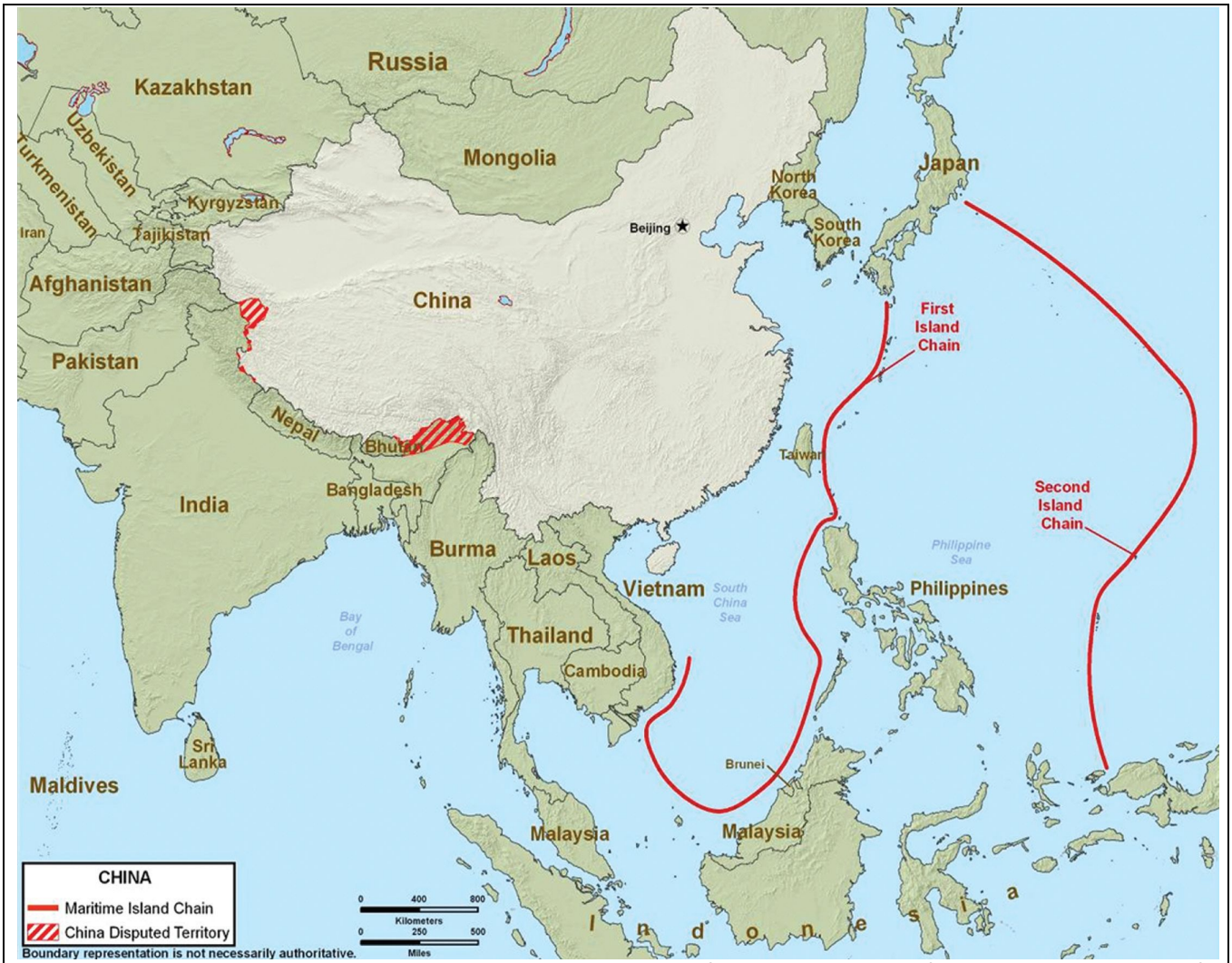
Following Jian Zemin's 1997/1998 directives, China cut 1.5 million troops from its armed forces, choosing instead to enhance its military assets by importing sophisticated weapons and equipment from abroad. In order to implement Jiang's high-tech defense strategy, Admiral Shi Yunsheng, Commander of the PLA Navy from 1996 till 2003, outlined China's 21st century naval strategy in the following fashion: "First, an offshore defense strategy; second, making the navy strong with science and technology, narrowing the gap between it and other military powers; third, more advanced weapons, including warships, submarines, fighters, missiles, torpedoes, guns, and electronic equipment; and fourth, trained personnel and more qualified people".[161]

So, in the question how far "offshore" will offshore defense take the PLA Navy, the answer, according to PLAN officers and implied in some PLAN publications, appears to

[160] Peter Howarth, *China's Rising Sea Power: The PLA Navy's Submarine Challenge*, Frank Cass, London and New York, 2006, pp. 41-42. According to the PLA's Academy of Military Science: "Prior to the 1980s, the PLAN considered 'offshore' to mean 200 nm from China's coast. Under Deng Xiaoping's guidance in the 1980s, China's 'offshore' included the Yellow Sea, East China Sea, South China Sea, the Spratly Islands, the sea area inside and outside of Taiwan and the Ryukyu Islands, and the sea area in the northern Pacific Ocean." Office of Naval Intelligence, *China's Navy 2007*, Washington, D.C., 2007, p. 26, http://www.fas.org/irp/agency/oni/chinanavy2007.pdf .

[161] Lee Jae-hyung, *China and the Asia-Pacific Region: Geostrategic Relations and a Naval Dimension*, iUniverse, Lincoln, Ne, 2003, p. 86.

be: as far as the PLA Navy's capabilities will allow it to operate task forces out at sea with the requisite amount of support and security.[162]



The First and Second Island Chains. PRC military theorists conceive of two island chains as forming a geographic basis for China's maritime defensive perimeter. Source: Office of the Secretary of Defense, *Military Power of the People's Republic of China 2009*: *Annual Report to Congress*, Washington, D.C., 2009, p. 18, http://www.defenselink.mil/pubs/pdfs/China_Military_Power_Report_2009.pdf . For an interesting map with a slightly different depiction of the two Island Chains see: Tony Tung-Lin Wu, "Changing the Asymmetric Strategic Equation Across the Taiwan Straits", *Taiwan Defense Affairs*, Vol. 5, No. 1, Autumn 2004, p. 7, http://www.tisanet.org/opinion/tlw-1.pdf .

[162] Office of Naval Intelligence, *China's Navy 2007*, Washington, D.C., 2007, p. 26, http://www.fas.org/irp/agency/oni/chinanavy2007.pdf .

5.1. The "*Peace Mission*" 2005 and 2007 Military Exercises: Testing the PLA's power-projection capabilities, and enhancing the Sino-Russian defense cooperation

Although it may not be possible to offer precise descriptions of a developing PLA Ground Forces doctrine of power-projection capabilities, a preview of the PLA's ambitions in power-projection was provided by the *Peace Mission 2007* exercises held from August 9 to 17, 2007 in Russia's Chelyabinsk region, under the auspices of the Shanghai Cooperation Organization (SCO).

The first *Peace Mission* drill (dubbed "*Peace Mission 2005*") was held on Chinese territory in August 2005 and involved only Russia sending airborne troops, marines, Su-27 fighters, and Tu-22M "Backfire" bombers to China's Shandong Peninsula. China had reportedly originally wanted the exercises to take place in Fujian Province opposite Taiwan. Furthermore, during *Peace Mission 2005* PLAN and Russian Navy Sovremenny- and Udaloy-class destroyers and submarines conducted joint exercises.[163]

In contrast, *Peace Mission 2007* did not involve naval forces or long-range bombers. *Peace Mission 2007* was planned as an SCO joint anti-terrorism exercise to be held in China's Xinjiang province and Russia's Chelyabinsk region. It was unique, since it was the first military exercise that involved all of the SCO member states. It was also the first time that the PLA had ever sent complete organizational units to take part in a joint anti-terrorism military exercise outside of China. The exercises were relatively large-scale, involving land and air units, and required that the PLA provide logistical support over long-distances. Technical cooperation for the exercises involved the use of unified communication frequencies and common signals for coordinated action. Involving more than 6,500 soldiers and 2,000 pieces of military hardware, supplied predominantly by Russia and China, it was evident that the whole exercise was dominated by the two countries.[164]

As a consequence, both Russia and China practised long-distance deployments for air-borne, light mechanized armour, and air support elements, which included many first-time foreign deployments for the PLA. Although the exercise only involved about 6,000 troops in total, it did allow both Russia and China to extend the exercise to include small numbers of troops from all SCO member states (i.e. Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan). Although the exercise was advertised by Russian and Chinese spokesmen as directed primarily against "terrorism", Russian statements in particular indicated the goal of defending "stability", presumably against forces of democracy. In that sense, *Peace Mission 2007* could be viewed to be similar to former Soviet incursions into Hungary in 1956 and Czechoslovakia in 1968, to defend the existence of compliant regimes. As such, *Peace Mission 2007* provided a platform for Russia and China not only

[163] These exercises marked a turning point for the PLA in that after 15 years of investments in modernized forces, they were able to conduct modern military exercises with a "peer" military force that could boast recent combat experience in Chechnya. They conducted joint airborne troop drops, an amphibious beach assault, air defense, and naval blockade missions, all skills that the PLA would require to attack Taiwan.

[164] Roger N. McDermott, *The Rising Dragon: SCO Peace Mission 2007*, Occasional Paper, The Jamestown Foundation, Washington, D.C., October 2007, p. 13, http://www.jamestown.org/uploads/media/Jamestown-McDermottRisingDragon.pdf .

to assert their leadership over this strategic region, but also to indicate they are willing to deploy forces to prevent democratic, "colour" revolutions.[165]

More specifically, the scenario of the *Peace Mission 2007* exercise was as follows:

Under support of an international terrorist organization based in the north border of country "N", a terrorist organization active in the SCO member state "A" launched anti-government/separatist activities in the south-eastern part of the country. They seized a city and took hostages. By creating chaos and disorder and forcing the government to take measures against the will of the population, and supported by domestic political opposition and ethnic groups, the terrorists intended to create a popular revolt, with which they would take over control of country "A". As part of the setting, country "A" was not capable of confronting this terrorist attack based exclusively on its own forces.

During the first stage of the exercise on August 9-10, 2007 in the Chinese city of Urumqi, political-military consultations were held at the level of Chiefs of the General Staff to discuss counter measures. During the consultations the terrorist attack was reported to these authorities. Under the scenario, country "A" requested from the SCO's Council of Heads of State military assistance to solve the crisis. Subsequently, the SCO asked and received a mandate from the U.N. Security Council to take military action against the terrorists. At the headquarters of the joint drill, commanders from the six SCO members decided to annihilate the terrorists by forming six operational battle groups. To conduct the counterterrorist operation, a joint SCO operational staff was formed comprised of 60 men.[166]

During the second stage of the manoeuvres (close to the Russian city of Cherbarkul) from August 11 to 17, 2007: the military units of state "A" localized activity of militant and terrorist groups, isolated the area of their activity, and ruled out the possibility of new militants penetrating into the territory or supplying weapons to them. After that, the joint SCO armed forces found and eliminated bases of the militants and their arms depots. The collective group of forces divided key forces of the militants and blocked certain groups of terrorists. Finally, on the last day of the exercises, the joint forces retook the occupied town from the terrorists, bringing the conflict to an end.[167]

Russia contributed an infantry battalion, a reinforced airborne company, 18 pieces of 122 mm and 100 mm artillery guns, and 47 aircraft: 6 Il-76MD "Candid" transport airplanes, 9 Su-25 "Frogfoot" ground-attack fighter jets, 14 Mi-24 "Hind" helicopter gunships, and 18 Mi-8/Mi-17 "Hip" transport helicopters. Russia dispatched to *Peace Mission 2007* not only defense forces, but also elements from the Internal Troops of the Ministry for Internal Affairs[168] (VVMVD), Border Guard Service Troops, Special

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[165] Richard D. Fisher, Jr., *China's Military Modernization: Building for Regional and Global Reach*, Praeger Security International, Westport, CT-London, September 2008, pp. 173-174.

[166] Marcel de Haas, *The 'Peace Mission 2007' exercises: The Shanghai Cooperation Organisation Advances*, Advanced Research and Assessment Group, Defence Academy of the United Kingdom, Swindon, September 2007, pp. 2-3, http://www.clingendael.nl/publications/2007/20070900_cscp_paper_haas.pdf .

[167] Marcel de Haas, *The 'Peace Mission 2007' exercises: The Shanghai Cooperation Organisation Advances*, Advanced Research and Assessment Group, Defence Academy of the United Kingdom, Swindon, September 2007, pp. 2-3, http://www.clingendael.nl/publications/2007/20070900_cscp_paper_haas.pdf .

[168] The Internal Troops of the Ministry for Internal Affairs (VVMVD) are a paramilitary gendarmerie-like force which in peacetime is subordinated to the Ministry of the Interior, but during wartime falls under Armed Forces military command and fulfils the missions of local, territorial defense and security.

Purpose Police Units (OMON) of the Ministry of Justice, and other special security units (e.g. Special Rapid Response/Special Police Units: SOBR/OMSN). On the whole, the Russian participation to the exercise came up to the equivalent of an armoured infantry brigade, reinforced with artillery and airpower.

China deployed 1,600-1,700 soldiers, including one army combat group, one air force combat group, and one integrated support group. In the operational formations alone, there were multiple service branches, including fighter-bomber units, paratrooper units, transport units, special forces, armoured units, and ground-force aviation units. More specifically, China provided, among other things, an airborne company of 120 soldiers, 40 BMP and 14 BTR armoured infantry fighting vehicles, 18 pieces of 122 mm and 100 mm artillery guns and howitzers, 340 PLAAF personnel, and some 46 aircraft: 6 Il-76MD "Candid" transport aircraft, 8 JH-7A[169] fighter-bombers, 16 Z-9W[170] "Haitun" attack and 16 Mi-17 "Hip" transport helicopters. Several Il-76MD and JH-7A aircraft were involved in joint aerial assault operations during the exercise.[171]

The *Peace Mission 2007* did advance key PLA operational ambitions directly related to the development of future power-projection capabilities. As the U.S. Pentagon's 2009 report on the Military Power of the People's Republic of China noted, Peace Mission 2007 tested the PLA's logistics and mobility requirements for long-range deployments.[172]

As a matter of fact, despite the painstaking and detailed preparations that preceded the exercises, the Chinese and Russian Generals were faced with a considerable logistical challenge during the deployment of Chinese troops and equipment to Russia: Kazakhstan did not permit the transit of Chinese military forces through its territory. Although Kazakhstan is a member of the SCO and took part in the exercise, it failed to pass legislation allowing foreign troops to cross into its territory. Clearly, the shortest over-land route from Xinjiang to Chelyabinsk, in central Russia, would be through Kazakhstan.[173]

Therefore, the Chinese organisers of the manoeuvres faced the considerable logistical challenge of deploying 1,600-1,700 Chinese troops and their equipment, by rail and air,

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[169] The JH-7A is a multi-purpose, supersonic fighter-bomber, designed, developed and produced by Xi'an Aircraft Industrial Corporation (XAC). It can carry out anti-aircraft operations and perform ground-attack missions or surface attack missions against seaborne targets. The JH-7 was China's first completely indigenous combat aircraft design, and the first third-generation fighter aircraft produced in China.

[170] The Z-9W attack helicopter shares the same airframe with the Z-9B utility helicopter (developed from the AS365 N1 Dauphin). The Z-9W is fitted with a pair of weapon pylons, and is able of carrying 4 (8 in the Z-9WA version) HJ-8 wire-guided anti-tank missiles. Alternatively, the helicopter can carry up to two 12.7 mm machine gun pods, or two 57 mm or 90 mm unguided rocket pods, or four TY-90 IR-homing air-to-air missiles (with a range of up to 6 km). "Zhi-9W Attack Helicopter", *Sino Defence*, January 2, 2009, http://www.sinodefence.com/airforce/helicopter/z9w.asp .

[171] Roger N. McDermott, *The Rising Dragon: SCO Peace Mission 2007*, Occasional Paper, The Jamestown Foundation, Washington, D.C., October 2007, pp. 3, 12, 14, http://www.jamestown.org/uploads/media/Jamestown-McDermottRisingDragon.pdf . Nikita Petrov, "Peace Mission 2007 to tackle terror threats", *RIA Novosti*, July 24, 2007, http://en.rian.ru/analysis/20070724/69580465.html .

[172] Office of the Secretary of Defense, *Military Power of the People's Republic of China 2009*: *Annual Report to Congress*, Washington, D.C., 2009, p. 55, http://www.defenselink.mil/pubs/pdfs/China_Military_Power_Report_2009.pdf .

[173] Roger N. McDermott, *The Rising Dragon: SCO Peace Mission 2007*, Occasional Paper, The Jamestown Foundation, Washington, D.C., October 2007, p. 12, http://www.jamestown.org/uploads/media/Jamestown-McDermottRisingDragon.pdf .

from Xinjiang to central Russia. Apart from a small number of 300 soldiers who were transported by air, the PLA contingent taking part in the manoeuvres (approximately 1,400 soldiers) had to travel by train; a trip which lasted two weeks. They Chinese soldiers had to cover a distance of 10,300 km, 5,333 km of which was over Chinese territory. More specifically, from Xinjiang they travelled to the east of China, through the Inner Mongolia province, to cross the border with Russia in the Zabaykal-Chita region, where railway platforms had to be changed due to the difference in railway size. From Chita the trip continued on Russian territory via Irkutsk, Novosibirsk and Omsk to Chelyabinsk. Qui Yanhan, deputy commander of the Chinese contingent, told the official Chinese *Xinhua* news agency that this was the first time the PLA faced the challenge of dispatching so many soldiers and military equipment at such a long distance. That said, it becomes clear why *Peace Mission 2007* contributed considerably to the advancement of the logistics capabilities of the PLA.[174]

Especially, the deployment of the helicopters has been viewed as a test for the People's Liberation Army Aviation. In effect, after the completion of the exercise, Major General Ma Xiangsheng stated that this deployment represented a test for the Army Aviation, since its forces had to cover a long distance, flying over the Altay Mountains at an altitude of 4,000 meters. Given that Chinese troops lack experience in conducting joint military exercises, they were also presented with the problems of overcoming technical issues related to interoperability and having to cope with the language barrier when cooperating with their SCO counterparts.

PLA Senior Colonel[175] Lu Chuangang, noted that the *Peace Mission 2007* allowed the PLA to test four key capabilities: i) capability in long distance mobility; ii) capability in joint operations; iii) capability in carrying out precision engagement; and, iv) capability in long distance integrated logistics support.[176]

Attempting a brief reference to the *Peace Mission 2005* and a comparison between the 2005 and 2007 military drills, we observe that the *Peace Mission 2005* was an important military exercise, because it was the first time in 40 years Russian and Chinese armed forces carried out joint exercises. These drills (carried out from August 18 to 25, 2005) involved 10,000 military personnel (of which Russia contributed 1,800 and China more than 8,000), approximately 70 Navy surface vessels and submarines, fighter jets, and strategic bombers. The participating forces executed a wide range of military action, such as flights of strategic long-range bombers; neutralisation of anti-aircraft defense, command posts and airbases; gaining air superiority; enforcing a maritime blockade and controlling maritime territory; as well as, amphibious and airborne landings. Although originally bilaterally organized, China and Russia brought *Peace Mission 2005* under the

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[174] Marcel de Haas, *The 'Peace Mission 2007' exercises: The Shanghai Cooperation Organisation Advances*, Advanced Research and Assessment Group, Defence Academy of the United Kingdom, Swindon, September 2007, pp. 2-3, http://www.clingendael.nl/publications/2007/20070900_cscp_paper_haas.pdf .

[175] A PLA Senior Colonel is equivalent in rank to a NATO/European/North American Army Brigadier General.

[176] Richard D. Fisher, Jr., *China's Military Modernization: Building for Regional and Global Reach*, Praeger Security International, Westport, CT-London, September 2008, p. 174. "PLA ready for Peace Mission challenge", *People's Daily Online*, July 31, 2007, http://english.peopledaily.com.cn/90001/90776/90786/6227627.html .

umbrella of the SCO. These war games were mainly held on Chinese territory and saw large-scale amphibious landings on the Chinese Yellow Sea coast.[177]

The *Peace Mission 2005* manoeuvres had some significant differences in comparison to the 2007 drills. More specifically, the 2005 war games involved significant numbers of heavy weapons, ranging from some 70 Navy ships and submarines to long-range strategic bombers. In comparison, the total number of troops taking part in the *Peace Mission 2007* was some 7,000, of which Russia, as the host country, provided the greater part. In contrast to the heavy weapons-loaded and more offensive character of *Peace Mission 2005*, the 2007 drills did not involve heavy military equipment in significant numbers. Instead, as mentioned earlier, troops of Russia's security departments earmarked for internal security, such as Border Guard Service Troops, the Interior Ministry's Internal Troops (VVMVD) and Special Purpose Police (OMON) units, took part in the exercise. As to the forces and the military equipment deployed during the manoeuvres, it was rather lightly equipped units using infantry fighting vehicles, armoured personnel carriers, a small number of second/third generation aircraft (nine Su-25 and seven JH-7A jets), transport and attack helicopters (as opposed to the main battle tanks, advanced/multi-role fighter aircraft -e.g. Su-30MKK/MK2-, strategic bombers, submarines, amphibious landing craft, destroyers and frigates of *Peace Mission 2005*) that dominated the 2007 exercises.[178]

Even though the majority of analysts and researchers tend to conclude that both *Peace Mission 2005* and *2007* exercises heralded a new era in Moscow's and Beijing's strategic partnership, some pundits remain sceptic arguing, with regard to the *Peace Mission 2005* exercise, that this was true insofar as it was the first time the two militaries had participated together in exercises. But, this unity was more notional than real. In the months leading up to the exercises, Moscow and Beijing engaged in protracted negotiations over their location and scale. The PLA pressed hard for the exercises to take place in Zhejiang province, a proposal rejected by Moscow as too provocative owing to the province's relative proximity to Taiwan; finally, the two sides compromised by holding the exercises off the Shandong peninsula, south-east of Beijing. The Russian Ministry of Defense had originally wanted to send only a token number of troops, but was persuaded eventually to send a sizeable contingent. Most significant, *Peace Mission 2005* was run as two separate exercises rather than as a single joint exercise, with limited interoperability between the 7,000 Chinese troops and the 1,800-men strong Russian contingent. As a result, it has been argued that while the *Peace Mission* manoeuvres

[177] Marcel de Haas, *The 'Peace Mission 2007' exercises: The Shanghai Cooperation Organisation Advances*, Advanced Research and Assessment Group, Defence Academy of the United Kingdom, Swindon, September 2007, p. 6, http://www.clingendael.nl/publications/2007/20070900_cscp_paper_haas.pdf .

[178] Marcel de Haas, *The 'Peace Mission 2007' exercises: The Shanghai Cooperation Organisation Advances*, Advanced Research and Assessment Group, Defence Academy of the United Kingdom, Swindon, September 2007, pp. 7-8, http://www.clingendael.nl/publications/2007/20070900_cscp_paper_haas.pdf . Nikita Petrov, "Peace Mission 2007 to tackle terror threats", *RIA Novosti*, July 24, 2007, http://en.rian.ru/analysis/20070724/69580465.html .

marked an important step forward in the Sino-Russian relationship, they "also highlighted the limits of cooperation and trust".[179]

And, more specifically, as far as the 2007 exercise is concerned, the analysts who tend to be sceptical about the impact of these manoeuvres on the strengthening of the bilateral Sino-Russian defense ties are pointing out that it took SCO military experts six rounds of talks to coordinate all aspects of the war games. Indeed, Russia and China had divergent opinions on the size of the military contingents, the potential involvement of the *Collective Treaty Organisation* (CSTO)[180], logistics issues, and openness to mass media and foreign defense attachés accredited to the Russian Federation and the People's Republic of China. As to the size of the force contributions, during the consultation rounds the Chinese side pressured Kremlin to accept the participation of a bigger PLA contingent than initially anticipated. Although Moscow finally conceded to Beijing's request for the participation of a larger Chinese contingent, it did not give in to the Chinese demand to allow the dispatch to Chelyabinsk of PLA main battle tank formations and other heavily armed units, in order to keep up appearances and ultimately keep the operation along the lines of the officially intended anti-terrorist scenario.

[179] Bobo Lo, *Axis of convenience: Moscow, Beijing, and the new geopolitics*, Brookings Institution Press, Washington, D.C., 2008, pp. 48-49.

[180] A conflicting issue between Russia and China was the possible involvement of the CSTO in the 2007 war games. The CSTO is a Russian-led military alliance of seven countries within the Commonwealth of Independent States (CIS). Apart from Russia, the other member states are Armenia, Belarus, Kazakhstan, Uzbekistan, Kyrgyzstan and Tajikistan. Just as NATO, the CSTO charter contains a military assistance article, which states that an aggression against one signatory would be perceived as an aggression against all members. It is worth noting that the main incentives of the CSTO are cooperation in defense issues, common research and development of weapon systems, common education and training of military personnel, and peace-keeping activities. Other areas of cooperation include the development of a common integrated air defense system, and the fight against terrorism and narcotics, which particularly concerns Central Asian states. In the near future the CSTO is planning to create a sizeable contingent of peace-keeping troops. Marcel de Haas, *The 'Peace Mission 2007' exercises: The Shanghai Cooperation Organisation Advances*, Advanced Research and Assessment Group, Defence Academy of the United Kingdom, Swindon, September 2007, pp. 5-6, http://www.clingendael.nl/publications/2007/20070900_cscp_paper_haas.pdf .

Russian Army soldiers attack "terrorists", and a People's Liberation Army Aviation Z-9W attack helicopter fires unguided rockets against soft and semi-hardened targets during the 2nd phase of the "*Peace Mission 2007*" anti-terror drill in the Chebarkul range[181], near Chelyabinsk, Russia, on August 13, 2007. The 2nd phase of the exercise started on August 11, and was completed six days later, on August 17, 2007. According to SCO official press releases, *Peace Mission 2007* "*covered the whole range of anti-terrorist operations, such as the demonstration of strategic determination, the development and execution of battle plans, the implementation of operational tactics, and the establishment of efficient logistic support networks*". Sources: i) "SCO forces hold last anti-terror joint drill rehearsal", *Xinhua News Agency*, August 14, 2007, http://news.xinhuanet.com/english/2007-08/14/content_6526525_7.htm [Photograph by Xinhua/Li Gang]; ii) "SCO forces hold last anti-terror joint drill rehearsal", *Xinhua News Agency*, August 14, 2007, http://news.xinhuanet.com/english/2007-08/14/content_6526525_4.htm [Photograph by Xinhua/Li Gang] .

[181] The Chebarkul Range (located about 80 km west of the Russian city of Chelyabinsk) is the main live training facility for the Russian Army's 34th Motorized Rifle Division, in the Volga-Ural Military District. Nikita Petrov, "Peace Mission 2007 to tackle terror threats", *RIA Novosti*, July 24, 2007, http://en.rian.ru/analysis/20070724/69580465.html .

Shanghai Cooperation Organization's (SCO) Military/Law Enforcement Exercises during the period 2002-2009[182]

Codename	Dates	Participants	Location(s)	Details
"*Exercise-01*"	October 10-11, 2002	China, Kyrgyzstan	Kyrgyzstan	Anti- and Counter-terrorism exercise. It was the first time for the PLA to hold a joint military manoeuvre with a foreign army and the first ever drill conducted within the framework of the SCO.
"*Cooperation /Coalition 2003*" [also known as "*Sotrudnichestvo 2003*"]	August 6/8-12, 2003	Russia, China, Kazakhstan, Kyrgyzstan, Tajikistan	Usharal town in the Kazakh Almaty/Alma-Ata province in south-eastern Kazakhstan; and, Ili Kazakh Autonomous Prefecture in China's northernmost Xinjiang Uyghur Autonomous Region[183]	Cross-border anti- and counter-terrorism manoeuvres, aimed at improving inter-agency and cross-border co-ordination. The drills were focused in particular on the protection of infrastructure and high-value assets close to borders. 1,300 troops.
"*Peace Mission*	August 18-25, 2005	China, Russia	Russia's city of	10,000 troops.

[182] The enumeration of the military/law enforcement exercises, run under the aegis of the Shanghai Cooperation Organization, and cited in this table, is indicative and not necessarily exhaustive. For instance, based on the official SCO 2008 and 2009 "year in review" reports, apart from the "*Peace Mission 2009*", no other substantial drills were organized by the SCO throughout 2008 and 2009. This information is inaccurate, and it is true that other large- and small-scale manoeuvres did take place in 2008 and 2009. Nevertheless, official SCO information on those, mainly small-scale, manoeuvres tends to be scarce. "Chronicle of main events at SCO in 2008", *Shanghai Cooperation Organization website*, December 31, 2008, http://www.sectsco.org/EN/show.asp?id=66 . "Chronicle of main events at SCO in 2009", *Shanghai Cooperation Organization website*, December 31, 2009, http://www.sectsco.org/EN/show.asp?id=182 .

[183] Running counter-terrorist exercises in the Xinjiang Uyghur Autonomous Region enables the Chinese Security forces to develop counter-insurgency and terrorist techniques in the area they would be expected to operate. Organizing and carrying out large-scale anti- and counter-terrorism drills in Xinjiang is a common practice for the PLA. It goes without saying that the manoeuvres in Xinjiang are not carried out exclusively under the aegis of the SCO. For example, on August 6, 2004 the first joint counter-terrorist exercise between the PLA and Pakistani forces, dubbed "*Friendship 2004*", was run in western Xinjiang's Tashkurgan/Taxkorgan Tajik Autonomous County: a high-altitude (on the Pamir Mountains, at over 4,000 meters), cold weather exercise, comprising over 200 soldiers and border guards, including personnel from the PLA's dedicated anti-terrorist battalion. The "*Friendship 2004*" exercise scenario entailed the searching and tracking down of terrorists over Xinjiang's mountainous terrain. Martin Andrew, "Beijing's Growing Security Dilemma in Xinjiang", *China Brief*, The Jamestown Foundation, Vol. 5, Issue 13, June 7, 2005, http://www.jamestown.org/programs/edm/single/?tx_ttnews%5Btt_news%5D=30498&tx_ttnews%5BbackPid%5D=166&no_cache=1 .

2005"			Vladivostok; China's Shandong Peninsula, and the adjacent Yellow Sea	• Russian participation included the Sovremenny-class destroyer "Burny" (No. 778) and the Udaloy I-class destroyer "*Marshal Shaposhnikov*" (No. 543); the Project 775M "*BDK-11 Peresvet*" (No. 077) landing ship; various Navy auxiliary vessels; 17 aircraft of various types (including TU-95MS "Bear" and TU-22M3 "Backfire" strategic long-range bombers); units of the 76th Airborne Division. Formal objectives: • Counter- and Anti-terrorism/counter-insurgency exercise. The exercise was not targeted at a third country. • Enhance combat readiness against emerging and unconventional threats. De facto objectives: • Practice of modern conventional warfare. • Practice of amphibious landing operations. • Show-of-force against Taiwan, Japan, South Korea, and the United States of America.
"*Vostok Anti-terror 2006*" [also known as "*East Anti-terror 2006*"]	March 2-5, 2006	Russia, China, Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan	In the outskirts of the city of Tashkent in Uzbekistan[184] . Ulugbek, approximatel y 30 km north-east of Tashkent	Special forces and law enforcement agencies defending critical infrastructure and state facilities against terrorist attacks. The scenario concerned the protection of the Tashkent Nuclear Physics Institute, which hosts a 10 MW VVR-SM research nuclear reactor (the reactor's core loading is 5.5 kg of 36% highly enriched uranium) and maintains fresh and irradiated nuclear fuel storage facilities to support continued reactor operations.[185]

[184] It is worth mentioning that Uzbekistan's capital, Tashkent, is since January 1, 2004 the seat of the Executive Committee of the Regional Anti-Terrorist Structure (RATS) of the Shanghai Cooperation Organization. RATS is a permanent organ of the SCO, serving to promote cooperation of member states against the "*three evils of terrorism, separatism, and extremism*". The first Director (with a three year term) of the RATS Executive Committee was the Uzbek Major General Vyacheslav Temirovich Kasimov. "RATS History", *RATS website*, November 30, 2004, http://www.ecrats.com/en/rats_history/2010 .

[185] The VVR-SM reactor (operated at 2 MW from criticality in September 1959 until 1971; since modernization, which took place in 1971-1979, the reactor has operated at 10 MW) is designed to carry out experiments in the field of nuclear physics and nuclear engineering, neutron activation analysis, solid state physics, and isotope production. During the Soviet era, the reactor was also used for military scientific experiments. In addition to the VVR-SM reactor, the Tashkent Nuclear Physics Institute includes two cyclotrons, a gamma source facility, a neutron generator, and a radiochemical complex. The facility engages in commercial production of radioactive isotopes, labelled compounds and isotope sources, super-

"*Tien Shan No1-2006*"	August 24-26, 2006	Kazakhstan, China	Kazakhstan's Zharkent/Jarkent town in Almaty province; China's Ghulja/Yining city in the Xinjiang Uyghur Autonomous Region	• Counter- and Anti-terrorism exercise involving border guards and law enforcement agencies from Kazakhstan and China. • Tactical response exercises, investigation and consequence management exercises. Building recapturing and hostage rescue operations. • Such exercises have fostered closer links between the security structures in China and their counterparts elsewhere in Central Asia.
"*Coordination 2006*"	September 22-23, 2006	Tajikistan, China	Tajikistan's Kulob/Kulyab city in Khatlon province	In that drill participated more than 300 Tajik troops from artillery, infantry and airborne divisions, as well as a PLA reinforced company composed of more than 150 soldiers.
"*Issyk-Kul Anti-terror 2007*"	May 28-31, 2007	Russia, China, Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan	North-eastern Kyrgyzstan.[186] Kyrgyz Defense Ministry's "Edelveys"	"*Issyk-Kul Anti-terror 2007*" included elements from the regional anti-terror structure, the CSTO, the CIS anti-terror center, alongside with security agencies and special services. Kyrgyz participation involved the

pure metals, measurement and control instruments, and air and water purification filters. It is to be noted that the Tashkent Nuclear Physics Institute has been indicated (since as early as the mid-1990s) by the United States as a highly vulnerable target. Considering the instability that had characterized the Andijan region in May 2005, one year before the "*Vostok Anti-terror*" exercise, it was thought advisable to give special attention to this vulnerable research institute. The purpose was, according to some observers, to strengthen the Regional Anti-Terrorist Structure (RATS) of the Shanghai Cooperation Organization intervention capacity, so as to be able to tackle any emergencies that may occur as a result of U.S. troops leaving the region. Lorena Di Placido, "Origins, Development, and Consolidation of the Shanghai Cooperation Organization after the Bishkek Summit", *Connections: The Quarterly Journal*, Partnership for Peace Consortium of Defense Academies and Security Studies Institutes, Vol. 6, No. 3, Fall 2007, pp. 78-79, https://www.ciaonet.org/journals/co/v6i3/0000664.pdf . "Institute of Nuclear Physics, Ulugbek", *Nuclear Threat Initiative website*, October 2009, http://www.nti.org/e_research/profiles/Uzbekistan/Nuclear/facilities.html .

[186] According to a report published by the *Swedish Defence Research Agency*, in 2006 has taken place in Kyrgyzstan another SCO (in cooperation with the CSTO) drill: the "*Atom Anti-terror 2006*" exercise. This information does not correspond to reality. "*Atom Anti-terror 2006*" was not an SCO exercise, and had nothing to do with Kyrgyzstan. In fact, "*Atom Anti-terror 2006*" was a CSTO exercise aimed at the development and the implementation of mechanisms for alert, response, and management of a terrorist attack on a nuclear facility. The exercise was carried out on September 26-29, 2006 in Armenia's Metsamor Nuclear Power Plant (which uses two VVER-440 Model V230 nuclear reactors). Likewise, the SCO was not involved in the "*Atom Anti-terror 2008*" exercise, which took place in Kazakhstan on June 6-8, 2008. This drill was organized under the auspices of the "Global Initiative to Combat Nuclear Terrorism", an international institution which was launched in July 2006 by the Presidents of the U.S.A. and the Russian Federation. Ingmar Oldberg, *The Shanghai Cooperation Organisation: Powerhouse or Paper Tiger?*, Swedish Defence Research Agency, Stockholm, June 2007, p. 15, http://www2.foi.se/rapp/foir2301.pdf . "Armenia: Group to hold anti-terrorism drill", *Stratfor*, September 25, 2006, http://www.stratfor.com/node/38136/armenia_group_hold_anti_terrorism_drill . Naubet Bisenov, "*Kazakhstan holds first nuclear antiterrorism drills*", *Central Asia Online*, July 14, 2008, http://centralasiaonline.com/cocoon/caii/xhtml/en_GB/features/caii/features/2008/07/14/feature-02 .

			training ground, and Orto-Tokoy reservoir and dam, both of them near the town of Balykchy in Kyrgyzstan's north-eastern Issyk-Kul province	"Scorpion" subunit, drawn from the 3rd motorized-rifle Brigade of the Kyrgyz Emergencies Ministry's eastern regional department. One part of the exercise was focused on the release of hostages. Special Forces freed ten simulated hostages, disarmed a militant group, and detained terrorist suspects. Specialists were also allowed to carry out bomb disposal practice and to safely manage the presence of civilians in the area. The exercise involved establishing effective ways of coordinating communication between law enforcement and other security agencies. Monitored by representatives of the 4 SCO observer countries (i.e. India, Iran, Mongolia, Pakistan), and the CSTO. Intelligence services, special forces and law enforcement agencies.
"*Peace Mission 2007*"	August 9-17, 2007	Russia, China, Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan	Urumqi in China's Xinjiang Uyghur Autonomous Region (two starting days); and, six days in Chebarkul, Chelyabinsk province, Volga-Ural Military District, Russia	• Anti- and Counter-terrorism exercise. • Some 7,000 troops, mainly Russian (4,700) and Chinese (1,700), from the six SCO member states (i.e. Russia, China, Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan). • Mostly Special Forces, but also Russian Internal, Border and Justice Troops. • Monitored by the SCO observer countries (i.e. India, Iran, Mongolia, Pakistan), the CSTO, and some 80 defense attachés accredited to the Russian Federation. • For the first time SCO war games took place in parallel with the annual summit of the Council of Heads of Member States of the SCO (which was held in Bishkek, Kyrgyzstan, on August 16, 2007). • The scenario of the war games included a de facto "military assistance" concept.
"*Norak Anti-terror 2009*"	April 17-19, 2009	Tajikistan, Russia, China, Kyrgyzstan, Kazakhstan	Tajikistan. Fakhrobod Training Ground in the Khatlon province, some 35 km to the south of Dushanbe	1,000 troops. Objective of the drill: Improve coordination of efforts, the SCO countries' unity of effort practicing in various anti-terrorist operations, better occupational awareness and special divisions' combat skills training. Mainly Russian and Tajik special forces

				rehearsed countering a terrorist incursion from Afghanistan. The scenario saw "al-Qaeda" members cross the Afghan-Tajik border into Djirgital region of Tajikistan, then capturing a chemical factory, and taking its workers hostage. Despite the importance of the SCO exercise, and the portrayal of organizational unity, Uzbekistan refused to take part. Tashkent merely stated that its Special Forces and Special Services were "occupied" with other activities.
"*Peace Mission 2009*"	July 22-26, 2009	China, Russia	Russia's Far East city of Khabarovsk; and, China's Taonan city in Jilin province	Official objectives: • Combined arms operations against "terrorists, separatists, and extremists", especially in an urban setting (such as the July 5, 2009 riots in Urumqi, the capital city of the Xinjiang Uyghur Autonomous Region). • Improve cooperation and coordination between the Armed Forces of the two countries, in order to respond more quickly and efficiently to terrorist, separatist, and extremist actions. • Preserve regional stability. • The drills were not intended to target any third country. Real objectives: • A joint plan of action for "unexpected incidents" in North Korea, by deploying missiles and air defense forces, and carrying out air assaults, aerial bombings, and ground attack missions. • Test for joint military action in response to a regime crisis in the Democratic Republic of North Korea (DPRK); the management of a "*Ceausescu scenario*", if conditions worsened in North Korea and Kim Jong-il lost control over some of the security forces.[187]

[187] General Nikolai Makarov, Chief of the General Staff of the Russian Armed Forces, noted that "*Russia and China should develop military cooperation in the wake of North Korean missile threats that prompted intensified military preparations in Japan and South Korea*". Sergei Blagov, "Moscow's Security Plans Face Reality Check", *ISN Security Watch*, August 6, 2009, http://www.isn.ethz.ch/isn/Current-Affairs/Security-Watch/Detail/?lng=en&id=104184 . Stephen Blank, "Peace-Mission 2009: A Military Scenario Beyond Central Asia", *China Brief*, The Jamestown Foundation, Vol. 9, Issue 17, August 20, 2009, http://www.jamestown.org/programs/chinabrief/single/?tx_ttnews%5Btt_news%5D=35433&tx_ttnews%5BbackPid%5D=25&cHash=201d76e87b .

				• This exercise was meant to send Japan (and by implication the United States) a message regarding Russia's and China's capability to defend their interests in the Korean peninsula against both allies, and second, in China's case its capability to defend itself against Japan in any territorial disputes. The exercise involved paratroopers, 100 main battle tanks, self-propelled guns and howitzers, APCs and IFVs, 60 attack helicopters, fighter jets, and transport aircraft. About 2,600 Army and Air Force personnel from China and Russia.

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Nikolaos Diakidis, *An Assessment of China's Defense Strategy in the post-Cold War Era. What Role for Bilateral Defense Cooperation with Russia?*, Piraeus, December 2009

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6. China's security environment and Chinese views of the American and Japanese foreign and defense policies in East Asia. Implications on the evolution of China's defense policy

"The strategic intention of the United States and Japan is not transparent in many aspects. For example, the United States deliberately maintains a 'strategic ambiguity' in respect of its military intervention in a military conflict across the Taiwan Straits, including under what scenarios and scope a U.S.-Japan alliance would function. The United States has taken advantage of the war against terrorism to seize important strategic points and adjust the deployment of its military forces toward its actual strategic targets. In another example, Japan has ballyhooed the 'missile threat' and 'nuclear threat' of North Korea to create a reason for the political transformation and pursuit of the status of a military great power. The strategic intention of both countries is highly deceitful, making cooperation on the sea difficult".[188]

Yang Yi, Rear Admiral of the PLA Navy and director of the Institute for Strategic Studies at the PLA National Defense University

6.1. Chinese views of America's military presence in East Asia

Examining China's regional security environment, we realize that there are a number of external, mostly low-intensity, security challenges that the Chinese currently face and for which Beijing feels it must plan, including the acquisition of new weapon systems.

Such challenges include traditional security threats, such as:

i) Territorial disputes that continue to threaten the territorial integrity of the PRC: with India over the Aksai Chin region, Shaksgam valley, and a small part of Xinjiang; with South Korea over the Baekdu Mountain and the Leodo island/Suyan rock; with Taiwan and the Philippines over the Macclesfield bank/Zhongsha islands; with Taiwan and Vietnam over the Paracel and the Spratly islands; with Japan and Taiwan over the Senkaku islands;

ii) The security of the maritime lines of communication, upon which China is increasingly dependent as a major global trading power and one of the largest global energy importers;

And, non-traditional security threats, such as:

i) The international narcotics trade;

[188] Yang Yi, "Engagement, Caution", *China Security*, World Security Institute, Vol. 3, No. 4, Autumn 2007, p. 34, http://www.defence.org.cn/aspnet/vip-usa/UploadFiles/2008-02/200802071406413281.pdf .

ii) Potential regional instability (for example, on the Korean peninsula), that could threaten the continued vibrancy of the Chinese economy, either by undermining the sense of stability and security in the East Asian region that incubates China's growth, or by more directly harming it with an influx of refugees that could disrupt the domestic Chinese economy.

Even though these security challenges are closely followed, considered and analyzed by the Chinese leadership, high-ranking Chinese officials seem to be convinced that the principal external security challenge is the one posed by the United States of America. According to this perspective, in the long run, the United States poses a potential threat to strategically contain or encircle China. In the short term, American support for Taiwan represents a potentially powerful obstacle to Beijing's efforts to reunify the island with the PRC. Moreover, the U.S. factor (particularly American intervention in a conflict with Taiwan) intermingles with several of the other external challenges, aggravating China's sense of potential threat.[189]

Various means are identified by the Chinese as examples of the American quest for hegemony:

- Domination of the international trading and financial systems.
- An ideological crusade to expand western-style democracies and subvert states that oppose the U.S. primacy in the international system or "hegemonism", according to the Chinese.
- An interventionist emphasis on the respect of human rights, as these are conceived and interpreted based exclusively on western values and the European/American historical experience and traditions.
- Strengthening old and building new military alliances.
- Reverting to military coercion in pursuit of political and economic goals.
- Intervention in regional conflicts.
- Manipulating arms control negotiations in order to "leverage" weaker states.
- Manipulating and dominating regional multilateral security organizations.[190]

Although some observers wave the question of a Sino-American confrontation away, going so far as to declare that, in the age of globalization, economic interdependence has rendered great-power geopolitical competition moot, and rising powers no longer vie with dominant powers to rule the waves or control key points on the map; it seems that Thomas Friedman is closer to the mark when, pointing to the emergence of China, he declares that economic interdependence raises the costs of geopolitical ventures, but does not end geopolitics altogether. China's leadership declares itself intent on a "peaceful rise" (i.e. growth in conditions of peace) to regional eminence, but even a peaceful rise

[189] Michael R. Chambers, "Framing the problem: Chinas' threat environment and international obligations", in Roy Kamphausen and Andrew Scobel, eds., *Right-Sizing the People's Liberation Army: Exploring the Contours of China's Military*, Strategic Studies Institute, U.S. Army War College, Carlisle, PA, September 2007, pp. 26-27, http://www.strategicstudiesinstitute.army.mil/pubs/display.cfm?pubID=784 .

[190] David Shambaugh, *Modernizing China's Military: Progress, Problems, and Prospects*, University of California Press, Berkeley, Los Angeles and London, 2002, pp. 297-298.

does not rule out a build-up of diplomatic, economic, and military power (the implements of a classical, geopolitically-minded foreign policy).[191]

As a result, most analysts agree that the United States' military presence in East, South-East, and Central Asia poses a conundrum for the PLA. On the one hand, China needs to maintain good relations with the U.S, in order to achieve its overarching national security objective of sustained economic development and to attract foreign direct investments. But, on the other hand, this economic imperative should not be confused with Beijing's vision of how the post–Cold War security landscape in Asia should unfold. The Chinese do not subscribe to the U.S. argument that Washington's bilateral military alliances in the region are necessarily stabilizing in the long term. The Pacific Ocean is under American dominance and the looming shadow of the U.S. Navy casts a pall over all other key players. It is in the interests of China and the PLA to see the U.S. military presence in Asia reduced at some point in the future.

However, the interesting thing is that Chinese officials are adopting a cautious attitude with regard to the precise timing of a desired U.S. retreat from East/South-East Asia. They definitely don't want to see an immediate withdrawal of U.S. Navy and Air Force units from Asia, because such a development would create a power vacuum in the regional balance of power, which PLA is currently unable to fill, because it still lacks the required modern, cutting edge weapon systems. As a consequence, an immediate withdrawal of the American forces from Asia could give rise to Japan's, South Korea's, and India's Armed Forces, which will try to fill the power vacuum left by the American decision to move their forces away from East/South-East Asia. In that case, the appearance of a tough and financially exhausting arms race, with a difficult to predict outcome, between the major Asian powers will be inevitable, and will heighten security anxieties in the region.

Such a scenario could have significant repercussions especially on Japan's military development, since Japan would have to abandon its largely defensive military doctrine, invest in the development and acquisition of sophisticated weapon systems, use its civilian high-tech industrial sector for the production of innovative, dual-use technologies with military applications, and assume a more dynamic and consistent engagement in the regional (and maybe global) security environment (i.e. deployment of forces abroad, increased participation in Peace Keeping Operations, etc). To put it simply, a quick drawdown by the U.S. would result in Tokyo filling the military power vacuum quicker than the PLA could be prepared to credibly face down the Japanese.[192]

That's why Chinese analysts usually are careful to state that they oppose the strengthening or reinforcement of the U.S.-Japan alliance, not the alliance's existence per se. In May 2009, PLA Air Force Lieutenant General Ma Xiaotian, deputy head of the

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[191] James R. Holmes and Toshi Yoshihara, "China's 'Caribbean' in the South China Sea", *SAIS Review*, Johns Hopkins University, Vol. 26, No. 1, Winter-Spring 2006, http://www.kabar-irian.com/pipermail/kabar-indonesia/2006-June/007919.html ; http://www.kabar-irian.com/pipermail/kabar-indonesia/2006-June/007918.html .

[192] As Kenneth Waltz put it: "Japan has to worry about China, and China has to worry about Japan, while both are enmeshed in the many problems of their region". Kenneth N. Waltz, "The Emerging Structure of International Politics", *International Security*, Vol. 18, No. 2, Autumn 1993, p. 68. David M. Finkelstein, "China's National Military Strategy", in James C. Mulvenon, Richard H. Yang, eds., *The People's Liberation Army in the Information Age*, RAND Corporation, Project Air Force, Santa Monica, CA, July 1999, p. 121, http://www.rand.org/pubs/conf_proceedings/CF145/CF145.chap7.pdf .

PLA General Staff Department, was careful enough to point out that "we [i.e. China] oppose the *expansion* of [a U.S.-Japan] alliance, […] when the alliance is *expanded* to target at multiple countries and a third country" [emphasis added].[193] He further explained that "China opposes the *enlargement* of the existing bilateral military alliances in Asia Pacific, which were left over from the Cold War" [emphasis added].[194]

Indeed, China does not appear to be all that active in trying to pry the United States and Japan or the United States and the Republic of Korea (ROK) apart. More important, in principle China's leaders are not unequivocally against these alliances. At the moment, the primary tool in Chinese diplomacy is rhetorical: a critique of the obsolescence of the "Cold War thinking" that undergirds the American military alliances in the region. China has yet to use economic or military threats or covert financial intervention in domestic political debates, in order to promote anti-alliance policies within Japan and South Korea. Many Chinese analysts believe that a Japan within a bilateral alliance with the United States is better than a Japan outside of such constraints, as long as this alliance is not used to provide military cover for an independent Taiwan.[195]

This feeling is also shared by other Asian nations. As Singapore's deputy Prime Minister and Minister for Defense, Tony Tan Keng Yam, stated in January 1997: "U.S. engagement in the Asia-Pacific region is the key factor to ensure stability in the region. A strong U.S. military presence will continue to be important, relevant and necessary for regional security and stability".[196] In addition, the Australian 2009 Defense White Paper explicitly emphasizes the importance of the United States military presence in East Asia, as well as the strong military and politico-diplomatic ties forged between Tokyo and Washington in the aftermath of World War II, as significant components of the balance of power system in the Asia-Pacific region, by stating that: "The United States has played a stabilising role across the world and especially so in the Asia-Pacific region. […] Japan's alliance with the United States has been a key stabilising feature of the post-war regional security environment and will continue to play a vitally important role. Were Japan unable to rely on that alliance, its strategic outlook would be dramatically different, and it would be compelled to re-examine its strategic posture and capabilities".[197]

It is equally noteworthy that even Russia doesn't seem to oppose a moderate American military presence and diplomatic engagement (through a series of bilateral and multilateral alliances) in the Asia-Pacific region. On a visit to Japan in May 1997, the Russian defense minister Igor Rodionov had praised the Japanese-American alliance as

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[193] "Interview: Lieutenant General Ma Xiaotian, Deputy Chief of Staff of the PLA", *Kanwa Asian Defence*, Issue 58, August 2009, July 18, 2009, http://www.kanwa.com/ .

[194] Lieutenant General Ma Xiaotian, "The major powers and Asian security: Cooperation or Conflict", *Second Plenary Session, The 8th IISS Asia Security Summit; The Shangri-La Dialogue*, Singapore, May 30, 2009, http://www.iiss.org/conferences/the-shangri-la-dialogue/shangri-la-dialogue-2009/plenary-session-speeches-2009/second-plenary-session/lieutenant-general-ma-xiaotian/ .

[195] Alastair Iain Johnston, "Is China a Status Quo Power?", *International Security*, Vol. 27, No. 4, Spring 2003, pp. 40-42.

[196] "Talk by Dr. Tony Tan Keng Yam, Deputy Prime Minister and Minister for Defence, at the National University of Singapore (NUS). Political Lecture held at NUS lecture theatre 11, on Friday, 24 January 1997 at 7.00 p.m.", *National Archives of Singapore Library*, Press Release Number: 22/Jan, 05-1/97/01/24, April 1, 1997, p. 3, http://stars.nhb.gov.sg/stars/tmp/tkyt19970124s.pdf .

[197] Australian Department of Defence, *Defence White Paper 2009. Defending Australia in the Asia Pacific Century: Force 2030*, May 2009, pp. 30, 33, http://www.defence.gov.au/whitepaper/docs/defence_white_paper_2009.pdf .

contributing to regional security, suggesting trilateral cooperation between Russia, Japan, and the U.S.A. to ensure Asia–Pacific security[198]; an assessment shared by many Russian politicians and academics, who are convinced that Russian interests in the Far East are met by retaining the American military presence in Japan, and they fear that a U.S. withdrawal from the region is bound to lead to a faster and more comprehensive remilitarization of Japan[199] and, in due course, to a confrontation between Tokyo and Beijing. As A. Arbatov has pointed out: "A sharp change in the balance of power in favour of either China or Japan, and the appearance of hegemonistic aspirations in one of these powers, could create a direct threat to the Russian Far East".[200]

In that context, we could argue that the American military presence has some utility for China, since the U.S. guarantees the regional stability Beijing needs to have. A stable regional defense environment is a vital precondition for China's unimpeded economic development. Besides, some Chinese analysts are seeing utility in the continued U.S. military presence in Korea as a check on instability close to home, although that argument will disappear after an eventual Korean unification or reconciliation.

Yet we have to mention that there is a residual distrust and apprehension in the PLA about the true intentions of the United States in Asia and the role of its armed forces in the Pacific Ocean. The United States, through its forward military presence (mostly through the presence of the 7th Fleet[201]), has the potential to act as the great spoiler to two of Beijing's core security concerns: i) Taiwan[202]; and, ii) Japan.

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[198] Richard Weitz, "Why Russia and China have not formed an anti-American alliance", *Naval War College Review*, Autumn 2003, Vol. LVI, No. 4, p. 51. Andrew C. Kuchins, "Russia and great-power security in Asia", in Gennady Chufrin, ed., *Russia and Asia: The Emerging Security Agenda*, SIPRI, Oxford University Press, Oxford, 1999, p. 434, http://books.sipri.org/files/books/SIPRI99Chu/SIPRI99Chu27.pdf .

[199] Japan's economic and technological prowess not only gives it tremendous status as a world power, but can also potentially be applied to the defense sector in a much more concentrated fashion. For example, General Valery Manilov, deputy head of the General Staff of the Russian Armed Forces, argued in 1996 that: "Economic achievements enable Japan to build equal relations with the USA instead of subjugation, and increase its confidence in the ability to act independently in world affairs, first of all in Asia". While the containment of China is a more recent concern, Moscow probably tacitly approved the US–Japan security relationship even before the collapse of the Soviet Union. Andrew C. Kuchins, "Russia and great-power security in Asia", in Gennady Chufrin, ed., *Russia and Asia: The Emerging Security Agenda*, SIPRI, Oxford University Press, Oxford, 1999, pp. 434-435, http://books.sipri.org/files/books/SIPRI99Chu/SIPRI99Chu27.pdf .

[200] Oles M. Smolansky, "Russia and the Asia-Pacific Region: Policies and Polemics", in Stephen J. Blank and Alvin Z. Rubinstein, eds., *Imperial Decline: Russia's Changing Role in Asia*, Duke University Press, Durham, N.C., 1997, p. 13.

[201] It is worth mentioning that the 7th Fleet is the largest forward-deployed fleet in the United States Navy, and it is equipped with some of the most advanced weapon systems in the American naval arsenal. It consists of between 50 and 60 ships, 350 aircraft, and 60,000 Navy and Marine Corps personnel. The fleet is usually made up of 1 or 2 aircraft carriers, 3 or 4 cruisers, 18 to 20 destroyers and frigates, 5 or 6 submarines, an amphibious command and control ship, 5 to 8 transport and landing ships, 18 logistics and support ships, and 16 ships of the Maritime Pre-positioned Force. Its Naval Air Force is made up of 200 aircraft aboard carriers and other ships, 22 land-based maritime patrol aircraft, 10 shore-based utility aircraft, and 150-160 Marine Corps aircraft. For a detailed, constantly updated presentation of the forces and the activity of the U.S. Navy 7th Fleet see the official website of the Commander of the 7th Fleet at the following web address: http://www.c7f.navy.mil/forces.htm . Peter Howarth, *China's Rising Sea Power: The PLA Navy's Submarine Challenge*, Frank Cass, London and New York, 2006, p. 57.

[202] As a matter of fact, the U.S. military bases on the Japanese island of Okinawa (the largest of the Ryukyu Islands complex) are only some 500 km away from northern Taiwan and just over 600 km from the

Because the United States guarantees the security of Taiwan and has attached even greater importance to Taiwan's strategic value in containing China, some Chinese security analysts claim that Taipei can continue to be recalcitrant in negotiating cross-Strait political issues and "*reckless to the point of provocation*" in its foreign and domestic policies.

Moreover, it is the United States, some PLA planners would argue, that is goading the Japanese to re-arm and pressuring Tokyo to expand its military role in the region under the false flag of increased host-nation burden sharing.

As a result, the overwhelming majority of PLA analysts seriously believe that the U.S. is attempting to contain China militarily having deployed strong forces in the western Pacific and having formed a system of military bases on the First and Second Island Chains with a strategic posture involving Japan[203] and South Korea[204] as the "northern anchors", Australia and the Philippines as the "southern anchors"[205], and with Guam

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Chinese mainland coast, well within the average operational radius (that is, 500 nm/926 km – without in-flight aerial refuelling) of current and next generation U.S. fighter aircraft, such as the F-15, F-16, F-22, and F-35. Furthermore, USAF long-range heavy, strategic bombers, such as the Boeing B-52 Stratofortress, stationed on the Andersen Air Force Base (on the northern end of the island of Guam, which is an unincorporated territory of the United States) could play a significant role in an American effort to deter or defeat a Chinese aggression against Taiwan. More specifically, B-52s armed with Harpoon anti-ship missiles could play a key role in defeating Chinese maritime operations in the Taiwan Strait. The distance between Guam and the Taiwan Strait (about 1,500 nautical miles) is only half the distance between the island of Diego Garcia in the Indian Ocean and central Iraq: during the two Gulf Wars, strategic bombers operating from the U.S. Navy and Air Force base in Diego Garcia had actively participated in the saturation bombings against Iraq. Zalmay Khalilzad, David T. Orletsky, Jonathan D. Pollack, Kevin L. Pollpeter, Angel Rabasa, David A. Shlapak, Abram N. Shulsky, Ashley J. Tellis, *The United States and Asia: Toward a new US strategy and force posture*, RAND Corporation, Project Air Force, Santa Monica, CA, 2001, pp. 68, 71, http://www.rand.org/pubs/monograph_reports/MR1315/MR1315.ch4.pdf.

[203] In February 2005, Condoleezza Rice and Donald Rumsfeld hosted a meeting in Washington with top Japanese officials at which an agreement was signed to improve cooperation in military affairs between the two countries. Known as the "*Joint Statement of the US-Japan Security Consultative Committee*", the agreement called for greater collaboration between U.S. and Japanese forces in the conduct of military operations in an area stretching from North-East Asia to the South China Sea. It also called for close consultation on policies regarding Taiwan, an implicit hint that Japan was prepared to assist the United States in the event of a military clash with China precipitated by Taiwan declaring its independence. Michael T. Klare, "Containing China: The US's real objective", *Asia Times*, April 20, 2006, http://www.atimes.com/atimes/China/HD20Ad01.html .

[204] According to U.S. Navy Admiral William J. Fallon, Commander of the U.S. Pacific Command: "The U.S.-ROK [i.e. Republic of Korea] alliance must remain adaptable in light of the changing security environment, including unconventional threats, *China's military modernization*, and the potential for reconciliation between the Koreas. The ROK and U.S. are working to transform both our militaries and the alliance. We also hope to foster greater trilateral military cooperation between the ROK, Japan, and the U.S., and we welcome Korea's adoption of *a more regional view of security and stability*. By moving forward as partners we will continue to successfully modernize the alliance for our mutual and enduring benefit" [emphasis added]. William J. Fallon, "Statement of Admiral William J. Fallon, U.S. Navy Commander U.S. Pacific Command, before the House Armed Services Committee on U.S. Pacific Command Posture", U.S. House of Representatives Armed Services Committee, Washington, D.C., March 7, 2006, http://www.shaps.hawaii.edu/security/us/2006/3-9-06Fallon.html .

[205] Since September 1951, Australia is a founding signatory member of the "*Australia, New Zealand, United States Security Treaty*" (ANZUS). As part of a joint declaration (the "*Sydney Statement*") signed in July 1996, Australia expanded its military commitments under the ANZUS Security Treaty with the U.S. In combined military exercises, some of the largest conducted in Australia since the end of World War II, Washington and Canberra have covered the full range of operational and tactical cooperation (from full

positioned as the forward base.[206] Some of them have even accused the U.S. for trying to knock together with Japan, South Korea, Taiwan and, even, India a "mini NATO" in the Asia-Pacific region with an obvious aim to deal with China.[207]

Chinese defense planners have noted with concern that in the post-Cold War era many American pundits and State Department officials are emphasizing the necessity for an upgraded Japanese role in Asian politics as a counterbalance to China's rising power and influence. Kenneth Waltz, the most prominent scholar of the structural realist paradigm in international relations theory, had argued that: "Unless Japan responds to the growing power of China, China will dominate its region and become increasingly influential beyond it".[208] It should not be surprising that defense analysts from both sides of the Taiwan Strait are increasingly concluding that security in the Taiwan Strait has moved from a trilateral US-China-Taiwan interaction to a US-Japan alliance-China-Taiwan relation.[209]

The Chinese were alarmed by the Pentagon's draft of the "*Defense Planning Guidance for the Fiscal Years 1994-1999*" that leaked to the American press in March 1992 and gained great publicity. In that text the U.S. Department of Defense maintained that: "Our first objective is to prevent the re-emergence of a new rival, either on the territory of the former Soviet Union or elsewhere, that poses a threat on the order of that posed formerly by the Soviet Union. This is a dominant consideration underlying the new regional defense strategy and requires that we endeavor to prevent any hostile power from dominating a region whose resources would, under consolidated control, be sufficient to generate global power. […] We must maintain the mechanisms for deterring potential competitors from even aspiring to a larger regional or global role. An effective reconstitution capability is important here, since it implies that a potential rival could not

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scale joint/combined activities to unit level tactics involving all branches of the services of the two countries). Besides significant bilateral military exercises, the U.S. Navy conducts numerous port calls annually in Australia. In 1997 alone, according to official U.S. sources, the U.S. Seventh Fleet made 102 port calls to Australia. The two sides are also exploring increased combined training, particularly in the Australian Northern Territory. In July 2001, a trilateral security dialogue process was put forward by the Australian Foreign Minister Alexander Downer and endorsed by the U.S. Secretary of State Colin Powell and the Foreign Minister of Japan Makiko Tanaka. The idea behind this process was to break down the tight, mutually exclusive network of bilateral U.S. alliances with Japan and Australia, the "*northern and southern anchors*" of the U.S. presence in the Pacific. This initiative was expected to lead to better coordination among the three countries, than it was possible under bilateral arrangements. The American expectation was that the two spokes (Japan and Australia) would be able to share information and formulate a common approach in keeping with the United States' policy objectives. C. Raja Mohan, "The Asian Balance of Power," *Seminar*, No. 487, March 2000, http://www.india-seminar.com/2000/487/487%20raja%20mohan.htm . Purnendra Jain, "A 'little NATO' against China", *Asia Times*, March 18, 2006, http://www.atimes.com/atimes/China/HC18Ad01.html .

[206] Xu Qi, "Maritime Geostrategy and the Development of the Chinese Navy in the early Twenty-First Century", *Naval War College Review*, Vol. 59, No. 4, Autumn 2006, p. 57, http://www.nwc.navy.mil/press/review/documents/NWCRAU06.pdf .

[207] James R. Holmes and Toshi Yoshihara, *Chinese Naval Strategy in the 21st Century: The Turn to Mahan*, Routledge, London and New York, 2008, p. 57.

[208] Kenneth N. Waltz, "The Emerging Structure of International Politics", *International Security*, Vol. 18, No. 2, Autumn 1993, p. 68.

[209] Lai I-chung, "How the US-Japan Alliance is Shaping the Strategic Structure of the Taiwan Strait", *Taiwan Daily*, July 20, 2004, http://taiwanthinktank.org/ttt/servlet/OpenBlock?Template=Article&lan=en&article_id=210&BlockSet= .

hope to quickly or easily gain a predominant military position in the world".[210] In other words, the United States would tolerate neither a peer competitor nor the emergence of a regional hegemon in East Asia.[211] And the 2006 U.S. Quadrennial Defense Review concluded that: "[The U.S.] will also seek to ensure that no foreign power can dictate the terms of regional or global security. It will attempt to dissuade any military competitor from developing disruptive or other capabilities that could enable regional hegemony or hostile action against the United States or other friendly countries".[212]

The Chinese foreign and defense policy planners have equally taken very seriously various statements, pronounced by high-ranking American government and military officials, evoking the dire necessity for the implementation of a U.S. containment strategy vis-à-vis Beijing.

For instance, a statement made by Condoleezza Rice was particularly alarming for Beijing, since it appeared to reveal the true nature of America's foreign policy objectives in its relations with China. C. Rice in an article appeared in *Foreign Affairs* emphasized that: "China's success in controlling the balance of power depends in large part on America's reaction to the challenge. *The United States must deepen its cooperation with Japan and South Korea and maintain its commitment to a robust military presence in the region*. […] The United States also has a deep interest *in the security of Taiwan*. It is a model of democratic and market-oriented development, and it invests significantly in the mainland's economy. The longstanding U.S. commitment to a 'one-China' policy that leaves to a future date the resolution of the relationship between Taipei and Beijing is wise. But that policy requires that neither side challenge the status quo and that Beijing, as the more powerful actor, renounce the use of force. U.S. resolve anchors this policy. […] If the United States is resolute, peace can be maintained in the Taiwan Strait until a political settlement on democratic terms is available. Some things take time. U.S. policy toward China requires nuance and balance. It is important to promote China's internal transition through economic interaction while *containing Chinese power and security ambitions*. Cooperation should be pursued, *but we should never be afraid to confront Beijing when our interests collide*" [emphasis added].[213]

In that context, it should not be surprising that in Chinese official documents the United States is frequently accused as having adopted a containment and encirclement policy towards the PRC and trying to enhance Taiwan's deterrence capabilities. The newly released Chinese Defense White Paper explicitly states that "[China] faces strategic manoeuvres and containment from the outside while having to face disruption and sabotage by separatist and hostile forces from the inside. […] In particular, the United States continues to sell arms to Taiwan in violation of the principles established in the

[210] "Excerpts From Pentagon's Plan: Prevent the Re-Emergence of a New Rival", *The New York Times*, March 8, 1992, http://www.nytimes.com/1992/03/08/world/excerpts-from-pentagon-s-plan-prevent-the-re-emergence-of-a-new-rival.html?pagewanted=1 .

[211] John J. Mearsheimer, "China's Unpeaceful Rise", *Current History*, Vol. 105, Issue 690, April 2006, p. 161.

[212] "Quadrennial Defense Review Report", United States Department of Defense, February 6, 2006, p. 30, http://www.defenselink.mil/qdr/report/Report20060203.pdf .

[213] Condoleezza Rice, "Campaign 2000: Promoting the National Interest", *Foreign Affairs*, Vol. 79, No. 1, January/February 2000, http://www.cfr.org/publication/10456/ .

three Sino-U.S. joint communiqués, causing serious harm to Sino-U.S. relations as well as peace and stability across the Taiwan Straits".[214]

Throughout the latter half (since roughly 2006) of the second G. W. Bush administration, high-ranking PLA officials were claiming that: "[America's foreign and defense policies are] not aimed primarily at the defeat of global terrorism, the incapacitation of rogue states, or the spread of democracy in the Middle East. These may dominate the rhetorical arena and be the focus of immediate concern, but they do not govern key decisions regarding the allocation of long-term military resources. The truly commanding objective (the underlying basis for budgets and troop deployments) is the containment of China".[215]

In fact, it is not only Chinese scholars and military or diplomatic officials who tend to argue that the United States has gradually adopted since Soviet Union's collapse a prudent strategy of containment towards the People's Republic of China. Many Western analysts seem to acknowledge the revival of an American-led containment strategy vis-à-vis China, and to believe that the most significant factor that contributed to the development of this strategy was the perception that in the aftermath of the Cold War China had finally emerged as a major regional power in its own right and was beginning to contest America's long-term dominance of the Asia-Pacific region. To some degree this was manifested, so the Pentagon claimed, in military terms, as Beijing began to replace Korean War-vintage weapons with more modern, though hardly cutting edge, Russian designs.

It was not China's military moves, however, that truly alarmed U.S. policymakers (most analysts are well aware of the continuing inferiority of Chinese weaponry), but rather Beijing's success in using its enormous purchasing power and hunger for resources to establish friendly ties with such long-standing U.S. allies as Thailand, Indonesia, and Australia. Because the Bush administration had done little to contest this trend while focusing on the war in Iraq, "China's rapid gains in South-East Asia finally began to ring alarm bells in Washington".[216]

A growing number of Chinese officials are convinced that the American authorities are now clearly engaged in a coordinated, systematic effort to contain Chinese power and influence in Asia. According to the Chinese, this effort appears to have three broad objectives: i) convert existing relations with Japan, Australia and South Korea into a robust, integrated anti-Chinese alliance system; ii) bring other nations, especially India, into this system; and, iii) expand U.S. military capabilities in the Asia-Pacific region.

In fact, Chinese opposition to NATO expansion is born of a fear that the *Partnership for Peace* programme might spread to Central Asia and exponentially enhance U.S. influence on China's western doorstep.

As a consequence, PLA views of the U.S. are highly dichotomous. On the benign side, the U.S. is probably viewed by PLA strategists not so much as a direct military threat to

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[214] Information Office of the State Council of the People's Republic of China, *China's National Defense in 2008*, Beijing, January 2009, p. 6, http://www.fas.org/programs/ssp/nukes/2008DefenseWhitePaper_Jan2009.pdf .

[215] Michael T. Klare, "Containing China: The US's real objective", *Asia Times*, April 20, 2006, http://www.atimes.com/atimes/China/HD20Ad01.html .

[216] Michael T. Klare, "Containing China: The US's real objective", *Asia Times*, April 20, 2006, http://www.atimes.com/atimes/China/HD20Ad01.html .

Beijing, but as a lumbering but lethal giant that can wreak havoc on China's national security interests. On the more cynical side, the U.S. is seen as capable of undermining China's core interests concerning Japan and especially Taiwan.

6.2. Chinese views of Japan's regional policies

The Chinese are well aware of the fact that profound change in a country's international situation produces radical change in its external behaviour, since the behavior of states responds more to external conditions than to internal habit, if external change is profound. So, China's leadership realizes that in the post-Cold War era Japan has gradually started enlarge its conventional forces to protect its national interests.[217]

The perception of the PLA strategic analysts appears to correspond to reality. Even though Japan is obviously reluctant to assume the mantle of a great power; its reluctance, however, is steadily, though slowly, waning. Japan is made uneasy now by the steady growth of China's military budget. The presence of China's ample nuclear forces, combined with the drawdown of American military forces, can hardly be ignored by Tokyo, the less so because economic conflicts with the United States cast doubt on the reliability of American military guarantees.[218]

Japanese officials have indicated that when the protection of America's extended deterrent is no longer thought to be sufficiently reliable, Japan will equip itself with a nuclear force, whether or not openly. Japan has put itself politically and technologically in a position to do so. Consistently since the mid-1950s, the various Japanese governments have defined all of their Self-Defense Forces as conforming to constitutional requirements. Nuclear weapons purely for defense would be deemed constitutional should Japan decide to build some.[219] As a secret report of the Japanese Ministry of Foreign Affairs put it in 1969: "For the time being, we will maintain the policy of not possessing nuclear weapons. However, regardless of joining the NPT or not, we will keep the economic and technical potential for the production of nuclear weapons, while seeing to it that Japan will not be interfered with in this regard". In March 1988, the Japanese Prime Minister Noboru Takeshita called for a defensive capability matching Japan's economic power. While, in June 1994, the Japanese Prime Minister Tsutumu Hata mentioned in parliament that Japan had the ability to develop nuclear weapons.[220]

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[217] Kenneth N. Waltz, "Structural Realism after the Cold War", *International Security*, Vol. 25, No. 1, Summer 2000, p. 34.

[218] Reminders of Japan's dependence and vulnerability multiply in large and small ways. For example, as rumours about North Korea's developing nuclear capabilities gained credence, Japan became acutely aware of its lack of observation satellites. Uncomfortable dependencies and perceived vulnerabilities have led Japan to acquire greater military capabilities, even though several Japanese politicians may prefer not to. Kenneth N. Waltz, "Structural Realism after the Cold War", *International Security*, Vol. 25, No. 1, Summer 2000, p. 33.

[219] Norman D. Levin, "Japan's Defense Policy: The Internal Debate", in Harry H. Kendall and Clara Joewono, eds., *Japan, ASEAN, and the United States*, Institute of East Asian Studies, University of California Press, Berkeley, 1990.

[220] Japan has laid a firm foundation for doing so by developing much of its own weaponry instead of relying on cheaper imports. Remaining months or moments away from having a nuclear military capability

As far as the issue of the deployment of units of the Japanese Self-Defense Forces in areas far away from Japan's territory is concerned, we should briefly mention that throughout the last eight years many Japanese officials and scholars are arguing that the U.S. military is preoccupied coping with the insurgencies in Afghanistan and Iraq, and it has no time or personnel to spare to defend economically vital sea lines of communication. According to this approach, Tokyo needs to defend critical maritime routes, and in that context Japan should dispatch escort ships to potentially dangerous waters and protect Japanese vessels through joint exercises and patrol. In fact, the Japanese Navy, or as it is officially called the "Maritime Self-Defense Force", has already been refuelling vessels and escort ships in the Indian Ocean, more than 1,000 miles away from Japan, providing logistic support to foreign contingents engaged in Afghanistan's reconstruction. In order to counter piracy, since 2000 (that is long before the establishment of the specialized anti-piracy E.U. and U.S. naval task groups) Japan's Coast Guard has dispatched patrol boats to take part in joint exercises and anti-piracy patrol activities abroad (e.g. in India, Malaysia, etc). In April 2009, Japan reached an agreement with the government of Djibouti permitting the opening of a Japanese Coast Guard base in that African country.[221]

On the other hand, the Chinese are worrying about the security of the maritime routes (primarily of the Malacca Strait) through which are passing the tankers that carry the overwhelming majority of China's oil imports. Appraising Japan's newly evolving defense posture, Chinese researchers express concern that Japan's defense scope has extended to the Taiwan Strait and could include the Malacca Strait; Japan has also gained access to Singapore's air bases.[222] Other Chinese naval specialists have been critical of Japan's deployment to Iraq, arguing that this initiative has more to do with the geopolitics of oil than with any humanitarian motives. This illustrates a larger concern that the regional maritime oil security environment is being reshaped to Beijing's detriment.[223]

6.3. Conclusion

is well designed to protect the country's security without unduly alarming its neighbors. Kenneth N. Waltz, "Structural Realism after the Cold War", *International Security*, Vol. 25, No. 1, Summer 2000, pp. 34-35.

[221] The signing of the agreement with Djibouti will enable Japan to deploy P-3C Orion maritime surveillance aircraft to the region, in the context of anti-piracy operations. Masahiro Akiyama, "Defending sea lanes vital to nation's interests", *The Asahi Shimbun*, September 1, 2004, www.southchinasea.org/docs/Akiyama-Defending%20sea%20lanes%20vital.doc . "Present State of the Piracy Problem and Japan's Efforts", *Japan's MFA website*, December 2001, http://www.mofa.go.jp/policy/piracy/problem0112.html . "Exchange of notes between the Government of Japan and the Government of the Republic of Djibouti concerning the status of the Self-Defense Forces of Japan, etc. in the Republic of Djibouti", *Japan's MFA website*, April 2009, http://www.mofa.go.jp/region/africa/djibouti/note0904-e.pdf .

[222] Chinese concern regarding Japan and the Taiwan Strait has been heightened by the *U.S.-Japan Defense Guidelines*' revisions, which some interpret as authorizing the extension of Japan's Self-Defense Force coverage to the Taiwan Strait.

[223] Andrew Erickson and Lyle Goldstein, "Gunboats for China's new 'Grand Canals'? Probing the Intersection of Beijing's Naval and Oil Security Policies", *Naval War College Review*, Vol. 62, No. 2, Spring 2009, pp. 55-56.

The Chinese leaders are carefully watching and analyzing the American and Japanese foreign policy and military activities in Asia. More than likely, the PLA must constantly take into consideration the potential reaction of the U.S. into almost every military contingency plan it may have. Assuming there are a variety of PLA contingency plans targeted against Taiwan, the U.S. factor is a significant unknown variable for the PLA. Beijing's suspicions about Tokyo's future path and the vagueness of the phrase "*areas surrounding Japan*" in the *U.S.-Japan Guidelines for Defense Cooperation* have probably only heightened concern about the U.S. role in the Western Pacific.[224]

In conclusion, reviewing the PLA's official view of China's security environment, we can draw the following conclusions regarding the evolution of the PRC's defense strategy, the PLA's main missions, potential enemies, and force modernization:

- The PLA must be prepared to deal with internal unrest every day.
- The PLA must be prepared with military options for China's leaders to consider in dealing with Taiwan, should the national leadership decide to employ the military element of national power to achieve its political ends.
- The PLA has to develop a credible defense of its economic center of gravity: the coast. It must also be prepared to enforce Beijing's maritime claims.
- Any bilateral security concern that involves China with another country on its land borders (India, North Korea, Vietnam, Russia, etc.) should be considered an enduring security concern regardless of how pacific the situation is at the moment or promises to remain in the future.
- Russia is a long-term and enduring security concern for Beijing, not because it is perceived as a direct military threat to China, but due to its proximity, long land border with China, historical mistrust, and its potential to regain, at least partially, its great power status.
- For the foreseeable future, the United States remains an enduring security concern, because of its military and economic power, the proximity of its military forces, its extended network of bilateral military alliances, and its potential role to act as a spoiler for core Chinese security interests (e.g. Taiwan, Korean peninsula, Japan).
- Japan is probably the one country in the region, which in the mid-term Beijing views with the most suspicion as a potential challenger in the military, as well as political and economic realms.
- As for force structure and combined arms operations, the PLA has already started enhancing its maritime and aerospace capabilities. At the same time, because of the continuing possibility of internal unrest and current (India, Korea), and potential (Russia, Vietnam) security concerns along China's extensive land borders, the PLA cannot neglect the modernization of its ground forces.
- Finally, China continues fielding a credible nuclear deterrent, especially in light of India's decision in June 2009 to heavily reinforce its Army and Air Force units along its 3,500 km undefined border with China[225], and Chinese concerns about the potential for

[224] David M. Finkelstein, "China's National Military Strategy", in James C. Mulvenon, Richard H. Yang, eds., *The People's Liberation Army in the Information Age*, RAND Corporation, Project Air Force, Santa Monica, CA, July 1999, pp. 121-122, http://www.rand.org/pubs/conf_proceedings/CF145/CF145.chap7.pdf .

[225] During the summer of 2009, India transferred to its borders with the PRC two infantry divisions (each comprising around 25,000-30,000 personnel, along with artillery, medical, signals, and engineering support

the U.S./NATO member states or Russia to acquire credible ballistic missile defense capabilities in the medium or in the long run.[226]

units), and a squadron of 18 Su-30MKI fighter jets (to be stationed at the Tezpur Air Base in Assam). Furthermore, the Indian Air Force plans to invest heavily in the development of the military infrastructure in the country's north-eastern regions with the construction of 4 or 5 air bases and a number of advanced landing grounds. India's objective is to "meet future national security challenges" along the McMahon Line, that is its 1,030 km unfenced border with China in the mountainous state of Arunachal Pradesh. According to China's Ministry of Foreign Affairs, the Indian moves are in breach of the two countries obligations under a 1993 Sino-Indian treaty to keep force levels in border areas to "a minimum level compatible with […] friendly and good neighbourly relations". "India ramps up military presence along China border", *Indo-Asian News Service*, June 9, 2009, http://www.thaindian.com/newsportal/uncategorized/india-ramps-up-military-presence-along-china-border-lead-changing-dateline_100202734.html . Neville Maxwell, "Renewed tension on the India-China border: Who's to blame?", *East Asia Forum*, September 3, 2009, http://www.eastasiaforum.org/2009/09/03/renewed-tension-on-the-india-china-border-whos-to-blame/ .

[226] David M. Finkelstein, "China's National Military Strategy", in James C. Mulvenon, Richard H. Yang, eds., *The People's Liberation Army in the Information Age*, RAND Corporation, Project Air Force, Santa Monica, CA, July 1999, p. 123, http://www.rand.org/pubs/conf_proceedings/CF145/CF145.chap7.pdf .

7. The bilateral defense cooperation with Russia as a significant dimension of China's defense strategy

The last years of the Cold War (especially since Mikhail Gorbachev's speech of July 1986 in Vladivostok) and in the aftermath of Soviet Union's breakup in December 1991, the Sino-Russian relations experienced, initially, a détente and then, as time was passing by, the establishment of continuously closer ties, that took the shape of a strategic alliance with the signature on July 16, 2001 of the "*Treaty of good-neighbourliness and friendly cooperation between the People's Republic of China and the Russian Federation*".[227] In that context, the definitive settlement of the territorial disputes between the two countries in October 2004 and the mutually agreed demarcation of their common borders[228] have laid the foundations for the development and further enhancement of their cooperation in a number of important international issues.

The defense cooperation (e.g. joint military exercises conducted by Moscow and Beijing under the auspices of the Shanghai Cooperation Organization) and the arms transfers have always been two of the main topics (actually, most of the time they formed the centrepiece, the focal point) of the Sino-Russian cooperation. To achieve their own state interests, China and Russia attempted to pursue military cooperation at two levels: i) defusing remaining points of tension through confidence-building measures (CBM); and, ii) developing new areas of cooperation, including arms transfers and military-technical cooperation.

From the early 1990s till 2006, Moscow was Beijing's leading weapons supplier, averaging 1-2 billion dollars a year in sales. According to Anatoly Isaikin, Rosoboronexport's[229] general director, the value of Russian-Chinese military-technical cooperation between 2001 and 2009 totalled 16 billion dollars.[230] Top items included Su-27SK/UBK, J-11, and Su-30MKK/MK2 fighter jets; Kilo-class (type 877EKM, 636, 636M) submarines; Sovremenny-class (type 956E and 956EM) destroyers; Mi-17 transport helicopters; turbofan engines (AL-31F/N and RD-93); surface-to-air (Tor-M1 and S-300PMU-1/2), air-to-ground and anti-ship missiles (e.g. 3M-80MBE surface-to-surface missiles, and Klub-S submarine-launched missiles).

As did the USSR with Germany in the 1920s and 1930s, in the 1990s China found in the Russian Federation a reliable partner willing to provide almost any weapon and technical expertise the Chinese were willing to pay for. Germany played this role for the

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[227] Ministry of Foreign Affairs of the People's Republic of China, "Treaty of Good-Neighbourliness and Friendly Cooperation Between the People's Republic of China and the Russian Federation", *PRC's MFA website*, July 24, 2001, http://www.fmprc.gov.cn/eng/wjdt/2649/t15771.htm .

[228] The official transfer of control (from the Russian Federation to the PRC) of the last two disputed islands (Bolshoy Ussuriysky, and Tarabarov) in the Ussuri river took place in August 2008, thus completing a process revitalized in 1991 to delineate the border between China and the former Soviet Union. This process had included agreements in 1994, the formation of the Shanghai Cooperation Organization (SCO), and a set of final deals reached in October 2004. "China, Russia: An End to an Island Dispute", *Stratfor*, July 17, 2008, http://www.stratfor.com/node/120065/analysis/china_russia_end_island_dispute .

[229] Rosoboronexport is the state intermediary agency for Russia's exports/imports of defense-related and dual-use products, technologies and services.

[230] "Russia-China military-technical deals worth 16 billion dollars since 2001", *RIA Novosti*, April 10, 2009, http://rianovosti.com/russia/20090410/121053007.html .

Soviet Union, and in the 1990s Russia acted as China's major partner in defense technology and arms supplies. It was not a coincidence that in both cases, the supplier countries were former superpowers, which saw exports as the only way to save their respective defense industrial complexes from impoverishment and bankruptcy after internal demand for modern weapons shrank dramatically.[231]

Russia, China's main partner in military-technical cooperation, was in the 1990s in pretty much the same position as Germany was in the aftermath of World War I. Russia had no choice but to rely almost exclusively on exports, so as to keep its defense industrial complex alive. That the Russian defense industry has survived at all was not because of domestic military procurement investment, but because of foreign sales. Following the demise of the USSR, China became the principal financier of the Russian defense industry.[232] The agreements on licensed production of various Russian weapon systems in China (e.g. the production of J-11/Su-27SK fighter jets) were quite limited in a respect, but in the long run these transfers did not constitute the most significant part of the bilateral defense cooperation. Of much more importance seems to be the experience Chinese engineers, technicians and scientists are acquiring as a result of the joint projects carried out with their Russian counterparts, and the considerable numbers of Chinese students educated in Russian universities and technical institutes throughout the 1990s and 2000s. What's more, in the early and mid-1990s many civil and dual-use technologies were purchased by Chinese defense firms at bargain prices from impoverished Russian and CIS (mainly Ukrainian) science centers (including legal and illegal imports of nominally civilian machinery and materials that can be used in the manufacture of weapon systems and related components).[233] China has also received weapon-making know-how from large numbers of Russian scientists, who were employed by China's defense industries during the first chaotic years that followed USSR's dissolution.[234] According to some estimates, the number of Russian scientific researchers declined by more than 50%: from 993,000 in 1990 to 417,000 in 1998.[235]

Another, less significant, aspect of the Russo-Chinese defense cooperation, which we will not present and analyze here in detail, are the joint military exercises carried out by the armed forces of the two countries, either under the auspices of the Shanghai

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[231] Vasiliy Kashin, "Will China Repeat Stalin's Success?", *Moscow Defense Brief*, No. 2 (2), 2004, p. 20, http://mdb.cast.ru/mdb/2-2004/di/wcrs/ .

[232] "The Russian Defense Industry", *Stratfor*, February 11, 2009, http://www.stratfor.com/node/131874/analysis/20090210_part_iii_russian_defense_industry .

[233] This reality led some researchers to assert that "*throughout the 1990s and continuing to the present, Russia has been selling her great military power status to China piece by piece*". Vasiliy Kashin, "Will China Repeat Stalin's Success?", *Moscow Defense Brief*, No. 2 (2), 2004, p. 21, http://mdb.cast.ru/mdb/2-2004/di/wcrs/ .

[234] This trend continued, at a slower pace, even during the 2000s. President Vladimir Putin noted in February 2004 that Russia was losing much of its scientific talent to professions that provide better remuneration in Russia, such as business and politics. He also averred that although only 2% of scientists who leave the field choose to go abroad, their number includes some of Russia's most highly skilled and youngest scientists. Evan S. Medeiros, Roger Cliff, Keith Crane, James C. Mulvenon, *A New Direction for China's Defense Industry*, RAND Corporation, Santa Monica, CA, 2005, p. 27, http://www.rand.org/pubs/monographs/2005/RAND_MG334.pdf . Deborah Yarsike Ball, Theodore P. Gerber, "Russian Scientists and Rogue States: Does Western Assistance Reduce the Proliferation Threat?", *International Security*, Vol. 29, No. 4, Spring 2005, p. 53.

[235] Deborah Yarsike Ball, Theodore P. Gerber, "Russian Scientists and Rogue States: Does Western Assistance Reduce the Proliferation Threat?", *International Security*, Vol. 29, No. 4, Spring 2005, p. 53.

Cooperation Organisation (SCO) or on a purely bilateral basis. Throughout the last five years, the Chinese and the Russian Armed Forces have carried out three joint, large-scale military exercises (all of them organized under the aegis of the SCO) in August 2005, August 2007, and July 2009 (dubbed "*Peace Mission*" manoeuvres).

Russian Army paratroopers parachute into a training field near the Chinese city of Taonan in Jilin province, in the north-eastern part of the country (near China's borders with North Korea and Russia), during the "*Peace Mission 2009*" military manoeuvres on July 26, 2009. In the second picture we can discern another snapshot from the landing of Russian paratroopers somewhere in China's Jilin province during the same SCO exercise in July 2009. Sources: i) "Chinese, Russian troops showcase anti-terror power in joint military exercise", *Ministry of National Defense of the PRC website*, July 27, 2009, http://eng.mod.gov.cn/SpecialReports/2009-07/27/content_4016983_3.htm [Photograph by Xinhua/Zha Chunming]; ii) "Russia, China hold Peace Mission 2009 joint exercise: Image Galleries", *RIA Novosti*, July 24, 2009, http://rianovosti.com/photolents/20090724/155604547_4.html [Photograph by RIA Novosti/Pavel Gerasimov].

In brief, after the end of the Cold War, we can identify three distinct phases in the Sino-Russian arms trade.

The first period, between 1992 and 1998, was characterized by China's acquisition of export (i.e. downgraded) versions of standardized Russian weapon systems, which had entered service with the Soviet Air Force and Navy in the late 1970s-early 1980s, and most of them were based on technologies developed for the first time in the late 1960s-early 1970s. In principle, these export variants had simplified, less sophisticated characteristics, when compared to the systems in service with the Russian Armed Forces. That was the case with the Su-27SK/UBK fighter jets (an air-superiority aircraft that cannot exploit stand-off air-to-ground weapons, and is able to undertake only secondary strike missions); the Mi-17/171 military transport helicopters; the first two Sovremenny-class (Project 965E) destroyers (powered by a relatively obsolete and difficult to maintain high-pressure steam boiler propulsion system); the baseline S-300PMU SAM systems; and the first two Kilo-class (Project 877EKM) submarines.

During the second phase, between 1999 and 2004, the PRC started gradually to acquire military equipment and hardware for the PLAAF and the PLAN within the framework of more "individualized" projects, conceived to answer the specific needs and requirements of the Chinese Armed Forces. During this period, Chinese orders were described from a higher degree of complexity and sophistication. However, the progress, when compared to the first phase of the Sino-Russian defense cooperation, wasn't so impressive or substantial. The PLA Air Force and Navy continued to prefer adopting conservative,

prudent, low-risk solutions for the modernization of their arsenal and the enhancement of their power-projection capabilities. They chose to order standardized versions of military equipment already in service with the Russian Armed Forces (securing, in that way, their unimpeded access to maintenance support/life cycle customer support and spare parts, for many years to come), instead of following India's example and opt for more advanced and innovative solutions (which, however, incorporate higher technological and development risks, resulting in much higher prices and longer delivery schedules). As a consequence, Chinese orders were carried out without the major delays and quality control problems that have plagued the weapon systems (i.e. Su-30MKI aircraft, and Talwar-class frigates) ordered by the Indian Armed Forces.[236]

For China's military leadership, when deciding on PLAAF's and PLAN's armament programmes and, more specifically, military acquisitions from Russia, the reliability of the weapon systems as well as PLA's experience in their operation were more important criteria than the innovation and the integration of advanced technologies. The most notable PLA acquisitions during this time period, included the Su-30MKK/MK2 multi-role fighter jets, the A-50 AEW&C systems, the Improved Sovremenny-class (Project 956EM) destroyers, as well as the Improved Kilo-class (Project 636M) submarines. In addition, during the same period, China became the first export client for the S-300PMU-2 SAM system.

As aforementioned, during the first two phases of the Sino-Russian arms trade (i.e. 1992-1998 and 1999-2004), the Russian arms designers and manufacturers depended on the Chinese contracts for 30-50% of their revenue. Beijing had become an indispensable partner for Russia's defense industrial sector in that respect. Without the Chinese orders, many Russian aeronautical and naval defense industries and design bureaus would not have survived through the 1990s. The Indian Air Force and Navy contracts, for all their importance, would not have sufficed on their own to keep active Russia's defense industrial complex.[237] On the other hand, it is worth keeping in mind that throughout the 1990s Russia was the only country both willing and able to sell modern military equipment and technology to China, helping the PLA to make a leap from using second generation arms systems to third and fourth generation equipment. Likewise China's aviation industry, benefiting from Russia's assistance, has gone from producing second-generation fighters in the early 1990s to producing domestically developed fourth-generation aircraft, such as the J-10, in the late 2000s.

The third part of the Sino-Russian arms trade starts in 2005. It is marked by a pause in the purchases of complete weapon platforms, after the intensive buying spree of the 1990s-early 2000s. The PLAAF and the PLANAF do not seem any longer interested in purchasing large batches of Russian-made fighter jets. Most likely, a new surge in purchases will only happen if a Su-35 variant (e.g. the Su-35BM "Flanker-E") should reach the market anytime soon or in the event of the expansion of the PLA Navy with a

[236] By the end of 2004, China had received 176 Su-27SK/UBK and Su-30MKK/MK2 fighters, without taking into account the 105 license-built J-11 fighter jets, locally assembled in Shenyang Aircraft Corporation's facilities. By that time, India had received only 40 Su-30MKI fighters of dubious functionality. Isabelle Facon and Konstantin Makienko, *La coopération militaro-technique entre la Russie et la Chine: bilan et perspectives*, Fondation pour la Recherche Stratégique, Paris, July 2006, p. 96, http://www.frstrategie.org/barreFRS/publications/rd/RD_20060701.pdf .

[237] Konstantin Makienko, "Russian Exports to China: What the Future Holds", *Moscow Defense Brief*, No. 4 (18), 2009, http://mdb.cast.ru/mdb/4-2009/item2/article1/ .

large aircraft carrier programme (possibly centered around the former Soviet Admiral Kuznetsov-class *Varyag* aircraft carrier, bought by the Chinese from Ukraine in 1998), which may prompt China's Defense Ministry to seek to acquire Su-33 "Flanker-D" carrier-based fighter jets (if the Shenyang Aircraft Corporation is not successful in completing on time the J-15 "Flying Shark"[238], which made its maiden flight on August 31, 2009).[239]

During the current period, special emphasis is given to: i) the acquisition of weapon systems that are able to support a range of strategic combat operations, enhancing Beijing's power-projection capabilities (i.e. transport aircraft, aerial refuelling tankers, etc); and, ii) the purchase of complex sub-systems (e.g. turbofan engines, radar systems, missile homing heads, etc), many of which cannot as yet be independently produced by Chinese defense industries. These sub-systems are intended to be integrated on locally designed and developed platforms produced by Chinese defense firms (e.g. the J-10 or the JF-17/FC-1 fighter jets). Nevertheless, it is noteworthy that even during the current, latest phase of the Russo-Chinese defense cooperation, Chinese orders are not characterized by advanced technological requirements. For instance, the AL-31FN and RD-93 turbofan engines are developed on the basis of older Soviet-era designs (the AL-31F and the RD-33 respectively) without incorporating any significant upgrades in comparison to the prototypes. Besides, the Il-76MD and Il-78MK transport and air-refuelling aircraft ordered in 2005 (with the fate of this contract pending the two parties

[238] In 2001, China acquired from Ukraine an unfinished Su-33 prototype, the T-10K-3, which is said to have been studied extensively by Chinese researchers, with development on the J-15 "Flying Shark" beginning immediately afterward.

[239] Russian defense analysts, taking into account the current state of affairs in the international arms market and the relative stagnation of the Russian research and development spending, conclude that the exports of Russian fighter aircraft in the coming years will probably be much less significant than during the 1999-2004 period, when more than 50 military aircraft were sent abroad annually. This recession will likely continue until the Russian aviation complex is in a position to offer aircraft with capabilities approaching those of fourth and a half ("4++", according to Russian classification) or fifth generation fighters currently made available on the market by American (with the F-22, F-35 JSF, and F-16 Block 60 fighter jets) and European (with the Eurofighter, Rafale, and JAS 39 Gripen fighters) firms. According to the same analysts, the only way for Russia's aerospace industry to weather through this crisis will be mainly with the help of state funding and the purchase of current production aircraft by the Russian Ministry of Defense. Since the end of the Cold War, the Kremlin has not invested enough in its own defense industry to sustain it. From 1994 to 2003 the Russian Air Force (VVS) did not receive a single new combat aircraft. Lately, this dire situation seems to be well understood by the Russian authorities, and it is certainly not a coincidence that on August 18, 2009 the Russian Ministry of Defense signed a 3 billion dollar contract for the purchase of 64 Sukhoi fighters for the account of the Russian Air Force. More specifically, the contract provides for the purchase of 12 Su-27SM and 4 Su-30M2 fighters (to be delivered by 2011), along with 48 Su-35BM fighters (to be delivered by 2015), representing the first production order for the Su-35. The deal included also a provision for the purchase of 96 117S/AL-41F-1S thrust-vectoring engines from UMPO and NPO Saturn. Immediately after the signing of the contract, the head of *Vnesheconombank* (VEB), Vladimir Dmitriyev, announced that Russia's National Development Bank would grant Sukhoi a 109 million dollar loan to start mass production of Su-35 jets. Likewise, the Russian Ministry of Defense has recently placed another order for 32 Su-34 "Fullback" fighter jets (to be delivered by 2013), and 12 Su-25UBM "Frogfoot" fighters/trainers. Konstantin Makienko, "Russian Military Aircraft Export: The Passing of a Golden Age", *Moscow Defense Brief*, No. 2 (4), 2005, pp. 13, 14, http://mdb.cast.ru/mdb/2-2005/am/rusmilitary/ . "Russian Defense Ministry orders 64 Su-family fighters", *RIA Novosti*, August 18, 2009, http://en.rian.ru/russia/20090818/155845491.html . Roger McDermott, "Russian Strategic Bomber Flights: Long Range Deception", *Eurasia Daily Monitor*, The Jamestown Foundation, Vol. 6, Issue 220, December 1, 2009.

agreement on its renegotiation), are also standard versions developed in the 1970s-1980s. Finally, China having procured many complete weapons platforms, now has started seeking to acquire (legally or illegally) the technologies associated with them[240], as well as the right to joint development and production.[241]

7.1. Russia's shrinking defense industrial base and the growing imbalance of forces and capabilities between the Russian and the Chinese Militaries

The future of the Russo-Chinese defense cooperation is not cloudless and appears to approach a crossroad. Russia seems to be well aware of the fact that China would like to obtain its most sophisticated military technology, which, in case of deteriorating relations, Beijing might use against Russia. Many officials at Russian security agencies are afraid that the sale of offensive weapons, namely advanced multi-role fighter jets (e.g. the Su-35BM fitted with the Irbis-E[242] passive electronically scanning array radar, or the MiG-35/D fitted with the Zhuk-AE AESA radar), supersonic strategic bombers, diesel-electric submarines making use of AIP systems (e.g. Project 677 Lada-class/Amur-1650/950[243] submarines), theatre ballistic missiles, and advanced SAM systems (e.g. S-

[240] China has already attempted to reverse engineer many Russian weapon systems it has acquired from Russia and Ukraine in the post-Cold War era and produce them by itself, thereby infringing upon Russia's intellectual property rights and causing the prospect of millions of dollars in losses for Russian companies. Stephen Blank, "Recent Trends in Russo-Chinese Military Relations", *China Brief*, The Jamestown Foundation, Vol. 9, Issue 2, January 22, 2009, http://www.jamestown.org/programs/chinabrief/single/?tx_ttnews%5Btt_news%5D=34389&tx_ttnews%5BbackPid%5D=25&cHash=7458900c65 .

[241] Isabelle Facon and Konstantin Makienko, *La coopération militaro-technique entre la Russie et la Chine: bilan et perspectives*, Fondation pour la Recherche Stratégique, Paris, July 2006, pp. 32-35, 89-96, http://www.frstrategie.org/barreFRS/publications/rd/RD_20060701.pdf .

[242] The Irbis-E radar can detect and track about 30 airborne targets and engage up to eight simultaneously. Its terrain mapping, synthetic aperture mode delivers an image resolution of less than 1 m. The radar also has a ground-moving target indicator function, tracking up to four targets simultaneously. Crucially, the Irbis-E can track a ground target while still maintaining air surveillance. According to the manufacturer, when functioning at its optimum performance level in the air-to-air mode, the radar detects a target with a 3 m^2 radar cross section at a distance of 350- 400 km, while stealth targets with a radar cross section of 0.01 m^2 are detected at a range of up to 90 km. Using a combination of mechanical and electronic scanning, the radar has a look angle of +/- 185 degrees, +/- 60 degrees in elevation, and +/- 120 degrees in azimuth. Robert Hewson, "China assesses new radar for Su-30 fighters", *Jane's Defence Weekly*, Vol. 43, Issue 46, November 15, 2006, p. 5. ARMS-TASS Information Agency, "Sukhoi continues Su-35 test flights", *Aerospace Show News*, May 28, 2008, p. 29.

[243] Even though the submarine's designer, the Central Design Bureau for Marine Engineering "Rubin", asserts in its official website that "*provision is made for the outfitting of the submarines of this class with AIP on the basis of fuel cells*", and Rosoboronexport has advertised "*electrochemical AIP*" as available for "*follow-on installation*" on Russian submarines, with the Russian press (e.g. *Kommersant* daily) suggesting that research is focused on the development of Radioisotope Thermoelectric Generators(RTG)-based AIP systems (i.e. what Russian journalists call a "diesel-atomic submarine"), the truth is that the exact nature of Russia's AIP design, or how close it is to being ready for testing, is not yet clear. As of 2009, Russian companies have not produced any AIP system available for installation on submarines. "Non-Nuclear Submarines of Amur 1650 and Amur 950", *Central Design Bureau for Marine Engineering "Rubin" website*, http://www.ckb-rubin.ru/eng/index.htm . "Russia: A new patrol submarine on the market", *Stratfor*, December 4, 2007, http://www.stratfor.com/analysis/russia_new_patrol_submarine_market .

400 *Triumf* SAM systems), to Beijing would impair the defense capability of the Russian Armed Forces, primarily the deterrence capabilities of the units stationed in the Far East[244], and Siberia Military Districts.[245] The imbalance of the two countries dynamics and potentials is growing, and that is a legitimate reason for concern among the Russian military elite.

The difference between the 1990s and the current day is that 15-20 years ago the Chinese contracts were instrumental in preventing the collapse of Russia's defense industrial complex. The threat posed by a potential collapse of Russia's defense industrial base was much more serious and imminent than China's gradually growing military power. Nowadays, however, the Russian defense contractors are doing rather well even without the Chinese money. On the other hand, after almost two decades of Russian arms exports to China, a growing number of defense analysts believe that Russia's security could someday be threatened by the very weapon systems it has transferred to the PLA, since China is the only country likely to pose a real military threat to Russia in the foreseeable future. In a December 1996 speech, even the Russian Defense Minister Igor Rodionov let slip that China was a potential threat to Russia.[246]

Likewise, Russian commanders in the Transbaikal are regularly complaining that they face Russian-made aircraft in their theatre in better repair and maintenance conditions than their own; and, Russian naval officers have expressed dissatisfaction that the Sovremenny-class destroyers sold to China could have been deployed in the Russian fleet, if economic conditions had allowed.[247]

More recently, in March 2009, the Russian Defense Minister A. Serdyukov admitted that only 10% of the Russian military's weaponry can be considered modern, and the "new" weapons and equipment that are currently entering service in tiny quantities are based on Soviet designs and do not meet the demands of modern warfare.[248] Even weapon systems, which are counted among the most modern equipment acquired by the

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"Russia: A New Development in Naval Propulsion", *Stratfor*, September 13, 2007, http://www.stratfor.com/russia_new_development_naval_propulsion . "Submarine: Military Secret Shows Up on the Internet", *Kommersant*, September 12, 2007, http://www.kommersant.com/p803553/military_technology/ .

[244] At least 200,000 Chinese live in Russia's Far East region, and many more stay for long stretches of time. On the Russian side of the border is vast, empty space, rich with natural resources and occupied by a dwindling population of 7 million Russians. On the Chinese side is a bursting-at-the-seams society desperate for breathing space and raw materials to feed its modernizing economy. About 77 million Chinese live in three provinces that border their northern neighbour. Peter Baker, "A tense divide in Russia's Far East: Chinese immigrants face anger and envy of northern neighbours, who fear a takeover", *The Washington Post*, July 29, 2003, p. A09, http://www.washingtonpost.com/ac2/wp-dyn?pagename=article&node=&contentId=A59191-2003Jul28&notFound=true .

[245] Nikita Petrov, "Problems in Russian-Chinese military-technical cooperation", *RIA Novosti*, September 25, 2007, http://en.rian.ru/analysis/20070925/80780903.html .

[246] Andrew C. Kuchins, "Russia and great-power security in Asia", in Gennady Chufrin, ed., *Russia and Asia: The Emerging Security Agenda*, SIPRI, Oxford University Press, Oxford, 1999, p. 440, http://books.sipri.org/files/books/SIPRI99Chu/SIPRI99Chu27.pdf .

[247] Andrew C. Kuchins, "Russia and great-power security in Asia", in Gennady Chufrin, ed., *Russia and Asia: The Emerging Security Agenda*, SIPRI, Oxford University Press, Oxford, 1999, p. 440, http://books.sipri.org/files/books/SIPRI99Chu/SIPRI99Chu27.pdf .

[248] Dmitry Gorenburg, "The new Model Army: Still equipped with Soviet-era weapons", *Russian Military Reform*, September 10, 2009, http://russiamil.wordpress.com/2009/09/10/the-new-model-army-still-equipped-with-soviet-era-weapons/ .

Russian Army throughout the last decade, such as the 9K720 Iskander (SS-26 "Stone") theatre ballistic missile system and the 2S19 "Msta-S" self-propelled 152 mm howitzer, are characterized by some critical vulnerabilities. The missiles of the Iskander-E variant are equipped only with an inertial navigation system (that is a rather untrustworthy, for modern warfare standards, guidance package), and not a GPS/GLONASS satellite guidance system (as it happens with the American JDAM and JSOW precision-guided munitions and the ATACMS Block IA long-range guided missile).[249] Likewise, the 2S19 "Msta-S" howitzer is said to be fitted with an inadequate, frequently malfunctioning communications suite. As far as the tank formations of the Russian Ground Forces are concerned, it is widely known that T-90's explosive-reactive armour is not thick enough to stop advanced anti-tank guided missiles fitted with high-explosive (HEAT) shaped-charge warheads[250] and most Russian Army tank and mechanized infantry battalions are yet to receive any reliable thermal/night imagers (in 2009 Russia reached an agreement with France's *Thales* for the licensed production of Catherine-FC thermal imaging cameras, operating in the 8-12 μm spectral band[251]). While according to some unconfirmed accounts, several Russian Army T-90A main battle tanks may not be equipped with an on-board computer control system.[252]

In the mean time, it is becoming all the more clear that China is steadily acquiring enough knowledge to build a solid, modern, competitive military industry of its own.

In fact, it seems that the Sino-Russian cooperation in the defense sector (weapons sales, and joint research and development of new arms systems) has reached a critical turning-point, as a result of the rapid development of the indigenous Chinese defense industry and the incapacity of the Russian defense enterprises to develop new generation, modern arms, able to effectively operate in a network-centric environment and make the difference in the 21st century's battle field.

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[249] Inertial guidance is significantly less accurate than satellite guidance. The JDAM achieves a published CEP of 13 m under GPS guidance, but typically only 30 m under inertial guidance. That happens because all inertial navigation systems suffer from integration drift: small errors in the measurement of acceleration and angular velocity are integrated into progressively larger errors in velocity, which are compounded into still greater errors in position. Since the new position is calculated from the previous calculated position and the measured acceleration and angular velocity, these errors are cumulative and increase at a rate roughly proportional to the time since the initial position was input.

[250] The design of the T-90 MBT puts crew survivability as the least important aspect of the tank.

[251] The first contact between Thales and the Russian Armed Forces for the supply of 100 Catherine-FC thermal imaging cameras was signed in 2007. After this initial order, which aimed at testing the suitability of the French cameras to come up to the demands and requirements of the Russian Army, the Russian side decided to carry on with a much bigger order and, finally, produce under license the cameras in Russia, in the Vologda Optical and Mechanical Plant. In October 2008, a maintenance and repair center for Catherine-FC cameras was opened at the Vologda Optical and Mechanical Plant. Localized production will allow Russia to reduce production and maintenance costs by at least 5-10% and manufacture thermal imagers for civilian purposes in the future. It is noteworthy that the Indian Army has acquired, since the late 1990s, more than 1,000 units of the Catherine-FC cameras in order to equip its T-90S/M main battle tanks. "Thales and Rosoboronexport sign contract for supply of Catherine FC cameras for Russian Army", *Thales Group website*, August 27, 2007, http://www.thalesgroup.com/Press_Releases/LandJoint_PressRelease_070827_Catherine_FC/ . "Thales confirms leadership in T-90 armoured vehicle optronics", *Thales Group website*, February 16, 2008, http://www.thalesgroup.com/Pages/PressRelease.aspx?id=6210 .

[252] Dmitry Gorenburg, "The new Model Army: Still equipped with Soviet-era weapons", *Russian Military Reform*, September 10, 2009, http://russiamil.wordpress.com/2009/09/10/the-new-model-army-still-equipped-with-soviet-era-weapons/ .

So, either Russia will decide to release and sell to China more sophisticated weapons (designed towards the end of the Soviet era), which may have a tangible impact on the regional balance of power in East Asia, or its share to China's defense market will inevitably decline and diminish over the next decade. It has become clear that Russia will preserve its present leading position on the Chinese market only on condition that it offers more modern armaments, which can enable China to compete with the more technologically advanced militaries of Taiwan, South Korea, and Japan.

The dilemma which arises here is that Russia's defense sector and military (in spite of the recent revival of defense spending, made possible thanks to the high hydrocarbons prices of 2007-2008) are shrinking. The Russian military has a long way to go to recover from two decades of mismanagement and neglect. For instance, Russia's strategic-deterrent force has shrunk from 1,398 ICBMs in 1991 to 430 in 2008.[253] The Russian defense industry is similarly experiencing a hard time. Since Soviet Union's collapse, there is no significant funding for the research and the development of innovative, sophisticated, efficient weapon systems.[254]

It has been argued that in the future the Russian military may look like the PLA of old; large, technologically backward, and supported by a few hundred vulnerable nuclear weapons linked to an inadequate C^4I system. By comparison to the West, the scientific community would be meager, and the once robust Russian military industrial complex will have deteriorated.[255]

The crucial question is whether Russia has the ability to develop brand new weapon systems. For many years the Russian defense industries have been able to continue to produce Soviet-era weapons using equipment, know-how and stockpiles of components left over from the Cold War. This trend has continued up to the present day: the 15 MiG-29SMT fighter jets delivered to the Algerian Air Force in 2006/2007 were not new as it was guaranteed by the manufacturer, but on the contrary their production was based on refurbished old airframes[256], and stockpiles of components left in several Russian plants from the Soviet years were used for the building of the aircraft (for example, the *Aviaremsnab* company used forged certificates and tags on old aviation equipment – manufactured between 1982 and 1996– and sold it as new to the MiG corporation).[257]

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[253] James Hackett (ed.), *The Military Balance 2009*, The International Institute for Strategic Studies, Routledge, London, January 2009, p. 214.

[254] The ongoing development by Sukhoi of the fifth generation PAK FA/T-50 fighter aircraft (incorporating technology from the discontinued Su-47 and MiG 1.44 projects), which when it will enter series production (in any case, not before 2015; according to Ruslan Pukhov, the aircraft is expected to enter active service with the Russian Air Force sometime in 2018-2020, meaning that Russia will be about 12-15 years behind the United States in fighter aircraft design) will certainly be inferior to Lockheed Martin's F-22 Raptor in combat capability, avionics systems and stealth features, does not contradict our assessment that the funds attributed by the Russian state defense budget to research and development of new weapon systems are inadequate. In effect, the PAK FA is nothing more than the exception (the only notable exception that we can think of) that proves the rule.

[255] Alexei G. Arbatov, *The Russian Military in the 21st Century*, Strategic Studies Institute, U.S. Army War College, Carlisle, PA, June 3, 1997, pp. 8-9, www.strategicstudiesinstitute.army.mil/pdffiles/PUB151.pdf .

[256] Nabi Abdullaev, "Algeria wants to return MiGs: Fighter tiff may sink $8b arms sale and energy deal", *Defense News*, February 25, 2008, http://www.defensenews.com/story.php?i=3392605 .

[257] In May 2009, *Aviaremsnab* chief executive officer, Musail Ismailov, and his deputy, Alexander Kutumov, were convicted of fraud (including forging certificates that designated old and obsolete equipment as new), and they are currently serving jail terms. "Russia opens criminal case over MiG fighters returned by Algeria", *RIA Novosti*, September 18, 2009,

Russia's defense industry has utterly failed to produce and provide the military with weapons the Soviet inventory did not have, like UAVs. According to Russia's deputy Defense Minister, General Vladimir Popovkin, the *Tipchak* (1K133), the only Russian-made mobile air reconnaissance system (operating up to six 9M62[258] UAVs) currently operated by the Russian Army, had demonstrated many problems during the August 2008 war against Georgia, among them a distinct acoustic signature audible from long distance, which, coupled with the low ceiling, yielded high vulnerability to ground fire.[259] More recently, the Commander-in-Chief of the Russian Air Force, Colonel General Alexander Zelin, expressed his profound disappointment by the performance of Russian-designed UAVs citing issues with: "*[...] the speed, flight altitude, or the resolution capacity of their equipment. It is a sheer crime to make operational unmanned aircraft without the required tactical and technical characteristics. […] I am, therefore, refusing to sign any acceptance papers*".[260]

As a result, the Russian Ministry of Defense chose in April 2009 to sign a 53 million dollar contract with Israel Aerospace Industries providing for the purchase of twelve Bird-Eye 400, I-View MK150 and Searcher II UAVs including ground stations, maintenance, technical support and instruction; with more significant orders to follow, since the Russian Army has a stated short-term requirement for at least 100 UAVs (including medium-altitude long endurance UAVs, such as IAI's Heron/Eitan).[261]

In recent years, the Russian defense industrial complex has repeatedly been criticized by top government and military officials for its inability to design and build high-tech weaponry. For instance, on October 29, 2004, Yuri Solomonov, director of the Moscow

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http://en.rian.ru/mlitary_news/20090918/156171853.html . "Algeria, Russia: A Handful of MiGs", *Stratfor*, February 18, 2008, http://www.stratfor.com/node/111021/analysis/algeria_russia_handful_migs .

[258] The Tipchak air reconnaissance system was developed by the Vega Radio-Engineering Corporation and the Lutch Design Bureau. The 9M62's payload uses video and infrared sensors that have a combined mass of 14.5 kg. It also has a real-time digital data link for communication with artillery units for laser-guided weapon targeting, including the 152 mm Krasnopol howitzer shell and the 300 mm Smerch multiple rocket system. The first *Tipchak* system was put in service with the Russian Army at the end of 2008. Vladimir Karnozov, "Tipchak UAV enters Russian service", *Flight International*, February 11, 2008, http://www.flightglobal.com/articles/2008/02/11/221471/tipchak-uav-enters-russian-service.html .

[259] "Israel and Russia in UAV Deal", *Defense Industry Daily*, December 13, 2009, http://www.defenseindustrydaily.com/Israel-and-Russia-in-UAV-Deal-05459/ . "UAV sale marks a new milestone in Russian-Israeli defense relations", *Defense Update*, April 13, 2009, http://defense-update.com/features/2009/april/israeli_russian_uav_130409.html .

[260] "Israel and Russia in UAV Deal", *Defense Industry Daily*, December 13, 2009, http://www.defenseindustrydaily.com/Israel-and-Russia-in-UAV-Deal-05459/ . Roger McDermott, "Russian Strategic Bomber Flights: Long Range Deception", *Eurasia Daily Monitor*, The Jamestown Foundation, Vol. 6, Issue 220, December 1, 2009.

[261] Even with the purchase of the Israeli UAVs, Russia will be a long way from having the ability to produce and deploy complex unmanned systems capable of functioning autonomously. This will require doctrinal integration and effective employment, as well as the appropriate use of the ISR information that UAVs provide. "Russia: Qualitative Solutions to Quantitative Problems", *Stratfor*, April 14, 2009, http://www.stratfor.com/analysis/20090414_russia_qualitative_solutions_quantitative_problems . "Russia confirms spy drone deal with Israel", *RIA Novosti*, April 10, 2009, http://en.rian.ru/russia/20090410/121045416.html . "Russia: 12 drones to be purchased from Israel", *Stratfor*, June 22, 2009, http://www.stratfor.com/sitrep/20090622_russia_12_drones_be_purchased_israel . "Russia wants more Israeli spy drones", *UPI*, December 8, 2009, http://www.upi.com/Business_News/Security-Industry/2009/12/08/Russia-wants-more-Israeli-spy-drones/UPI-67481260290589/ .

Institute of Thermal Technology and main designer of the 3M30 Bulava ("SS-NX-30") submarine-launched intercontinental ballistic missile (ICBM), told a news conference in Moscow that "*some of the Russian-made components and materials used to construct the Bulava are of inferior quality*", and that "*key Soviet military technologies are being lost. Russian defense sector enterprises have lost more than 200 technologies [since the end of the Soviet era]*".[262]

Corroborating Solomonov's[263] concerns and scepticism on the capacity of the Russian defense industrial sector to successfully carry out complex research and development programmes, the Commander-in-Chief of the Russian Navy, Admiral Vladimir Vysotsky, has recently stated with regard to the failed tests of the Bulava ICBM (as of 2009, 7 flight tests had failed, 4 had been partially successful, and, most likely, only 1 test was entirely successful[264]): "*The problem is that our technological and manufacturing capability, as well as our ability to bring various defense contractors together to deliver this [i.e. the Bulava] project have turned out to be much weaker than we expected. We are facing a crisis in some areas of technology. The Bulava is a litmus test that will show whether we can overcome this crisis or forever become a third-rate world power*".[265]

On August 6, 2004, according to the Russian newspaper *Nezavisimaya Gazeta*, Colonel General[266] Anatoly Sitnov, speaking at a conference in Moscow, stressed that "*the Russian defense industrial complex is incapable of producing fourth and fifth generation weapons*". More specifically, Colonel General A. Sitnov, who served as the head of the Defense Ministry's armaments department from 1994 till 2000, described the campaigns waged in former Yugoslavia, the first Gulf War, and the 2003 war against Iraq as "fourth-generation wars", arguing that Russia, by contrast, is capable of waging only a "third-generation" war, such as the Soviet campaign in Afghanistan in the 1980s, or the two Chechen wars in the 1990s-early 2000s.[267]

Additionally, Sitnov argued that one of the main problems of the Russian defense industrial complex is the lack of quality control safeguards, meaning that the Russian defense industries produce an unacceptably large amount of inferior quality weapon systems and components. The abolition of the "State Standards Bureau/*Gosstandart*" in 2004, when combined with the fact that the newly established "Federal Agency for

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[262] "Russia lacks raw material for Bulava missiles production", *Bellona*, November 26, 2004, http://www.bellona.no/bellona.org/english_import_area/international/russia/navy/northern_fleet/general/36307 . Pavel Felgenhauer, "Russia launches new strategic submarine", *Eurasia Daily Monitor*, The Jamestown Foundation, Vol. 4, Issue 76, April 18, 2007, http://www.jamestown.org/programs/edm/single/?tx_ttnews%5Btt_news%5D=32685&tx_ttnews%5BbackPid%5D=171&no_cache=1 .

[263] In July 2009, after the 11th flight test (which took place on July 15, 2009) of the Bulava ICBM had failed, Yuri Solomonov resigned from his posts as director of the Moscow Institute of Thermal Technology and chief designer of the Bulava missile. "Russian Bulava missile designer quits after failed tests", *RIA Novosti*, July 22, 2009, http://en.rian.ru/mlitary_news/20090722/155584015.html .

[264] Pavel Felgenhauer, "The Bulava Designer Resigns", *Eurasia Daily Monitor*, The Jamestown Foundation, Vol. 6, Issue 141, July 23, 2009, http://www.jamestown.org/single/?no_cache=1&tx_ttnews%5Btt_news%5D=35301 .

[265] Sergey Safronov, "Interview with Admiral Vladimir Vysotskiy, Commander of the Russian Navy", *Moscow Defense Brief*, No. 1 (19), 2010, p. 21, http://mdb.cast.ru/mdb/1-2010/item4/article1/ .

[266] In Western armies, the equivalent rank of a Russian Colonel General is a Lieutenant General.

[267] "General says poor quality crippling defense complex", *IPR Strategic Business Information Database*, August 8, 2004, http://findarticles.com/p/articles/mi_hb5561/is_200408/ai_n22679408/ .

Technical Regulation and Metrology/*Rostekhregulirovaniye*" has yet to begun functioning efficiently and at full pace, renders the quality control of the military hardware produced by the Russian defense sector an extremely difficult task. In fact, when output fell during the 1990s, several enterprises wound down their quality-management systems, and currently very few can display the ISO 9001 international quality symbol, with many advanced weapons programmes increasingly reliant on imported components. In 2004, only 1% of the Russian defense enterprises were ISO 9000[268] certified.[269]

Although in comparison to the 1990s there has been progress in the combat readiness of the Russian Armed Forces, the current situation of the Russian military is still far from being satisfactory.

In May 2008, Colonel General Nikolai Frolov, head of Russia's Armed Forces tactical/troops air defense command (VVS and PVO), acknowledged at a military science conference that Russia's air-defense assets are no longer capable of confronting modern air-to-ground precision-guided munitions: "*the missile and artillery air-defense systems in service with Russia's Armed Forces will be unable, even after they have been modernized, to contend with an air enemy in the coming years*". And, further: "*the enemy's [i.e. NATO] air-attack weapons are at the present time capable of independently accomplishing not only operational and tactical, but also strategic assignments determining the outcome of an armed conflict. […] Russian defense equipment is inferior not only qualitatively but also quantitatively [in comparison to NATO member states equipment]*".[270]

As far as the Russian Navy is concerned, it is worth mentioning that since the collapse of the Soviet Union, Russia's naval forces have received only two new types of surface combatants: i) small (with a displacement of only 500 tons) gunboats of the Makhachkala-type –also known as "Buyan"– (Project 21630), destined for the Caspian Sea flotilla[271]; and, ii) Steregushchy-class (Project 20380) corvettes, which were actually

[268] ISO 9000 is a family of standards for quality management systems. The ISO 9000 family of standards represents an international consensus on good quality management practices. Broadly speaking, this means that a corporation must fulfill: i) the customer's quality requirements, and ii) applicable regulatory requirements; while, aiming to iii) enhance customer satisfaction, and iv) achieve continual improvement of its performance in pursuit of these objectives. Besides, some of the ISO 9001 (which is one of the standards in the ISO 9000 family) requirements include: i) a set of procedures that cover all key processes in the business; ii) monitoring processes to ensure they are effective; iii) keeping adequate records; iv) checking output for defects, with appropriate and corrective action where necessary; v) regularly reviewing individual processes and the quality system itself for effectiveness; and, vi) facilitating continual improvement. "ISO 9000 essentials", *International Organization for Standardization*, http://www.iso.org/iso/iso_catalogue/management_standards/iso_9000_iso_14000/iso_9000_essentials.htm

[269] "General says poor quality crippling defense complex", *IPR Strategic Business Information Database*, August 8, 2004, http://findarticles.com/p/articles/mi_hb5561/is_200408/ai_n22679408/ . James Hackett (ed.), *The Military Balance 2009*, The International Institute for Strategic Studies, Routledge, London, January 2009, p. 214.

[270] "Issue Taken With General Frolov's Comments on Air-Defense Deficiencies", *Nezavisimaya Gazeta*, May 27, 2008. "Air Defence in a State of Total Incapacity", *BBC Monitoring Former Soviet Union*, May 24, 2008. "Russia stays defenseless against possible nuclear attack", *Pravda*, May 26, 2008, http://english.pravda.ru/russia/economics/105334-nuclear_attack-0 .

[271] The Caspian Sea Flotilla is a small force for coastal defense and waterways patrol consisting of two frigates, twelve patrol boats, and about fifty other small craft based in the Russian port of Astrakhan. Command and equipment are shared with Azerbaijan and Kazakhstan, two former Soviet republics on the

the first new surface combatants built for the Russian Navy since the collapse of the Soviet Union.[272] When the U.S. Navy finances huge, multi-billion dollar research programmes aiming at the construction of large (with a displacement of around 14,800 tons), cutting edge guided missile destroyers (like the Zumwalt-class –DDG 1000– ships[273]), which incorporate new, advanced technologies combined with innovative, stealthy hull designs[274], and they are able to ensure the American preponderance and naval dominance in the world's oceans for the coming decades, the Russian Navy during the last 19 years has commissioned only some small, in most of cases inadequately armed, gunboats and corvettes. It goes without saying that the design concept of these gunboats and corvettes is conventional and doesn't bear resemblance neither to the stealth design of the Zumwalt-class destroyers or the Swedish Visby-class corvettes nor to the modular "plug-and-fight" mission packages of the American Littoral Combat Ship -LCS- programme[275].

Furthermore, as far as the Steregushchy-class corvettes are concerned, it is important to note that the lead ship of the class was commissioned on November 14, 2007. However, due to delays in financing it took Severnaya shipyards in Saint Petersburg 6 years to build the first corvette (the ship was laid down in 2001, and was commissioned in 2007), and no more vessels of this type are expected to be commissioned before 2010. Moreover, it is worth keeping in mind that the Steregushchy (pennant number 530) was the first

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Caspian littoral. "Caspian Flotilla", *Federation of American Scientists*, http://www.fas.org/nuke/guide/russia/agency/mf-caspian.htm .

[272] In our analysis we haven't included the Admiral Sergei Gorshkov-class (Project 22350) multi-purpose frigates, because the first vessel of this class (ordered by the Russian Navy to the Saint Petersburg-based Severnaya shipyards) is still under construction. So, till that moment, the Russian Armed Forces haven't received any Gorshkov-class frigates. In fact, the first vessel of the Project 22350 was laid down in February 2006, and is expected to be commissioned with the Russian Navy by 2011. It is worth mentioning that even though these ships are based upon the design of the Talwar-class frigates (built by Russian shipyards for India; the first three vessels were commissioned with the Indian Navy in 2003-2004), it seems that the Russian Navy will have to wait for another 1-2 years before the commissioning of the lead ship of the class. "Russia to float out new missile frigate in 2011", *RIA Novosti*, October 30, 2008, http://en.rian.ru/russia/20081030/118043727.html .

[273] Developed under the DD(X) destroyer program, USS Zumwalt (DDG 1000) is the lead ship of a class of next-generation multi-mission destroyers tailored for land attack and littoral dominance. "DDG 1000 - Leading the Fleet into the 21st Century", *Naval Surface Warfare Center, Dahlgren Division*, http://www.nswc.navy.mil/ET/DDG/ .

[274] For instance, DDG-1000 class destroyers will have a wave-piercing "tumblehome" hull form, i.e. a design in which hull slopes inward from above the waterline. This is expected to significantly reduce the vessel's radar cross-section, since such a slope returns a much less defined radar image than a more hard-angled hull form. As a consequence, the Zumwalt-class destroyers despite being 40% larger than the older Arleigh Burke-class destroyers, their radar signature will be more akin to a fishing boat and their sound levels will be compared to that of a nuclear-powered Los Angeles-class submarine. The tumblehome hull reduces radar return, and the inclusion of composite materials reduces it still further. Water sleeting along the sides, along with passive cool air induction in the mack reduces thermal emissions. "DDG 1000 Zumwalt Class - Multimission Destroyer: Advanced Technology Surface Combatants, USA", *Naval Technology*, http://www.naval-technology.com/projects/dd21/ . "DDG-1000 Zumwalt / DD(X) Multi-Mission Surface Combatant/ Future Surface Combatant", *Global Security*, http://www.globalsecurity.org/military/systems/ship/dd-x.htm .

[275] Ronald O'Rourke, *Navy Littoral Combat Ship (LCS) Program: Background, Oversight Issues, and Options for Congress*, Congressional Research Service Report for Congress, Order Code RL33741, Washington, D.C., June 5, 2009, p. 1, http://fas.org/sgp/crs/weapons/RL33741.pdf .

warship built at Severnaya shipyards since 1992[276], and in the time it took Severnaya Verf to build this corvette (which was originally expected to be completed in 2004) its cost jumped from 1.8 billion rubles to 7 billion rubles![277]

Indeed, Russian defense analysts have repeatedly lashed out against Russia's naval re-armament policy, putting emphasis on the fact that "*state funding for new ships has long dried up, and even finishing those few that are now in the shipyards takes much longer than necessary, due to funding shortages*".[278] Meanwhile, in November 2009, Admiral Vyacheslav Popov, chairman of the Federation Council of Russia[279] Commission on National Maritime Policy, member of the Federation Council's Commission on Defense and Security, and former commander of the Northern Fleet, was much more caustic and harsh when he publicly stressed that: "*The allocated funds are not enough to finance the mass production of new ocean-going warships and ships for offshore maritime zone, and at the same time to maintain the current fleet forces in a combat-ready condition*".[280]

Top Russian Navy officials are publicly acknowledging the drop in Russian fleet's performance. Admiral Vyacheslav Popov, after proclaiming the statement quoted in the previous paragraph, went further on stipulating that the Russian Navy has practically no new warships; its weapons, control and maintenance systems are out-of-date; in terms of its naval might Russia is 5-6 times weaker than France or the U.K., and 20-30 times weaker than the U.S. Navy; in the Far East "*Japan has three times more surface ships than we do*". In addition, the Russian Admiral was open enough to admit that: "*Over the last 10 years the [Russian] fleet has received just 1 corvette with a displacement of some 2,000 tons. Not a single ocean-going warship has entered active service. […] If things remain as they are, we can expect that by 2015 many ocean-going warships and vessels for offshore maritime patrol will be out of active service and, as a result, the Russian Navy's combat capability will be drastically reduced*".[281] In other words, high ranking Russian naval commanders fear that in the medium term the Russian Navy may lose its ocean-going capabilities and may turn into a coastal fleet of limited combat capability, unable to promote and safeguard Russia's vital geopolitical and economic interests on the high seas.

As of 2009, only 12 nuclear-powered submarines, 20 major surface warships and one aircraft carrier remain in service with the Russian Navy, the last of which is routinely followed by two tugs in case of breakdown.

If we carefully examine the Project 20380 corvettes and the other major warship projects currently under way in Russia, we can draw an interesting conclusion, common for all the military vessels designed and built in Russia since 1991: their small scale. These vessels variously dubbed corvettes and frigates (in some ways riding the fence in

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[276] "Russian Navy Modernized", *RIA Novosti*, December 7, 2007, http://en.rian.ru/photolents/20071207/91124614_2.html .

[277] "Russian Navy Gets New Ship", *Kommersant*, November 15, 2007, http://www.kommersant.com/p825296/naval_forces/ .

[278] Mikhail Barabanov, "The Mistral Problem", *Moscow Defense Brief*, No. 3 (17), 2009, http://mdb.cast.ru/mdb/3-2009/item1/article1/ .

[279] The Federation Council of Russia is the upper house of the Federal Assembly of Russia, i.e. the Parliament of the Russian Federation.

[280] "Ex-commander paints bleak picture of Russia's naval potential", *RIA Novosti*, November 27, 2009.

[281] "Ex-commander paints bleak picture of Russia's naval potential", *RIA Novosti*, November 27, 2009.

terms of dimensions and displacement) cannot compare to the Soviet-era grandiose shipbuilding projects.

The largest ships currently under construction in Russia are the Sergei Gorshkov-class multi-purpose frigates (Project 22350), which when fully loaded displace about 4,500 tons. This trend represents a significant departure from Soviet naval architecture. The embodiment of the Soviet shipbuilding legacy are the 28,000-ton nuclear-powered Kirov-class (Project 1144 Orlan) guided missile cruisers[282], and the equally impressive (with a maximum displacement of 33,800 tons when submerged) Akula-class (Project 941) nuclear-powered ballistic missile submarines.[283] These were ambitious and expensive to build and maintain platforms. The current portfolio of surface combatant construction, however, is far more conservative, both in design and scale. Russia has begun building a new fleet in a way that outwardly appears consistent with the thinking of many second-tier Western navies, by acquiring cost-efficient, multi-purpose frigates and corvettes.[284]

Meanwhile, the quality of the ships under construction is another open question. Russia's shipyards were not just quiet for a decade; they spiraled into decay. Though some major surface combatants have been refitted and returned to the sea, this is obviously an interim measure. It seems that cranking out new ships (of modest, but passable quality) is almost certainly of far more significance for the Kremlin right now than making more advanced ships of impeccable workmanship.[285]

As the Russian daily *Kommersant* correctly noted on March 22, 2008, large-scale modernization of the Russian fleet's vessels is out of the question right now. From 1991 on, qualitative development of Russia's above-water naval forces has come to a standstill. So, the surface ships and boats which have remained in service are technically 20-30 years behind, and they lag more and more behind modern requirements and foreign vessels of corresponding types.[286]

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[282] The Kirov-class cruisers are the largest and heaviest surface warships currently in active operation in the world.

[283] The Akula (NATO reporting name: Typhoon) SSBNs are the largest submarines ever built.

[284] "Russia: Future Naval Prospects", *Stratfor*, December 7, 2007, http://www.stratfor.com/analysis/russia_future_naval_prospects .

[285] "Russia: Future Naval Prospects", *Stratfor*, December 7, 2007, http://www.stratfor.com/analysis/russia_future_naval_prospects .

[286] "The Entire Russian Fleet", *Kommersant*, March 22, 2008, http://iraqwar.mirror-world.ru/article/159814 .

Nikolaos Diakidis, *An Assessment of China's Defense Strategy in the post-Cold War Era. What Role for Bilateral Defense Cooperation with Russia?*, Piraeus, December 2009

In the first photograph we can discern the graphic reconstruction of a U.S. Navy Zumwalt-class (DDG-1000) destroyer (the two main contractors for this programme are Northrop Grumman –through the Ingalls Shipbuilding in Pascagoula, Mississippi–, and General Dynamics –through the Bath Iron Works shipyards in Maine–; other subcontractors include Lockheed Martin, BAE Systems, and Boeing). The DDG-1000 will be armed with the BGM-109 Tactical Tomahawk cruise missile, the RIM-161 anti-ballistic Standard Missile SM-3, and the RIM-162 Evolved Sea Sparrow surface-to-air Missile (ESSM). In the second photograph (taken in July 2008, in Saint Petersburg) is depicted a Steregushchy-class corvette (Project 20380). This corvette (No. 530) was the first surface vessel, based on a new (not Soviet-era) design, which was ordered by and built for the Russian Navy after Soviet Union's dissolution. It was laid down in December 2001; launched in May 2006; and, commissioned in November 2007. In the third picture is shown a snapshot from the launch in Saint Petersburg's Almaz Shipyards of the first Makhachkala-type (Project 21630) gunboat (named *Astrakhan*), on October 7, 2005. In the last picture is shown a shot of the first Makhachkala-type gunboat, while undergoing sea trials. Sources: i) "DDG 1000 Zumwalt Class - Multimission Destroyer: Advanced Technology Surface Combatants, USA", *Naval Technology*, http://www.naval-technology.com/projects/dd21/dd212.html ; ii) http://www.militaryphotos.net/forums/showthread.php?t=99988&page=583 ; iii) http://www.almaz.spb.ru/ ; iv) http://www.china-defense.com/smf/index.php?topic=176.350 .

In so far as the Russian naval/shipbuilding industry is concerned, we could briefly make another interesting observation focusing upon the absence of any major research effort aiming at the production of new naval guns. In effect, while the U.S. Navy actively experiments on the advancement of naval gun technology, achieving in October 2006 a significant milestone with the first successful test and stand-up of an electromagnetic (EM) rail gun facility[287], the Russian Navy continues to rely on naval guns either developed back in Soviet times or based on slight modifications of Soviet legacy designs.[288] The new 100 mm A-190/E naval single-barrel automatic turret-gun (which arms Indian Navy's Talwar-class frigates, as well as Russian Navy's Steregushchy-class corvettes), while it incorporates some advanced, improved characteristics (greater rate of fire, accuracy, and higher automation of fire preparation and control systems) in comparison to its predecessor (the Soviet 100 mm AK-100 gun), it is still a conventional design based on Cold War era's experience, without incorporating any significant stealth/low visibility features (e.g. a stealth cupola) or innovative technological characteristics.

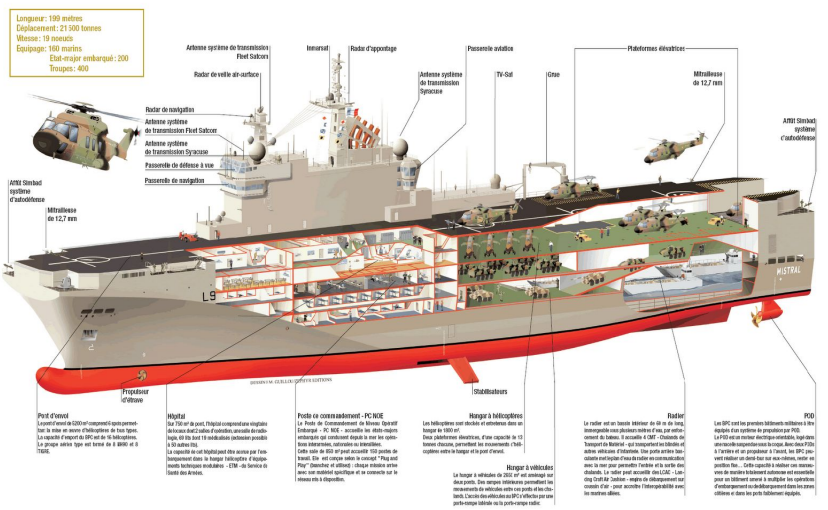
7.2. The Mistral sale

Indicative of the decaying capabilities of the Russian shipbuilding industry is the fact that, as the French newsletter "*Russia Intelligence*" first revealed, during the 21st Euronaval International Exhibition, held in Paris in October 2008, the Russian Navy (and more specifically, the Commander of the Russian Navy, Admiral V. Vysotsky) manifested a strong interest for the acquisition of a Mistral-class amphibious assault ship/landing helicopter dock ("*Projection and Command*" vessel, *BPC*, in French).[289]

[287] The rail gun system is comprised of a launcher, pulse forming network (PFN) modules (power supply) and a projectile recovery area. "Finding of No Significant Impact (FONSI) for electromagnetic rail gun research, development, test and evaluation (RDT&E) facility construction and operation environmental assessment at naval support facility Dahlgren, Virginia", *Naval Support Facility Dahlgren*, Dahlgren, VA, April 7, 2009, p. 1, http://www.nswc.navy.mil/ET/railgun/FONSI-07apr09.pdf .

[288] Parenthetically, it is worth mentioning that electromagnetic technology uses high power electromagnetic energy instead of explosive chemical propellants (energetics) to propel a projectile. An important distinction between rail guns and propellant-based guns is the difference in muzzle velocity. The 5-inch/54 and 5-inch/62 guns of today achieve muzzle velocities of approximately 800 m/s. In contrast, a rail gun can accelerate a projectile to hypersonic velocities of 2,500 m/s (Mach 7) and greater, enabling 200-plus nautical mile ranges within a six-minute time of flight. The high velocity projectile destroys its targets due to its kinetic energy rather than with conventional explosives. The safety aspect and the subsequent lowered logistics costs of the electromagnetic rail gun are considered to be two of the greatest potential advantages of the new technology. Safety on board ship is increased because no explosives are required to fire the projectile and no explosive rounds are stored in the ships magazine. Lucia Sanchez, "Electromagnetic Gun Facility Operational with Successful First Test", News Release, *Naval Surface Warfare Center, Dahlgren Division*, Dahlgren, VA, October 23, 2006, p. 2, http://www.nswc.navy.mil/ET/railgun/first_test.pdf . Office of Naval Research, "U.S. Navy Demonstrates World's Most Powerful Electromagnetic Railgun at 10 MJ", News Release, *ONR website*, January 31, 2008, p. 1, http://www.onr.navy.mil/emrg/news-release-electromagnetic-railgun.pdf .

[289] Back in November 2008, "*Russia Intelligence*" wrote that Admiral Vysotsky's interest in the purchase of a Mistral-class ship wasn't an improvisation deprived of any sense or official cover. According to French



There is no better evidence illustrating Russia's decaying shipbuilding capabilities than the planned acquisition by the Russian Navy of, possibly, four Mistral-class amphibious assault ships designed by the French DCNS company. This project has been the logical, hardly surprising, outcome of two decades of continuing Russian industrial decay. Instead of investing in the development of concepts (like the one depicted in the third picture) calling for the construction of small fast carriers (intended to carry the Yak-41 "Freestyle" supersonic VTOL fighter and Kamov naval helicopters) designed in the 1980s by Soviet ship design bureaus, the Russian government opted for purchasing a foreign, French ship, manifesting, in that way, its deep mistrust on the capabilities of the domestic shipbuilding companies and ship design bureaus for successfully carrying out on time such a large-scale, complex and demanding programme. Sources: i) "BPC Tonnerre (L 9014): Galerie", *Marine Nationale*, http://www.defense.gouv.fr/var/dicodrefonte/storage/images/media/images/marine/batiments/tonnerre/exercice_noble_midas_2007__1/822467-1-fre-FR/exercice_noble_midas_2007.jpg ; ii) "Les Bâtiments de Projection et de Commandement Mistral et Tonnerre", *Marine Nationale*, http://www.defense.gouv.fr/marine/layout/set/popup/content/download/44419/443313/file/linterieur_du_bpc_mistral_mn.cb.poster_a3_mistral.pdf ; iii) Richard Fisher, Jr., "Update: China's Aircraft Carriers", *International Assessment and Strategy Center*, March 10, 2009, http://www.strategycenter.net/research/pubID.193/pub_detail.asp .

Initially, from a pragmatic point of view, the possibility Moscow ordering to French shipyards the construction of one or more Mistral-class vessels appeared to be unlikely. Not because the Russians could indigenously design and build such a large ship (they

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sources, on fringe of the Euronaval exhibition Admiral Vysotsky had private meetings with cadres of the French state-owned shipbuilding enterprise *DCNS* and the French electronics company *Thales*, in the presence of Konstantin Biryulin, deputy head of the Federal Service for Military-Technical Cooperation (FSVTS), Admirals Borisov and Trofimov of the General Chief of Staff, Captain Maksim Kazantsev, Russian Federation's Naval Attaché in France, as well as Alexander Brindikov, head advisor to Anatoly Isaykin, the chairman of Rosoboronexport. "Moscou souhaite acheter des navires de guerre à la France", *Russia Intelligence*, No. 87, November 6, 2008, p. 1.

cannot do it right now, and it will certainly take them much time and a lot of funds to design and develop a large, modern amphibious assault ship), but because the Russian Navy didn't seem to possess the necessary financial means for the purchase of such an expensive vessel.

At first sight, the Russian Navy's budget, at least for the short term, didn't appear capable of sustaining and financing such an ambitious and expensive defense procurement programme (with a cost of about 450-500 million euros per ship; without taking into consideration the cost for equipping the ship with shipborne, navalized helicopters, the cost required for the training of Russian sailors so as to be able to operate a new ship based on Western designs and shipbuilding practices, and the high technological risk deriving from the effort to integrate sensors, subsystems and other equipment of Russian origin into the French platform). In fact, several Russian and foreign defense analysts have repeatedly pointed out that the total expenditure on this purchase (approximately 2 billion euros for four ships) could be greater than the budget allocated to the entire domestic military shipbuilding programme.[290]

Nevertheless a few months afterwards, and despite the initial doubts and uncertainty, the information quoted by the French newsletter proved out to be accurate[291], since the Russian Navy publicly announced its intention to "*buy one such [i.e. Mistral-class] ship, and build at least three more at Russian shipyards with technical assistance from France*".[292]

This development shed light to the tragic condition of the Russian shipbuilding industry, and of the Russian Navy in general. To put it simply, a former super power is unable to design, develop and build in its own shipyards an amphibious assault ship, and therefore Russian officials are seriously considering the possibility of buying a vessel of this type from a foreign/NATO country.

Admittedly, the Mistral deal represents a significant shift in Russia's military thinking and its underlying strategic circumstances. However, despite the projected acquisition of a few Mistral-class LSTs by the Russian Navy, the future prospects of the Russian Navy remain gloomy. Dmitry Gorenburg brilliantly portrayed and described the harsh, but undeniable, reality, when he wrote that: "[…] in any case, there is little if any cause to fear that the Russian Navy is making progress in its oceanic ambitions, whether or not it still has any. Instead, we should be thinking of it as living out the last years of the leftover glory of its Soviet years. In another 10 years, its major ocean-going ships will be gone, with nothing but a few corvettes and a couple of French LSTs to replace them".[293]

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[290] Dmitry Gorenburg, "The Mistral Comes to Town", *Russian Military Reform*, November 25, 2009, http://russiamil.wordpress.com .

[291] This indisputable success of the French newsletter (the first publication to reveal, report, and cover this important development), should likely be credited to Arnaud Dubien, editor-in-chief of "*Russia Intelligence*" in 2007-2008.

[292] Sergey Safronov, "Interview with Admiral Vladimir Vysotskiy, Commander of the Russian Navy", *Moscow Defense Brief*, No. 1 (19), 2010, p. 22, http://mdb.cast.ru/mdb/1-2010/item4/article1/ .

[293] Dmitry Gorenburg, "Update on the Navy", *Russian Military Reform*, November 5, 2009, http://russiamil.wordpress.com/2009/11/05/update-on-the-navy/ .

7.3. China's reverse engineering efforts. Or, how the foundations of the bilateral defense cooperation with Russia can be severely undermined

Meanwhile, China consecrates large amounts of money for the development of new fighter jets (J-10 and JF-17/FC-1, the latter in partnership with Pakistan), frigates (Type 054/A), destroyers (Type 051C, 052B, 052C) and nuclear attack submarines (Type 094, Jin-class). Furthermore, Beijing has already proved that is capable of employing reverse engineering methods, in order to illegally copy and indigenously produce arms systems of Russian (or Western, in cooperation with Pakistan) origin.

Even though some Russian analysts appear reassuring, downplaying the success, the results and the impact of China's reverse engineering efforts, arguing that the Chinese have devoted themselves to an uninspired imitation of foreign designs, which points to a deficit of independent ideas in technology, strategy and tactics of warfare[294]; we can't ignore or overlook the fact that China has to display a long record of successfully copying or using technology from weapons imported from abroad.

For example, the Chinese PL-11, the first indigenously produced Chinese beyond-visual-range air-to-air missile (BVRAAM), was based heavily on the Italian Aspide Mk.1 missile, itself an improved variant of the American AIM-7E Sparrow. China has equally a long history of successfully copying (either legally under a licensed production agreement, or illegally without any permission) Russian aircraft. As a matter of fact, Chinese Shenyang J-6 and Chengdu J-7 fighters were modelled after MiG-19 "Farmer" and MiG-21 "Fishbed"; Xi'an H-6 bomber after Tu-16 "Badger"; and, Nanchang/Shijiazhuang Y-5, Xi'an Y-7, and Shaanxi Y-8 military transport planes after An-2 "Colt", An-24 "Coke", and An-12 "Cub", respectively.[295]

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[294] For instance, Mikhail Barabanov has lately stressed that: "*The Chinese rely too much on superficial mechanical copying of individual design elements, which often do not fit together very well. This copying does not translate into any advantages compared to the original foreign designs, and in many cases leads to unexpected problems. […] China has succeeded in importing a wide range of military know-how from Russia, but it is far from certain that the Chinese defense industry will actually manage to absorb all that know-how. There are questions even about China's ability simply to replicate the technology is has already bought. The current strategy of scaling down defense industry cooperation with Russia could yet come back to haunt China, revealing the decrepitude behind its army's high-tech veneer. And then Beijing will have to turn to its northern neighbour for help once again*". Similarly, with regard to China's unauthorized development of the J-11B fighter jet (which incorporates many subsystems originally developed for the Russian Su-27 aircraft), Ilya Kramnik, *RIA Novosti*'s military commentator, notes (with a certain amount of over-optimism and wishful thinking) that: "*Although China has made some progress in adapting Russian designs and technology, it is still far from posing either a military or commercial threat to Russian aviation. […] China has managed to copy an aircraft developed in the early 1980s 15 years after the initial Su-27 deliveries, and 10 years after the first Chinese-assembled Su-27 performed its maiden flight. The prototype Su-27 and the J-11 are no match for the revamped Su-27SM fighters now being adopted by the Russian Air Force and the new Su-35BM, which has entered its testing stage. Although the J-11 will carve out its own market niche, this does not mean that Russian-made aircraft will lose their popularity*". Ilya Kramnik, "China copies obsolete Russian fighter", *RIA Novosti*, April 25, 2008, http://en.rian.ru/analysis/20080425/105928822.html . Mikhail Barabanov, "China's Military Modernization: The Russian Factor", *Moscow Defense Brief*, No. 4 (18), 2009, http://mdb.cast.ru/mdb/4-2009/item1/article1/ .

[295] Regarding the Chinese efforts to illegally copy and incorporate systems of Russian origin to the Type 054A (Jiangkai II-class) frigates, see James C. Bussert, "China Copies Russian Ship Technology for Use and Profit", *SIGNAL Online*, June 2008,

In 2009, Russia refused to sell Su-33 fighter jets to China even after Beijing had offered to buy 14 of them (in two batches of seven aircraft each), arguing that at least 24 jets should be sold to recoup production costs, as production of the Su-33 had been suspended and the cost for reconstructing the production line was too high for such a small order. Similarly, the Russian government was reluctant to authorize the delivery of two Su-33 airplanes to the PLAN for evaluation, given China's past record of copying Russian aircraft technology (with the most recent example being the J-11B). Suspicions were high that the Chinese intended to study the Su-33 and produce their own version of the fighter plane (designated as the J-15 "Flying Shark"), using the Su-33 as a model.[296]

Russia upset by China's both extensive and impressive record of producing and, in some cases, marketing abroad reverse engineered weapon systems of Russian origin, pressed in December 2008, during the 13th session of the bilateral joint inter-governmental commission on military-technical cooperation, for the drafting and the signing of an intellectual property protection agreement. This binding agreement simplified copyright registration procedures in the two countries and strengthened the protection of the copyright holders.[297]

Notwithstanding the adoption, on Russia's insistence, of the December 2008 agreement on the protection of intellectual property rights (with a particular focus on the sphere of military-technical cooperation), we can be absolutely certain that China will keep on with its "*guochanhua*" (i.e. reverse engineering) activities. We should not overlook the fact that 13 years ago, in April 1996, the two countries had reached another agreement on "*cooperation on intellectual property rights*"[298], which has never deterred the Chinese from copying foreign (in our case: Russian) arms systems, violating in that way the provisions of the agreement they had previously signed with Russia and the property rights of foreign companies. The only tangible impact of the 2008 agreement will

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http://www.afcea.org/signal/articles/templates/SIGNAL_Article_Template.asp?articleid=1624&zoneid=7 . Siemon T. Wezeman and Mark Bromley, "International Arms Transfers", in Alyson J. K. Bailes, ed., *SIPRI Yearbook 2005: Armaments, Disarmament and International Security*, Oxford University Press, Oxford, 2005, p. 424, http://www.sipri.org/yearbook/2005/files/SIPRIYB0510.pdf . "China copies Su-27 fighter, may compete with Russia – paper", *RIA Novosti*, February 21, 2008, http://en.rian.ru/russia/20080221/99765686.html . Alexandr Nemets, Thomas Torda, "China's Guochanhua (Reverse Engineering)", *Newsmax*, June 13, 2002, http://archive.newsmax.com/archives/articles/2002/6/13/24549.shtml .

[296] Andrei Chang, "China can't buy Sukhoi fighter jets", *UPI*, March 25, 2009, http://www.upi.com/Business_News/Security-Industry/2009/03/25/China-cant-buy-Sukhoi-fighter-jets/UPI-70711238010376/ .

[297] Due to the same copyright infringement considerations, in late October 2009 Rosoboronexport was working to reach an agreement with China on copyright protection of *Kalashnikov* assault rifles. *RIA Novosti* reported that Anatoly Isaikin, Rosoboronexport's general director, told journalists that the Russian authorities were working with the Chinese to prepare and conclude an intergovernmental agreement on that field. "What the Russian papers say: Russia, China sign copyright agreement", *RIA Novosti/Vedomosti/Kommersant*, December 12, 2008, http://en.rian.ru/analysis/20081212/118835148.html . "Russia, China draft Kalashnikov copyright deal", *RIA Novosti*, October 22, 2009, http://en.rian.ru/russia/20091022/156560593.html .

[298] "Trade and Cooperation Agreements Reached", *Eurasia Daily Monitor*, The Jamestown Foundation, Vol. 2, Issue 82, April 26, 1996, http://www.jamestown.org/single/?no_cache=1&tx_ttnews%5Btt_news%5D=7670&tx_ttnews%5BbackPid%5D=210 .

probably be China's restraint from exporting to other nations the illegally, without an appropriate license, reproduced weapon systems.

Indeed, Russian and Western analysts are often citing past instances when Chinese scientists copied Russian weapon systems and, after making slight adjustments in their parameters (e.g. changing from 100 mm to 105 mm the caliber of the Russian 9K116 Bastion anti-tank missile system[299]), sold them for export.[300]

[299] The 9K116 Bastion (U.S. DoD/NATO reporting names: AT-10 "Stabber") missile system is equipped with 9M117-type laser-guided, gun-launched missiles. Like the Russian 9M117 Bastion, the Chinese-made missile has a 5 km range. It also has a penetration measured in RHA (Rolled Homogeneous Armour) 650 mm with ERA (Explosive Reactive Armour), meaning it can penetrate 650 mm of hard armour after penetrating outer explosive reactive armour. The missile is also capable of engaging low-flying helicopters. It is to be noted that the Chinese-made missile system arms the export version of Norinco's PTL-02 "Assaulter" wheeled tank destroyer (which is armed with a 105 mm rifled gun), as well as the highly modified Type 59D/WZ-120C main battle tank. China has helped Sudan and other African countries to upgrade the Type 59 (a Chinese version of the Soviet T-54A) tanks they had imported from China in earlier years to the Type 59D/WZ-120C standard. In fact, Sudan's "Military Industry Corporation" (MIC) has licensed the Type 59D/WZ-120C for domestic production as the "Al-Zubair 2" tank. "China a huge market for Ukraine's military equipment repair service", *Kanwa Asian Defence*, Issue 51, January 2009, December 17, 2008, http://www.kanwa.com/ . Andrei Chang, "China upgrading tanks for export to Africa", *UPI Asia*, September 5, 2008, http://www.upiasia.com/Security/2008/09/05/china_upgrading_tanks_for_export_to_africa/4438/ . Richard Fisher, Jr., "Chinese Notes from AeroIndia and IDEX", *International Assessment and Strategy Center*, February 28, 2005, http://www.strategycenter.net/research/pubID.63/pub_detail.asp . "Norinco Assaulter 105 mm tank destroyer", *Jane's Land Forces*, July 5, 2006, http://www.janes.com/defence/land_forces/news/jaa/jaa060705_1_n.shtml . "PTL02/Type 02", *Army Guide*, http://www.army-guide.com/eng/product4160.html . "Military Products: Al-Zubair 2 Battle Tanks", *Military Industry Corporation's (MIC) website*, September 2009, http://mic.sd/images/products/wepons/ar/endb/dbAlZUBAIR2.htm .

[300] Richard Weitz, "The Sino-Russian Arms Dilemma", *China Brief*, The Jamestown Foundation, Vol. 6, Issue 22, November 8, 2006, http://www.jamestown.org/single/?no_cache=1&tx_ttnews%5Btt_news%5D=32222 .

The six PLAN Type 054A (Jiangkai II-class) frigates are fitted with a sensor suite mainly based on Russian designs, including reverse-engineered systems first obtained by the PLAN with the acquisition of the Sovremenny-class destroyers. Primarily, these systems include the Fregat-MAE-5 3D air/surface search/surveillance radar; MR-90 Orekh fire control/SAM guidance radars; MR-331 Mineral-ME target acquisition and SSM fire control radar; MR-36 surface search radar; and, the MGK-335 fixed, medium frequency active/passive sonar suite.[301] It has been rumored that Russia's *Severnoye Design Bureau* cooperated with the Chinese in the designing of the Type 054A frigates. According to the same sources, the *Severnoye Bureau* played a consulting role, assisting the Chinese shipbuilders with the integration of Russian systems on the ships.[302] Nonetheless, other sources contradict this information claiming that *Severnoye* was not implicated in the development of these

[301] "Rapid Naval Growth in Asia", *Defence Review Asia*, http://www.defencereviewasia.com/issues/dec09.php . James C. Bussert, "China Copies Russian Ship Technology for Use and Profit", *SIGNAL Online*, June 2008, http://www.afcea.org/signal/articles/templates/SIGNAL_Article_Template.asp?articleid=1624&zoneid=7 .

[302] Mikhail Barabanov, "China's Military Modernization: The Russian Factor", *Moscow Defense Brief*, No. 4 (18), 2009, http://mdb.cast.ru/mdb/4-2009/item1/article1/ . Richard Fisher, Jr., "PLA Navy Carrier Update and Euro-Naval Notes", *International Assessment and Strategy Center*, November 7, 2006, http://www.strategycenter.net/research/pubID.126/pub_detail.asp .

frigates, and top executives of the *Rosoboronexport* and *Severnoye* were puzzled, "*shocked, and angered*" when the first Type 054A frigate (which integrated several illegally copied Russian subsystems) was publicly displayed in 2006.[303] The first and the second hulls, *Xuzhou* (No. 530) and *Zhoushan* (No. 529), pictured above, were launched on September 30, 2006 and December 12, 2006, and they were commissioned and subsequently assigned to the PLAN's East Sea Fleet on January 27, 2008 and January 3, 2008 respectively. Source: "Type 054A (Jiangkai II-Class) Missile Frigate", *Sino Defence*, April 2, 2009, http://www.sinodefence.com/navy/surface/type054a-jiangkai-ii.asp .

It is worth mentioning that in some cases, Chinese defense industries offer to sell these illegal copies to third world nations (especially in Africa, Pakistan, and South-East Asia) at exceptionally low prices, thus closing these markets to Russian firms, which were occupying till the late 1990s-early 2000s a dominant, quasi-monopolistic position there.

7.4. The Sino-Russian competition for primacy in the developing world's arms market

During the last two decades, developing world arms market accounted for nearly 100% of China's arms exports. To illustrate, in 2003-2006 the 96.8% of China's arms exports were absorbed by the developing world, while in 2006 this figure reached the 100%.[304] Throughout the period 2003-2006, among all weapons suppliers, China ranked fifth in the value of arms transfer agreements signed with developing nations (Chinese exports were worth 4.5 billion dollars), and fifth during 1999-2006 (with exports amounting to nearly 9 billion dollars).[305] From 2004 to 2007, the value of China's arms transfer agreements with developing nations averaged about 2.3 billion dollars annually (reaching their peak in 2007 with the signing of contracts worth 3.8 billion dollars).[306] In 2007, China was the third largest supplier of arms to the developing world with deliveries worth 1.2 billion dollars.[307]

China's largest markets are located in Asia, the Middle and Near East, and, particularly, Africa. As far as the African continent is concerned, sales to African governments made up nearly one-quarter of all Chinese arms exports from 1998-2001; and more than 16%

[303] James C. Bussert, "China Copies Russian Ship Technology for Use and Profit", *SIGNAL Online*, June 2008, http://www.afcea.org/signal/articles/templates/SIGNAL_Article_Template.asp?articleid=1624&zoneid=7 .

[304] Richard F. Grimmett, *Conventional Arms Transfers to Developing Nations: 1999-2006*, Congressional Research Service Report for Congress, Order Code RL34187, Washington, D.C., September 26, 2007, p. 40, http://www.fas.org/programs/ssp/asmp/factsandfigures/government_data/2008/RL34187.pdf .

[305] Richard F. Grimmett, *Conventional Arms Transfers to Developing Nations: 1999-2006*, Congressional Research Service Report for Congress, Order Code RL34187, Washington, D.C., September 26, 2007, pp. 33, 47, http://www.fas.org/programs/ssp/asmp/factsandfigures/government_data/2008/RL34187.pdf .

[306] Richard F. Grimmett, *Conventional Arms Transfers to Developing Nations: 2000-2007*, Congressional Research Service Report for Congress, Order Code RL34723, Washington, D.C., October 23, 2008, p. 11, http://www.fas.org/sgp/crs/weapons/RL34723.pdf .

[307] Richard F. Grimmett, *Conventional Arms Transfers to Developing Nations: 2000-2007*, Congressional Research Service Report for Congress, Order Code RL34723, Washington, D.C., October 23, 2008, p. 52, http://www.fas.org/sgp/crs/weapons/RL34723.pdf .

from 2002-2005.[308] Throughout 1999-2002, China ranked third in the value of arms transfer agreements, with 8.3% of the total value of all arms transfer agreements signed with African states during that period of time (Germany ranked first with 16.7%, and Russia was second with 12.5%). During the same period, Russia ranked first in the value of all arms deliveries to Africa with a share of 21.1% (i.e. 800 million dollars), and China ranked second with 13.2% (i.e. 500 million dollars). More recently, throughout 2003-2006 China and France were ranked first in the conclusion of arms transfer agreements with African governments with a share of 25.1% each (i.e. 900 million dollars each), and Russia ranked second with 11.1% (i.e. 400 million dollars).[309] In the same period, Germany ranked first in the value of all arms deliveries to Africa with a share of 27.7% (i.e. 900 million dollars), Russia ranked second with 18.4% (i.e. 600 million dollars), and China was third with 15.4% (i.e. 500 million dollars).[310]

It becomes apparent that China is increasingly challenging Russia especially in the African arms market[311], offering lower prices on weapons that, ironically, are often made in China with imported Russian technologies. Chinese armaments are much more affordable than Russian and Western counterpart equipment, they are similar to the Russian/Soviet systems which form the basis of many developing/African countries' arsenals, and, therefore, they are easy to integrate, maintain[312] and use in training. Furthermore, in principle, Chinese weapons are considered rather simple to operate and maintain, a key factor for countries where military professionalism is limited and the technological base is low. Thus, many developing nations are increasingly switching allegiance to China for their weapons purchases.[313]

Even though Chinese defense materiel supplied to African states is predominantly comprised of small arms, light weapons and ammunition, major end items (such as main battle tanks, field and self-propelled artillery guns and howitzers, fighter jets, and transport aircraft) are increasingly present.

A typical example is Sudan, which during 2005-2009 was the third largest recipient of major weapon systems in the African continent. During the 2007 Sudan's Independence Day military parade, the Khartoum regime showcased its Chinese-made ZTZ-96/Type 96, Type 85-IIM, Type 80, and WZ-120C/Type 59D main battle tanks, and ZSL-92/Type

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[308] Human Rights First, *Investing in Tragedy: China's Money, Arms, and Politics in Sudan*, New York, March 2008, p. 15, http://www.humanrightsfirst.info/pdf/080311-cah-investing-in-tragedy-report.pdf .

[309] China has also remained the single largest seller of arms to Africa during the period 2004-2007.

[310] Richard F. Grimmett, *Conventional Arms Transfers to Developing Nations: 1999-2006*, Congressional Research Service Report for Congress, Order Code RL34187, Washington, D.C., September 26, 2007, pp. 32, 42-43, 50, http://www.fas.org/programs/ssp/asmp/factsandfigures/government_data/2008/RL34187.pdf

[311] African states accounted for 7% of international imports of major conventional weapon systems over the period 2005-2009. Paul Holtom, Mark Bromley, Pieter D. Wezeman, Siemon T. Wezeman, *Trends in International Arms Transfers: 2009*, SIPRI Fact Sheet, March 2010, p. 7, http://books.sipri.org/files/FS/SIPRIFS1003.pdf . [*N.B. This reference to SIPRI's Fact Sheet was added, after the original draft of the present study had been completed*].

[312] Many parts and supplies may be interchangeable between the older Russian/Soviet systems already in service with African armies, and the newly acquired Chinese-made weapon systems.

[313] Daniel L. Byman, Roger Cliff, *China's Arms Sales: Motivations and Implications*, RAND Corporation, Project Air Force, Santa Monica, CA, 1999, p. 25, http://www.rand.org/pubs/monograph_reports/MR1119/MR1119.chap3.pdf . Andrei Chang, "Russian, Chinese weapons compete in Africa", *UPI Asia*, December 19, 2008, http://www.upiasia.com/Security/2008/12/19/russian_chinese_weapons_compete_in_africa/5472/ .

92[314] amphibious wheeled infantry fighting vehicles.[315] Sudan has also acquired from China 17 J-6/F-6 fighter aircraft (a Chinese copy of the Soviet MiG-19), 12 JL-8/K-8 trainer/light attack aircraft; 15-20 Q-5/A-5C ground-attack aircraft (modelled on the MiG-19, with emphasis placed on close air support missions); 22 J-7 (export version: F-7B/M) fighter jets (based on the MiG-21); 2 Y-8D military transport aircraft (a reverse-engineered copy of the Soviet An-12, fitted with avionics systems of American origin); 400 mm WS-2[316] multiple launch rocket systems (MLRS); Type 59-1 130 mm towed field guns (a Chinese copy of the Soviet/Russian M-46 gun); Type 54-1 122 mm towed field howitzers (modelled on the Soviet/Russian M1938/M-30 howitzer)[317]; large

[314] The development of the ZSL-92/Type 92 was based on the ZSL-90/Type 90 wheeled armoured infantry fighting vehicle. It is manufactured by China North Industries Corporation (NORINCO), and the latest version of the vehicle is reportedly armed with a Russian 2A72 30 mm dual-feed automatic cannon (in lieu of the original 25 mm gun). Russia's KBP Design Bureau transferred the 2A72 cannon technology to China in 1996, along with fire-control technology developed for the BMP-3 infantry fighting vehicle. Andrei Chang, "Russian, Chinese weapons compete in Africa", *UPI Asia*, December 19, 2008, http://www.upiasia.com/Security/2008/12/19/russian_chinese_weapons_compete_in_africa/5472/ .

[315] The acquisition of Chinese armoured fighting vehicles from the Sudanese Armed Forces was carried out in the context of a contract worth 80 million dollars signed in 2005 between the governments of Khartoum and Beijing. In 2005, Sudan exported to China 6.6 million tonnes of crude oil (accounting for almost 5.2% of China's total oil imports in 2005). Andrei Chang, "China ships more advanced weapons to Sudan", *UPI Asia*, March 28, 2008, http://www.upiasia.com/Security/2008/03/28/china_ships_more_advanced_weapons_to_sudan/6836/ .

[316] The WS-2 MLRS (developed by Sichuan Aerospace Industry Corporation/062 Base, and China National Precision Machinery Import and Export Corporation) is fitted with 6 box-shape launchers, and fires 400 mm rockets at a maximum range of up to 200 km, at a peak speed of Mach 5.6. Rockets can be launched in single or salvo modes. Warheads can be as large as 200 kg when making use of the system's minimum (70 km) range, and about 100 kg when exploiting the maximum (200 km) range of the rocket system. The WS-2 MLRS can be equipped with various types of warheads, including anti-armour/personnel submunitions, blast fragmentation, thermobaric/fuel-air explosive (FAE), and high-explosive incendiary (HEI) warheads, to meet different user requirements. The anti-armour/personnel submunitions warhead carries 540 bomblets with a High-Explosive Anti-Tank (HEAT) warhead (penetrating up to 85 mm of conventional steel armour, with a lethal radius of 7 m) which is also highly effective against troops. In addition, the "comprehensive effect cluster" warhead carries 61 submunitions, with each submunitions warhead containing approximately 200 pre-formed fragments and a shaped charge, penetrating 180 mm of conventional steel armour. The WS-2 is fitted with an inertial navigation system, but can also make use of the Chinese "Beidou" satellite navigation and positioning system for mid-course guidance. There is also a capability to use terminal guidance to compensate the degraded accuracy caused by the long distance (up to 200 km) flight of the rocket. Sudan was the first African country to receive the WS-2, and apparently Khartoum has also been the first export customer for the WS-2 on a global scale. "WS-2 Guided Multiple Launch Rocket System", *SCAIC website*, http://www.scaic.com.cn/index.asp?modelname=e%2Dproducts%2Ddetail&FractionNo=&titleno=PROENG00&recno=5 . "SCAIC 400 mm WS-2 Guided Multiple Rocket Weapon System (China)", *Jane's Armour and Artillery*, February 24, 2009, http://www.janes.com/articles/Janes-Armour-and-Artillery/SCAIC-400-mm-WS-2-Guided-Multiple-Rocket-Weapon-System-China.html . Andrei Chang, "Sudan obtains advanced Chinese MLRS", *UPI Asia*, July 10, 2009, http://www.upiasia.com/Security/2009/07/09/sudan_obtains_advanced_chinese_mlrs/1455 . "Chinese rockets mysteriously appear in Sudan", *Strategy Page*, July 21, 2009, http://www.strategypage.com/htmw/htart/articles/20090721.aspx . "WS-2: Multiple Launch Rocket System", *Military Today*, http://www.military-today.com/artillery/ws2.htm .

[317] Human Rights Watch, *Global trade, local impact: Arms transfers to all sides in the civil war in Sudan*, HRW Report: Vol. 10, No. 4 (A), August 1998, http://www.hrw.org/reports98/sudan/Sudarm988-04.htm . Andrei Chang, "Chinese arms and African oil", *UPI*, November 5, 2007,

numbers of EQ2100E6D troop/cargo carrier trucks (in 2005 only, 222 trucks were delivered to the Sudanese Armed Forces)[318]; and, undisclosed numbers of FN-6/HY-6[319] passive infrared man-portable air defense systems (MANPADS) and HJ-8 anti-tank wire-guided missile (ATGM) systems. Sudan has historically been a customer of Russian defense industries. All in all, it is estimated that Russia has provided almost three-quarters of imports for Sudan's current heavy military arsenal[320], including MiG-29SE/UB and Su-25 fighter jets, Mi-24V/P attack helicopters, BMP-1 and BMP-2 infantry fighting vehicles, BTR-50, BTR-70 and BTR-80A amphibious armoured personnel carriers (APC), BRDM-2 armoured combat reconnaissance/patrol vehicles, and T-54/T-55 main battle tanks.[321]

However, Chinese-made main battle tanks (MBT) have gradually begun replacing the vintage T-54/T-55 in one African country after another. In 2006, China exported ZTZ-96/Type 96 MBTs to Uganda, which used to be another traditional Russian weapons client.[322] Zimbabwe National Army is similarly predominantly armed with Chinese tanks: 35 WZ-120/Type 59 and 10 WZ-121/Type 69 MBTs, along with 20 Type 63 (developed from the Soviet/Russian PT-76) light tanks form the bulk of Zimbabwe's armoured regiment; while, almost half of Zimbabwe's armoured personnel carrier fleet is composed of 30-60 Chinese YW-531/Type 63 vehicles (some of these vehicles belong to the North Korean version, designated VTT-323).

In Algeria, a Maghreb country maintaining till nowadays very close military ties with Russia, the PRC has recently (in 2004-2006) managed to sell a 5,500-ton Type 795 (Daxin-class) training ship and, at least, 25 C-802/YJ-82 (CSS-N-8 "Saccade") surface-to-surface missiles, 3 Type 347G fire control radars and 3 Type 363 air search radars for installation on the 500-ton Djebel Chenoua (C-58) class (Project 802) corvette/large

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http://www.upi.com/Security_Industry/2007/11/05/Analysis-Chinese-arms-and-African-oil/UPI-39081194290309/ .

[318] Sherrone Blake-Lobban, Ernst J. Hogendoorn, Eustace Mainza, Gerard P. McHugh, *Report of the Panel of Experts established pursuant to paragraph 3 of resolution 1591 (2005) concerning the Sudan*, United Nations Security Council, S/2006/65, January 30, 2006, p. 37, http://daccess-dds-ny.un.org/doc/UNDOC/GEN/N05/632/74/PDF/N0563274.pdf?OpenElement ; http://www.un.org/Docs/sc/committees/Sudan/SudanselectedEng.htm .

[319] The FN-6/HY-6 man-portable air defense system is specifically designed for use against low and very low altitude (i.e. up to 3.5 km) targets, such as fighters, fighter-bombers, and, especially, helicopters. The system features a very short engagement range (up to 6 km), and an all-aspect attack capability. Targets can be engaged while they are manoeuvring at up to 4 g, and a single-shot-kill probability is claimed to be around 0.7 (i.e. 70%). "FN-6 (China), Man-portable surface-to-air missile systems", *Jane's Land-Based Air Defence*, February 16, 2009, http://www.janes.com/articles/Janes-Land-Based-Air-Defence/FN-6-China.html .

[320] Human Rights First, *Investing in Tragedy: China's Money, Arms, and Politics in Sudan*, New York, March 2008, p. 12, http://www.humanrightsfirst.info/pdf/080311-cah-investing-in-tragedy-report.pdf .

[321] It would be an omission not to make reference to the fact that Belarus is responsible for a significant portion of Russian weaponry delivered to Sudan's Armed Forces during the last decade. In 2008, Belarus sold to Sudan 11 Su-25 aircraft; in 2004 and 2007, it transferred to Sudan 12 BTR-70 APCs (two of the vehicles were modernized to meet the "Kobra K2/K" standard); in 2004, 7 BTR-80 APCs were exported from Minsk to Khartoum; while, in 2003 and 2004, the Sudanese government purchased from Belarus a total of 60 BRDM-2 vehicles. United Nations Register of Conventional Arms, "Overall Participation: Belarus", *U.N. Office for Disarmament Affairs website*, http://disarmament.un.org/UN_REGISTER.NSF .

[322] Uganda's ground forces are currently armed with T-54/T-55 MBTs and BTR-60 armoured personnel carriers, and its air force is equipped with 6 MiG-21 and 5 MiG-23 fighter aircraft of Russian origin.

patrol boats of the Algerian National Navy, designed and built by the ECRN shipyards in Mers-el-Kebir.[323]

In addition, in some cases, China has been willing to share and transfer subsystems and expertise, which is important to countries that wish to build up their own defense industries. Iran, Iraq, Pakistan, Egypt, Turkey, Sudan, and North Korea all benefited from Chinese assistance in developing their own defense industries, and domestically building modern weapon systems.[324]

A North African country where Chinese arms exports appear to have overshadowed to a great extent those of Russia is Egypt. Since abandoning the Soviet camp and tilting toward the U.S. in 1979 with the conclusion of a Peace Treaty with Israel (following the 1978 Camp David Accords), Egypt has intensified the imports of Chinese arms. With technical assistance from China, Egypt's "Arab Organization for Industrialization" assembled 80 JL-8/K-8E trainer/light attack aircraft[325] and, under the provisions of a contract signed in 2004/2005, has locally built (producing indigenously as much as 97.4% of the aircraft's components) another 40 units, for a total of 120 JL-8/K-8E aircraft currently in service in the Egyptian Air Force (making Egypt China's top export customer for this type of aircraft). In addition, the Egyptian Air Force still operates approximately 53 Chinese-built J-7/F-7B/M fighter aircraft. Other African nations operating Chinese JL-8/K-8 trainers include Sudan with 12, Namibia with 12, Zimbabwe with 12, Zambia with 8, Tanzania with 6, and Ghana with 4 aircraft.[326] China is also negotiating with several African countries (notably, Egypt, Sudan, Zimbabwe, Angola[327], and Nigeria[328]) the export of JF-17/FC-1 fighter jets.[329]

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[323] Stockholm International Peace Research Institute (SIPRI) Arms Transfers Database, http://armstrade.sipri.org/armstrade/page/trade_register.php .

[324] Daniel L. Byman, Roger Cliff, *China's Arms Sales: Motivations and Implications*, RAND Corporation, Project Air Force, Santa Monica, CA, 1999, p. 25, http://www.rand.org/pubs/monograph_reports/MR1119/MR1119.chap3.pdf .

[325] The contract providing for the assembly from Chinese-supplied kits of 80 JL-8/K-8E aircraft in Egypt (by the "Arab Organization for Industrialization") was signed in 1999 for a total cost of 347.4 million dollars. The JL-8/K-8E replaced the Czech L-29 "Maya" trainer aircraft in the inventory of the Egyptian Air Force. "China award Egypt aircraft production licence", *China Daily*, August 29, 2005, http://www.chinadaily.com.cn/english/doc/2005-08/30/content_473362.htm . "Egypt produces 80 Chinese-designed K-8E aircraft in past five years", *People's Daily Online*, December 12, 2005, http://english.peopledaily.com.cn/200512/12/eng20051212_227272.html . Evan S. Medeiros, Bates Gill, *Chinese Arms Exports: Policy, Players, and Process*, Strategic Studies Institute, U.S. Army War College, Carlisle, PA, August 2000, p. 14, http://www.fas.org/nuke/guide/china/doctrine/chinarms.pdf .

[326] "CNAMC/PAC K-8 Karakorum Trainer and Light Attack Fighter", *AeroSpace Web*, http://www.aerospaceweb.org/aircraft/attack/k8/ .

[327] K. H. Butts and B. Bankus have erroneously noted that the National Air Force of Angola has acquired "*eight Chinese-built Su-27SK [i.e. J-11] fighter jets*". This is certainly not true. The J-11 hasn't yet been exported from China to any foreign customer. Angola received a number of Su-27SK/UBK fighter jets from a CIS country (probably from Russia, or, according to *SIPRI*, from Belarus or Ukraine) in 1999/2000. Kent H. Butts, Brent Bankus, *China's Pursuit of Africa's Natural Resources*, Collins Center Study, Center for Strategic Leadership, U.S. Army War College, Volume 1-09, June 2009, p. 9, http://www.csl.army.mil/usacsl/publications/CCS1_09_ChinasPursuitofAfricasNaturalResources.pdf .

[328] The Nigerian Air Force obtained its first Chinese fighter jets in 2005, when it ordered 12 J-7/F-7NI and 3 J-7/FT-7NI under a contract worth 251 million dollars. At the same time, China and Nigeria reached a trade agreement, in which Nigeria is supplying China with 30,000 barrels of oil per day for the period 2005-2010. Andrei Chang, "Chinese arms and African oil", *UPI*, November 5, 2007, http://www.upi.com/Security_Industry/2007/11/05/Analysis-Chinese-arms-and-African-oil/UPI-

All these African countries had traditionally been Russia's weapons clients. In another interesting case, it is worth noting that although Namibia used to be a customer of Russia's defense industries and even nowadays the Namibian Army operates T-54/T-55 tanks and Namibia's Air Force is equipped with Russian An-26 "Curl" transport aircraft, the South-Western African country has chosen to forge closer economic, diplomatic and military ties with Beijing. In that context, Windhoek has recently (in 2006-2008) purchased from China 12 J-7 (export versions: F-7NM, FT-7NG) fighter jets, and, in the late 1990s, two Y-12 military utility aircraft.

In the past, Chinese-made arms were known for their low prices[330] and poor quality, which has long plagued military production in China.[331] Chinese weapon systems were frequently delivered late and were often defective or of poor quality, and as such were no match for the Russian, European, and American weapons in the international market. It is characteristic that the initial Type 033 Romeo-class submarines (built by Shanghai's Jiangnan Shipyards) China delivered to Egypt in March 1983 and January 1984 arrived in Alexandria with worn-out engines.[332] But, this situation is gradually being reversed.

Starting almost 15 years ago, as China received technical support from Russia, Ukraine, Israel, South Africa, and indirectly even from Western European sources (through Pakistan, or via dual-use technology transfer agreements) the quality gap between Chinese-made ground and air force equipment and systems from the former Soviet block or the West (i.e. European countries, U.S., Canada, Israel, South Africa, etc) has greatly narrowed.[333] In many occasions, Chinese defense firms offer for export arms systems of comparable quality to Russian or Western designs, at a significantly lower cost.[334]

39081194290309/ . Kent H. Butts, Brent Bankus, *China's Pursuit of Africa's Natural Resources*, Collins Center Study, Center for Strategic Leadership, U.S. Army War College, Volume 1-09, June 2009, p. 9, http://www.csl.army.mil/usacsl/publications/CCS1_09_ChinasPursuitofAfricasNaturalResources.pdf .

[329] Andrei Chang, "Russian, Chinese weapons compete in Africa", *UPI Asia*, December 19, 2008, http://www.upiasia.com/Security/2008/12/19/russian_chinese_weapons_compete_in_africa/5472/ .

[330] To illustrate this point, in 1992 the cost on the open market of a Russian MiG-29 fighter jet was around 25 million dollars, whereas a Chinese J-7/F-7M was sold for 4.5 million dollars at most. Karl W. Eikenberry, *Explaining and Influencing Chinese Arms Transfers*, McNair Paper 36, Institute for National Strategic Studies, National Defense University, Washington, D.C., February 1995, p. 34, http://www.ndu.edu/inss/McNair/mcnair36/mcnair36.pdf .

[331] Evan S. Medeiros, Roger Cliff, Keith Crane, James C. Mulvenon, *A New Direction for China's Defense Industry*, RAND Corporation, Santa Monica, CA, 2005, p. 45, http://www.rand.org/pubs/monographs/2005/RAND_MG334.pdf.

[332] Daniel L. Byman, Roger Cliff, *China's Arms Sales: Motivations and Implications*, RAND Corporation, Project Air Force, Santa Monica, CA, 1999, p. 25, http://www.rand.org/pubs/monograph_reports/MR1119/MR1119.chap3.pdf .

[333] Andrei Chang, "Russian, Chinese weapons compete in Africa", *UPI Asia*, December 19, 2008, http://www.upiasia.com/Security/2008/12/19/russian_chinese_weapons_compete_in_africa/5472/ .

[334] The impact of international competition on the development of China's defense industries was two-folded. On the one hand, in the early 1990s, following the collapse of the Soviet Union, Chinese weapon exporters suffered from the influx of technologically superior and relatively inexpensive (often sold at bargain basement prices) Russian/CIS weapons into international markets. On the other hand, the increased international competition put pressure on Chinese enterprises and served as an incentive for Chinese industrial leaders to try to improve the reliability and quality of their products, as well as to ameliorate their management practices and the financial efficiency of their companies. Evan S. Medeiros, Roger Cliff, Keith Crane, James C. Mulvenon, *A New Direction for China's Defense Industry*, RAND Corporation, Santa Monica, CA, 2005, pp. 6-7, 71, http://www.rand.org/pubs/monographs/2005/RAND_MG334.pdf .

In general, the price of Chinese weapons is still about one-third lower than comparable Russian/CIS equipment. More importantly, China is frequently willing to accept flexible payment arrangements when dealing with developing African nations, or cancel African state debt and finance (through low-interest loans) the construction of large-scale, ambitious infrastructure programmes in exchange for the order of Chinese-made weapon systems and military equipment.[335] China's willingness to accept flexible payment methods has greatly helped Beijing to solidify its position as one of the major, leading arms exporters on a world scale. What China wants from Africa is access to natural/mineral resources and raw materials, especially crude oil, and has already exported (in the form of "arms-for-oil" agreements) large quantities of weapons in exchange for petroleum. As a result, China's appetite for access to natural resources serves as an important comparative advantage vis-à-vis other suppliers of military equipment, because it helps Beijing to secure arms export deals with developing nations. It is certainly not a coincidence that in recent years Chinese arms sales to Africa have outstripped those of the United States.

7.5. Shaping China's arms exports. Energy security and access to hydrocarbons reserves

China's imports have grown from about 6% of its oil needs in the mid-1990s to roughly one-third today and are forecast to rise to 60% by 2020.[336] In 2008, China consumed 390.2 million tonnes of oil (i.e. 8.293 million barrels of oil per day), and imported from Africa 53.9 million tonnes of oil (i.e. 1.079 million barrels of oil per day), which corresponded to nearly one-fourth of China's total oil imports (i.e. 217.8 million tonnes per year, or 4.393 million barrels per day).[337] In 2008, Africa's proved oil reserves amounted to 16.6 billion tonnes, or 125.6 billion barrels.[338]

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[335] From 2000 to 2007, China cancelled more than 10 billion dollars in debt for 31 African countries, and gave 5.5 billion dollars in development aid. In 2006, China's President, Hu Jintao, promised to African leaders the construction (with Chinese financial aid) of 30 hospitals, 100 village schools, a giant conference center for the African Union, the launch of a training programme for 15,000 young Africans in technical professions, low-interest loans valued at 3 billion dollars, and preferred loans for the purchase of Chinese goods valued at 2 billion dollars. Beijing has also overtaken the World Bank in lending to Africa: in 2005, China committed 8 billion dollars in lending to Nigeria, Angola and Mozambique alone; the same year the World Bank spent 2.3 billion dollars in all of Africa. In Nigeria, it was not the World Bank, but the state-owned China Civil Engineering Construction Corporation that secured the construction contract (worth 8.3 billion dollars) for a new railroad from Lagos to Kano. According to the *Spiegel*, the Chinese offered the Nigerians better terms than all other bidders, Chinese banks will provide the financing, and, unlike the World Bank, the Chinese have never tried to impose to Nigeria any safeguards regarding the proper accounting of funds or the fair treatment of workers. Andy Scott, "China and Africa: Aid, Trade and Guns", *China Briefing*, August 2, 2007, http://www.china-briefing.com/news/2007/08/02/china-and-africa-aid-trade-and-guns.html . Andreas Lorenz and Thilo Thielke, "The Age of the Dragon: China's Conquest of Africa", *Spiegel International*, May 30, 2007, http://www.spiegel.de/international/world/0,1518,484603,00.html .

[336] Peter S. Goodman, "China and Sudan: Partners in oil - and warfare?", *The Washington Post*, December 27, 2004, http://seattletimes.nwsource.com/html/nationworld/2002131515_chinaoil27.html .

[337] More specifically, in 2008 Beijing imported 39.1 million tonnes (i.e. 783,000 barrels/day) of oil from West Africa; 10.6 million tonnes (i.e. 213,000 barrels/day) from East and Southern Africa; and, 4.2 million

During the last decade Beijing has significantly increased its presence in the African petroleum extraction and refining market. China National Petroleum Corporation (CNPC) has undertaken several ambitious projects, investing considerable amounts of money in the development of Africa's oil and natural gas extraction, transportation (building pipelines and marine terminals) and refining infrastructure. CNPC is currently present in 9 African states: i) in Algeria (since 2003); ii) in Chad (since 2003); iii) in Equatorial Guinea (since 2006); iv) in Libya (since 2005); v) in Mauritania (since 2004); vi) in Niger (since 2003); vii) in Nigeria (since 2006); viii) in Sudan (since 1996); ix) in Tunisia (since 2004).[339]

In addition, China Petroleum and Chemical Corporation (SINOPEC), the nation's second largest oil company and Asia's largest crude oil refiner, successfully completed in mid-2009 the acquisition of the Swiss-based (registered in Canada) Addax Petroleum Corporation for 7.3 billion dollars, marking China's biggest foreign takeover. In 2008, with an average production of 136.5 thousand barrels of oil per day and total reserves and resources of approximately 1.9 billion barrels of oil equivalent, Addax was one of the largest independent oil producers in West Africa and the Middle East, allowing SINOPEC to expand its activities in West Africa, especially in Gabon, Cameroon, and Nigeria[340] (nearly the 75% of Addax's output comes from Nigeria).[341]

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tonnes (i.e. 83,000 barrels/day) from North Africa. BP, *BP Statistical Review of World Energy June 2009*, London, June 2009, pp. 11, 12, 20, http://www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/reports_and_publications/statistical_energy_review_2008/STAGING/local_assets/2009_downloads/statistical_review_of_world_energy_full_report_2009.pdf .

[338] More specifically, as of 2008, Nigeria had 4.9 billion tonnes (i.e. 36.2 billion barrels) of proved oil reserves; Libya 5.7 billion tonnes (i.e. 43.7 billion barrels); Angola 1.8 billion tonnes (i.e. 13.5 billion barrels); Algeria 1.5 billion tonnes (i.e. 12.2 billion barrels); Chad 0.1 billion tonnes (i.e. 0.9 billion barrels); Republic of Congo 0.3 billion tonnes (i.e. 1.9 billion barrels); Egypt 0.6 billion tonnes (i.e. 4.3 billion barrels); Equatorial Guinea 0.2 billion tonnes (i.e. 1.7 billion barrels); Gabon 0.4 billion tonnes (i.e. 3.2 billion barrels); Sudan 0.9 billion tonnes (i.e. 6.7 billion barrels); Tunisia 0.1 billion tonnes (i.e. 0.6 billion barrels). BP, *BP Statistical Review of World Energy June 2009*, London, June 2009, p. 6, http://www.bp.com/statisticalreview .

[339] "CNPC Worldwide", *CNPC website*, http://www.cnpc.com.cn/en/cnpcworldwide/default.htm .

[340] Apart from SINOPEC, China National Offshore Oil Corporation (CNOOC) is also active in the exploration of Nigerian oil fields. In 2006, CNOOC paid 2.27 billion dollars for the acquisition of a 45% stake at the OML 130 block (which includes 4 oil fields with proved reserves of more than 620 million barrels of oil and about 3.75 trillion cubic feet of natural gas), and an additional 4 billion dollars for drilling licences. It worth noting that CNOOC is equally active in Liberia, Equatorial Guinea, the Republic of Congo, and Kenya. Andreas Lorenz and Thilo Thielke, "The Age of the Dragon: China's Conquest of Africa", *Spiegel International*, May 30, 2007, http://www.spiegel.de/international/world/0,1518,484603,00.html . Peter S. Goodman, "CNOOC buys oil interest in Nigeria", *The Washington Post*, January 10, 2006, http://www.washingtonpost.com/wp-dyn/content/article/2006/01/09/AR2006010901779.html .

[341] "Addax Petroleum 2009 Spring Fact Sheet", *Addax Petroleum Corporation website*, Spring 2009, p. 1, http://www.addaxpetroleum.com/_media/Spring_Fact_Sheet20090407.pdf . "China strengthens its hold over African oil", *Chinafrica.asia website*, July 8, 2009, http://www.chinafrica.asia/china-strengthens-african-oil/ . John Duce, Stephen Cunningham, "Sinopec Group Agrees to Buy Addax for $7.3 Billion", *Bloomberg*, June 24, 2009, http://www.bloomberg.com/apps/news?pid=20601087&sid=aIRoJNEX00t8 . "Sinopec International Pays for Addax Petroleum Corporation Shares and Will Appoint New Addax Petroleum Board of Directors", *Addax Petroleum Corporation website*, Calgary, Alberta, August 18, 2009, http://www.addaxpetroleum.com/press_room/158 .

Selling arms to African countries helps China cement relationships with African leaders[342], insulate the Chinese economy from price hikes and fluctuations on the international oil market[343] (reducing China's dependence on the Middle East and the sea lanes stretching from the Persian Gulf to the South China Sea), and offset the costs of buying oil from Africa, since China's arms sales help return to China some of the funds used to purchase African oil.[344] In dealing with oil-producing countries China has a comparative advantage over Russia, which, as a major world oil[345] and natural gas[346] producer, has no need to trade weapons for hydrocarbons.[347]

Oil-rich Angola[348], Nigeria, Sudan, and, to a lesser extent, Equatorial Guinea[349] and the Republic of the Congo (Brazzaville) figure among the top, major foreign recipients of Chinese defense equipment and military training. In addition, China taking advantage of inter-state and intra-state/civil turmoil and conflicts, unmoved by ideological concerns[350]

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[342] Chinese analysts believe that maintaining good relations with leading oil-exporting nations is important to China's energy security. Daniel L. Byman, Roger Cliff, *China's Arms Sales: Motivations and Implications*, RAND Corporation, Project Air Force, Santa Monica, CA, 1999, p. 11, http://www.rand.org/pubs/monograph_reports/MR1119/MR1119.chap3.pdf .

[343] Erica Strecker Downs, *China's Quest for Energy Security*, RAND Corporation, Project Air Force, Santa Monica, CA, 2000, pp. 18-19, http://www.rand.org/pubs/monograph_reports/MR1244/MR1244.ch3.pdf .

[344] Esther Pan, "Q&A: China, Africa, and Oil", *The New York Times*, January 18, 2006, http://www.nytimes.com/cfr/international/slot2_011806.html . Human Rights First, *Investing in Tragedy: China's Money, Arms, and Politics in Sudan*, New York, March 2008, p. 13, http://www.humanrightsfirst.info/pdf/080311-cah-investing-in-tragedy-report.pdf . Ian Taylor, "Beijing's Arms and Oil Interests in Africa", *China Brief*, The Jamestown Foundation, Vol. 5, Issue 21, October 13, 2005, http://www.jamestown.org/programs/chinabrief/single/?tx_ttnews%5Btt_news%5D=3899&tx_ttnews%5BbackPid%5D=195&no_cache=1 .

[345] In 2008, the Russian Federation produced 488.5 million tonnes of crude oil, or 9.886 million barrels per day. BP, *BP Statistical Review of World Energy June 2009*, London, June 2009, pp. 8, 9, http://www.bp.com/statisticalreview .

[346] In 2008, the Russian Federation produced 601.7 billion cubic meters of natural gas, or 541.5 million tonnes of oil equivalent. BP, *BP Statistical Review of World Energy June 2009*, London, June 2009, pp. 24, 25, http://www.bp.com/statisticalreview .

[347] Andrei Chang, "Russian, Chinese weapons compete in Africa", *UPI Asia*, December 19, 2008, http://www.upiasia.com/Security/2008/12/19/russian_chinese_weapons_compete_in_africa/5472/ .

[348] Throughout the second half of the 2000s, Angola was China's second largest oil supplier after Saudi Arabia, exporting to China as much as 456,000-640,000 barrels of oil per day. In 2006, Angola exported 10.93 billion dollars worth of oil, and more recently, in 2009, Angola shipped 235 million barrels of oil to China.

[349] With oil reserves per capita approaching and might exceeding those of Saudi Arabia, Equatorial Guinea is currently the third largest oil producer in sub-Saharan Africa, after Nigeria and Angola.

[350] A key aspect of China's policies toward Africa is its avowedly apolitical and amoral stance, described as "*non-interference in domestic/internal affairs*" and "*no-questions asked*" policies. China is making use of its diplomatic and economic influence in order to import oil from whichever source it can, regardless of the moralistic implications of their engagement. Therefore, the PRC refrains from lecturing African governments on democracy, human rights protection, implementation of western-style, market economy-oriented reforms, and adoption of anti-corruption policies. For instance, in 2004 the Chinese Deputy Foreign Minister, Zhou Wenzhong, stated (referring to China's economic and military ties with Sudan) that: "*Business is business. We try to separate politics from business. […] I think the internal situation in the Sudan is an internal affair, and we are not in a position to impose upon them*". In fact, the sole political/ideological prerequisite set by China's leadership when investing in a foreign country is the isolation and the complete break of links with Taiwan and the endorsement of the "one China" policy by the local government authorities. Howard W. French, "China in Africa: All Trade, With No Political

and without fearing any political consequences, has managed to sell considerable volumes of weapons to isolated from the international community African states. The Eritrean-Ethiopian war (1998-2000) is a typical example, since China sold an estimated 1 billion dollars worth of weapons to both countries between 1998 and 2000.[351]

The connection between China's arms exports to Africa in exchange for the import of African oil becomes more visible when we study the transfers of Chinese small arms, light weapons, and ammunition. Although the prospects for significant revenue earnings from those small arms and light weapons sales are modest, Beijing views such sales as one means of enhancing its status as an international political power (relatively small volumes of arms supplies to sub-Saharan African countries may have a major impact on regional conflict dynamics), gaining important African allies in the U.N. General Assembly, thus securing and ensuring political support for its own policies (e.g. preventing Taiwanese independence[352], and diverting attention from its own problematic, poor human rights record), and increasing its ability to obtain access to critical natural resources, especially, but not exclusively, crude oil, adapting, in that way, its foreign policy to its domestic development strategy.[353]

In the case of Sudan (which currently provides about one-tenth of China's total oil imports[354]), from 2003 to 2006 China's defense firms provided over 55 million dollars

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Baggage", *The New York Times*, August 8, 2004, http://www.nytimes.com/2004/08/08/international/asia/08china.html . Ilana Botha, *China in Africa: Friend or Foe*, University of Stellenbosch, Stellenbosch, December 2006, p. 53, http://etd.sun.ac.za/bitstream/10019/973/1/Botha%20I.pdf . John C. K. Daly, "Feeding the Dragon: China's Quest for African Minerals", *China Brief*, The Jamestown Foundation, Vol. 8, Issue 3, February 29, 2008, http://www.jamestown.org/programs/chinabrief/single/?tx_ttnews%5Btt_news%5D=4694&tx_ttnews%5BbackPid%5D=168&no_cache=1 .

[351] Ian Taylor, "Beijing's Arms and Oil Interests in Africa", *China Brief*, The Jamestown Foundation, Vol. 5, Issue 21, October 13, 2005, http://www.jamestown.org/programs/chinabrief/single/?tx_ttnews%5Btt_news%5D=3899&tx_ttnews%5BbackPid%5D=195&no_cache=1 .

[352] One-sixth (i.e. 4 out of 23) of the states that currently (as of 2009) recognize the Republic of China/Taiwan as a sovereign, independent state are African: Gambia, Burkina Faso, Swaziland, Sao Tome and Principe. A number of African countries have recently revoked their recognition of Taiwan's independence and have chosen to switch allegiance from Taipei to Beijing: Liberia (in 2003), Senegal (in 2005), Chad (in 2006), Malawi (in 2008).

[353] Richard F. Grimmett, *Conventional Arms Transfers to Developing Nations: 2000-2007*, Congressional Research Service Report for Congress, Order Code RL34723, Washington, D.C., October 23, 2008, p. 12, http://www.fas.org/sgp/crs/weapons/RL34723.pdf . Esther Pan, "Q&A: China, Africa, and Oil", *The New York Times*, January 18, 2006, http://www.nytimes.com/cfr/international/slot2_011806.html .

[354] Sudan is China's largest overseas oil project, and China is Sudan's main oil producer, exporter, and importer, buying in 2008 the 55% of Sudan's oil exports. In 2008, Sudan produced 23.7 million tonnes of oil (i.e. 480,000 barrels on a daily basis). Sudan's proved oil reserves are 900 million tonnes (i.e. 6.7 billion barrels), and China has been Khartoum's key partner in developing the infrastructure necessary to extract and transport oil. It is estimated that China has invested 4 billion dollars in oil production and the development of ports and pipelines in Sudan. For instance, it is surely not a coincidence that China National Petroleum Corporation's (CNPC) first investment in the African continent was carried out in Sudan. CNPC has been present in Sudan since 1996, when it paid 441 million dollars to acquire a 40% majority share in the Greater Nile Petroleum Operating Company, and now has oil and gas assets and equity in the country, while also providing oil field services. According to CNPC, about half of all its overseas oil comes from Sudan, which is by far its largest overseas operation at over 3 times that of Kazakhstan. CNPC owns 41% (the largest single share) of blocks 3 and 7 situated in the Melut basin in the east of Sudan, covering an area of 72,400 km^2. One of the major oil fields in the blocks 3 and 7 is the

worth of small arms to President Omar al-Bashir's regime. Since July 2004, when the U.N. Security Council imposed an arms embargo[355] on the *Janjaweed* (i.e. government allied militia) and other militia with resolution 1556, China has been a major supplier of advanced weapon systems and the near-exclusive provider of small arms and light weapons (including mortars, machine guns, single-barrel anti-aircraft guns, RPGs, assault and sniper rifles, etc) to Sudan, supplying on average 90% of Khartoum's small arms purchases each year.[356]

For instance, according to official customs data, in 2006 the 97.8% (i.e. 9.1 out of 9.3 million dollars) of Sudan's imported "*military weapons other than revolvers and pistols*", transferred through commercial entities (i.e. without taking into account government-to-government arms transfers), were of Chinese origin.[357] Furthermore, Chinese companies assisted the Sudanese government with the development of its domestic arms manufacturing sector. The Chinese have established three assembly plants for small arms and ammunition outside Khartoum, located at Kalakla, Chojeri, and Bageer. These factories are said to produce heavy and light machine guns, rocket launchers, mortars, anti-tank weapons, and ammunition. In addition, one account of the Giad industrial

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Palogue oil field (discovered in 2003), which in its major reservoirs contains more than 300 million tonnes of crude oil. Palogue is the largest overseas oil field ever discovered by a Chinese oil company. According to CNPC's website, the total proved oil reserves in the Palogue oil field currently exceed the 5 billion barrels, with possible recoverable reserves of 956 million tonnes. In 2008, the field's daily output was 230,000 barrels of crude oil. It is to be noted that CNPC's figures on the oil reserves of the blocks 3 and 7 must be treated with caution, since they seem to be inflated. BP, *BP Statistical Review of World Energy June 2009*, London, June 2009, pp. 6, 8, 9, http://www.bp.com/statisticalreview . Human Rights First, *Investing in Tragedy: China's Money, Arms, and Politics in Sudan*, New York, March 2008, p. ii, http://www.humanrightsfirst.info/pdf/080311-cah-investing-in-tragedy-report.pdf . Yitzhak Shichor, "Sudan: China's Outpost in Africa", *China Brief*, The Jamestown Foundation, Vol. 5, Issue 21, October 13, 2005, http://www.jamestown.org/programs/chinabrief/single/?tx_ttnews%5Btt_news%5D=3898&tx_ttnews%5BbackPid%5D=195&no_cache=1 . "CNPC in Sudan: Oil and Gas Operations", *CNPC website*, http://www.cnpc.com.cn/NR/exeres/5A53BDC2-D493-4BE7-BE27-8693BA6213AA.htm?NRMODE=Unpublished&wbc_purpose=Basic&WBCMODE=PresentationUnpublished . "Discovery of the Largest Oil Field of Central Africa in Block 3/7 in Sudan", *China National Oil and Gas Exploration and Development Corporation (CNODC) website*, http://www.cnpcint.com/%5Cworldwideoperations/ourstrengths/exploration2.html . Andreas Lorenz and Thilo Thielke, "The Age of the Dragon: China's Conquest of Africa", *Spiegel International*, May 30, 2007, http://www.spiegel.de/international/world/0,1518,484603,00.html .

[355] The arms embargo imposed by the Resolution 1556 (2004) prohibits not only the transfer of weapons and ammunition to the belligerents in Darfur, but also "*military vehicles and equipment, paramilitary equipment and spare parts for the aforementioned*", as well as "*technical training or assistance*" related to these items.

[356] Human Rights First, *Investing in Tragedy: China's Money, Arms, and Politics in Sudan*, New York, March 2008, pp. ii, 11-12, 15, http://www.humanrightsfirst.info/pdf/080311-cah-investing-in-tragedy-report.pdf . Amnesty International, *Blood at the Crossroads: Making the case for a global arms trade treaty*, AI Index: ACT 30/011/2008, Amnesty International Publications, London, September 2008, p. 91, http://www.amnesty.ca/amnestynews/upload/ACT300112008.pdf .

[357] In 2006, Chinese firms exported to Sudan 54,406 items, weighing 1,653 tonnes, of "*military weapons other than revolvers and pistols*". Amnesty International, *Blood at the Crossroads: Making the case for a global arms trade treaty*, AI Index: ACT 30/011/2008, Amnesty International Publications, London, September 2008, p. 91, http://www.amnesty.ca/amnestynews/upload/ACT300112008.pdf .

complex near Khartoum indicated that Chinese engineers were supervising the facility's work.[358]

According to the final report (filed in December 2005) of the U.N. Security Council's Panel of Experts on the Sudan, submitted to the President of the Security Council through the Security Council's Committee established pursuant to resolution 1591 (2005) to monitor the Darfur arms embargo: "Shell casings collected from various sites in Darfur suggest that most ammunition currently used by parties to the conflict in Darfur is manufactured either in the Sudan or in China. Bullet casings collected in Kufra, Northern Darfur, included 7.62 x 51 mm bullets (for G3 battle rifles), and 12.7 x 99 mm bullets (for heavy machine guns) manufactured in China; those collected in Tawilla, Northern Darfur, included 12.7 x 99 mm bullets".[359]

It is estimated that Sudan's hydrocarbon exports currently represent over 95% of the country's total export revenues, and in 2008 the 55% of Sudan's oil exports was directed to the Chinese market.[360] It is noteworthy that, as it has been stated by Abda Yahia El-Mahdi, Sudan's former minister of Finance, more than 70% of Sudan's oil revenues (in 2006 Sudan's oil profits amounted to 4.7 billion dollars) are spent for the reinforcement and the modernization of Sudan People's Armed Forces, with a government priority being to manufacture guns and ammunition domestically, and boost Sudan's defense industrial capabilities.[361] Therefore, as a *Human Rights First* report pointed out: "Beijing has used arms exports to help it both to enter and to stay in Sudan's oil market, […] providing Khartoum with an incentive to keep giving China preferential access to its oil", therefore consolidating, protecting and expanding Chinese investment in Sudan's oil reserves. Besides, "China's huge appetite for oil from Sudan filled Khartoum's coffers, enabling Sudan to return the favour by buying Chinese arms".[362]

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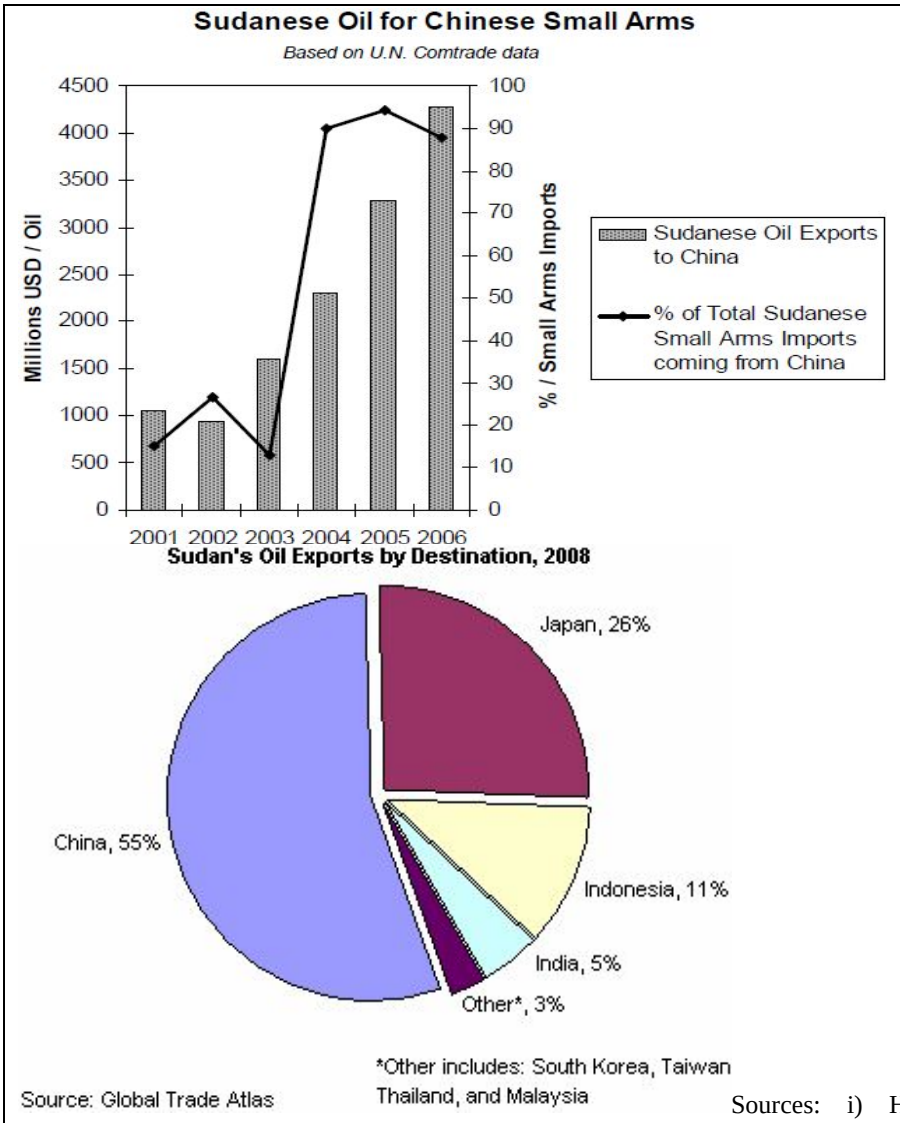
[358] Human Rights First, *Investing in Tragedy: China's Money, Arms, and Politics in Sudan*, New York, March 2008, pp. 14, 15, http://www.humanrightsfirst.info/pdf/080311-cah-investing-in-tragedy-report.pdf .

[359] Sherrone Blake-Lobban, Ernst J. Hogendoorn, Eustace Mainza, Gerard P. McHugh, *Report of the Panel of Experts established pursuant to paragraph 3 of resolution 1591 (2005) concerning the Sudan*, United Nations Security Council, S/2006/65, January 30, 2006, p. 37, http://daccess-dds-ny.un.org/doc/UNDOC/GEN/N05/632/74/PDF/N0563274.pdf?OpenElement ; http://www.un.org/Docs/sc/committees/Sudan/SudanselectedEng.htm .

[360] U.S. Energy Information Administration, "Country Analysis Briefs: Sudan", *U.S. E.I.A. website*, September 2009, http://www.eia.doe.gov/emeu/cabs/Sudan/Oil.html .

[361] Jeffrey Gettleman, "Despite embargo, Sudan builds a booming economy based on oil", *International Herald Tribune*, October 24, 2006, http://www.nytimes.com/2006/10/24/world/africa/24iht-sudan.3268650.html?_r=1 .

[362] Human Rights First, *Investing in Tragedy: China's Money, Arms, and Politics in Sudan*, New York, March 2008, pp. ii, 11, 13, 15, http://www.humanrightsfirst.info/pdf/080311-cah-investing-in-tragedy-report.pdf .



Sources: i) Human Rights First, *Investing in Tragedy: China's Money, Arms, and Politics in Sudan*, New York, March 2008, p. 13, http://www.humanrightsfirst.info/pdf/080311-cah-investing-in-tragedy-report.pdf [*the statistical graph was compiled based on data released by the U.N. International Merchandise Trade Statistics Database (Comtrade, http://comtrade.un.org/)*]; ii) U.S. Energy Information Administration, "Country Analysis Briefs: Sudan", *U.S. E.I.A. website*, September 2009, http://www.eia.doe.gov/emeu/cabs/Sudan/Oil.html .

ASIA'S OIL INTERESTS IN AFRICA

ALGERIA
CNPC
Exploration: Block 112/102a (75%), Block 350 (75%) and Block 438b (100%).
Exploration, construction, marketing: Adrar Upstream & Downstream Integrated Project (70%).
Petronas
Exploration & production: Ahnet Block & Block 401C (interest).
Petrovietnam (PIDC) (40%) and Petroleum Authority of Thailand (PTTEP) (35%)
Exploration: Blocks 433a & 416b (Touggourt).
Teikoku (Japan)
Development: Ohanet, El Ouar I & II Blocks.

MAURITANIA
CNPC
Exploration: Blocks Ta 13, Ta 21, 12 & 20.
Production sharing: Blocks Ta 13, Ta 21 & 12.
Operation: Block 20.
Miscellaneous: engineering & technical services such as geophysical prospecting, well drilling & well logging.
Petronas
Exploration & production: Block 6 (interest), located NW of Nouakchott.
Operation: Chinguetti oil field.
Exploration: PSC A, PSC B; Offshore Blocks 2, 6 & 7; Blocks Ta 11 & Ta 12.

GAMBIA
Philippine National Oil Company
Exploration block (this deal had no tender or technical review, unsure of current status).

SENEGAL – GUINEA-BISSAU JOINT EXPLORATION BLOCK
Markmore Energy (Malaysia)
Exploration: Dome Flore Block (55% interest).

CÔTE D'IVOIRE
Joint exploration project, CI-112:
ONGC (India) (21%); **Oil India** (10.4%); **Sinopec** (27%).

TOGO
Petronas
Exploration: Togo offshore block (interest).

BENIN
Petronas
Exploration: Block 4 (20% interest).
Korea National Oil Company (KNOC)
Exploration & production: Blocks 2 & 3.

NIGERIA
CNPC
Blocks OPL 298, OPL 471, OPL 721 & OPL 732.
CNOOC
OML 130 (45%).
Sinopec
Interest in exploration project.
IndianOil
An onshore block.
Oil India Ltd (OIL)
Block OPL 205 (oil/gas; 25% interest).
Korea National Oil Company (KNOC)
Exploration & production: Offshore Blocks OPL 321 & OPL 323 (interest).

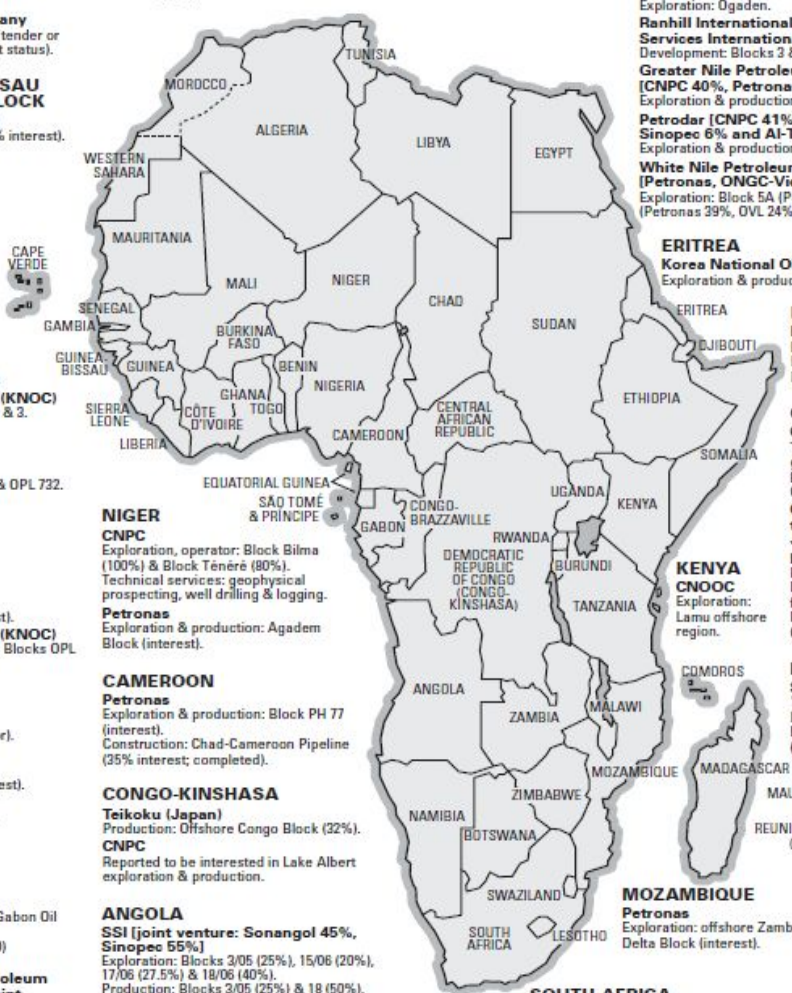
EQUATORIAL GUINEA
CNPC
Production: Block M (70%; operator).
China National Offshore Oil Company (CNOOC)
Exploration: offshore project (interest).
Petronas
Exploration & production: Block N, offshore Corisco Bay (interest); Block P, Rio Muni Basin (interest).

GABON
IndianOil
Onshore farm-in arrangements in Gabon Oil India Ltd (OIL).
Exploration: Block Shakthi (FT-2000) (operator; 45% interest).
Petronas and Mitsubishi Petroleum Development Corporation [joint venture with Amerada Hess, operator]
Exploration & production: Moabi & Nguma Permits.

MOROCCO
Petronas
Exploration & production: Tiznit Block, offshore (42.5%).
Exploration: Cap Drâa Haute Mer Permit Block (26.67%; operated by Energy Africa, 80% Petronas-owned).

TUNISIA
CNPC
Exploration: NK block.
Production: SLK Oilfield (50%).
Technical services: drilling.

LIBYA
CNPC
Exploration & production: Block 17-4 (interest).
Construction: crude/gas parallel pipeline in western Libya (2004).
Technical services: seismic crews, five drilling rigs & eight well logging crews.
IndianOil Corporation (IOC) and Oil India Ltd (OIL)
Exploration: Blocks 86 & 102-4 (18.4% interest in each).
Medco Energy (Indonesia)
Exploration: Area 47 (50% interest).
Korea National Oil Company (SK)
Elephant field, joint venture.
ONGC-Videsh (OVL)
Exploration & production: NC 188, NC 189 (49% interest in each); 81-1 & Contract Area 43.
Japanese consortium [Inpex, Japan Petroleum Exploration (JAPEX), Mitsubishi, Nippon Oil and Teikoku]
Exploration & production: Blocks 2-1/2, 40-3/4, 42-2/4, 81-2, 82-3 & 176-4.



NIGER
CNPC
Exploration, operator: Block Bilma (100%) & Block Ténéré (80%).
Technical services: geophysical prospecting, well drilling & logging.
Petronas
Exploration & production: Agadem Block (interest).

CAMEROON
Petronas
Exploration & production: Block PH 77 (interest).
Construction: Chad-Cameroon Pipeline (35% interest; completed).

CONGO-KINSHASA
Teikoku (Japan)
Production: Offshore Congo Block (32%).
CNPC
Reported to be interested in Lake Albert exploration & production.

ANGOLA
SSI [joint venture: Sonangol 45%, Sinopec 55%]
Exploration: Blocks 3/05 (25%), 15/06 (20%), 17/06 (27.5%) & 18/06 (40%).
Production: Blocks 3/05 (25%) & 18 (50%).
Petronas
Exploration: Block 24 (15%).
Teikoku (Japan)
Production: Cabinda North Block (17%).

EGYPT
Petroleum Authority of Thailand (PTTEP)
Exploration: Rommana Block (30%; not operator); Sidi Abd El Rahman Offshore Block (30%; not operator).
Petronas
Exploration: 4 blocks in Siwa, W Ghazalat, El Farafa, El Saloom [partnership with Tharwa Petroleum (Egypt)]; Block E1 Burg (30% interest).
Exploration & production: NE Mediterranean Deepwater (Nemed) Oil & Gas Block (interest); West Delta Deep Marine (WDDM) Concession (interest).
LNG liquifaction plant (under construction; joint venture).
GAIL (India)
15% interest in NATGAS (gas company).
ONGC-Videsh (OVL)
Exploration & production: N Ramadan Block (interest).
AOC (Japan)
Exploration & production: NW October Block, Suez Gulf (interest).
Teikoku (Japan)
Interests in S October, N Qarun, W Bakr & SE July blocks.

SUDAN
CNPC
Blocks 1, 2 & 4 (40%), Blocks 3 & 7 (41%; operator; oil/gas), Block 6 (100%; Fula oil field & its pipeline), Block 15 (production sharing with Sudapet, Petronas & others), Khartoum Refinery (50%), Block 13 (co-operator).
Petronas
Refinery construction: Port Sudan (completion 2009).
Operates: service stations, bulk terminals, storage.
Exploration: Blocks 5A, 5B & 8 (interest).
Gas exploration & production: Offshore Block 15 (interest).
Sinopec
Exploration: Ogaden.
Ranhill International (Malaysia) and Petroneeds Services International (Sudan)
Development: Blocks 3 & 7.
Greater Nile Petroleum Operating Company (GNPOC) [CNPC 40%, Petronas 30%, ONGC 25% and Sudapet 5%]
Exploration & production: Blocks 1, 2 & 4 (joint operation).
Petrodar [CNPC 41%, Petronas 40%, Sudapet 8%, Sinopec 6% and Al-Thani Corporation 5%]
Exploration & production: Blocks 3 & 7.
White Nile Petroleum Operating Company (WNPOC) [Petronas, ONGC-Videsh (OVL) and Sudapet]
Exploration: Block 5A (Petronas 69%, OVL 24%); Block 5B (Petronas 39%, OVL 24%); & Block 8 (Petronas 77%).

ERITREA
Korea National Oil Company (KNOC)
Exploration & production: Defnin Block.

ETHIOPIA
Petronas
Exploration & production: Ogaden Blocks 3, 4, 12, 16, 17 & 20; Gambela Basin Block G (interests).

CHAD
CNPC
Technical services Block H (100%); geophysical prospecting, well drilling & logging.
Construction: N'Djamena Refinery.
China Petroleum Company (Taiwan) through overseas arm OPIC
Joint exploration: 3 blocks
Petronas
Exploration & production: Doba Three-Field Development (Miandoum, Bolobo & Komé fields) (interest).
Exploration: Permit H (Doba, Doseo & Lake Chad Basins) (interest).

KENYA
CNOOC
Exploration: Lamu offshore region.

MADAGASCAR
Sunpec (HK, China)
100% owner of Madagascar Energy International Limited (MEIL) and its Madagascar Oilfield Block 3113 (gas/oil exploitation & operation).

MAURITIUS
IndianOil Mauritius Ltd
Operator: storage facility of 18,000 MT, Mer Rouge in Port Louis.

MOZAMBIQUE
Petronas
Exploration: offshore Zambezi Delta Block (interest).

SOUTH AFRICA
Petronas
Owns 80% Engen Ltd (Durban refinery, 1400 service stations).

Sources: EIA; Afroil; ENI; KNOC; Petronas; CNOOC; CNPC; Sinopec; IndianOil

Source: Ricardo Soares de Oliveira, "Making sense of Chinese oil investment in Africa", in Chris Alden, Daniel Large, Ricardo Soares de Oliveira, eds., *China Returns to Africa: A Rising Power and a Continent Embrace*, Columbia University Press, New York, 2008, p. 94.

7.6. China's quest for raw materials, metals, and minerals

China's demand for metals is increasing almost exponentially and is driving commodity prices to new levels. By 2004, China's economic growth had driven up global copper prices by 37%, and aluminium and zinc by 25%. By 2007, copper prices were up 344%, nickel prices were up 760%, and zinc prices 218%. China's role in setting world prices reflects the volume of its consumption. In 2007, China consumed: 25% of the global aluminium and 27% of the global steel production; 32% of iron ore and coal production; 30% of the global total for zinc production and 25% of that of lead; and, 40% of the world's cement. Since 1996, China's consumption of refined copper has risen from less than 10% of world demand to 22%. In 2003, China passed the United States to become the world's largest copper consumer and by the following year consumed 46% more than the United States. The world demand for copper could increase from 3 million tonnes a year at present to 20 million tonnes in 2020, and for wood from 34 million cubic metres to 150 million. Understanding, perhaps better than any other state, how its increasing demand and future expected consumption will further tighten world markets, China announced in 2006 plans to set up a strategic mineral reserve to stockpile uranium, copper, aluminium, iron ore and other minerals. These reserves will be critical for providing China with a buffer to adjust to market fluctuations, manage emergencies and guarantee the security of resource supplies. Establishing and strengthening bilateral relationships that will ensure China's supply with strategically important metals and minerals is another critical aspect of China's foreign policy.[363]

Considering China's dynamic economy and robust growth, its interest in African minerals may well prove in the long run more strategically important in its grand strategy than African oil. That may happen, because the minerals sought by China affect every aspect of its economy, from the minerals like titanium needed for producing military aircraft to the iron ore needed to fuel its export of consumer goods, to its surging diamond trade for the country's growing appetite for luxury items.[364]

[363] Kent H. Butts, Brent Bankus, *China's Pursuit of Africa's Natural Resources*, Collins Center Study, Center for Strategic Leadership, U.S. Army War College, Volume 1-09, June 2009, p. 4, http://www.csl.army.mil/usacsl/publications/CCS1_09_ChinasPursuitofAfricasNaturalResources.pdf . John C. K. Daly, "Feeding the Dragon: China's Quest for African Minerals", *China Brief*, The Jamestown Foundation, Vol. 8, Issue 3, February 29, 2008, http://www.jamestown.org/programs/chinabrief/single/?tx_ttnews%5Btt_news%5D=4694&tx_ttnews%5BbackPid%5D=168&no_cache=1 . Andreas Lorenz and Thilo Thielke, "The Age of the Dragon: China's Conquest of Africa", *Spiegel International*, May 30, 2007, http://www.spiegel.de/international/world/0,1518,484603-2,00.html .

[364] John C. K. Daly, "Feeding the Dragon: China's Quest for African Minerals", *China Brief*, The Jamestown Foundation, Vol. 8, Issue 3, February 29, 2008, http://www.jamestown.org/programs/chinabrief/single/?tx_ttnews%5Btt_news%5D=4694&tx_ttnews%5BbackPid%5D=168&no_cache=1 .

Therefore, in some cases, Beijing is eager to trade arms in exchange for access to industrially important metal and mineral resources: coal, copper, cobalt, chromium, zinc, bauxite/aluminium, uranium, coltan, manganese, nickel, asbestos, gold, silver, leucite, nepheline, quartz, tantalum, vanadium, titanium, niobium, molybdenum, zirconium, iron ore[365], industrial diamonds[366], platinum group metals, and, in some rare cases, even timber, elephant ivory[367] (!), or fishing rights[368] within the Exclusive Economic Zones of African states are on the agenda.[369]

Accepting barter deals in metals (usually, non-ferrous metals) has started becoming a common practice for Chinese state-controlled defense firms when they negotiate with African customers. Beijing is willing to sign "arms-for-raw materials" agreements securing access and sufficient supply (at stable prices) of minerals of strategic importance for China's military, industrial, and civilian needs.

Africa is a major supplier of strategically important minerals. Essential industrial metals such as aluminium/bauxite, coltan, copper, iron ore, lead, nickel, zinc, and the industrial minerals of phosphate rock, coal, and uranium are all present in Africa in large quantities. Particularly important are the strategic minerals of chromium, cobalt, platinum group metals, and manganese. The reserve bases of these minerals are highly concentrated geographically in South Africa, the Democratic Republic of Congo (DRC), Zimbabwe, and Zambia. For example, 33% of the world reserve base of chromium is

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[365] In 2006, China's imports of African iron ore were valued at 839.16 million dollars. John C. K. Daly, "Feeding the Dragon: China's Quest for African Minerals", *China Brief*, The Jamestown Foundation, Vol. 8, Issue 3, February 29, 2008, http://www.jamestown.org/programs/chinabrief/single/?tx_ttnews%5Btt_news%5D=4694&tx_ttnews%5BbackPid%5D=168&no_cache=1 .

[366] In 2006, China imported from Africa industrial diamonds worth 704.5 million dollars. John C. K. Daly, "Feeding the Dragon: China's Quest for African Minerals", *China Brief*, The Jamestown Foundation, Vol. 8, Issue 3, February 29, 2008, http://www.jamestown.org/programs/chinabrief/single/?tx_ttnews%5Btt_news%5D=4694&tx_ttnews%5BbackPid%5D=168&no_cache=1 .

[367] In May 2000, China reportedly swapped a shipment of AK-47/Type 56 assault rifles for 8 tonnes of Zimbabwean elephant ivory worth 1 million dollars. R. Mugabe's regime reportedly acquired the AK-47/Type 56 rifles in order to bolster its security in the face of a possible defeat in the June 2000 parliamentary elections. Jonathan Manthorpe, "China trades guns for market access in Zimbabwe", *The Vancouver Sun*, October 28, 2004, http://www.zimbabwesituation.com/oct30_2004.html . Ian Taylor, "Beijing's Arms and Oil Interests in Africa", *China Brief*, The Jamestown Foundation, Vol. 5, Issue 21, October 13, 2005, http://www.jamestown.org/programs/chinabrief/single/?tx_ttnews%5Btt_news%5D=3899&tx_ttnews%5BbackPid%5D=195&no_cache=1 . Ilana Botha, *China in Africa: Friend or Foe*, University of Stellenbosch, Stellenbosch, December 2006, p. 74, http://etd.sun.ac.za/bitstream/10019/973/1/Botha%20I.pdf .

[368] As of 2009, Kenya is reportedly negotiating with Beijing to trade fishing rights in exchange for the acquisition of Chinese arms systems. Andrei Chang, "China expanding African arms sales", *UPI Asia*, January 26, 2009, http://www.upiasia.com/Security/2009/01/26/china_expanding_african_arms_sales/1148/ .

[369] Beijing has been encouraging representatives of state-controlled companies to look for and secure exploration and supply agreements with states that extract oil, natural gas, and metals. With CCP's Politburo 2001 "*zou chuqu*" (literally meaning, "go/walk out") directive, state-owned enterprises are officially instructed to "go global", find new markets for their products, invest overseas, establish factories, capture a greater portion of the "value chain" in the production of goods, buy property, and seek overseas long-term access to natural resources. David Zweig, Bi Jianhai, "China's Global Hunt for Energy", *Foreign Affairs*, Vol. 84, No. 5, September/October 2005, p. 26, http://wuyibing.com/cache/china-s-global-hunt-for-energy.pdf .

found in the Republic of South Africa, and South Africa and Kazakhstan alone account for 95% of world chromium resources. Zambia and the DRC have between them 52% of world cobalt reserves. South Africa has 77% of the world manganese reserve base and 88% of the reserve base for the platinum group metals.[370]

China has moved aggressively to tie up mineral concessions in Africa. The case of Zimbabwe is an indicative example highlighting the direct link between China's arms exports and the preferential treatment the Chinese mining companies receive from the local authorities in many developing African nations. In Zimbabwe during the last decade China has signed a series of arms deals with Robert Mugabe's government, including a 2004 contract worth 240 million dollars providing for the delivery of 12 JL-8/K-8E trainer/light attack aircraft, 100 military vehicles, armoured personnel carriers, riot gear, mobile water cannons, and other military/law enforcement equipment, and the dispatch in 2006-2007 of 55 Zimbabwe Army and Air Force officers to China to receive military and technical training. While both the United States and the European Union have ceased all sales of arms and military equipment to the Zimbabwean government, China's overall arms sales to Zimbabwe have been at least 300 million dollars since 2000.[371]

To return the favour, Chinese companies are receiving preferential access to Zimbabwe's gold and platinum mines.[372] In addition, Chinese companies are allowed to invest in Zimbabwe's profitable asbestos, chromium, iron, ferrochrome[373], zinc, silver, coal, copper, and aluminium production ventures.[374]

Another noticeable example is Zambia. The South African country has used its cobalt and copper[375] resources (which account for more than 60% of the country's exports, given the fact that Zambia is Africa's top copper producer and the fourth largest producer

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[370] Kent H. Butts, Brent Bankus, *China's Pursuit of Africa's Natural Resources*, Collins Center Study, Center for Strategic Leadership, U.S. Army War College, Volume 1-09, June 2009, p. 5, http://www.csl.army.mil/usacsl/publications/CCS1_09_ChinasPursuitofAfricasNaturalResources.pdf .

[371] Human Rights First, "China's Arms Sales to Zimbabwe", *HRF Fact Sheet*, 2008, p. 1, http://www.humanrightsfirst.info/pdf/080428-CAH-china-zimbab-arms-fs.pdf .

[372] Zimbabwe possesses the second largest deposits of platinum in the world. Ilana Botha, *China in Africa: Friend or Foe*, University of Stellenbosch, Stellenbosch, December 2006, p. 50, http://etd.sun.ac.za/bitstream/10019/973/1/Botha%20I.pdf .

[373] Ferrochrome is an alloy of chromium and iron containing between 50% and 70% chromium. In December 2007, Sinosteel Corporation, a Chinese mining and trading group, purchased a 92% stake in Zimasco Consolidated Enterprises, the holding company of Zimbabwe's largest ferrochrome producer. Zimasco produces 210,000 tonnes of high carbon ferrochrome annually, accounting for about 2.5-4% of the global ferrochrome production. Tawanda Karombo, "China courts Zimbabwe, to venture into gold and platinum mining", *Mineweb*, February 23, 2008, http://www.mineweb.com/mineweb/view/mineweb/en/page67?oid=47974&sn=Detail . "About Zimasco: History", *Zimasco (Private) Limited website*, http://www.zimasco.co.zw/about-zimasco/history.html .

[374] Zimbabwe's coal reserves (both energy coal and coking coal) are estimated at 30 billion tonnes, of which 1.3 billion tonnes are recoverable by surface mining. Andrei Chang, "China expanding African arms sales", *UPI Asia*, January 26, 2009, http://www.upiasia.com/Security/2009/01/26/china_expanding_african_arms_sales/1148/ . "China, Zimbabwe in Coal Link-Up", *Sunday Mail*, Zimbabwe, January 17, 2010, http://minerals-and-metals.blogspot.com/2010/01/china-zimbabwe-in-coal-link-up.html .

[375] Andrei Chang, "China expanding African arms sales", *UPI Asia*, January 26, 2009, http://www.upiasia.com/Security/2009/01/26/china_expanding_african_arms_sales/1148/ . "China's Unusual Deals Working to Grow African Arms Presence", *Defense Industry Daily*, February 1, 2009, http://www.defenseindustrydaily.com/Chinas-Unusual-Deals-Working-to-Grow-African-Arms-Presence-05275/ .

in the world), in order to conclude a number of military deals, including the purchase of JL-8/K-8E aircraft, with Chinese defense industries (e.g. with Hongdu Aviation Industry corporation). China is currently the third largest foreign investor in Zambia (after South Africa and the United Kingdom). In 1998, the China Non-Ferrous Metal Mining Corporation (CNMC) acquired ownership of the Chambishi Copper Mine[376], as well as an area of 41 km^2 on the surface of the mine, in north-central Zambia for 20 million dollars. In November 2006, the CNMC announced an investment of 250-310 million dollars in the construction of a copper smelter[377] (the "Chambishi Copper Smelter Ltd") to be located in the newly established "Multi-Facility Economic Zone" in Chambishi.[378] And, in May 2009 the CNMC bought Luanshya Copper Mines out for an estimated 50 million dollars.

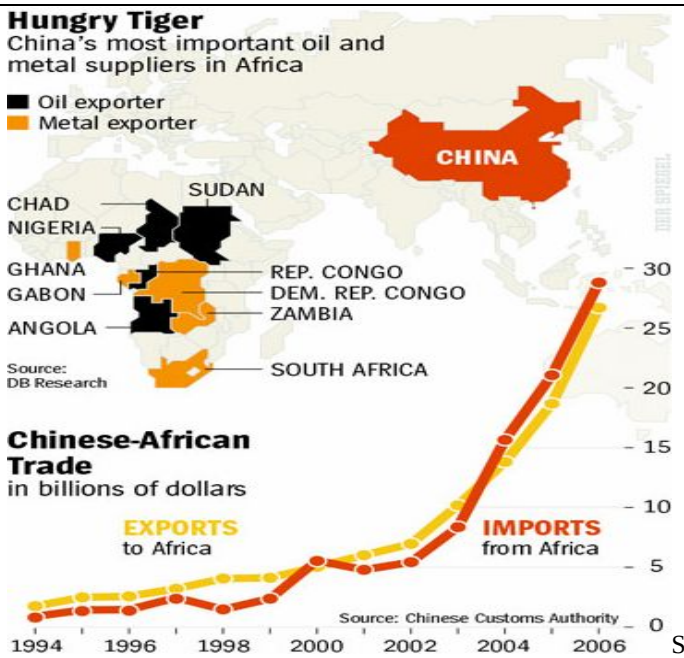
Consistent with its strategy for gaining access to much needed natural resources, Beijing has provided over 24 billion dollars in loans to Africa through the Export-Import Bank of China. Most of these loans include provisions for barter arrangements that emphasize resource extraction. In return, China has exported skilled laborers and materials and invested in infrastructure to facilitate the flow of resource back home. In fact, over 50% of all China loans through its Export-Import Bank have been invested in Africa, spanning 36 countries.[379]

[376] The Chambishi Copper Mine holds estimated reserves of 5 million tonnes of copper, and 120,000 tonnes of cobalt. Since 1998, the CNMC has invested approximately 160 million dollars in the development of the mine's infrastructure, carrying out one of the biggest Chinese foreign investments in the field of non-ferrous metal mining activities. "Chambishi Copper Mine", *CNMC website*, August 20, 2009, http://www.cnmc.com.cn/417-1102-1600.aspx .

[377] The Chambishi Copper Smelter commenced production in late 2008, and has the capacity to produce 150,000 tonnes of blister copper (a mixture of copper and iron oxides) annually. "Chambishi Copper Smelter", *CNMC website*, August 20, 2009, http://www.cnmc.com.cn/417-1102-1606.aspx .

[378] Chinese companies are committed to invest 800-900 million dollars in manufacturing copper products in this economic zone, where they receive tax waivers on dividends and customs duty on capital equipment.

[379] In Sudan only, since 1996 the Export-Import Bank of China has given more than 1 billion dollars in "concessional loans", which are low-interest or even interest-free; while in March 2004, it offered a two billion dollar oil-backed loan to Angola on very favourable terms. Khadija Sharife, "The Battle for Angola's Oil", *Foreign Policy In Focus*, Washington, D.C., November 19, 2009, http://www.fpif.org/articles/the_battle_for_angolas_oil . Human Rights First, *Investing in Tragedy: China's Money, Arms, and Politics in Sudan*, New York, March 2008, p. ii, http://www.humanrightsfirst.info/pdf/080311-cah-investing-in-tragedy-report.pdf . Paul Hare, "China in Angola: An Emerging Energy Partnership", *China Brief*, The Jamestown Foundation, Vol. 6, Issue 22, May 9, 2007, http://www.jamestown.org/programs/chinabrief/single/?tx_ttnews%5Btt_news%5D=3997&tx_ttnews%5BbackPid%5D=196&no_cache=1 .



Source: Andreas Lorenz and Thilo Thielke, "The Age of the Dragon: China's Conquest of Africa", *Spiegel International*, May 30, 2007, http://www.spiegel.de/international/world/0,1518,484603,00.html .

7.7. Conclusion.
What the future holds for the Sino-Russian arms trade and defense cooperation?

Under these circumstances, Moscow is already reluctant to provide Beijing with its state-of-the-art military equipment (designed during the last years of the Soviet era and entered serial production in the 1990s-2000s), and the obvious consequence of these developments is a spectacular drawback, since roughly 2006, in Russian arms exports towards China.

As a result, Chinese orders for Russian military equipment are now dwindling. India, Algeria, Venezuela, Vietnam and Iran have overtaken the PRC as major importers of Russian military hardware. China's share of Russia's military sales has been dropping steadily: from 64.3% of total deliveries of 6.126 billion dollars in 2005, to 38.3% of 6.46 billion dollars in 2006, and 21% of 7.5 billion dollars in 2007.[380] In 2008, the Chinese share of Russian arms exports fell to 18%, and, according to preliminary estimates, this figure could further drop to a mere 10-15% in 2009-2010, ending the trade surplus Russia has had with China since 1999.[381]

[380] Yu Bin, "China-Russia Relations: Embracing a Storm and Each Other?", *Comparative Connections*, Center for Strategic and International Studies, Vol. 10, No. 4, January 2009, p. 135, http://csis.org/files/media/csis/pubs/0804qchina_russia.pdf .

[381] "Russia-China military-technical deals worth 16 billion dollars since 2001", *RIA Novosti*, April 10, 2009, http://rianovosti.com/russia/20090410/121053007.html . Mikhail Barabanov, "China's Military Modernization: The Russian Factor", *Moscow Defense Brief*, No. 4 (18), 2009, http://mdb.cast.ru/mdb/4-2009/item1/article1/ .

Apart from the 2009 contract providing for the delivery of 9 Ka-27PL/Ka-28 ASW helicopters to the PLA Navy, the 2007 contract regarding the licensed production in China of various editions of the Mi-17 military transport helicopters, and the frozen (with its status currently unknown) 2005 contract providing for the delivery of 34 Il-76MD and 4 Il-78MK aircraft, there is currently not one single large-scale defense contract between Russia and China as in the past. The decrease in arms imports from Russia, in spite of the upward trends in China's defense spending (e.g. in 2008, China's official defense budget increased by 17.6% in comparison to 2007), suggests that the Chinese defense industrial complex has strengthened its capacity to replicate existing arms transfers from Russia indigenously, and China's growing investment in defense research and development. However, despite the recent strains in the Sino-Russian arms relationship and even though outright weapon purchases are down, Russia still remains a critical source for China of all manner of military technology.[382]

A Ka-27PL/Ka-28 PLA Navy-Air Force helicopter on its final approach to land on the flight deck of the Project 956E *Fuzhou* (No. 137) Sovremenny-class destroyer of the PLA Navy. Source: http://www.china-defense.com/smf/index.php?topic=176.300 .

In brief, trying to make a prediction of the future trends in the Sino-Russian defense cooperation, it seems that the key factors that will determine and influence to a significant extent this relation are the following:

- An eventual lifting/raising of the European Union's embargo on arms sales to the PRC, which was imposed following the violent suppression of Tiananmen Square protests of 3-4 June 1989.[383] With the possibility of increasingly stiff competition for

[382] Russell Hsiao, "Sino-Russian Strategic Partnership Matures", *China Brief*, The Jamestown Foundation, Vol. 8, Issue 8, April 16, 2008, http://www.jamestown.org/programs/chinabrief/single/?tx_ttnews%5Btt_news%5D=4850&tx_ttnews%5BbackPid%5D=168&no_cache=1 . Richard Fisher, Jr., "Chinese Dimensions of the 2007 Dubai Airshow", *International Assessment and Strategy Center*, January 20, 2008, http://www.strategycenter.net/research/pubID.179/pub_detail.asp .

[383] In reaction to the Tiananmen Square events, the Council of the European Union issued a political declaration on June 27, 1989 imposing several sanctions to China, including "an embargo on trade in arms with China". However, the Council's declaration is not legally binding, and any E.U. member could legally

the Chinese market from E.U. member states, in case the E.U. arms embargo is lifted, Beijing's leverage over foreign suppliers to relax limits on military sales will be drastically increased. Therefore, on such an occasion, the Russian Government might feel compelled to authorize the export of even more sophisticated, top-of-the-line systems to China, in order to remain competitive and retain its current market share.[384] As a matter of fact, potential competition from E.U. member states may have

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resume arms sales to China at anytime, if it were willing to bear the political consequences of doing so. The language in the European Council's declaration is also vague, and the declaration doesn't clearly define the embargo's scope. For example, it doesn't state whether the embargo covers all military articles, including weapons platforms, non-lethal military items, spare parts, or components. The European Union has left the interpretation and enforcement of the 1989 declaration to its individual member states, providing them with substantial "wiggle room" in interpreting the provisions of the declaration. Each E.U. member may interpret and implement the embargo's scope for itself, and the members have indeed interpreted the ban on sales of arms to China in different ways. Some E.U. member states have embargoed the sale of virtually all military items to China. In contrast, some other countries (such as the United Kingdom, Italy, Germany, and France) do not bar exports of dual-use equipment and non-lethal military items (such as satellite technology, civil helicopters –A-109E, AS-350, EC-120–, avionics, aircraft engines, marine diesel engines and gas turbines –German MTU 16V-396 and French PA6 STC engines–, and radars), because their interpretation of the embargo is limited to lethal weapons, ammunition, military aircraft and helicopters, warships, and equipment likely to be used for internal repression. In that context, during the 1990s, Italy and the United Kingdom agreed to sell China non-lethal military items (Italy agreed to sell Grifo-MG fire control radars for use on Chinese J-7PG/F-7PG fighters; and the United Kingdom agreed in 1996 to sell China the Skymaster/Searchwater maritime surveillance and early warning airborne radar system, which was fitted on Y-8J aircraft operated by the PLANAF, and in 1998/1999 to export up to 90 second-hand RB.168 Spey Mk.202 turbofan engines for use in JH-7/A aircraft). We find no instances of E.U. members entering into new agreements to provide the Chinese armed forces with lethal military items after 1989; although France and Italy delivered lethal military items (Crotale short-range SAM systems, and Aspide Mk.1 medium-range air-to-air missiles) to China during the 1990s in fulfilment of pre-embargo contracts. Also, the U.K. honoured a pre-embargo agreement by providing China with Super Skyranger fire control radars, head-up displays, and other avionics for its J-7MG/F-7MG fighter aircraft. The E.U. embargo could be formally ended by unanimous consent, or informally eroded by individual E.U. members' resumption of military trade with China. That is, E.U. members, whose defense firms are faced with severe economic pressures, could move to modify their participation in the embargo, if they judge that China's human rights record is improving. United States General Accounting Office, "China: U.S. and European Union Arms Sales Since the 1989 Embargoes", Testimony GAO/T-NSIAD-98-171, *FAS website*, April 28, 1998, http://www.fas.org/man/gao/nsiad-98-171.htm . E.U. Council Secretariat, "E.U. arms and dual use exports policy and E.U. embargo on China", *E.U. Council's website*, February 2005, http://www.consilium.europa.eu/uedocs/cmsUpload/050228_China-initial.pdf . Richard A. Bitzinger, "A Prisoner's Dilemma: The E.U.'s China Arms Embargo", *China Brief*, The Jamestown Foundation, Vol. 4, Issue 13, June 23, 2004, http://www.jamestown.org/programs/chinabrief/single/?tx_ttnews%5Btt_news%5D=30005&tx_ttnews%5BbackPid%5D=194&no_cache=1 . Richard Fisher, Jr., "How May Europe Strengthen China's Military?", *International Assessment and Strategy Center*, January 15, 2005, http://www.strategycenter.net/research/pubID.61/pub_detail.asp . Kristin Archick, Richard F. Grimmett, Shirley Kan, *European Union's Arms Embargo on China: Implications and Options for U.S. Policy*, Congressional Research Service Report for Congress, Order Code RL32870, Washington, D.C., May 27, 2005, pp. 5, 20-23, 37-41, http://www.fas.org/sgp/crs/row/RL32870.pdf .

[384] In March 2005, the Russian President, Vladimir Putin, echoed his government's deep concern about E.U's moves toward lifting its arms embargo on China, acknowledging that: "*Our position is based on economic considerations. We sell a lot of arms to China. The less competitors on the Chinese market, the better. There's no point acting the fool, I'm just saying it like it is*". "Press Conference Following the Four-Country Meeting Between Russia, France, Germany and Spain", *The President of Russia (Kremlin) website*, Paris, March 18, 2005,

already prompted Russia to expand the range of the arms systems it is willing to offer for export to China.

- The policy and the general attitude of the Russian Government (and especially of the Ministry of Defense) with regard to the admissibility of an increase in the technological level and sophistication of Russian arms delivered to the PRC. An eventual raise of the restrictions imposed on the export of Russian-made strategic arms to China (e.g. ICBMs; nuclear submarines; strategic bombers, like the Tu-160 "Blackjack" supersonic, variable-geometry heavy bomber).

A Tu-160 "Blackjack" supersonic heavy bomber launching a Kh-55SM[385] (AS-15B "Kent") cruise missile from its aft bay. Source: Carlo Kopp, "Soviet/Russian Cruise Missiles", *Air Power Australia*, August 2009, http://www.ausairpower.net/APA-Rus-Cruise-Missiles.html .

- The willingness of Russia to permit significant technology-transfers to Chinese military industries and much improved access to design technology through production licensing agreements, and sign co-development and co-production contracts with Chinese defense firms (as it has already done in many occasions with Indian firms).
- The dynamics and the degree of development and sophistication of the indigenous Chinese defense (mainly aerospace, naval, and missile) industries in the near future.
- The state funding and the allocation of sufficient economic resources from the Russian state budget for investment in research, design, and development of new, competitive arms systems by Russian companies.
- The trends and the developments in Moscow's relations primarily with i) India and ii) the United States of America; and, secondly, with iii) Japan and iv) South Korea.

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http://eng.kremlin.ru/speeches/2005/03/18/2334_type82914type82915_85457.shtml . Siemon T. Wezeman and Mark Bromley, "International Arms Transfers", in Alyson J. K. Bailes, ed., *SIPRI Yearbook 2005: Armaments, Disarmament and International Security*, Oxford University Press, Oxford, 2005, p. 424, http://www.sipri.org/yearbook/2005/files/SIPRIYB0510.pdf .

[385] The Kh-55 closely resembles the early versions of the U.S. BGM-109 Tomahawk missile. The PRC is known to have acquired samples of the Kh-55SM from the Ukraine. Carlo Kopp, "Regional Precision Guided Munitions Survey", *Defence Today*, January/February 2006, p. 66, http://www.ausairpower.net/DT-Missiles-01-06.pdf .

8. The main contracts providing for the transfer of Russian-made weapon systems and military equipment to the PRC, concluded during the period 1992-2009

8.1. Introductory Comment

The attempt to present a detailed, analytical and comprehensive review of the major contracts providing for the transfer of military equipment, concluded between the governments[386] of the Russian Federation and the People's Republic of China after the end of the Cold War (between the years 1992-2009) presents many difficulties. First of all, the Chinese Armed Forces are making public with extreme restraint and vigilance precise information about their arsenal and the acquisition of new weapon systems. Therefore, the leaks to the Media are limited, selective and, most importantly, controlled by the Chinese Armed Forces apparatus. In that context, the relevant literature is frequently characterized by inaccuracies and contradictory information regarding the Chinese armament programmes, their progress, complexity, sophistication, and pace of implementation.

For instance, it is not clear whether the anti-aircraft missile system installed on the 051C-type (Luzhou-class) destroyers is the S-300F/Rif (SA-N-6 "Grumble") or the S-300FM/Rif-M (SA-N-20A "Gargoyle"). The main characteristics, the key components, the sensors, as well as the efficiency and the lethality of the two aforementioned shipborne SAM systems are not identical. In fact, they differ to a non-negligible degree: the S-300F/Rif system is armed with the 5V55R missile, while the S-300FM/Rif-M system carries the 48N6 missile, which incorporates significant improvements in comparison to the older version (maximum engagement range extended to 120-150 km, heavier warhead, better kinematics, increased missile speed to approximately Mach 6 for a maximum target engagement speed of up to Mach 8.5, extended altitude envelope to 27 km, track-via-missile guidance system, secondary infrared terminal seeker, etc). Most available open sources [among others, we could mention: i) "*SIPRI Yearbook*" 2009 edition; ii) "*Jane's Fighting Ships*" 2007-2008 edition; iii) the research paper entitled "*La Coopération Militaro-Technique Entre la Russie et la Chine: Bilan et Perspectives*", authored by I. Facon and K. Makienko, and published by the French "*Foundation for Strategic Research*" (FRS) –pp. 27, 77, 80, 90, 104; iv) the article entitled "*People's Liberation Army Leverage of Foreign Military Technology*", written by Richard Fisher, and made available on the website of the *International Assessment and Strategy Center*

[386] Most Russian arms export earnings come from the implementation of government-to-government contracts. It is therefore no wonder that the overwhelming majority of contracts concerning the export of Russian-made weapon systems to China follow the form of government-to-government agreements managed by Rosoboronexport, the sole state intermediary agency for Russia's exports/imports of defense-related and dual-use products, technologies, and services. Direct commercial sales (in which Russian defense industries negotiate directly with China) are very limited and concern mainly spare parts, maintenance, and repair services.

on March 22, 2006; as well as, v) the website "*SinoDefense.com*" –entry for the 051C-type destroyers: http://www.sinodefence.com/navy/surface/type051c_luzhou.asp] reach the conclusion that the 051C-type destroyers are armed with the advanced version S-300FM/Rif-M; an assessment that we also adopted in our paper. However, there are some other sources [e.g. the 2008 edition[387] of the authoritative "*Military Balance*", published under the auspices of the British *International Institute for Strategic Studies* –p. 378; the monograph "*La Chine et la Russie: Entre Convergences et Méfiance*" –p. 253; and, the website "*Deagel.com*" –entry for the 051C-type destroyers: http://www.deagel.com/Destroyers-and-Cruisers/Type-051C_a001827003.aspx] claiming that this class of Chinese-built air defense guided-missile destroyers are outfitted with the simple, basic version S-300F/Rif.

Another problem which arises out of the same considerations is the fact that some reports quote information, which cannot be cross-checked, confirmed, or verified by any other independent source. In fact, on several occasions it is practically impossible to cross-check the validity of the information cited in some reports. An indicative example can be drawn from the book "*La Chine et la Russie: Entre Convergences et Méfiance*", authored by J-P. Cabestan, S. Colin, I. Facon and M. Meidan (published in 2008): In p. 250 is mentioned that in 1998 China acquired (from the surplus of the Russian Ministry of Defense) four used Il-78MK "Midas" in-flight refuelling tankers, paying about 100 million dollars.[388] To our knowledge, this specific piece of information is not confirmed by any other source apart from the aforementioned book, and, as a result, it is impossible to include it into our paper. As of 2009, the PLAAF does not operate any in-flight aerial refuelling tankers, apart from a small number of vintage H-6U/DU (based on the airframe of the H-6 bomber, the Chinese copy of the Tu-16 "Badger").

The same authors claim that the S-300F/Rif shipborne SAM system was integrated on type 052C (Luyang II-class) PLAN destroyers (i.e. on the *Lanzhou* -No. 170-, and the *Haikou* -No. 171-). In reality, the type 052C destroyers are equipped with 48 medium-range active radar-guided HHQ-9/A surface-to-air missiles. The S-300FM/Rif-M (and not the S-300F/Rif) system was installed on type 051C (Luzhou-class) destroyers (i.e. on the *Shenyang* -No. 115-, and the *Shijiazhuang* -No. 116-).[389]

In another instance, James R. Holmes and Toshi Yoshihara in their, otherwise well-documented and eloquently written, treatise entitled "*Chinese Naval Strategy in the 21st Century: The Turn to Mahan*" make the surprising assertion that China took delivery of five (not four) Sovremenny-class destroyers from Russia in the late 1990s-mid 2000s.[390]

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[387] The 2009 edition of the "*Military Balance*" makes a peculiar, ambiguous reference to a "SA-N-20 Grumble" SAM system employed on the Type 051C destroyers, without mentioning the Russian designation of this anti-aircraft system. The strange thing is that the "SA-N-20 Grumble" SAM system doesn't exist. There are two systems with designations resembling to the one mentioned by the "*Military Balance*": i) the SA-N-6 "Grumble", and ii) the SA-N-20 "Gargoyle". As a result, a reference to a "SA-N-20 Grumble" system (without any mention of the system's Russian designation) creates confusion, without providing any useful information to the researcher. James Hackett (ed.), *The Military Balance 2009*, The International Institute for Strategic Studies, Routledge, London, January 2009, p. 384.

[388] Jean-Pierre Cabestan, Sébastien Colin, Isabelle Facon and Michal Meidan, *La Chine et la Russie: Entre Convergences et Méfiance*, Délégation aux Affaires Stratégiques, Editions UNICOMM, Paris, 2008, p. 250.

[389] Jean-Pierre Cabestan, Sébastien Colin, Isabelle Facon and Michal Meidan, *La Chine et la Russie: Entre Convergences et Méfiance*, Délégation aux Affaires Stratégiques, Editions UNICOMM, Paris, 2008, p. 253.

[390] James R. Holmes and Toshi Yoshihara, *Chinese Naval Strategy in the 21st Century: The Turn to Mahan*, Routledge, London and New York, 2008, p. 96.

This is certainly not true, since it is widely known that the PLA Navy ordered in 1997 and 2002 two batches of 2 Sovremenny-class destroyers each. Two Project 956E ships were ordered in 1997 and delivered in 1999-2000: *Hangzhou* (No. 136) and *Fuzhou* (No. 137); and, two Project 956EM ships were ordered in 2002 and delivered in 2005-2006: *Taizhou* (No. 138) and *Ningbo* (No. 139).

Furthermore, "*SIPRI Yearbook*"[391] mentions that in 2002 China obtained from Russia (probably from the RosAeroSystems enterprise) a Zmei/Sea Dragon MP aircraft radar for use on a type Au-21/Puma balloon for surveillance of the Taiwan Strait. It proved out to be equally impossible to confirm the veracity of this information. As a matter of fact, as of 2003 *Jane's* sources were reporting that the People's Republic of China was planning to introduce one or more radar-equipped surveillance aerostats to monitor activity along its southern coastline, and more specifically in the Taiwan Strait. The cited sources described the proposed system as making use of the RosAeroSystems Puma tethered aerostat, a mooring platform, an associated ground station, and a sensor payload based on the surveillance radar developed for the Leninets Novella/Sea Dragon maritime patrol mission suite.[392] However, only the *SIPRI Yearbook* maintains that the delivery of the aerostat-based surveillance radar system was indeed successfully completed, the system was installed, and started operating in order to monitor the air activity over the Taiwan Strait.

Besides, it is worth mentioning that from time to time have been exposed to the light of publicity (mainly in the American press and electronic media) unsubstantiated reports and uncorroborated rumours, according to which throughout the first half of the 1990s China managed to acquire from Russia a limited number of MiG-29 and MiG-31[393] fighter jets. The alleged acquisition of this type of aircraft is not confirmed by any credible source. There is no recorded appearance of MiG-29 or MiG-31 fighters painted with the colours and displaying the insignia and markings/roundels of the PLA Air Force, and no such aircraft has appeared in the PLAAF inventory during military manoeuvres, parades, or air shows. As of 2009, it is certain that the Chinese Armed Forces do not possess any MiG-29 or MiG-31 jets. Nevertheless, we can't totally exclude the scenario, according to which China may have obtained from Kazakhstan (in the beginning of the 1990s; possibly in 1992) a few MiG-31 aircraft, in a non-operational, non-flying condition.[394] If this assumption corresponds to reality, then China may have purchased these fighters in order to study their basic components and avionics (radar equipment -with the powerful Zaslon S-800 PESA radar-, electronics suite, missiles -including the R-

[391] "Transfers and licensed production of major conventional weapons: Exports sorted by supplier. Deals with deliveries or orders made 1994-2004", Stockholm International Peace Research Institute, http://www.sipri.org/contents/armstrad/REG_EXP_RUS_94-04.pdf .

[392] In the described aerostat application, the radar is reported to be able to detect targets out to ranges of 200 km from an altitude of 3 km. "Chinese aerostat surveillance system (China), Airborne Early Warning", *Jane's Electronic Mission Aircraft*, October 9, 2003, http://www.janes.com/extracts/extract/jema/jaem1027.html .

[393] Richard D. Fisher, Jr., "Known and Projected PRC Weapons Acquisitions", table in a report for the U.S.-China Economic and Security Review Commission, August 3, 2001, http://www.uscc.gov/textonly/transcriptstx/tesfis.htm . According to some unconfirmed (highly controversial and dubious) accounts, the PLAAF may have obtained 24 MiG-31 jets in 1992.

[394] Isabelle Facon and Konstantin Makienko, *La coopération militaro-technique entre la Russie et la Chine: bilan et perspectives*, Fondation pour la Recherche Stratégique, Paris, July 2006, pp. 22, 65, 90, http://www.frstrategie.org/barreFRS/publications/rd/RD_20060701.pdf .

33/AA-9 "Amos", and, less likely, the R-37/AA-13 "Arrow" AAMs-, turbofan engines, communications equipment, construction techniques and materials used for the building of the aircraft's frame, etc), try to copy them (via the implementation of reverse engineering techniques), and apply the acquired technical knowledge to its own domestic industrial programmes that are aiming and vying for the design, development, and construction of modern fourth/fifth generation fighter jets.

Another point we should always bear in mind is that, sometimes, calculating the precise financial cost of a contract providing for the sale of Russian military equipment to the Chinese Armed Forces may become a complicated task. For example, during the early and mid-1990s, many contracts included provisions for payment in barter goods (i.e. electronic devices, clothes, foodstuffs, and other low-quality consumer products), or export of weapon systems in exchange for the forgiveness of Russian state debt owed to the PRC. Therefore, it is not always easy to ascribe a precise financial value to the transfers of Russian weapon systems to China.

In fact, it is quite common to read in sources, which are generally considered to be credible, visibly false and mistaken assumptions about the precise cost of China's arms acquisitions. For instance, for two contracts signed in 1995 providing for the purchase of 22 (according to *SIPRI*: 24) Su-27SK/UBK fighter jets, *SIPRI* quotes a total cost of 2.2 billion dollars.[395] That is, a price of 91.6 million dollars per aircraft! Without a doubt, *SIPRI*'s assessment is flawed.[396] A price tag of 650-800 million dollars for the 22 aircraft (i.e. 30-36 million dollars per unit) sounds much more reasonable, accurate, and close to the real cost of the contract.

Despite the aforementioned difficulties and constraints, in the analytical presentation that follows we employed all the available means, using a plethora of separate and independent (from each other) open sources, so as to verify and cross-check the credibility of the information and details that appear in our monograph. As a consequence, even though it is not realistic to completely rule out the presence of errors or the occurrence of oversights or omissions (any such over-optimistic claim wouldn't be pragmatic in face of the demanding and challenging task posed by the monitoring of the PLA's arms acquisitions), we can nevertheless assert that the overwhelming majority of the information and data cited in our study correspond to reality, accurately depicting the volume of the purchases of Russian-made weapon systems carried out by the three service branches[397] of the People's Liberation Army (PLA) between 1992 and 2009.

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[395] "Appendix 3: Transfers of major conventional weapons by Russia to Asian countries: 1992-1998", in Gennady Chufrin, ed., *Russia and Asia: The Emerging Security Agenda*, SIPRI, Oxford University Press, Oxford, 1999, p. 506, http://books.sipri.org/files/books/SIPRI99Chu/SIPRI99ChuAp3.pdf .

[396] If we accept *SIPRI*'s estimates, then in 1995 one Su-27SK/UBK fighter jet should cost 30 million dollars more than what it does one current (2009) production Su-35BM aircraft. Under an August 2009 contract, the Su-35BM is delivered to the Russian Air Force at a unit cost of 60-65 million dollars. "Russian Defense Ministry orders 64 Su-family fighters", *RIA Novosti*, August 18, 2009, http://en.rian.ru/russia/20090818/155845491.html .

[397] The three service branches of the Chinese Armed Forces are the following (listed in order of date of establishment): i) People's Liberation Army (PLA –Ground Forces); ii) People's Liberation Army Navy (PLAN); iii) People's Liberation Army Air Force (PLAAF). In Chinese official documents the Second Artillery Corps (i.e. China's Strategic Rocket Forces) is usually not considered a service branch (*junzhong*), but rather a service arm (*bingzhong*), which is one-half notch lower in bureaucratic rank. Furthermore, it is worth mentioning that the People's Liberation Army Reserve Force is incorporated into the PLA's order of battle, while the People's Armed Police Corps (a paramilitary force under the dual leadership of the Central

8.2. Aircraft and military materiel/equipment/hardware for the PLA Air Force, and helicopters for the PLA Aviation and the PLA Air Force

Weapon description	Weapon designation	Manufacturer	Year of order	Year(s) of deliveries	Number of units	Comments. Additional information
Single-seat air superiority fighter aircraft	Su-27SK (NATO reporting name: "Flanker-B")	Komsomolsk-on-Amur Aircraft Production Association (KnAAPO)	1991	1992	20	The Su-27SK ("Flanker-B") fighter jet is the export version of the baseline Su-27 design (first flown on April 20, 1981), which was developed to replace Yak-28P, Su-15 and Tu-28P/128 interceptors, and escort Su-24 attack aircraft in strike missions. Basic requirement was effective engagement of F-15, F-16, and other future aircraft and cruise missiles. The Su-27SK is considered to have a comparable strike capability to an F-15A/C.[398] It is primarily an air superiority/interceptor fighter, with a very limited strike capability (armed with "dumb" munitions that include a range of free-fall bombs and unguided rockets[399]). The Su-27SK weaponry is carried on 10 external hardpoints, totalling up to 4,430 kg. The fighter's air-to-ground munitions comprise: up to eight 500 kg bombs, up to sixteen 250 kg bombs, KMGU-2 sub-munition dispensers (loaded with 96 AO-2.5RTM fragmentation bomblets), four launchers for S-8 (80 mm), S-13 (122 mm), S-25-OFM (340/266 mm) unguided rockets[400], or one SPPU-22 gun pod (carrying a GSh-23 23 mm twin-barrel gun). When undertaking air superiority missions, Su-27SK's

Military Commission and the Ministry of Public Security) is sometimes erroneously confused as a distinct service branch of the PLA. "The Chinese People's Liberation Army", *People's Daily Online*, http://english.peopledaily.com.cn/data/organs/pla.shtml . Bates Gill, James Mulvenon, and Mark Stokes, "The Chinese Second Artillery Corps: Transition to Credible Deterrence", in James C. Mulvenon and Andrew N. D. Yang, eds., *The People's Liberation Army as Organization*, Reference Volume v1.0, RAND, Santa Monica, Ca, 2002, p. 520, http://www.rand.org/pubs/conf_proceedings/CF182/CF182.ch11.pdf .

[398] The Su-27SK can match the speed, acceleration, and climb performance of the F-15A/C, exceed the instantaneous and sustained transonic turn performance of the F-15A/C, and exceed the radar detection range of the baseline APG-63 radar as well as the number of externally carried air-to-air missiles, compared to the F-15A/C. The Su-27SK carries a maximum of 9,400 kg (20,723 lb) of internal fuel, which is comparable to the fuel load of an F-15A/C equipped with external Conformal Fuel Tanks. Carlo Kopp, "The Flanker Fleet. The PLA's 'Big Stick'", *International Assessment and Strategy Center*, May 3, 2006, http://www.strategycenter.net/research/pubID.106/pub_detail.asp .

[399] Notably, the S-8, S-13, S-25-OFM series of unguided rockets, intended to engage different kinds of ground targets (from manpower to armour materiel and hardened shelters or fortifications).

[400] The S-8 rockets are carried in 4 B-8M1 pods of 20 rockets each (i.e. a total of 80 rockets per aircraft); the S-13 rockets in 4 B-13L/1 pods of 5 rockets each (i.e. a total of 20 rockets); and, finally, the S-25-OFM rockets in 4 O-25/1 pods with 1 rocket each (i.e. a total of 4 rockets).

[401] The R-27 series of medium-range air-to-air missiles (MRAAMs) can intercept targets flying at speeds of up to 3,500 km/h and altitudes ranging from 0.02-27 km, and are capable of sustaining 8 g manoeuvres. R-27's warhead weighs 39 kg, and the missile attacks the target within target designation angles of +/- 50 degrees for the missiles fitted with 9B-1101K semi-active radar homing heads (i.e. R-27R, R-27ER missiles), and +/- 55 degrees for the missiles fitted with 36T and MK-80/M IR homing heads (i.e. R-27T, R-27ET missiles). The missiles are carried on AKU/APU-470 launchers. The R-27 family of MRAAMs includes: i) the R-27R semi-active radar guided missile (with an inertial navigation guidance control system, and radio correction), with a maximum range of 60 km, and a launch weight of 253 kg; ii) the R-27ER semi-active radar guided missile, with a maximum range of 62.5 km, and a launch weight of 350 kg; iii) the R-27T IR-guided missile, with a maximum range of 65 km, and a launch weight of 245 kg; iv) the R-27ET IR-guided missile, with a maximum range of 80 km, and a launch weight of 343 kg; v) the R-27P passive radar homing (fitted with 9B-1032 X-band passive anti-radiation seekers) missile, with a maximum range of 70 km, and a launch weight of 254 kg; vi) the R-27EP passive radar homing (fitted with a 9B-1032 seeker) missile, with a maximum range of 110 km, and a launch weight of 350 kg. The R-27 is the Russian equivalent to the late model U.S. AIM-7 Sparrow III MRAAM. Rosoboronexport, *Aerospace Systems: Export Catalogue*, Moscow, 2005, p. 119, http://www.rusarm.ru/cataloque/air_craft/aircraft.pdf . Yuri Babushkin (ed.), *Russia's Arms: 2001-2002*, Military Parade, Moscow, 2001, pp. 420-421. Carlo Kopp, "Asia's Advanced Flankers", *Australian Aviation*, No. 197, August 2003, p. 30, http://www.ausairpower.net/TE-Flankers-Aug03.pdf . Carlo Kopp, "Missiles in the Asia-Pacific", *Defence Today*, May 2005, p. 66, http://www.ausairpower.net/DT-Missile-Survey-May-05.pdf . Carlo Kopp, "The Russian Philosophy of Beyond Visual Range Air Combat", *Air Power Australia*, March 25, 2008, http://www.ausairpower.net/APA-Rus-BVR-AAM.html .

[402] The R-73 SRAAM is designed to intercept targets flying at speeds of up to 2,500 km/h and altitudes ranging from 0.02-20 km, and is capable of sustaining 12 g manoeuvres. The R-73 attacks the target within target designation angles of +/- 45 degrees, and its warhead weighs 8 kg. The R-73 has a maximum range of 30 km (14 km, when aimed against the target's aft hemisphere), and was one of the first SRAAMs featuring an all-aspect (i.e. capable for use in both head-on and tail-on engagements) passive IR homing (fitted with an MK-80/E/M/ME seeker) to enter serial production. The missiles are carried on APU-73 launchers and can be fitted with either a radar proximity fuse or a laser proximity fuse (with the latter version designated R-73EL). In 1991, China ordered 288 (according to *SIPRI Arms Transfers Database*: 300) R-73 missiles. A second, more substantial, order for 3,000 examples of the R-73 missile was placed in 1995, with deliveries carried out between 1996 and 2004. Rosoboronexport, *Aerospace Systems: Export Catalogue*, Moscow, 2005, p. 118, http://www.rusarm.ru/cataloque/air_craft/aircraft.pdf . Yuri Babushkin (ed.), *Russia's Arms: 2001-2002*, Military Parade, Moscow, 2001, pp. 419-420. "Appendix 3: Transfers of major conventional weapons by Russia to Asian countries: 1992-1998", in Gennady Chufrin, ed., *Russia and Asia: The Emerging Security Agenda*, SIPRI, Oxford University Press, Oxford, 1999, p. 506, http://books.sipri.org/files/books/SIPRI99Chu/SIPRI99ChuAp3.pdf . Stockholm International Peace Research Institute (SIPRI) Arms Transfers Database, http://armstrade.sipri.org/armstrade/page/trade_register.php . Carlo Kopp, "Missiles in the Asia-Pacific", *Defence Today*, May 2005, p. 66, http://www.ausairpower.net/DT-Missile-Survey-May-05.pdf .

[403] The R-60 short-range (10 km) air-to-air missile can intercept targets flying at speeds of up to 2,500 km/h and altitudes of 0.03-20 km, and is capable of sustaining 12 g manoeuvres. The missile attacks the target within target designation angles of +/- 12 degrees, and its warhead weighs 3 kg. According to *SIPRI*, in 1991 China ordered 96 R-60 missiles. Yuri Babushkin (ed.), *Russia's Arms: 2001-2002*, Military Parade, Moscow, 2001, p. 419. "Appendix 3: Transfers of major conventional weapons by Russia to Asian countries: 1992-1998", in Gennady Chufrin, ed., *Russia and Asia: The Emerging Security Agenda*, SIPRI, Oxford University Press, Oxford, 1999, p. 506, http://books.sipri.org/files/books/SIPRI99Chu/SIPRI99ChuAp3.pdf .

[404] Optionally, the Su-27SK fighters can make use of R-33 (AA-9 "Amos") AAMs, in lieu of the R-27 series of missiles. Paul Jackson, ed., *Jane's All the World's Aircraft: 2002-2003*, Jane's Information Group, Coulsdon, 2002, p. 402.

[405] The OEPS-27 opto-electronic sighting system provides for search, detection, tracking and ranging (in the IR band) of airborne targets, and for locating and ranging of ground targets (for gunfire delivery as well). It weighs 174 kg, and provides a viewing angle of +/- 60 degrees in azimuth, and +60 to -15 degrees in elevation. Edward Downs, ed., *Jane's Avionics: 2002-2003*, Jane's Information Group, Coulsdon, 2002,

						air-to-air armament includes a built-in 30 mm single-barrel GSh-301 (9A-4071K) gun with 150 rounds of ammunition, and up to 10 air-to-air missiles (AAM), with the following typical arrangement: i) 2 semi-active radar-homing R-27R[401] (AA-10A "Alamo-A") MRAAMs on tandem pylons under the fuselage; ii) 2 infrared-homing R-27T (AA-10B "Alamo B") MRAAMs on centre-wing pylons; iii) 2 semi-active radar-homing R-27ER (AA-10C "Alamo C"), or infrared-homing R-27ET (AA-10D "Alamo D") MRAAMs beneath each engine duct; iv) four R-73A/-E[402] (AA-11 "Archer") or R-60[403] (AA-8 "Aphid") infrared-homing SRAAMs on 4 outer-wing and wingtip pylons.[404] The Su-27SK is equipped with the RLPK-27 radar sighting system, fitted with a N001E ("Slot Back") track-while-scan coherent pulse Doppler radar. The radar displays a search range of up to 90-120 km in the forward hemisphere (40 km in the rear hemisphere), and a missile tracking/target engagement range of 65-80 km in the forward hemisphere against MiG-21-sized targets (that is, targets with a radar cross section of approximately 3 m^2). The radar is capable of simultaneously tracking 10 targets, and engaging 1 of them. In addition, the Su-27SK integrates the OEPS-27 (31E) electro-optic sighting system (which operates in conjunction with the radar sighting system) comprising an OLS-27 (36Sh) infrared search and track (IRST) sensor, and a collimated laser range-finder/target designator.[405] The electro-optic sighting system markedly improves target detection probability and target tracking reliability, especially in an ECM environment. The Su-27SK is powered by 2 AL-31F turbofan engines, each rated at 122.58 kN (12,500 kgf, 27,557 lbf) with afterburning. China was the first non-CIS country to operate the Su-27SK/UBK

pp. 680-681. Rosoboronexport, *Aerospace Systems: Export Catalogue*, Moscow, 2005, p. 95, http://www.rusarm.ru/cataloque/air_craft/aircraft.pdf .

[406] In the PLAAF, aviation units are organized into air divisions, regiments, groups, and squadrons. A PLAAF Fighter Regiment consists of 20-40 aircraft (with the most frequent repartition being 24-32 aircraft per regiment). In broad terms, a PLAAF/PLANAF Fighter Regiment is comparable to a RAF style Fighter Wing, with about half the strength of a USAF Fighter Wing (a RAF Wing is equivalent to a USAF Group). Ken Allen, "PLA Air Force Organization", in James C. Mulvenon, Richard H. Yang, eds., *The People's Liberation Army in the Information Age*, RAND Corporation, Project Air Force, Santa Monica, CA, July 1999, pp. 371, 389. Carlo Kopp, "People's Liberation Army Air Force and Naval Air Arm Air Base Infrastructure", *Air Power Australia*, January 30, 2007, www.ausairpower.net/APA-PLA-AFBs.html .

[407] "Su-27SK/UBK Air Superiority Fighter Aircraft", *Sino Defence*, http://www.sinodefence.com/airforce/fighter/su27.asp .

						fighter jet. The 26 Su-27SK/UBK fighter jets, ordered in 1991, were initially operated by PLAAF's 3rd Air Division, 7th Fighter Regiment[406], stationed at Wuhu Air Base, in Anhui Province, in Nanjing Military Region. Some years later, the aircraft were handed over to the 19th Air Division, 55th Fighter Regiment, based at Jining Air Base[407], in Shandong Province, in Jinan Military Region. The cost for the purchase of the 20 Su-27SK and the 6 Su-27UBK fighters amounted to 750 million dollars. At least one third of the amount in question wasn't settled in hard currency, but in barter goods (i.e. Chinese-made electronic devices, clothes, foodstuffs, and other consumer products).
Two-seat trainer-fighter aircraft	Su-27UBK (NATO reporting name: "Flanker-C")	Irkut Corporation JSC; Irkutsk Aviation Plant (IAPO)	1991	1992	6	The Su-27UBK ("Flanker-C"), fully combat capable, dual trainer-fighter jet is considered to have a comparable strike capability to an F-15B/D, with a combat load of 4,430 kg.[408] The serial production of the Su-27UBK tandem two-seat fighter/trainer jet began in 1986. The cost for the purchase of the 6 Su-27UBK and the 20 Su-27SK fighters, ordered in 1991, amounted to 750 million dollars.
Military transport aircraft	Il-76MD (NATO reporting name: "Candid-B")	JSC Ilyushin Aviation Complex; Tashkent Aviation Production Association n/a V.P. Chkalov (TAPO/TAPOiCh)	1992	1993	7+3	The Il-76MD medium-range (3,800-4,200 km, when carrying a 40-t payload) military transport aircraft is designed to airdrop troops, transport ground forces, combat equipment and armament (including medium-weight tanks), and transport casualties. The aircraft avionics ensure airdropping by day and night, in good and adverse weather conditions, in hostile air defense environment. The onboard equipment consists of a flight control and navigation system, radio communications facilities, airdropping/cargo-handling equipment, and an ECM suite (consisting of a radar illumination warning station, a chaff and IR-decoy dispenser, and IR flare cartridges). The single-deck version of the

[408] "*Jane's All the World's Aircraft*" maintains that the Su-27UBK has a maximum combat load of 8,000 kg (17,637 lb). This claim is not confirmed by Sukhoi's official website, where Su-27UBK's combat load is mentioned as being 4,430 kg (that is, similar to Su-27SK's combat load). The same figure (4,430 kg) is also quoted by several other Russian sources. It is noteworthy that *Jane's* cites a maximum combat load of 4,000 kg (8,818 lb) for the single-seat Su-27SK fighter jet, without explaining or clarifying how is it possible for the Su-27UBK to feature double the Su-27SK's combat load, when it is known that the Su-27UBK displays a mere 1,500 kg increase in empty weight and 2,500 kg in maximum take-off weight vis-à-vis the Su-27SK. Paul Jackson, ed., *Jane's All the World's Aircraft: 2002-2003*, Jane's Information Group, Coulsdon, 2002, pp. 399-400. "Su-27UBK: Aircraft Performance", *Sukhoi JSC website*, http://www.sukhoi.org/eng/planes/military/su27ubk/lth/ . "Su-27SK: Aircraft Performance", *Sukhoi JSC website*, http://www.sukhoi.org/eng/planes/military/su27sk/lth/ . Yuri Babushkin (ed.), *Russia's Arms: 2001-2002*, Military Parade, Moscow, 2001, p. 352.

						aircraft is capable of accommodating 145 personnel, while in the twin-deck version this number increases to 225 people. The Il-76MD's MEDEVAC version can evacuate 114 casualties. The Il-76MD is powered by four D-30KP two-shaft turbofan engines (each rated at 12,000 kgf). Three additional aircraft of the Il-76's civilian version (Il-76TD) were delivered to the company "China United Airlines"[409]. This airline was established in 1986 as an arm of the PLA's civil transport division and, till 2003, the majority of the share-capital of "China United Airlines" was directly controlled by the Chinese Armed Forces. The overall cost of the contract amounted to 200

[409] The PLA-owned civilian airline "China United Airlines" has a long history of purchasing civilian cargo aircraft, which are later substantially modified, in order to enter into the inventory of the PLA Air Force transport squadrons. For instance, in 2000 Boeing concluded an agreement with China United Airlines to sell 10 Boeing 737-800 (according to other sources: 737-300) transports. It has been confirmed that the 737 transports are now being used by the PLAAF as troop and cargo military jets, while one 737 has been modified by Xi'an Aircraft Company into a command post for the Chinese Army. The 737 is also a prime airframe for the PLAAF to use in converted roles, such as airborne radar or electronic warfare planes. In early 2005 officials in the U.S. State and Commerce Departments told Bill Gertz of the *Washington Times* that the PLA use of an American-made aircraft was under investigation. A State Department official reported to *Washington Times'* journalist that: "[…] commercial jets are permitted for export to China without a license, but converting a civilian aircraft into a military jet is not allowed under U.S. export rules". The same official then stated: "It is unquestionably true that these jets could not have been sold to the Chinese military without a presidential waiver, which is very unlikely".

A more ominous use of American-made airliners is the PLA's regular incorporation of civilian airliners into military troop and cargo transport missions. It has long been known that the PLA uses China's fleet of civilian airliners as a "reserve" air transport resource. These airliners have been used to perform troop rotations and are occasionally used in troop transport exercises. Following the May 12, 2008 Sichuan earthquake, the PLA again used Boeing and Airbus airliners with China Southern and China Eastern airlines to make emergency shipments of military personnel and medical material. These planes supplemented the use of PLAAF Il-76 and Y-8 transports for the same missions. In mid-June 2008 the PLA conducted another exercise, in which PLAAF Il-76, and both Airbus and Boeing airliners, were mobilized to move PLA Airborne troops. However, there was a unique addition to this exercise: the use of at least one Boeing B-747F and one McDonnell Douglas MD-11F dedicated cargo transports.

A cursory count of U.S.-made cargo airliners used by Chinese airlines -which would now include Hong Kong's airlines-, indicates that they possess at least 31 Boeing 747F cargoliners of various models and 9 MD-11F models, for a current total of 40 cargoliners. Enlisting "civilian" cargoliners in potential operations against Taiwan would be very attractive to the PLA. These aircraft could concentrate on moving the wide variety of palletized cargo, from bullets to artillery rockets to beans that would be needed to sustain light and medium weight tracked and wheeled armoured forces that would be best moved by Il-76s. By using civilian cargoliners to build up weapons and supplies, PLA Airborne armoured forces sent to capture a Taiwanese airport could quickly move from a defensive to an offensive mission. Andrei Chang, "Analysis: China fits Boeing 737 to military use", *UPI Asia Online*, November 12, 2007, http://www.upiasiaonline.com/Security/2007/11/12/analysis_china_fits_boeing_737_to_military_use/3277/ . "The new Chinese Army Air Force: Former China United 737 now a PLAAF C3 Plane", *Softwar.net*, http://www.softwar.net/plaaf.html . Bill Gertz, "Conversions of jetliners in China draw attention", *The Washington Times*, February 1, 2005, http://www.washingtontimes.com/news/2005/jan/31/20050131-115544-1044r/ . Richard Fisher, Jr., "China's Military Employment of American Dual-Use Technologies", *International Assessment and Strategy Center*, August 1, 2008, http://www.strategycenter.net/research/pubID.187/pub_detail.asp .

						million dollars (with about 60% of the amount in question being paid in barter goods).
Military transport helicopter	Mi-171 (NATO reporting name: "Hip-H")	Mil Moscow Helicopter Plant JSC; Ulan-Ude Aviation Plant	1995	1996–1997	60	The development of the original Mi-8 transport helicopter began in May 1960. The prototype of the Mi-17, known initially as Mi-18, was completed in 1975 using Mi-8's airframe, and power plant and dynamic components borrowed from the Mi-14 helicopter. The Mi-17 first flew on August 17, 1975, and entered service in 1977. A total of 7,500 Mi-8s, and subsequent improved Mi-17s and Mi-171/172s, have been marketed and delivered from Kazan Helicopters JSC since 1967, with more than 11,000 (about 3,700 Mi-8T and 7,300 Mi-17) from Ulan-Ude Aviation Plant since 1970 for civil and military use, including 3,500 exported to 70 countries. The Mi-17/171 military transport helicopters exported to China are capable of carrying troops (up to 37 soldiers[410]) and cargo (with a total weight of up to 4,000 kg internally in the cargo compartment, or up to 4,000 kg externally on a sling[411]), evacuate casualties (up to 12 wounded soldiers on stretchers), airlift special forces teams into hostile territory, transport supplies to remote guard posts, deliver supporting fires to infantry and airborne troops, and conduct air reconnaissance on the battlefield. The Mi-17/171 helicopters in service with the Russian Army have also often been used for conducting armed attacks and providing close air support with unguided rockets and machine guns. The Mi-17/171s sold to China were initially unarmed, but the PLA managed to fit these helicopters with external weapon pylons, similar to those used by the Russian Army. External stores are mounted on weapons racks on each side of the fuselage, with a total of six hardpoints. So far, Mi-17/171 in service with the PLA have been seen carrying 12.7 mm machine gun pods, 57/68 mm unguided rocket launchers, several 250/500 kg free-fall bombs (with a total weight of up to 4,000 kg), or the TY-90 air-to-air missiles. The helicopter's combat survivability assets include an armoured crew cabin, porous fuel tank fillers, and fire-fighting equipment. A small number of Mi-171 modified with a search light and an IRST turret has also entered service with the PLAAF for

[410] "Mi-171 multifunctional helicopter", *Ulan-Ude Aviation Plant website*, http://www.uuaz.ru/production/mi171/mi171_about_e.html .

[411] The sling can be up to 100 m long, and the helicopter has to reduce its speed to a maximum of 150 km/h.

						SAR missions. The Mi-171's SAR version is equipped with the SLG-300 (or LPG-150M) winch to lift or lower cargo of up to 300 (or 150) kg, as well as to lift or lower two (or one) men by means of a special rescue hoist, when the helicopter is hovering at an altitude of 50-55 (or 35-40) meters above surface.
Single-seat air superiority fighter aircraft	Su-27SK (NATO reporting name: "Flanker-B")	Komsomolsk-on-Amur Aircraft Production Association (KnAAPO)	1995	1996–1997	16	Deal worth 500-600 million dollars. The 22 Su-27SK/UBK fighter jets, ordered in 1995, were initially placed on combat duty with PLAAF's 2nd Air Division, 4th/6th Fighter Regiment, stationed at Suixi Air Base, in Guangdong Province, in the Guangzhou Military Region.
Two-seat trainer-fighter aircraft	Su-27UBK (NATO reporting name: "Flanker-C")	Irkut Corporation JSC; Irkutsk Aviation Plant (IAPO)	1995	1996–1997	6	Deal worth 150-200 million dollars.
Single-seat air superiority fighter aircraft	Su-27SK/J-11 (NATO reporting name: "Flanker-B")	Sukhoi Design Bureau; Komsomolsk-on-Amur Aircraft Production Association (KnAAPO); Shenyang Aircraft Corporation	1996	1998–2004	200 (105+95)	In 1995, Russia agreed in principle to allow the PRC to build the Su-27SK single-seat fighter locally under license. In 1996[412], Sukhoi JSC and the Shenyang Aircraft Corporation (SAC) concluded a formal contract worth 2-2.5 billion dollars for the co-production of 200 Su-27SK fighters (under the "*J-11*" designation, for domestic use only, without any licence for exports to third-party countries) over a period of 15 years. Under the terms of the 1996 agreement ("Su-27SK Fighter Technology Transfer Agreement"), Sukhoi/KnAAPO supplied the aircraft in kit form, in order to be assembled in SAC's main factory in Shenyang. It was also reported that Russia agreed to help the PRC to gradually increase the portion of Chinese-made components on the J-11, so that SAC could eventually produce a significant part of the aircraft independently. Furthermore, under the provisions of the 1996 contract, Rosoboronexport announced in December 1999 that it was establishing a facility in China (in

[412] According to *Jane's*, the contract was signed on December 6, 1996. However, this information doesn't appear to be accurate, since in another chapter of the same edition of "*Jane's All the World's Aircraft*" is maintained that the contract in question was concluded in February 1996, which seems more plausible. Paul Jackson, ed., *Jane's All the World's Aircraft: 2002-2003*, Jane's Information Group, Coulsdon, 2002, pp. 82, 319.

						Shenyang) for the production of spares and repair of AL-31 engines. The factory is managed by the Liming Engine Manufacturing Corporation[413], one of the largest and most experienced aero-engine enterprises in China. The licensed production of the Su-27 has given China its most capable fighter aircraft at that time, while also providing a vehicle for its industry to gain knowledge of third-generation fighter manufacturing. The first kit-built J-11 rolled out in December 1998 and was flight tested on December 16, 1998; but the full-scale production did not commence until 2000, due to technical problems. Russian sources confirmed that 48 aircraft had been produced by 2002, and another 48 between 2002 and 2003. However, SAC hinted as early as 2000 that not all 200 J-11s would be built. In November 2004, Russian media reported that the J-11 production had stopped after about 105 (according to other accounts, 95) examples were built. As stated by these reports, the Chinese side had requested Sukhoi JSC to stop deliveries of the assembly kits. PLAAF senior officials suggested that the basic variant of the Su-27SK/J-11 fighter could no longer satisfy Chinese Air Force demands. A number of reasons may have contributed to the halt of the J-11 production. Firstly, the co-production agreement did not include the transfer of avionics and engine technologies, and the

[413] Alternatively known as the Shenyang Aero-Engine Factory. Bill Gunston, ed., *Jane's Aero-Engines*, Jane's Information Group, Coulsdon, 2004, p. 109.

[414] It should be noted that the PLAAF has also purchased about 1,000 (according to *SIPRI*: 750) examples of the more modern active radar-guided R-77/RVV-AE (AA-12 "Adder") MRAAM. It has been reported that the Russians, in response to the PLAAF's complaints about the outdated radar technology of the Su-27SK/UBK, upgraded some number (probably 70 units) of early purchase Su-27SK/UBKs and a smaller number of early assembly J-11s, in order to be able to fire the R-77 missile. Richard Fisher, Jr., "China's Emerging 5th Generation Air-to-Air Missiles", *International Assessment and Strategy Center*, February 2, 2008, http://www.strategycenter.net/research/pubID.181/pub_detail.asp . Andrei Chang, "Russia upset by China's imitation fighter", *UPI Asia*, April 25, 2008, http://www.upiasia.com/Security/2008/04/25/russia_upset_by_chinas_imitation_fighter/5808/ . Stockholm International Peace Research Institute (SIPRI) Arms Transfers Database, http://armstrade.sipri.org/armstrade/page/trade_register.php .

[415] PLAAF's 1st Air Division was the first to receive indigenously built J-11 and J-11B fighters, and the third PLAAF's Division to receive Russian-supplied Su-27SK/UBK fighters in the early 1990s. In addition, this unit was among the first PLAAF's formations to receive a complement of domestically produced J-10 fighter jets. Andrei Chang, "China's fighter planes: Part 2", *UPI*, May 29, 2008, http://www.upi.com/Security_Industry/2008/05/29/Analysis-Chinas-fighter-planes-Part-2/UPI-62961212093683/ .

[416] PLAAF's 2nd Air Division (and more specifically, the Suixi Air Base) is said to be equipped with some of the most modern (and well maintained) aircraft hangars, hardened aircraft shelters, and support facilities currently in service with the PLAAF. "PLA Air Force building new aircraft hangars", *Kanwa Asian Defence*, Issue 49, November 2008, October 16, 2008, http://www.kanwa.com/ .

						Chinese-built Su-27SK/J-11 would have to continue relying on Russia for the supply of these systems. Secondly, the Russian N001V(E) fire-control radar system fitted on the Su-27SK/J-11 wasn't fully compatible with the Chinese-made missiles. As a result, the PLAAF had to import additional R-27 (AA-10 "Alamo") MRAAMs, and R-73 (AA-11 "Archer") SRAAMs from Russia.[414] Thirdly, as a single mission air superiority fighter, the Su-27SK/J-11 isn't configured to use modern stand-off weapons. Therefore, it can undertake only secondary attack missions (armed with "dumb" munitions that include a range of free-fall bombs and unguided rockets), exposed to the fire of ground-based air defense missile systems. In that context, after the end of the licensed production of the Su-27SK/J-11, the PLA Air Force seems to be moving towards either the purchase of a greater number of advanced multi-role fighter jets of Russian origin, like the Su-30MKK or the Su-35, or the procurement of additional units of the domestically designed and built J-10 fighter jet. Parenthetically, it should be mentioned that in 2009 Shenyang Aircraft Corporation had almost completed the development of a new version of the Su-27SK, designated J-11B, which is based on the Russian airframe (the Chinese used composite materials that reduce the aircraft's RCS), but is fitted with Chinese-built avionics, engines (WS-10A turbofan engines) and weapons. The J-11B has not entered full-rate production yet. J-11 fighter jets are currently deployed with the following PLAAF Air Divisions: i) 1st Air Division[415]; ii) 2nd Air Division[416]; iii) 6th Air Division; iv) 7th Air Division; v) 14th Air Division; vi) 19th Air Division (57th Fighter Regiment); vii) 33rd Air Division.
Military transport helicopter	Mi-171 (NATO reporting name: "Hip-H")	Mil Moscow Helicopter Plant JSC; Ulan-Ude Aviation	1998	1999–2000	15	The helicopters are powered by two Klimov TV3-117MT[417] turboshaft engines, which provide a maximum power of 1,923 shp each. The cost for the acquisition of the 15 helicopters reached the amount of 60 million dollars.

[417] The TV3-117 is a second generation turboshaft engine designed in 1967-1970, with the first versions going into production in 1972. Since then, about 22,000 TV3-117 engines have been produced to power helicopters. By 2009, total TV3-117 flight time had reached 4.5 million hours. Bill Gunston, ed., *Jane's Aero-Engines*, Jane's Information Group, Coulsdon, 2004, p. 301.

		Plant				
Jet fighter engine	AL-31F turbofan engine	Moscow Machine-Building Production Plant "Salut"; Promexport Federal State Unitary Enterprise	1999	1999–2000	31	The AL-31F turbofan engine powers the Su-27 SK/UBK and Su-30MKK/MK2 family of fighter jets. The AL-31F entered production in late 1981, and received final qualification in 1985. It is a two-shaft, bypass turbofan engine, with main/bypass exhaust mixing, a common afterburner, and a fixed-axis exhaust nozzle. In addition, the engine features a top-mounted gearbox, a looped oil system, an autonomous start-up system, a surge termination system, and high gas-dynamic stability of the compressor. The main control system is electronic, while the auxiliary (backup) one is hydraulic. The AL-31F turbofan engine generates 122.58 kN (12,500 kgf, 27,557 lbf) of thrust in full afterburner. It features a specific fuel consumption of 0.67 kg/kgf·h, an air flow rate of 112 kg/s, and a bypass ratio of 0.571:1. The engine is entirely modular, with the ability to replace the nozzle, afterburner, mixer, low-pressure (LP) turbine, LP compressor, and gearbox without removing the remainder from the aircraft. AL-31F's dry weight is 1,530 kg, while a high proportion of the construction is steel or titanium. The contract was valued at 80 million dollars.
Two-seat multi-role fighter-bomber aircraft	Su-30MKK (NATO reporting name: "Flanker-G")	Sukhoi Design Bureau JSC; Komsomolsk-on-Amur Aircraft Production Association (KnAAPO)	August 1999	2000–2001	38	The Su-30MKK ("Flanker-G") multi-role fighter-bomber aircraft is considered to be roughly equivalent to Boeing's F-15E Strike Eagle (even though its avionics subsystems and software are, undoubtedly, less sophisticated than those of the F-15E). The origins of the Su-30 lie in the last years of the Soviet era, when the Soviet Air Force sought an upgraded, fully combat capable derivative of the existing Su-27UB fighter-trainer. The dual variant was to be equipped for aerial refuelling, and used as a long range multirole strike fighter and combat command and control fighter to lead long-range Combat Air Patrol missions. The new fighter-bomber was based to a great extent on the design solutions previously adopted for the Su-27SK and the single-seat fighter Su-27M. The first Su-30MKK was built in the spring of 1999, and made its maiden flight on May 20, 1999. The Su-30MKK exported to China is equipped with the RLPK-27VE radar sighting system, fitted with a N001VE ("Slot Back") track-while-scan coherent Pulse-Doppler radar (with expanded air-to-ground capabilities, including terrain-mapping, and moving target indication). The main upgrades adopted in the N001VE radar

						(when compared to the older N001E variant) are its ability to simultaneously engage 2 of the 10 targets tracked, its improved digital processing ability (with a BCVM-486-6 processor), and compatibility with the RVV-AE/R-77 MRAAM. N001VE's search and target acquisition/engagement ranges are practically identical to the performance displayed by the earlier N001V version. The Su-30MKK integrates the OEPS-30I (31E-MK) electro-optic sighting system comprising an OLS-30 (52Sh) IRST sensor and a collimated laser range-finder/target designator, as well as the Sura-K helmet mounted display (HMD). The fighter is also fitted with a glass cockpit (with two 178x127 mm MFI-9 colour LCD multi-function displays in the front/pilot seat, and a single MFI-9 together with a 204x152 mm MFI-10 LCD multi-function displays in the rear/weapon operator seat), an A-737 satellite navigation system receiver (compatible with both GLONASS and GPS), and expanded (in comparison to the Su-27SK) electronic warfare capabilities. The aircraft's maximum combat load is augmented to 8,000 kg[418], and the weaponry is arranged at 12 suspension hardpoints. The Su-30MKK is powered by two AL-31F turbofan engines, each rated at 122.58 kN (12,500 kgf, 27,557 lbf) with afterburning. 26 Su-30MKK fighters are deployed with PLAAF's 3rd Air Division, 9th Fighter Regiment, stationed at Wuhu Air Base, in Anhui Province, in the Nanjing Military Region.[419] 20 and 19 Su-30MKK fighter-bombers are operated by the 87th (Quzhou Air Base) and the 54th (Datuopu/Changsha Air Base) Regiments of the 29th (deployed in the Nanjing Military Region) and 18th (deployed in the Guangzhou Military Region) Air Divisions, respectively.[420] Delivery of the 10 first units in December 2000; 28 units in 2001 (in August, and December 2001). Total cost: 1.5–2 billion dollars.

[418] "Su-30MK: Aircraft Performance", *Sukhoi JSC website*, http://www.sukhoi.org/eng/planes/military/su30mk/lth/ . "Su-30MK: Double-seat fighter", *KNAAPO JSC website*, http://www.knaapo.ru/eng/products/military/su30mk.wbp .

[419] 3rd Air Division's 9th Regiment was the first PLAAF's unit to be equipped with Su-30MKK fighters. Wuhu Air Base, with 26 hardened aircraft shelters and maintenance aircraft hangars, has some of the most complete and "fully-fledged" airport facilities currently found in the PLAAF. It is speculated that in a Taiwan conflict scenario, the 9th Fighter Regiment may constitute the backbone of PLAAF's strategic reserve force. Andrei Chang, "Combat missions of PLAAF's five key fighter-bomber regiments", *Kanwa Asian Defence*, Issue 47, September 2008, August 15, 2008, http://www.kanwa.com/ .

Two-seat trainer-fighter aircraft	Su-27UBK (NATO reporting name: "Flanker-C")	Irkut Corporation JSC; Irkutsk Aviation Plant (IAPO)	December 1999	2000–2002	28	The purchase of 28 Su-27UBK fighter-trainers was decided in order to offset the shortfall observed in 1998-1999 in China's licensed production of the J-11, and help maintain PLAAF's pilot training schedule. Eight units were delivered in 2000; another 10 in 2001; and, the last batch of 10 units in 2002. The aircraft were initially operated by the 97th/98th Fighter Regiment of the 33rd Air Division, based at Baishiyi/Chongqing Air Base, in Sichuan Province, in the Chengdu Military Region. Total value of the contract: 1 billion dollars. The sale was carried out as payment for Russian debt owed to China, under the provisions of a bilateral "programme for arms-for-debt sales".
Jet fighter engine	AL-31FN turbofan engine	Moscow Machine-Building Production Plant "Salut"	2000	2001–2004	54	The turbofan engines were intended to power the Chinese, indigenously produced, J-10 fighter jets. The AL-31FN is a derivative of the Su-27's AL-31F two-shaft turbofan engine, modified for single-engine aircraft with a lower positioning of the gearbox (the aircraft accessories gearbox is located on the engine). The AL-31FN unleashes 122.58 kN (12,500 kgf, 27,557 lbf) of thrust with afterburning. It features a specific fuel consumption of 0.685 kg/kgf·h; an air flow rate of 112 kg/s; and a bypass ratio of 0.571:1. The engine's dry weight is 1,547 kg.[421] It is worth mentioning that the J-10's new, upgraded version, which is still under development carrying the provisional codename "Super-10" or "J-10B", is expected to be fitted with the AL-31F (42 series) M1 (also known as AL-31FN-M1) engine, which reportedly features a 3D thrust vector control (TVC) system. [422] The contract was valued at 150-

[420] The remaining 11 Su-30MKKs are likely allocated to PLAAF's Flight Test and Training Center, at Cangzhou Air Base, in Hebei Province. Andrei Chang, "Combat missions of PLAAF's five key fighter-bomber regiments", *Kanwa Asian Defence*, Issue 47, September 2008, August 15, 2008, http://www.kanwa.com/ .

[421] Salut's official website provides slightly different technical data about the AL-31FN engine: i) afterburning thrust of 124.54 kN (12,700 kgf, 27,998 lb); ii) maximum length and diameter of 5,002 mm and 1,180 mm, respectively; iii) specific fuel consumption of 0.705 kg/kgf·h; and, iv) dry weight of 1,538 kg. "AL-31FN: By-passed turbojet engine with afterburner", *Moscow Machine Building Production Plant "Salut" website*, http://salut.ru/ViewTopic.php?Id=664 .

[422] Compared to the basic version of the J-10 fighter jet, J-10B incorporates modifications in the airframe and the avionics suite. Enhancements include the AL-31F (42 series) M1 turbofan engine, rated at 132.39 kN (13,500 kgf, 29,762 lbf) in afterburner; a redesigned diverter-less supersonic engine inlet (DSI); a modified vertical stabiliser; ventral fins; a stronger airframe; an infrared search and track (IRST) sensor; and, either a passive phased-array radar, or a derivative of the Russian Zhuk-MSE radar. In comparison to the basic variant of the AL-31 turbofan engine, the AL-31F (42 series) M1/AL-31FN-M1 engine employs a number of upgrades that include a modernized low pressure compressor (LPC) system with increased air

						162 million dollars.
Airborne Pulse-Doppler radar	N010 Zhuk-8-II	JSC Phazotron–NIIR	2001	2001–2005	100	For installation on F-8IIM ("Finback-B") fighter aircraft, first unveiled in 1996. The N010 Zhuk (modelled on the U.S. APG-65 and APG-68 radars) was originally developed for the MiG-29/MiG-23 fighter jets, and it was designed as a coherent, multimode, multi-mission, digital fire-control radar, able to perform both air-to-air and air-to-ground missions. The N010 Zhuk radar has a weight of 220 kg and uses an electronically scanned slotted planar array antenna with a 680 mm diameter aperture, which offers a detection range of 70-90 km against targets displaying a 5 m^2 RCS. The radar can track 10-12 targets, while engaging 2-4 of them, with a scanning area of +/-90 degrees in azimuth and +55/-40 degrees in elevation; its average power output is rated at 1kW and peak rating is 5 kW. The Zhuk-8-II radar developed for the F-8IIM ("Finback-B") fighter aircraft has similar performance and characteristics to the N010 Zhuk radar, with a slightly increased weight of 240 kg. Nevertheless, the Zhuk-8-II lacks sea search capability for anti-shipping missions, and is capable of tracking up to 10 targets and simultaneously engaging up to 2 targets.
Military transport helicopter	Mi-17-V5 (Mi-8MTV-5) (NATO reporting name: "Hip-H")	Mil Moscow Helicopter Plant JSC; Kazan Helicopte	2001	2002–2003	35	The Mi-17-V5 military transport helicopter can airlift up to 36 soldiers (i.e. a 4,000 kg, or 23-27 m^3 payload in the cargo compartment).[423] The Mi-17-V5 is an upgrade of the Mi-171 helicopter designed to: engage small-size ground/surface targets and personnel; transport military cargoes and troops; carry out SAR missions; and, evacuate

consumption; the use of synthetic materials in the rotors; a full-authority digital engine control (FADEC) system instead of an analogue one; a turbine starter with increased power and higher-altitude start-up capability; and, an adjustable, fully variable, 3D thrust vector control nozzle. The installation of the new engine is expected to allow more rapid take-offs and larger weapons carriage. The prototype J-10B reportedly made its maiden flight in December 2008. Pakistan is likely to be the first export customer for the J-10B, having, according to some sources close to China's defense industrial complex, already begun negotiations to buy 36 aircraft. Pakistan intends to designate the new fighter FC-20, and, according to the same sources, deliveries are likely to begin from 2014-15. "AL-31F (42 series) M1: By-Passed turbojet engine with afterburner", *Moscow Machine-Building Production Plant "Salut" website*, http://www.salut.ru/Section.php?SectionId=18 . Siva Govindasamy, "China's AVIC steps up sales push for FC-1, J-10 fighters", *Flight International*, September 30, 2009, http://www.flightglobal.com/articles/2009/09/30/332905/chinas-avic-steps-up-sales-push-for-fc-1-j-10-fighters.html .

[423] The helicopter's MEDEVAC version can evacuate up to 12 casualties. The helicopter can equally carry externally (on a sling, which can be up to 100 m long) 4,500 kg of cargo. The helicopter is capable of lifting the cargo at distances of up to 500 km, flying at speeds not exceeding the 150 km per hour. "Mi-17: Cargo transportation inside the cabin", *Kazan Helicopters JSC website*, http://www.kazanhelicopters.com/index.php?id=83 .

		rs JSC				casualties. It can carry several 250/500 kg free-fall bombs (with a total weight of up to 4,000 kg); up to four B8V20-A pods with S-8 unguided rockets; up to two UPK-23-250 gun pods (fitted with twin-barrelled 23 mm guns); and, 7.62 mm PKT machine guns mounted on the swivelling nose gun mount. Troops can fire their personal weapons from inside the helicopter, through six swivelling portholes in the side windows and doorway. It is worth mentioning that both the Mi-17-V5 as well as the Mi-171Sh[424] variant of the helicopter can carry up to eight 9M120 Ataka-V[425], or 9M114 Shturm[426] ATGMs[427].The Mi-17-V5's SAR version is equipped with the SLG-300 winch capable of lifting or lowering cargo weighing up to 300 kg, forward looking infrared (FLIR) and thermal imaging systems, and an SX-16 "Nightsun" searchlight with an infrared filter (which allows the use of the searchlight together with the night vision equipment and the FLIR system).[428] The Mi-17-V5 maximum ferry range is said to be 580 km (1,065 km, when using auxiliary external fuel tanks). The helicopters are powered by two TV3-117VM turboshaft engines, each rated at 2,170 shp. The Chinese government spent approximately 140-175 million dollars for the acquisition of the helicopters.
Jet fighter engine	AL-31F turbofan engine	Moscow Machine-Building Production Plant "Salut"	January 2001	2002–2003	100	The AL-31F turbofan engines were going to be fitted into Su-27SK/J-11 fighter jets, which were assembled in China, under a licence agreement, in the plant of the Shenyang Aircraft Corporation (SAC). The cost for the procurement of 100 engines amounted to 300 million dollars.
Two-seat multi-role fighter-bomber aircraft	Su-30MKK (NATO reporting name: "Flanker-	Sukhoi Design Bureau JSC; Komsomolsk-on-	July 2001	2002–2003	38	Delivery of 19 units in 2002; the second batch with the last 19 units was delivered in 2003. As we have already mentioned, the Su-30MKK aircraft ordered in 2001 were assigned to PLAAF's 29th and 18th Air Divisions. The value of the contract reached the amount of 1.8-2 billion

[424] The Mi-171Sh bears close resemblance to the Mi-17-V5 helicopter, but is produced and marketed by the Ulan-Ude Aviation Plant. As of today, the PRC has not acquired any helicopters of the Mi-171Sh configuration.
[425] U.S. DoD/NATO reporting names: AT-12 "Swinger".
[426] U.S. DoD/NATO reporting names: AT-6 "Spiral".
[427] Yet, notwithstanding the assertions of the manufacturing company, it is highly questionable whether the Mi-171 helicopters are capable of fully exploiting the ATGM's flight envelope, since they lack the sophisticated optronics and target acquisition systems installed on dedicated attack helicopters. Most probably, the Mi-171s can make a limited use of anti-tank guided missiles in day light and under favourable weather conditions.
[428] "Mi-17: SAR", *Kazan Helicopters JSC website*, http://www.kazanhelicopters.com/index.php?id=69 .

[429] The baseline Kh-59M design is fitted with a 7TM1 electro-optic seeker, and uses man-in-the-loop control via a data link to the launch aircraft. At the initial flight stage the missile is controlled by its inertial guidance system (target co-ordinates are downloaded to the missile before launch). As the missile approaches the target area, its TV-homing head turns on to broadcast the target image to the carrier aircraft (which usually carries, on the left -no. 9- inlet pylon, the APK-9 data link pod). The Kh-59ME's maximum range is estimated to be 115 km, and the missile is roughly comparable in performance to the Israeli-American AGM-142 Have Nap "Popeye". Rosoboronexport, *Aerospace Systems: Export Catalogue*, Moscow, 2005, p. 124, http://www.rusarm.ru/cataloque/air_craft/aircraft.pdf . Carlo Kopp, "Regional Precision Guided Munitions Survey", *Defence Today*, January/February 2006, p. 65, http://www.ausairpower.net/DT-Missiles-01-06.pdf .

[430] The Kh-31P medium-range (maximum range up to 110 km) air-to-surface missile is designed to engage illuminating radars of long- and medium-range SAM systems, as well as other ground- and sea-based radars operating in the appropriate wavelength band. As a matter of fact, the Kh-31P missile was specifically developed to target the U.S. Navy's AN/SPY-1 "Aegis" radar, and the U.S. Army's AN/MPQ-53/65 phased-array radar system used by the Patriot SAM system. The missile is provided with three changeable modules of the passive radar-homing head, covering the entire frequency range of radar targets. It is equipped with a combined propulsion unit, including a solid-propellant booster stage and a liquid ramjet operating on kerosene. The targets are detected either by the aircraft's electronic reconnaissance set, or by the missile's homing head. Yuri Babushkin (ed.), *Russia's Arms: 2001-2002*, Military Parade, Moscow, 2001, p. 425.

[431] The Kh-29 short-range supersonic air-to-ground missile is designed for use against large (the missile's warhead weighs 320 kg) battlefield targets and infrastructure (such as industrial buildings, depots, aircraft shelters, runways, etc). The TV-guided (fitted with a 7TM1 sensor) Kh-29T and Kh-29TE/Kh-29TM variants (with a maximum range of 10-12 km, and 30 km, respectively) are considered to be analogous to the American AGM-65 Maverick missile. The semi-active laser homing (fitted with a 24N1 seeker) Kh-29L variant (with a maximum range of 8-10 km) is considered to be equivalent to the French AS-30L missile. A Su-30MKK aircraft can carry up to six Kh-29 missiles suspended on APU/AKU-58 launchers. The PLAAF reportedly purchased 2,000 examples of the Kh-29T missile in 2002 from Russia. The missile has been seen in action with Chinese Su-30MKK aircraft during the "*Peace Mission 2005*" exercise. Bill Gertz, "China test-fires new missile", *The Washington Times*, July 1, 2002, http://cndyorks.gn.apc.org/yspace/articles/chinamissiletest.htm . Carlo Kopp, "Sukhoi Flankers: The Shifting Balance of Regional Air Power", *Air Power Australia*, January 2007, http://www.ausairpower.net/APA-Flanker.html . Rosoboronexport, *Aerospace Systems: Export Catalogue*, Moscow, 2005, p. 122, http://www.rusarm.ru/cataloque/air_craft/aircraft.pdf .

[432] The KAB-500/1500L guided bombs (fitted with a 27N/1 semi-active laser homing seeker) are designed to engage and destroy ground, small-size hardened and underground targets (such as reinforced concrete shelters, warehouses, nuclear weapon depots, and command posts), as well as waterborne targets. The KAB-1500L (with a 1,170 kg warhead) can penetrate the ground to a depth of 10-20 m, and pierce up to 2 m of reinforced concrete. Both bombs are dropped from aircraft flying at altitudes ranging between 1 and 8 km (up to 15 km for the KAB-1500L-Pr-E, KAB-1500L-F-E, KAB-1500L-OD-E variants), at speeds of 550-1,100 km/h (up to 1,700 km/h for the KAB-1500L-Pr-E, KAB-1500L-F-E, KAB-1500L-OD-E variants). The KAB-500/1500L guided bombs can be fitted with high-explosive/blast fragmentation (distinguished by the "-F" suffix), piercing/bunker busting (distinguished by the "-Pr" suffix), submunitions dispensing (distinguished by the "-K" suffix), or fuel-air explosive/thermobaric (distinguished by the "-OD" suffix) warheads, with a cited CEP of 7-10 m. The KAB-500L is a direct equivalent to the American GBU-16 Paveway II bomb. Yuri Babushkin (ed.), *Russia's Arms: 2001-2002*, Military Parade, Moscow, 2001, pp. 434-435. Rosoboronexport, *Aerospace Systems: Export Catalogue*, Moscow, 2005, p. 128, http://www.rusarm.ru/cataloque/air_craft/aircraft.pdf . Carlo Kopp, "Soviet/Russian Guided Bombs", *Air Power Australia*, August 2009, http://www.ausairpower.net/APA-Rus-GBU.html . Carlo Kopp, "Sukhoi Flankers: The Shifting Balance of Regional Air Power", *Air Power Australia*, January 2007, http://www.ausairpower.net/APA-Flanker.html . Carlo Kopp, "Regional Precision Guided Munitions Survey", *Defence Today*, January/February 2006, p. 66, http://www.ausairpower.net/DT-Missiles-01-06.pdf .

[433] The KAB-500/1500Kr electro-optical guided bombs (fitted with a 7TM1 seeker and a Scene Matching Area Correlation package) are designed to engage and destroy a wide range of large ground targets (such as

	G")	Amur Aircraft Production Association (KnAAPO)				dollars. The fire control system of the Su-30MKK has interfaces to support a wide range of air-to-ground guided weapons, including the Kh-59M/E[429] (AS-18 "Kazoo") cruise missile series (up to 2 missiles/aircraft); the Kh-31P[430] (AS-17 "Krypton") ramjet anti-radiation missile (up to 6 missiles/aircraft); the Kh-29L/T[431] (AS-14A/B "Kedge") laser/TV-guided air-to-ground tactical missiles (up to 6 missiles/aircraft); the KAB-500/1500L[432] laser-guided bombs; the KAB-500/1500Kr[433] and KAB-1500TK[434] electro-optical TV-guided bombs. One airplane usually carries up to six 500 kg bombs, or up to three

industrial facilities, railway bridges, reinforced concrete shelters, fuel/petroleum depots, port terminals, and runways), as well as waterborne targets. The KAB-500 and the KAB-1500Kr bombs provide a fire-and-forget capability, and they are dropped from aircraft flying at altitudes of 0.5-5 km and 1-8 km respectively, at speeds of 550-1,100 km/h. They can be fitted with high-explosive/blast fragmentation, piercing/bunker busting, submunitions dispensing, or fuel-air explosive/thermobaric warheads, featuring a target hit accuracy (CEP) of 4-7 m. The KAB-500Kr bears some resemblance to the long-retired American GBU-8 HOBOS. Yuri Babushkin (ed.), Russia's Arms: 2001-2002, Military Parade, Moscow, 2001, pp. 433, 435. Carlo Kopp, "Soviet/Russian Guided Bombs", *Air Power Australia*, August 2009, http://www.ausairpower.net/APA-Rus-GBU.html . Rosoboronexport, *Aerospace Systems: Export Catalogue*, Moscow, 2005, pp. 127, 128, http://www.rusarm.ru/cataloque/air_craft/aircraft.pdf .

[434] The design of the KAB-1500TK electro-optical TV-guided bomb (fitted with a 7TM1 seeker and a "man-in-the-loop" command link arrangement) can be described as a fusion of ideas used in the American GBU-8 HOBOS and GBU-15 TV-guided bombs. The APK-9 data link pod is used to send steering commands to the bomb, and receive video from the seeker during flight for display in the aircraft's cockpit. Carlo Kopp, "Soviet/Russian Guided Bombs", *Air Power Australia*, August 2009, http://www.ausairpower.net/APA-Rus-GBU.html . Carlo Kopp, "Regional Precision Guided Munitions Survey", *Defence Today*, January/February 2006, p. 66, http://www.ausairpower.net/DT-Missiles-01-06.pdf .

[435] The RVV-AE/R-77 MRAAM (50-90 km maximum range) is considered to be the Russian counterpart to the American AIM-120A/B AMRAAM. It can intercept targets flying at speeds of up to 3,600 km/h, at altitudes ranging from 0.02 to 25 km, and is able of sustaining 12 g manoeuvres. The RVV-AE is fitted with a 22.5 kg warhead, and features an active radar-homing head (with a 9B-1348E seeker) and radio-corrected inertial navigation control system, which permits in-flight target acquisition and missile re-targeting. The missile is suspended on AAKU/AKU-170 launchers. China acquired from Russia 100-200 examples of the RVV-AE/R-77 missile in 2001 (with following purchases putting the number of the R-77 missiles currently in service with the PLAAF at about 1,000 units), and test-fired the missile for the first time in late June 2002. China managed to indigenously develop the PL-12 (SD-10) MRAAM, probably on the basis of the R-77's radar seeker and data link technologies, combined with a Chinese rocket motor. It is particularly noteworthy that the PLAAF has showed a vivid interest in acquiring the IR-guided (fitted with MK-80E seekers) R-77T and R-77T-PD variants of the R-77 missile, as well as the anti-radiation/passive radar homing (fitted with a 9B-1032 X-band passive anti-radiation seeker) R-77P and R-77P-PD versions of the baseline R-77 missile. Bill Gertz, "China test-fires new missile", *The Washington Times*, July 1, 2002, http://cndyorks.gn.apc.org/yspace/articles/chinamissiletest.htm . Richard Fisher, Jr., "China's Emerging 5th Generation Air-to-Air Missiles", *International Assessment and Strategy Center*, February 2, 2008, http://www.strategycenter.net/research/pubID.181/pub_detail.asp . Yuri Babushkin (ed.), *Russia's Arms: 2001-2002*, Military Parade, Moscow, 2001, pp. 421-422. Rosoboronexport, *Aerospace Systems: Export Catalogue*, Moscow, 2005, p. 120, http://www.rusarm.ru/cataloque/air_craft/aircraft.pdf . Carlo Kopp, "The Russian Philosophy of Beyond Visual Range Air Combat", *Air Power Australia*, March 25, 2008, http://www.ausairpower.net/APA-Rus-BVR-AAM.html .

						1,500 kg bombs, on wing stations 3 and 4, inlet stations 9 and 10, and centreline tandem stations 1 and 2. It has been reported that PLAAF's Su-30MKKs are equipped with the Sapsan-E forward-looking infrared/electro-optic targeting and laser designation pod, which can guide the KAB-1500L bomb. As far as the air-to-air weaponry of the Su-30MKK is concerned, the main upgrade/advancement over the Su-27SK/UBK's armament consists in integrating the RVV-AE/R-77[435] (AA-12 "Adder") active radar-homing MRAAM.
Airborne Early Warning and Control (AEW&C) radar system	Beriev A-50E/U (NATO reporting name: "Mainstay")	Beriev Aircraft Company; JSC Scientific Research Institute of Instrument Design (NIIP) V.V. Tikhomirov	2001/2002	2007	4	The number of the aircraft ordered could be up to 6 (if the Chinese decide to proceed to the lease of 2 additional aircraft). The Chinese version of the Beriev A-50 AWACS is designated as the KJ-2000 (KongJing-2000). The aircraft was based on the airframe of the Russian-made Beriev A-50 (developed from the Il-76MD transport aircraft), but it was outfitted with a Chinese Active Electronically Scanned Array (AESA) radar developed by the Nanjing Research Institute of Electronics Technology (also known as the "14th Institute"). The KJ-2000 was a direct result of the failed A-50I EL/M-2075 PHALCON (PHased Array L-band CONformal Radar) programme. More specifically, in 1994 China started a three-way talk with Israel[436] and Russia for a possible

[436] Israel's military relations with China began in 1979. Developments in the late 1970s had created common Sino-Israeli interests that laid the groundwork for unofficial bilateral relations, primarily in the military field. The Israeli business tycoon Shaul Eisenberg, who had forged ties with the Chinese leadership in the 1970s, arranged in 1979 a secret meeting between the heads of the Israeli defense industry and Chinese defense leaders, which paved the way for several large arms deals. As early as 1984 several Western press reports estimated the value of Sino-Israeli military agreements at 3 billion dollars (probably an inflated estimation of the real volume of the Sino-Israeli arms trade deals). The main driving factors behind Israel's rapprochement with the PRC in the defense industry field in the late 1970s-early 1980s were the following: a) Israel had lost some of its most profitable customers, primarily Shah's Iran and apartheid South Africa; b) in these circumstances, Israel's military-industrial complex was pushed into an unprecedented economic crisis that led not only to unemployment, but also to a loss of income that brought a shortage of vital funds for Research and Development programmes; c) military relations could lead the PRC to moderate its pro-Arab foreign policy, reduce its hostility toward Israel, and ultimately pave the ground for official diplomatic relations between the two countries; d) the PRC could adopt a more positive stance towards Israel in the U.N. Security Council. Besides, in the 1990s China's vast network of human intelligence agents could, better than U.S. satellites, relay secret information to Israel about North Korea's sales of missiles to Iraq and Iran, and Russia's involvement in Iran's nuclear programme.

However, since the early 1990s, Israel has been accused of the illegal transfer of American defense technology to China. It is therefore no wonder that despite the reported decline in Israeli arms transfers to China since the 1990s, both in absolute terms and even more so in relative ones, Israel has been under constant U.S. pressure to reduce further its arms transfers to China and, even better, to cancel them altogether. In 1992, the State Department Inspector General applied pressure on the State Department Bureau of Politico-Military Affairs to take action and to curtail the "unauthorized" transfers of military hardware of American origin to China through Israeli channels. These unauthorized transfers included:

						purchase of advanced AWACS aircraft. Under the proposal, Russia would provide four Beriev A-50 airframes, which were to be fitted with the EL/M-2075 PHALCON airborne early warning (AEW) radar and other C3I (Communication, Command, Control, and Intelligence) systems, most of them developed by the Israeli company ELTA Systems (a company belonging to the Israel Aircraft Industries[437] -IAI- group). In May 1997, China, Israel, and Russia reached an agreement to supply one such AWACS aircraft to the PLAAF (under the designation A-50I) for 250 million dollars, with an option for three more aircraft for a total cost of 1 billion dollars (Russia agreed to become part of the deal in return for 20% of the proceeds). In October 1999, Russia delivered the first A-50I aircraft to Israel for the installation of the PHALCON AEW radar system. By May 2000, Israel had nearly completed the system's

Israel's Python-3 air-to-air missile (AAM), a version of the U.S.-made AIM-9L Sidewinder AAM; the MAPATZ anti-tank missile, based on the U.S.-made TOW-2; U.S.-made Patriot missiles or missile technology; and, Israel's support in designing and building the Chinese J-10 fighter jet, partially based on the discontinued Lavi fighter project that had received funding from the United States. In the dawn of the 21st century, the controversy over the sale of the Phalcon AEW&C radar system and the upgrade of Harpy UAVs further exacerbated the crisis. For a few months throughout the first half of 2005, Washington imposed harsh sanctions on Israel's entire defense industry (e.g. companies participating in the F-35 JSF development programme), not merely on plants that made deals with China. Finally, in August 2005 Tel Aviv signed a Memorandum of Understanding with the American government and was forced to establish a tight control mechanism of defense exports (including the control of dual civil-military use materiel), ban military trade with China, and adhere (without becoming a full member) to some principles of the 1996 Wassenaar Arrangement. Yitzhak Shichor, "Mountains out of molehills: Arms transfers in Sino-Middle Eastern relations", *Middle East Review of International Affairs*, Vol. 4, No. 3, September 2000, http://meria.idc.ac.il/journal/2000/issue3/jv4n3a6.html . Yoram Evron, "Sino-Israel Relations: Opportunities and Challenges", *Strategic Assessment*, The Institute for National Security Studies, Vol. 10, No. 2, August 2007, http://www.inss.org.il/publications.php?cat=21&incat=&read=249 . Uzi Eilam, "Defense Export Control in 2007: State of Affairs", *Strategic Assessment*, The Institute for National Security Studies, Vol. 9, No. 4, March 2007, http://www.inss.org.il/publications.php?cat=21&incat=&read=44 .

[437] Since 2006: "*Israel Aerospace Industries*".

[438] When the Sino-Israeli Phalcon deal was first broached to the United States in 1994, it was never formally approved, but no objections were registered either. However, the Sino-American relationship rapidly deteriorated in 1999-2000, and with it went the Phalcon sale. In April 2000, U.S. Defense Secretary William Cohen was blunt in condemning the proposed sale for upgrading Chinese capabilities against Taiwan, and possibly degrading American ability to operate in the region. American officials had spoken of reductions in aid and technology transfers, and even a lessening of America's commitment to Israel, if the sale was not voided. Jonathan Adelman, "The Phalcon sale to China: The lessons for Israel", *Jerusalem Letter / Viewpoints*, Jerusalem Center for Public Affairs, No. 473, March 1, 2002, http://www.jcpa.org/jl/vp473.htm .

[439] In comparison to the baseline D-30KP model, the D-30KP-2 version features a slightly lower fuel consumption (0.700 as opposed to 0.710 kg/kgf·h in cruising mode), bypass ratio (2.2 as opposed to 2.36), and air consumption (269 as opposed to 279 kg/sec). The D-30KP-2 engine provides 12,000 kgf of thrust at air temperature of +30 °C. Rosoboronexport, *Aerospace Systems: Export Catalogue*, Moscow, 2005, p. 74, http://www.rusarm.ru/cataloque/air_craft/aircraft.pdf .

						installation. However, the PHALCON deal became an increasingly controversial issue between the United States and Israel. In 2000, the Clinton administration voiced stronger objections to the sale (arguing that PHALCON is a system comparable to Boeing's E-3 Sentry AWACS, and thus it could potentially disrupt the East Asian military balance of power, jeopardizing the security of the American forces stationed in that region), and urged Tel Aviv to cancel the contract.[438] After some intensive talks, the Israeli government cancelled the deal with China on July 10, 2000 (the decision was made public on July 13, during the Camp David summit). China reacted to this setback by starting a domestic programme to develop its own AEW radar and relevant C3I equipment. Modifications on the airframe of a Beriev A-50 aircraft began in late 2002 to install the Chinese-made airborne radar systems, including an L-band active phased array radar device. The A-50/KJ-2000 airplanes currently in service with the PLA Air Force are carrying out patrol missions at an altitude of 5,000-10,000 m, and they are intended to detect and identify air objects, determine their coordinates and flight path data, transfer information to command posts, direct fighters and frontline aircraft to combat areas for attacking ground targets from low altitudes. The maximum flight range of the aircraft is 5,000 km and the flight endurance is estimated to be 7.7 hours. The A-50E/U is powered by four D-30KP-2 turbofan engines[439], each rated at 117.68 kN (12,000 kgf, 26,455 lbf). A total of four examples are being operated by the PLAAF 26th Air Division, based in the eastern Zhejiang Province, near the Taiwan Strait.
Military transport helicopter	Mi-17-V7 (Mi-8MTV-7) (NATO reporting name: "Hip-H")	Mil Moscow Helicopter Plant JSC; Kazan Helicopters JSC	2005	2006	24	The Mi-17-V7 transport helicopter is a direct derivative of the Mi-17-V5 helicopter (with minor modifications), and it seems that, since 2005, it has become the production standard of the Mi-17 family of helicopters. It displays an uprated gearbox, a main rotor derived from that of the Mi-38 transport helicopter, and a tail rotor derived from the Mi-28 attack helicopter. The Mi-17-V7 displays a 1,000 kg higher payload (14 t, as opposed to 13 t) and 11 kt (20 km/h) faster cruise speed in comparison to the Mi-17-V5. The Mi-17-V7 helicopters are powered by two VK-2500[440]

[440] Also known as the TV3-117VMA-SBZ engine.

						turboshaft engines, each rated at 2,400 shp. The VK-2500 engine is a derivative from the TV3-117, specially designed to have better endurance in "hot and high" climate conditions. The engines are equipped with a Full-Authority Digital Engine Control (FADEC), type BARK-78 (with a KPA-78 engine control unit), system, in order to be able to operate in high altitude (up to 4,500 metres) climate conditions, common in locations such as Tibet and Xinjiang. In addition, the VK-2500 engines differ from the baseline TV3-117 design in: i) extended overhaul period of the engine hot components; ii) extra gas-dynamic stability; iii) improved engine parameters accuracy and engine control quality; and, iv) better weight characteristics and overall dimensions.[441] According to the manufacturer, new materials made it possible to increase the gas temperature before the turbine without changing the geometry of the flow section, and increase the takeoff power by 10% compared to the original, TV3-117, model.[442] The newly acquired Mi-17-V7 are expected to replace the ageing fleet of the remaining S-70C-2 Black Hawk helicopters, which face serious maintenance problems, aggravated by the American arms embargo imposed on China since 1989/1990 (under the Public Law 101-246). Deal worth 200 million dollars.
Jet fighter engine	Klimov RD-93 turbofan engine	V.V. Chernyshev Moscow Machine-Building Enterprise (MMP); Klimov Company	April 2005	2006–2008	100	The RD-93 two-shaft turbofan engines were intended for use in Chinese-made JF-17/FC-1[443] fighters. The RD-93 engine, generating up to 81.395 kN (8,300 kgf, 18,298 lbf) thrust in reheat, is intended to propel the JF-17/FC-1 fighter jet at speeds up to Mach 1.6 and give the fighter a thrust-to-weight ratio near one-to-one (0.95). This engine is a variant of the RD-33 (which is used, since 1985, to power the MiG-29 fighters), specially modified (with accessories placed on the engine's underside) in order to be able to fit into

[441] Rosoboronexport, *Aerospace Systems: Export Catalogue*, Moscow, 2005, p. 76, http://www.rusarm.ru/cataloque/air_craft/aircraft.pdf .

[442] Klimov: MiG Corporation, "Aero Engines Design Company: Turbine", *Klimov Company website*, p. 13, http://en.klimov.ru/rad/dip/turbine/ .

[443] The construction of the first JF-17/FC-1 fighter jet was completed on May 29, 2003; the aircraft made its maiden flight on August 25, 2003; and, normal flight testing began on September 2, 2003. Bill Gunston, ed., *Jane's Aero-Engines*, Jane's Information Group, Coulsdon, 2004, p. 294.

						the single-engined (with lateral inlets) JF-17/FC-1 fighter jet. The export to other nations[444] of the Chinese aircraft equipped with RD-93 engines is explicitly forbidden, unless the consent/permission of the Russian government is obtained beforehand. That happens because (according to the agreement signed between the two countries) an end-user certificate (issued by the Russian authorities) is required for the re-export of the RD-93 engines. Nevertheless, given the fact that JF-17's development was jointly funded by both China and Pakistan, it had been made clear from the very beginning that the Pakistan Air Force (PAF) intended to acquire a significant number[445] of JF-17 fighters, in order to replace its ageing fleet of Chinese A-5C/Q-5III, F-7P/J-7, and French Mirage III, and Mirage 5 aircraft. Notwithstanding Kremlin's initial objections (under immense Indian pressure) regarding the export to Pakistan of RD-93-powered JF-17 fighter jets, finally in 2007 Russia agreed to give its consent and grant an end-user certificate allowing the export of the airplanes to Pakistan.[446] The total cost of the contract amounted to 238-267 million dollars.
Jet fighter engine	AL-31FN turbofan engine	Moscow Machine-Building Productio	June/July 2005	2005–2006	100	The engines were intended to power Chinese-made J-10 fighter jets. The AL-31FN two-shaft turbofan engine was developed in 1992-1994, and features Full-Authority Digital Engine Control

[444] Future sales prospects for the JF-17/FC-1 have been named as Pakistan, and a few states of South-East Asia (e.g. Bangladesh) and Africa (e.g. Egypt, Nigeria, Sudan, Angola, Zimbabwe, etc). Bill Gunston, ed., *Jane's Aero-Engines*, Jane's Information Group, Coulsdon, 2004, p. 294.

[445] *Jane's*, citing a statement made in March 2007 by Pakistan Air Force (PAF) Chief of Staff, Air Chief Marshal Tanvir Mehmood Ahmed, suggests that Pakistan possibly plans to acquire 200-250 JF-17/FC-1 fighter aircraft, in place of the 150 originally envisaged. However, in 2009 high-ranking Pakistani officials refrained from confirming this information, and they didn't clarify the precise number of JF-17 fighters that PAF intends to purchase. They noted that: "*The number and induction schedule of this aircraft [i.e. JF-17/FC-1] in PAF would be regulated according to the operational requirements of the service. Therefore, there is a lot of flexibility in the induction schedule and the total number of aircraft, which would be acquired by the PAF over the years*". Farhan Bokhari, "PAF seeks more JF-17 fighters", *Jane's Defence Weekly*, Vol. 44, Issue 13, March 28, 2007, p. 6. Cristina Solana, "JF-17 Q and A from JF-17 Project manager", *Pakistan Think Tank*, March 6, 2009, http://pakistanthinktank.org/v2/interviews/53-interviews/66-jf-17-q-and-a-from-jf-17-project-manager .

[446] One of the main reasons behind Kremlin's decision to permit the re-export of RD-93 engines to Pakistan was the prospect of lucrative follow-up Chinese orders for additional RD-93 engines. As reported by the Russian daily *Kommersant*, China planed to buy in total around 1,000 RD-93 engines, worth 6-7 billion dollars (or, according to more moderate and reasonable estimates, 3.5 billion dollars). However, given the development of China's indigenous turbofan engine, designated WS-13, the expectations of the Russian side do not seem realistic. "Russian engines to fly to Pakistan", *Kommersant*, August 4, 2007, http://www.kommersant.com/p792862/r_500/China_to_re-export_RD-93_to_Pakistan/ . "Chinese fighter jets to reach Pakistan", *Kommersant*, April 26, 2007, http://www.kommersant.com/p762182/r_500/deal_fighter_jets_Pakistan/ .

		n Plant "Salut"				(FADEC) with hydraulic (fuel pressure activation) back-up system, and improved fuel economy. Its dry weight is 1,538 kg, and the engine capable of unleashing 122.58 kN (12,500 kgf, 27,557 lbf) of thrust with afterburning. It is worth mentioning that the J-10's new, upgraded version, which is still under development carrying the provisional codename "J-10B" or "Super-10", is expected to be fitted with the AL-31F (42 series) M1 engine, which features a 3D thrust vector control (TVC) system. The contract was valued at 300–350 million dollars.
Military transport aircraft	Il-76MD (NATO reporting name: "Candid-B")	JSC Ilyushin Aviation Complex; Aviastar-SP (Ulyanovsk Aviation Industrial Complex "Aviastar" JSC); Tashkent Aviation Production Association n/a V.P. Chkalov (TAPO/TAPOiCh)	September 2005	2012–2018 (?)	34	In September 2005, China and Russia signed a contract worth 1.5 billion dollars[447] providing for the purchase of 34 Il-76MD transports, as well as 4 Il-78MK aerial refuelling tankers (powered by four D-30KP-2[448] engines, each rated at 12,000 kgf). These aircraft were to add to the PLAAF's existing fleet of 18 Il-76MDs.[449] The 38 aircraft would be built in Uzbekistan, but sold to China through the Russian state-run arms trader Rosoboronexport. The Chinese order, however, proved more than the Tashkent Aviation Production Association (TAPO) could handle. The Tashkent company was facing serious financial difficulties and was unable to produce the aircraft according to schedule. The situation was made worse by the dramatic fluctuation in the value of the American dollar (the subsequent strengthening of the Russian rouble meant that the contract price couldn't cover anymore the construction costs) and escalating inflation in Russia (9% in 2006, 11.9% in 2007), making the cost of producing the transport aircraft much higher than when the deal was originally signed. As a matter of fact, we should point out that the 2005 deal was controversial from the outset.

[447] That is, 1.2 billion dollars for the aircraft, and 300 million for the engines.

[448] The D-30KP-2 two-shaft turbofan engines do not meet Chapter 3 ICAO Noise Certification Standards, contained in Annex 16 ("*Environmental Protection*"), Volume I ("*Aircraft Noise*"), to the Chicago Convention on International Civil Aviation. In European Union member states, the Chapter 2 phase-out of airplanes with maximum take-off weight of 34 t or more, or more than 19 passenger seats, became applicable on April 1, 2002 (Directive 2002/30/EC). As a consequence, since April 2002, the Il-76/Il-78 aircraft powered by D-30KP-2 engines are not allowed to land at European airports. Similar restrictions to aircraft powered by engines that do not comply with Chapter 3 requirements have been adopted by the U.S. ("*Airport Noise and Capacity Act*"), Canada, Australia, New Zealand, Japan, etc. Environmental Unit of the International Civil Aviation Organization, *ICAO Environmental Report 2007*, 2007, Montréal, Québec, pp. 49-54, http://www.icao.int/env/pubs/env_report_07.pdf .

[449] In the 1990s, China purchased from Ukraine, possibly, eight second-hand Il-76 aircraft. Timothy Hu, "Marching Forward: China is working hard to transform its capabilities and become a credible regional military power", *Jane's Defence Weekly*, Vol. 44, Issue 17, April 25, 2007, p. 29.

		; NPO Saturn				According to a source in the Russian military industry, China initially offered only 18 million dollars for each airplane. The Russian side proposed 22 million, and eventually the two sides settled on a price tag of 20 million dollars per aircraft. Such a low price was unprecedented in the international transport aircraft market. By comparison, around the same time Jordan had contracted for a modernized variant of the Il-76 (the Il-76MF) at a price tag of about 50 million

[450] The Il-76MF military transport aircraft is based on the Il-76MD. In the Il-76MF version the length of the aircraft fuselage was enlarged by 6.7 m (53.3 m in the Il-76MF, as opposed to 46.6 m in the Il-76MD), and PS-90A-76 engines with higher capacity and efficiency were installed on the aircraft. The installation of the new engines has considerably raised the aircraft's operating cost efficiency by: increasing the maximum operational range to 6,200 km (according to the official –relatively optimistic– claims of the manufacturer), when carrying a 40-t payload; reducing direct operating costs; increasing the seating capacity to accommodate a total of 305 soldiers (in the twin-deck version), or 150 casualties, or 186 paratroopers; and increasing maximum payload, while operating in hot-climate and high-level airfield conditions. In addition, the Il-76MF has increased its cruise speed to 825-850 km/h (as against 750-770 km/h in the D-30KP-2-powered Il-76MD model); its maximum take-off weight is now up to 210 tons, and its maximum payload to 60 tons; while fuel efficiency is up by 13-17% (specific fuel consumption rate: 0.595 kg/kgf·h, as against 0.705 kg/kgf·h featured by the D-30KP-2 engines in the Il-76MD aircraft). The aircraft also features Leninets Kupol-76M avionics. "Il-76 Candid", *Global Security*, http://www.globalsecurity.org/military/world/russia/il-76.htm . Rosoboronexport, *Aerospace Systems: Export Catalogue*, Moscow, 2005, p. 30, http://www.rusarm.ru/cataloque/air_craft/aircraft.pdf . "Il-76MF", *Ilyushin Aviation Complex website*, http://ilyushin.org/eng/products/military/76mf.html .

[451] PS-90A-76 engines comply with the provisions contained in ICAO Chapter 3 (but not with the newer and more stringent Chapter 4) noise certification regulation, and thus aircraft fitted with PS-90A-76 engines are allowed to land at European airports. For that reason, one of the clauses included in the contract signed on October 10, 2003 between India on the one part, and Russia and Israel on the other, for the procurement of three A-50EI AWACS, provided for the replacement of the D-30KP-2 engines with the more efficient PS-90A-76 engines. The PS-90A-76 engines deliver a thrust of 14,500 kgf (12,000 kgf in the D-30KP-2 model), and reduce the Il-76 operating costs by 1.7 times. It should be mentioned that the producer of the PS-90A-76 engines, the Perm "Aviadvigatel" enterprise, advertises that it offers "*adaptable forms of sale for PS-90A/-76 engines. In the majority of cases, delivery is paid for over time, often in accordance with the number of operating hours*". "ICAO Noise Data Base: PS-90A-76 engine", *Direction Générale de l' Aviation Civile*, http://noisedb.stac.aviation-civile.gouv.fr/pdf.php?id=8370 . Vladimir Shvarev, "Leading Arms Exporters started struggling for re-distribution of India's defense market", ARMS-TASS Information Agency, *Arms Markets*, Vol. 7, No. 1, 2007, p. 24, http://www.arms-tass.su/data/Files/File/107.pdf . Bill Gunston, ed., *Jane's Aero-Engines*, Jane's Information Group, Coulsdon, 2004, pp. 282, 284.

[452] According to Ilyushin's forecast, the Il-476 is expected to make its maiden flight at the end of 2010; series production is expected to start in 2011; with aircraft deliveries starting around 2012-2013 at best.

[453] Andrei Chang, "China to renegotiate Russian aircraft deal", *UPI Asia*, June 10, 2008, http://www.upiasia.com/Security/2008/06/10/china_to_renegotiate_russian_aircraft_deal/4507/ . "Il-476 Candid", *Global Security*, www.globalsecurity.org/military/world/russia/il-476.htm .

[454] As it was stated by a representative of the Russian delegation travelling to Beijing in December 2008 to attend the 13th session of the Russian-Chinese Intergovernmental Commission on Military-Technical Cooperation: "Our Chinese partners have very much criticized the non-fulfillment by Russia of the terms of a contract concluded in Sochi in 2005 […] on the delivery to China of the Ilyushin Il-76 military-transport planes and Il-78 long-range refuelling planes. *The known stagnation in the bilateral military cooperation in the sphere of the Air Force began from that moment*" [emphasis added]. Yu Bin, "China-Russia Relations: Embracing a Storm and Each Other?", *Comparative Connections*, Center for Strategic and International Studies, Vol. 10, No. 4, January 2009, p. 135, http://csis.org/files/media/csis/pubs/0804qchina_russia.pdf .

						dollars per aircraft. Given the serious difficulties faced by the Tashkent-based company, Rosoboronexport decided in early 2006 to transfer most of the production line to Russia. According to this modification of the terms of the initial agreement, Uzbekistan's Tashkent Chkalov Aircraft Association was to build only 15 of the transport planes as a subcontractor to Russia's Ilyushin. First deliveries under the contract between Rosoboronexport and China were due to begin in 2007, but in 2006 Tashkent refused to sign a production contract with Rosoboronexport at the initial 2005 contract price. In that context, Russia requested from the Chinese authorities a renegotiation of the contract's price, which was refused by China and, subsequently, in retaliation Beijing suspended negotiations on several other military contracts with Moscow (such as the procurement of Su-33 carrier-based fighter jets). In late 2006, Rosoboronexport decided to completely change the contractor for the aircraft deal. All 38 aircraft will now be assembled at the Aviastar-SP JSC aircraft plant located in Ulyanovsk, Russia. The Chinese government continues to insist, however, that in order to accept a renegotiation of the contract's price and give in to the Russian pressures, Rosoboronexport has to offer a more advanced version of the Il-76 than the one described in the 2005 agreement. So, Beijing wishes along with the renegotiation of the 2005 contract to acquire not the legacy Il-76MD, but either the upgraded Il-76MF model[450] (which features the new PS-90A-76[451] engines –rated at 16,000 kgf–, glass cockpit, digital fly-by-wire flight control system, etc), or the brand-new, still under development, Il-476[452] version (which, according to several sources, might be tested with the experimental NK-93 ducted fan engines).[453] As a consequence, nowadays there is a stalemate and a general uncertainty regarding the status and the progress of this armament programme. It isn't sure whether the two sides will manage to reach a consensus and find a compromise over this controversial deal. As of 2009, the Il-76MD/Il-78MK issue continues to have a negative effect on Sino-Russian military cooperation, and has contributed to the development of a mutual feeling of mistrust between the two parties.[454]

Aerial refuelling tanker	Il-78MK (NATO reporting name: "Midas")	JSC Ilyushin Aviation Complex; Aviastar-SP (Ulyanovsk Aviation Industrial Complex "Aviastar" JSC); Tashkent Aviation Production Association n/a V.P. Chkalov (TAPO/TAPOiCh); NPO Saturn	September 2005	2012–2018 (?)	4	The Il-78MK flying tanker is designed for air refuelling of frontline/tactical[455] and military transport aircraft, and also for ground refuelling[456] of tactical aircraft (providing, in that way, mobility for the PLAAF's large units and air formations, and allowing the Chinese Armed Forces to quickly transfer significant numbers of troops and equipment over long distances, projecting their power in China's immediate neighbourhood). The Il-78MK has 3 fuel servicing points and is capable of transferring up to 74,000 kg of fuel at a refuelling range of 1,000 km, and up to 30,000 kg at a range of 3,500 km. Two UPAZ-1M refuelling pods (with a maximum fuel flow of 2,340 l/min each) are carried at the wingtips, and one refuelling pod is carried on a special port-side pylon in the rear fuselage. The Il-78MK can refuel one heavy aircraft from the rear fuselage refuelling pod, or two tactical aircraft from the wingtip refuelling pods. According to the terms of the 2005 contract, the aircraft will be powered by four D-30KP-2 engines (each rated at 12,000 kgf). Because of problems emerged with the deliveries timetable and the submission from the Russian side of a demand regarding the revision of the financial terms of the agreement, the realization of the contract is considered doubtful and its fate is pending, with the final decision dependent upon the discussions and negotiations undertaken by the two parties. According to the initial 2005 contract, the cost for the purchase of 38 Il-78/Il-76 planes, along with 240 D-30KP-2 engines[457], came up to 1.5 billion

[455] That is, fighter aircraft, strike-fighters, and attack airplanes.

[456] On the ground, the Il-78MK is capable of refuelling up to four airplanes simultaneously.

[457] Notwithstanding 152 engines suffice to equip a fleet consisting of 38 Il-76/Il-78 aircraft, China placed an order for 240 D-30KP-2 engines. In reality, the PRC planed to incorporate the additional 88 D-30KP-2 engines into the H-6K, the upgraded version of the H-6 strategic medium-range bomber. The main purpose of replacing the Chinese-made WP-8 single-shaft turbojet engines (based on the Soviet AM-3M/RD-3M design) of the baseline H-6 bomber with the Russian D-30KP-2 two-shaft turbofan engines was to give the aircraft a greater range (with much lower specific fuel consumption and ~38,500 kg of internal fuel, the H-6K will outrange all earlier H-6 variants significantly), so as to fit China's "second island chain" strategy. The stalemate occurred in the fulfillment of the 2005 contract, delayed significantly H-6K's entry into service with the PLAAF. As a matter of fact, H-6K's production at Xi'an Aircraft Industrial Corporation (XAC) facilities had to halt for several months, due to a shortage of turbofan engines. Finally, in December 2008, Russia agreed in principle to resume the deliveries of 88 D-30KP-2 engines to the PRC (fulfilling this part of the 2005 agreement), and ship to China in 2009-2011 an initial batch of 55 engines, with an option for another 33 engines. The new contract was announced in March 2009, entered into force in April 2009, with deliveries due to start in November 2009. The cost for the procurement of the D-30KP-2 engines is almost identical with the cost provided by the 2005 contract, that is 1.2 million dollars per unit.

						dollars.
Jet fighter engine	AL-31F turbofan engine	Moscow Machine-Building Production Plant "Salut"	December 2005	2006–2007	150	The engines were intended for replacement of Su-27/J-11 and Su-30MKK/MK2 fighters' engines that had suffered damage and were malfunctioning. Contract worth 550-580 million dollars.
Military transport helicopter	Mi-171 (NATO reporting name: "Hip-H")	Mil Moscow Helicopter Plant JSC; Ulan-Ude Aviation Plant	January 2006	2006–2007	24	The first 12 units were delivered in 2006; the remaining 12 in 2007. The contract was valued at 200 million dollars.
Jet fighter engine	AL-31FN turbofan engine	Moscow Machine-Building Production Plant "Salut"	2007	2008–2009	100	The engines were going to be installed on Chinese-made J-10 fighter jets. The AL-31FN turbofan engine produces a total thrust of 122.58 kN (12,500 kgf, 27,557 lbf) with afterburning. Contract to the tune of 320 million dollars.
Military transport helicopter	Mi-171, Mi-17-V5 (Mi-8MTV-5), and Mi-17-V7 (Mi-8MTV-7) (NATO reporting name: "Hip-H")	Mil Moscow Helicopter Plant JSC; Ulan-Ude Aviation Plant; Lantian Helicopter Company Ltd	March 2007	2008–…	N/A	The value of the orders received in 2008 amounted to 42.8 million dollars. Nevertheless, it is considered almost certain that the total value of the contracts which will be signed in 2009 will exceed the barrier of 220 million dollars. 20 helicopters were assembled and delivered to the PLA Army Aviation during the last year, while in the near future the production rate is expected to augment, in order to meet the 80 helicopters per year target. The Russian-designed helicopters are assembled in a Chinese production line established at the "Lantian Helicopter Company Ltd" main industrial plant, located in Chengdu, in Sichuan Province. For the construction of the helicopters are used imported Russian assembly kits, supplied by the Ulan-Ude Aviation Plant. The increase of the production rate to 80 helicopters per year by late 2009 is believed that it will offer to China the ability to re-export a considerable amount of the Mi-17 helicopter family to third-world countries (primarily in

According to sources close to the Russian defense industrial complex, the implementation of the contract at such a low price is not profitable for the Russian side, and therefore the financial shortfall will have to be covered from the Russian federal budget. Andrei Chang, "Russia-China military cooperation in 2009", *Kanwa Asian Defence*, Issue 55, May 2009, April 18, 2009, http://www.kanwa.com . Vasiliy Kashin, "Strategic Cruise Missile Carrier H-6K: A New Era for Chinese Air Force", *Moscow Defense Brief*, No. 4 (18), 2009, http://mdb.cast.ru/mdb/4-2009/item3/article1/ . Carlo Kopp, "XAC (Xian) H-6 Badger", *Air Power Australia*, July 2007, http://www.ausairpower.net/APA-Badger.html .

						Africa and, to a lesser degree, in Asia). This development will certainly hurt Russian exports and the interests of the Russian defense industrial complex, since it represents a direct competition to the Russian enterprises that have maintained a quasi-monopoly on rotary wing aircraft exports to developing nations for several decades. In addition, the successful implementation of the project could leave Russian manufacturers short of helicopter component parts[458], and could enable China to cooperate with other countries (such as South Africa) with the aim of jointly producing a series of upgraded versions of the Mi-17.[459]
Jet fighter engine	AL-31FN turbofan engine	Moscow Machine-Building Production Plant "Salut"	2009	2009–2010	122	The engines were to be integrated on Chinese-made J-10 fighter jets. The AL-31FN turbofan engine generates a total thrust of 122.58 kN (12,500 kgf, 27,557 lbf) with afterburning. The signing of this contract in 2009 is another evidence of the serious difficulties encountered by the Chinese defense industrial complex (and more specifically the Shenyang Aircraft Corporation) in the effort to design and produce an advanced, reliable turbofan engine capable of powering the J-10 and J-11/Su-27SK fighter jets. Apparently, the Chinese-made WS-10A Taihang engine is not yet mature enough to enter serial production. The contract was valued at 500 million dollars.
Jet aircraft engine	D-30KP-2 turbofan engine	NPO Saturn	March/ April 2009	2009–2011	55 + 33	The D-30KP-2 two-shaft turbofan engines are going to be utilized in the construction of H-6K strategic bombers. The D-30KP-2 engine generates 12,000 kgf of thrust, with a bypass ratio of 2.2. The H-6K strategic bomber, with a range of up to 3,500 km, first flew on January 5, 2007 and entered service with the PLAAF in October 2009. The contract, which included an option

[458] In 2007, Russian companies built only 120 Mi-171 helicopters (although they had orders for 150 units), due to a shortage of transmissions and rotors, and, according to estimates, there are no plans in the future to increase production for these components. "China starts producing Russian Mi-171 helicopters – paper", *RIA Novosti*, May 12, 2008, http://en.rian.ru/russia/20080512/107127123.html .

[459] According to a number of unconfirmed reports, China may have already signed an agreement with the South African firm "Advanced Technologies and Engineering" (ATE) to upgrade PLA's Mi-17 helicopters with South African assistance. ATE's upgrade package for the Mi-17 family of helicopters includes the fitting of a glass cockpit, optical sights, helmet sights, weather radar, a comprehensive radio navigation suite, radar altimeter, an automatic flight control system, and air-to-ground missiles (e.g. DENEL's Ingwe anti-tank guided missiles, with a range of up to 5 km). Designated by ATE as the Mi-17 IFR, the resulting aircraft can be certified for operation under instrument flight rules (and not just visual flight rules), allowing it to be safely operated at night and in poor weather conditions. "China purchases Mi17 helicopter upgrading technology", *Kanwa Asian Defence*, Issue 51, January 2009, December 17, 2008, http://www.kanwa.com/ . Keith Campbell, "South African and Russian companies in helicopter collaboration", *Engineering News*, October 6, 2006, http://www.engineeringnews.co.za/article/south-african-and-russian-companies-in-helicopter-collaboration-2006-10-06# .

						providing for the order of another 33 engines, was worth 70 million dollars (or, according to estimates of the Russian *Centre for Analysis of Strategies and Technologies*, 220 million dollars).

8.3. Fighting ships, weapon systems, and military materiel/equipment/hardware for the PLA Navy

Weapon description	Weapon designation	Manufacturer	Year of order	Year(s) of deliveries	Number of units	Comments. Additional information
Diesel-Electric submarine	Kilo-class submarines (Project 877EKM)	Central Design Bureau for Marine Engineering "Rubin" JSC; Krasnoye Sormovo Shipyard	1992	1994–1995	2	The first Project 877 Kilo-class submarine was built at the Komsomolsk yard on the Amur river in Russia's Far East region; it was launched in September 1980 (according to *Jane's*, in 1979); and entered service with the Soviet Navy on September 12, 1982. The Project 877EKM submarines, with a surfaced displacement of 2,325 tons, have six internal 533 mm torpedo tubes, mounted in the bow section of the first compartment. The two side tubes can launch wire-guided torpedoes; while, if the boats are modernized, they may also fire the 3M-54E and 3M-54E1 Klub-S anti-ship cruise missiles (with a range of 220 km and 300 km respectively) from the two upper torpedo tubes. Ammunition load comprises 18 torpedoes, including four 3M-54E/E1 missiles, or 24 mines. China has purchased from Russia at least 225 Test-71/96 ME anti-submarine and 225 53-65KE anti-ship wire-guided torpedoes (in two separate orders placed in 1993 and 2002) for its Kilo-class submarines. The Project 877EKM submarines are powered by two diesel generators, one main electric motor, one economic speed electric motor, two reserve electric motors, and one storage battery. Underwater full speed is 17 knots; snorkelling range (at 7 knots) is 6,000 nm; underwater range (at 7 knots) is 400 nm; maximum diving depth is 300 m; endurance is 45 days; and, a crew complement of 52 sailors is required to operate the submarine. The two Kilo 877EKM submarines acquired by China were originally built for Poland and Romania. However, in the aftermath of Soviet Union's collapse and Warsaw Pact's dissolution, the initial orders were cancelled. Soon after this development, China manifested a keen interest for the completion of the works on the two semi-finished hulls and their subsequent acquisition, paying 400 million dollars.

Diesel-Electric submarine	Kilo-class submarines (Project 636)	Central Design Bureau for Marine Engineering "Rubin" JSC; Admiralty Shipyards	1994	1997–1998	2	The contract was valued at 500 million dollars.
Anti-submarine warfare (ASW) helicopter	Ka-27PL/Ka-28 (NATO reporting name: "Helix-A")	Kamov Design Bureau JSC	1996	1997	2	The two helicopters acquired by the PLA Navy are deployed onboard the Russian-built Project 956E Sovremenny-class destroyers *Hangzhou* (pennant number: 136), and *Fuzhou* (pennant number: 137). The Ka-27PL (export models are designated Ka-28) anti-submarine warfare (ASW) helicopter was developed to replace the Ka-25 "Hormone" in Soviet naval service.[460] The prototype Ka-27 first flew in December 1974, entered service in 1980 (according to *Jane's*, on April 14, 1981), and was first observed onboard the Soviet destroyer *Udaloy* in September 1981.[461] The Ka-27PL/Ka-28 is capable of undertaking ASW missions at ranges of up to 200 km from the takeoff pad (normally the helicopters operate over distances of 20-90 km around the friendly naval force)[462], at sea state up to 5. Anti-submarine warfare operations consist of three phases: i) search; ii) detection; and, iii) attack. The main objective of any anti-submarine operation is the protection of the friendly naval force, in which the priority of the ASW helicopter is the detection of any underwater threat in the armada's cruising or anchoring areas. Attack and destruction of any hostile submarine takes second place to the major objective of keeping the area clear of any underwater threat. As an ASW platform, the Ka-27PL/Ka-28 offers a number of operational

[460] The Ka-25 was unable to operate its dipping sonar equipment at night and in adverse weather. Ka-27PL/Ka-28 is considered 3-5 times as effective as Ka-25.

[461] Paul Hatch, "Military Aircraft of the World", *Flight International*, Vol. 136, No. 4178, August 19, 1989, p. 58, http://www.flightglobal.com/pdfarchive/view/1989/1989%20-%202552.html .

[462] According to Kamov Design Bureau, Ka-28's maximum range at sea level is 850 km when carrying an 800 kg payload and 2,900 kg of fuel, or 1,070 km without payload (i.e. in a search configuration) and carrying 3,600 kg of fuel. Rosoboronexport, "Ka-28 shipborne anti-submarine warfare helicopter", *Royal Thai Navy website*, p. 6, http://www.navy.mi.th/namo/index.php?option=com_docman&task=doc_download&gid=42&Itemid=29 .

[463] Based on intelligence reports, the UMGT-1 (NATO designation: E40-79) is thought to have been developed as an equivalent to the U.S. Mark 46 torpedo.

[464] The "APR", which stands for "*aviatsionnaya protivoldochnaya raketa*" (i.e. airborne anti-submarine rocket), is a family of lightweight, air-launched, solid propellant, active acoustic homing torpedoes intended for use against submarines and surface ships. The design concept of the "APR" family of lightweight torpedoes is based on the principle of rapid reaction to the search and location of targets with the minimum of noise, thereby denying countermeasures. The APR-2E variant, developed specifically for airborne anti-submarine warfare, was first seen at the 1992 Moscow Air Show and is reported to have entered service the same year for use on the Ka-25 "Hormone", Ka-27/-28 "Helix" and Mi-14 "Haze" ASW helicopters. The APR-2E torpedo carries a 100 kg warhead of TNT equivalent and by employing active acoustic homing (with a range of 1,500 m) can engage submarines at depths of up to 600 m, moving at speeds of up to 43 knots. In effect, the APR-2E is considered to be a cross between a homing torpedo and a self-propelled depth charge. "APR-1, APR-2, APR-3 Lightweight Torpedoes", *Jane's Air-Launched Weapons*, http://www.janes.com/articles/Janes-Air-Launched-Weapons/APR-1-APR-2-APR-3-Lightweight-Torpedoes-Russian-Federation.html .

[465] The APR-3E/ME acoustic homing torpedo uses pump-jet propulsion, and is effective to 100-800 meter depths against targets moving at speeds of up to 43 knots. The torpedo has a range of approximately 3 km and carries a 74 kg warhead of TNT equivalent. It is to be noted that in their brochures and commercial documents, the *Tactical Missiles Corporation JSC* and the *GNPP Region JSC*, APR-3's manufacturers, describe this weapon as an "*airborne anti-submarine missile*" instead of a lightweight ASW torpedo. The same description (i.e. "*airborne anti-submarine missile*") is also assigned to the APR-2E torpedo. According to the manufacturer, this designation is justified because the APR-2E/-3E/-3ME torpedoes feature "a faster target search and detection capability, and a more effective approach to the target" that distinguish them from usual torpedo designs. "Anti-Ship Missiles: APR-3E", *Tactical Missiles Corporation JSC website*, http://eng.ktrv.ru/production_eng/323/512/521/ . Yuri Babushkin (ed.), *Russia's Arms: 2001-2002*, Military Parade, Moscow, 2001, pp. 505-506.

[466] The lethality of the S-3V guided depth charge is advertised as being 1.2-8 times higher in comparison to the target kill probability displayed by an unguided depth charge. Yuri Babushkin (ed.), *Russia's Arms: 2001-2002*, Military Parade, Moscow, 2001, p. 507.

[467] The Ka-27PL/Ka-28 helicopters can also fire the subsonic sea skimming Kh-35U/3M24 (SS-N-25 "Switchblade") anti-ship missile, which is the Russian equivalent of the AGM-84 Harpoon. Even though some earlier reports suggested that the PLAN may have ordered in 2001 an unspecified number of Kh-35U missiles, according to available data from open sources, it appears that China has not purchased any Kh-35U missiles, and currently PLAN Ka-27PL/Ka-28 helicopters are not armed with any type of air-to-surface missile. Carlo Kopp, "Anti Shipping Missile Survey", *Defence Today*, January/February 2008, pp. 34-35, http://www.ausairpower.net/DT-Regional-ASCM-1207.pdf .

[468] Rosoboronexport, "Ka-28 shipborne anti-submarine warfare helicopter", *Royal Thai Navy website*, p. 17, http://www.navy.mi.th/namo/index.php?option=com_docman&task=doc_download&gid=42&Itemid=29 .

[469] According to the U.S. Department of Defense, the Type 75 sonobuoy has many features (including its electronics systems) copied from the U.S. Navy's AN/SSQ-41B passive sonobuoy (the first LOFAR production sonobuoy).

[470] A magnetic anomaly detector (MAD) is an instrument used to detect minute variations in the earth's magnetic field. The term refers specifically to magnetometers used by military forces to detect submarines (a mass of ferromagnetic material creates a detectable disturbance in the magnetic field).

[471] The VGS-3 dipping sonar detects submarines, determines the target coordinates, and transfers the data, in semi-automatic mode, to data transmission equipment. "Kamov Ka-27: History", *Ka-27 website*, http://www.ka27.info/eng/history/ .

[472] The birth of the naval SH-60B Seahawk came up to satisfy the U.S. Navy requirements for the Light Airborne Multi-Purpose System (LAMPS) Mk.III programme. This programme concentrated on finding the right aerial platform to secure the medium and outer zones around a carrier battle/strike group from Soviet submarines. The LAMPS Mark III required the development of a manned helicopter, smaller than the Sikorsky SH-3/S-61 Sea King, to replace the Kaman SH-2 Seasprite in the anti-submarine warfare role. The new helicopter was to operate as an integral fighting unit aboard the Oliver Hazard Perry-class frigates,

						advantages over fixed-wing ASW platforms: i) the ability to operate from medium-size surface ships, enabling very short reaction times; ii) the ability to hover that allows to use systems such as the dipping sonar; and, iii) the ability to operate on a 24-hour basis, even in adverse weather conditions. Ka-28's payload is normally 600-800 kg (1,000 kg maximum; with a maximum takeoff weight of 12,000 kg), and the helicopter's armament may include: i) AT-1M/V (450 mm), VTT-1 (450 mm) "Strizh", UMGT-1/ME -also known as APSET-95 (NATO designation: E40-79)- (400 mm) "Orlan"[463], APR-2E[464] or APR-3E/ME[465] (350 mm) "Yastreb-M" ASW torpedoes (each helicopter can carry up to 2 torpedoes); ii) S-3V anti-submarine guided bombs/depth charges (fitted with an active, hydro-acoustic guidance system and a 19 kg shaped charge warhead)[466]; iii) PLAB-250-120, or KAB-250PL depth charges (each helicopter can carry up to 6-8 depth charges); as well as, iv) OMAB-25-12D (day) and OMAB-25-8N (night) marine marking bombs.[467] According to the manufacturer's data, the firing of a single torpedo results to a 0.8/80%-0.85/85% kill probability, while the firing of three torpedoes (by 2 helicopters) results to a kill probability that approaches 1.0/100%. On the contrary, the efficiency of the depth charges is significantly lower, since the drop of a series of 8 depth charges achieves a hit probability of 0.3/30% against a submarine target.[468] The Ka-27PL/Ka-28 carries up to 12 Type 75[469] low frequency analysis and recording (LOFAR) sonobuoys (or, alternatively, up to 36 RGB-16/-1 and RGB-NM/-1 sonobuoys), and an APM-73V/2 Bor magnetic anomaly detector[470] (MAD) system (the MAD equipment is capable of detecting the position of a submerged submarine at a range of up to 400 meters). In order to receive and process the sonobuoys' signals, the helicopters are equipped with the Izumrud system, and they are also fitted

Spruance- and Kidd-class destroyers, as well as Ticonderoga-class cruisers. Anthony Tsagaratos, *Aegean Hawks: The Sikorsky S-70B-6s of the Hellenic Navy*, Ilektronikes Tehnes, Athens, November 2002, p. 11.

[473] Rosoboronexport, "Ka-28 shipborne anti-submarine warfare helicopter", *Royal Thai Navy website*, p. 17, http://www.navy.mi.th/namo/index.php?option=com_docman&task=doc_download&gid=42&Itemid=29 .

[474] Eric Wertheim, *The Naval Institute Guide to Combat Fleets of the World: Their Ships, Aircraft, and Systems*, 15th Edition, Naval Institute Press, Annapolis, MD, 2007, p. 600. Rosoboronexport, "Ka-28 shipborne anti-submarine warfare helicopter", *Royal Thai Navy website*, p. 17, http://www.navy.mi.th/namo/index.php?option=com_docman&task=doc_download&gid=42&Itemid=29 .

						with the Osminog-E combat direction/command and control system designed around the Osminog-PS ("Splash Drop") under-nose mounted search radar and the VGS-3 Ros'-V[471] ("Lamb Tail") dipping sonar (the sonar has a maximum range of 8 km when trying to reveal the exact position of a hostile submarine). The helicopter's command and control system detects and locates surfaced and submerged submarines, and advises the crew as to which weapon should be used to attack the target, by displaying the tactical situation on the system navigation/tactical monitor. The Ka-27PL/Ka-28 typically operates in pairs ("hunter and killer" teams), constantly exchanging target information, which can then be downloaded to the tactical system of either helicopter: then, one aircraft tracks the underwater threat, the other drops depth charges/torpedoes eliminating any chance of the detected submarine evading the hunting helicopters. Apart from the acoustic sensors (i.e. sonar, sonobuoys, and magnetic anomaly detectors) available to detect submarines, a secondary role can be played by the non-acoustic sensors fitted on the Ka-27PL/Ka-28, such as the Osminog-PS radar and Electronic Support Measures (ESM) systems, which supplement the sonar's target detection capability. The use of the helicopter's Osminog-PS radar allows for the detection of submarines when either wholly or partially surfaced (at a distance of up to 25-30 km), or of submarines having a raised periscope, communications antenna, or a snorkel (at a distance of up to 8 km). Similarly, the Ka-27PL/Ka-28's ESM system can effectively detect and intercept radar transmissions from a hostile submarine. Ka-27PL/Ka-28 radar and sonobuoy-derived data are data-linked (using the on-board VHF/UHF/HF communications equipment) to Sovremenny's combat management system (a similar function is carried out by Ka-28's American counterpart, the SH-60B/S-70B helicopter –originally referred to as SH-60B Light Airborne Multi-Purpose System Mk.III[472]). Therefore, the helicopter's Osminog-PS radar can provide long-range targeting data for the Sovremenny's 3M-80E Moskit (SS-N-22 "Sunburn"), or 3M-54E Klub-N (SS-N-27 "Sizzler") anti-ship missiles. Furthermore, the helicopters can carry both search equipment and weapons simultaneously, and they are equipped with an NKV-252 navigation system, and a PKV-

						252/-1 flight control system. During an operational sortie, a "hunter & killer" team composed of two Ka-27PL/Ka-28 helicopters can cover 1,020 km^2 of ocean when using a VGS-3 sonar, or 290 km^2 when making use of the APM-73V2 MAD equipment; while, a pair of Ka-27PL/Ka-28 helicopters in a search configuration is able of covering 1,670 km^2 of ocean when using a VGS-3 sonar, or 450 km^2 when exploiting the functions of the APM-73V2 MAD.[473] Maximum endurance for anti-ship targeting or ASW missions is 5.2 hours: 2.15-2.25 hours when carrying an 800 kg combat load flying at distances of up to 200 km from the takeoff pad, or 3.59 hours in a search configuration, using a dipping sonar but no torpedoes or depth charges.[474] According to Russian and Chinese sources, the Ka-27PL/Ka-28 helicopters are able to intercept, engage, and destroy enemy vessels submerged at depths of up to 500 m, and running at speeds of up to 40.5 knots. The Ka-27PL/Ka-28 helicopters are powered by two TV3-117VMAR turboshaft engines, each rated at 2,200 shp.
Destroyer	Sovremenny-class destroyers (Project 956E)	Severnoye Design Bureau JSC; Severnaya Shipyard	1997	1999 – 2000	2	The destroyers in question are the *Hangzhou* (No. 136) and *Fuzhou* (No. 137). The Project 956E Sovremenny-class destroyers were introduced in the mid-1980s by the Soviet Navy as a counter to the U.S. Navy's surface warships, in particular the aircraft carrier battle/strike groups and the "Aegis"/Ticonderoga- and Arleigh Burke-class cruisers and destroyers. They are outfitted with forty-eight 9M38/M1[475] (SA-N-7 "Gadfly") semi-active radar-homing, medium-range (25 km) anti-aircraft missiles, which constitute part of the 3K90 M-22 Uragan/Shtil surface-to-air missile system (on two MS-196 launchers on raised decks behind

[475] The Mach 3 9M38 surface-to-air missile has a maximum engagement range of 18-25 km against aircraft-type targets (flying at altitudes of 15-15,000 m), and 8-12 km against cruise missile-type targets (at altitudes of 10-10,000 m). Minimum engagement range is 3.5 km. As claimed by the manufacturer, kill probability using two missiles is 0.81-0.96 against aircraft, and 0.43-0.86 against cruise missiles. Rate of fire is 14 seconds with one launcher, and 7 seconds with two launchers. The 9M38 missile is guided by a combination of inertial and semi-active radar (SAR) homing: inertial guidance is used in the early stages of the flight, and then the SAR seeker is activated to complete the interception. The 9M38 missile uses a 9E50 mono-pulse semi-active radar homing seeker, while the 9M38M1 missile uses a 9E50M1 seeker. In 1996 and 2002, China ordered two batches of 150 9M38/M1 (SA-N-7 "Gadfly") surface-to-air missiles each. The missiles were delivered to the PLA Navy in 1999-2001, and 2005-2006 respectively. Stockholm International Peace Research Institute (SIPRI) Arms Transfers Database, http://armstrade.sipri.org/armstrade/page/trade_register.php .

[476] The 3M-80E SSM weighs 4,150 kg (with a 300-kg warhead) and it can be programmed to fly a high altitude trajectory at Mach 3 (2,800 km/h), or a sea-skimming trajectory at Mach 2.2. If the sea-skimming mode is chosen, the missile will be first detected by a warship under attack when it emerges over the horizon at a distance of about 15-25 nautical miles. This provides the defenses on the ship with about 25-60 seconds of warning time before impact. The missile is powered by a 3D83 cruise ramjet with a solid-fuel rocket booster; the raw speed of the 3M-80E Moskit makes it a challenging target for most shipboard defenses. The 3M-80E missile seeker has active radar and passive anti-radiation homing capability. Inertial mid-course guidance is supplemented with an *Altair* active radar seeker. All variants of the 3M-80 missile use the 3A-81E-01 series radar altimeter, similar to the design used in the Kh-59ME air-to-ground missile. China ordered 48 3M-80E Moskit anti-ship missiles in July 1998, the first batch consisting of 24 missiles was delivered to the PLAN in May 2000, and the acceptance testing of the newly delivered missiles and their support systems took place in 2001. Carlo Kopp, "Anti Shipping Missile Survey", *Defence Today*, January/February 2008, p. 37, http://www.ausairpower.net/DT-Regional-ASCM-1207.pdf . Carlo Kopp, "Soviet/Russian Cruise Missiles", *Air Power Australia*, August 2009, http://www.ausairpower.net/APA-Rus-Cruise-Missiles.html . "Moskit-E Missile System", *Tactical Missiles Corporation JSC website*, http://eng.ktrv.ru/production_eng/323/507/522/ .

[477] Some sources (including the 1996 edition of *Jane's Fighting Ships*) are reporting that the 3M-80E Moskit missile, during the final stage of its flight, increases its speed to Mach 4.5. If this information is accurate, then Moskit should be the only currently deployed (in active service) surface-to-surface anti-ship missile reaching that speed (even though it is speculated that a new version of the BrahMos missile, fitted with a scramjet engine, may be able to achieve speeds of Mach 5.26). Richard Sharpe, ed., *Jane's Fighting Ships: 1996-1997*, Jane's Information Group, Coulsdon, 1996, p. 570. "Hypersonic version of BrahMos undergoes successful lab test", *domain-b.com*, May 13, 2008, http://www.domain-b.com/aero/mil_avi/miss_muni/20080513_hypersonic_version.html . "India: Tinkering with Hypersonic Missiles", *Stratfor*, May 14, 2008, http://www.stratfor.com/analysis/india_tinkering_hypersonic_missiles .

[478] The baseline Fregat-MAE radar has a detection range of 130 km for fighter aircraft-type targets (the upgraded Fregat-MAE-5 has a range of 230 km) and 30 km for cruise missile-type targets (50 km for the Fregat-MAE-5 variant). Rosoboronexport, *Naval Systems: Export Catalogue*, Moscow, 2003, p. 83, http://www.rusarm.ru/cataloque/navy/navy.pdf . Yuri Babushkin (ed.), *Russia's Arms: 2001-2002*, Military Parade, Moscow, 2001, p. 553.

[479] Out of the remaining seven ships currently in service with the Russian Navy, only the *Bespokoiny* (No. 620) and the *Nastoychivy* (No. 610, ex *Moskovski Komsomolets*) of the Baltic Fleet, and the *Admiral Ushakov* (No. 434, ex *Besstrashny*) and the *Gremyashchy* (No. 406, ex *Vieduzczy*) of the Northern Fleet are fully operational. In the Pacific fleet, the *Bystry* (No. 715), the *Burny* (No. 778) and the *Bezboyaznenny* (No. 754) are all in a so-called limited condition of operational availability. Mikhail Barabanov, "A Survey of Russian Naval Forces: The Surface Fleet in Decline", *Moscow Defense Brief*, No. 2 (2), 2004, p. 9, http://mdb.cast.ru/mdb/2-2004/rat/sfd/ .

[480] *Jane's Fighting Ships* quotes a range of 14,000 nautical miles at a speed of 14 knots for the Sovremenny-class destroyers. The veracity and the accuracy of that information is questionable, because it is confirmed neither by Rosoboronexport nor by the Severnoye Design Bureau. In fact, *Jane's* estimate seems to be, at least partially, inconsistent with the official data provided by Rosoboronexport and Severnoye. Rosoboronexport, *Naval Systems: Export Catalogue*, Moscow, 2003, p. 17. "Ships and Vessels: Project 956 Destroyer (Missile Artillery Ship)", *Severnoye Design Bureau website*, http://spkb.air.spb.ru/en/ships/generation3/956/ . Richard Sharpe, ed., *Jane's Fighting Ships: 1996-1997*, Jane's Information Group, Coulsdon, 1996, p. 570.

[481] As maintained by *SIPRI*, in 2002 the Chinese Defense Ministry ordered 150 53-65KE-type anti-ship torpedoes, which were delivered to the PLA Navy in 2005-2006. Stockholm International Peace Research Institute (SIPRI) Arms Transfers Database, http://armstrade.sipri.org/armstrade/page/trade_register.php .

[482] It is worth mentioning that the Russians, seeking to emphasize and illustrate the enhanced anti-ship warfare capabilities of the Sovremenny-class destroyers, call these vessels "*Missile Artillery Ships*". "Ships and Vessels: Project 956 Destroyer (Missile Artillery Ship)", *Severnoye Design Bureau website*, http://spkb.air.spb.ru/en/ships/generation3/956/ .

[483] According to *Jane's*, in 1995 the *Vazhny* was renamed *300 Let Rossiykomy*. The accuracy of that statement is highly contested, and it is not confirmed by any other source. Richard Sharpe, ed., *Jane's Fighting Ships: 1996-1997*, Jane's Information Group, Coulsdon, 1996, p. 570.

						the front/stem and rear/stern AK-130 twin gun mounts); as well as, with eight 3M-80E[476] Moskit (SS-N-22 "Sunburn") supersonic (Mach 2.5)[477], ramjet-powered, sea-skimming, long-range (120 km) surface-to-surface missiles. The 3M-80E missile has a launch weight of 4,000 kg and is armed with a 300 kg high-explosive warhead. The Sovremennys are fitted with two KT-190E fixed quadruple launchers for the 3M-80E missiles, installed port and starboard of the vessel's forward superstructure and set at an angle of 15 degrees. The Project 956E destroyers are also armed with two twin 130 mm/54 cal AK-130 gun mounts (making use of the MR-184/Leo-218 fire control radar and the DVU-2 Kondensor "Squeeze Box" optronic gunfire-control director, which combines a laser range-finder, low-light-level television, and infrared devices). Rate of fire is 20-35 rounds per minute (with a reserve of 2,000 A3-UF-44 and A3-UZS-44/R rounds on each destroyer), and the firing range slightly exceeds the 22 km. For close-in air-defense purposes the ships are armed with four 30 mm six-barrelled AK-630M CIWS, whose AO-18K cannons have a maximum rate of fire of 4,500-5,000 HE-FRAG incendiaries or fragmentation tracer rounds per minute (each AK-630M system has a reserve of 3,000-4,000 rounds, and each destroyer carries a total of 16,000 rounds of 30 mm ammunition) and a range of 500-4,000 m (with a muzzle velocity of 900 m/s) against sea-skimming anti-ship missiles, under control of either the MR-123-02 ("Bass Tilt") fire control radar or optical sight. The Sovremenny-class destroyers are equipped with three MR-212/201/202/203 Vaygach-U ("Palm Frond") navigation/surface search radars; one MR-750MA Fregat-MAE[478] ("Top Plate-B") 3D air/surface search/surveillance radar; one MR-184E Lev ("Kite Screech C") and two MR-123-02 Vympel ("Bass Tilt") fire control radars for the AK-130 130 mm and the AK-630M 30 mm gun mounts respectively; one Mineral-E ("Band Stand") target acquisition/designation radar for the P-270 Moskit anti-ship missile system; six (each with two channels) MR-90 Orekh ("Front Dome") missile guidance radars for the 9M38 SAMs. The ships are equally fitted with an MGK-335 fixed sonar suite, which includes the MG-335MS Platina-MS-E ("Bull Horn") active and the MGV-1 Ekho, or MG-7, ("Whale Tongue") passive hull-mounted, medium frequency search

						and attack sonar systems. Eight PK-10 (with 80 rounds) and two PK-2M (with 200 rounds) chaff launchers, and MP-401E and MP-407E jamming/decoy control systems, each of them capable of jamming two threats simultaneously, complement the electronic warfare and electronic counter-measures suite of the ships. The Sovremenny-class destroyers are powered by a relatively obsolete, and difficult to maintain propulsion system: four KVG-3 high-pressure steam boilers, and two 50,000 hp TV-12-4 steam turbines driving two fixed five-blade propellers. Electric power is supplied by two 1,000 kW steam turbo-generators and four 600 kW diesel generators. Although in the late 1970s and the 1980s the Soviet Navy had largely moved to gas turbine propulsion for its new warships, steam turbines were selected instead for Project 956 destroyers, partly because production of naval gas turbines would have been insufficient for the 19 ships (laid down in the years between 1977 and 1990) of this shipbuilding programme. In fact, the service life of the Project 956 destroyers is severely undermined by their unreliable high-pressure steam boilers and poor servicing; factors that led 10 out of the 17 destroyers commissioned with the Soviet/Russian Navy between 1980 and 1996 to be stricken.[479] The PLAN destroyers have a maximum speed of 32 knots and an economic speed of 18 knots. Maximum range at 32 knots is 2,400 nm, and 4,500 nm at 18 knots.[480] The Sovremenny-class destroyers compare in size (but not in capabilities) to the U.S. Navy Arleigh Burke-class destroyers. As a matter of fact, the Project 956E Sovremenny-class destroyers were not designed to operate as stand-alone platforms, since they lack organic anti-submarine warfare (ASW) defenses, and their SAM armament (based only on medium-range missiles, without any provision for long-range anti-aircraft defense) is not that much sophisticated and adequate for a destroyer with a standard displacement of 6,600 tons. The Sovremenny-class destroyers lack the large and expensive towed sonar array and anti-submarine warfare systems that are commonly found on U.S. Navy warships; they are equipped only with basic self-defense anti-submarine weapons: two twin DTA-53-956 533 mm torpedo tubes (with four ready to launch SET-65KE or 53-65KE[481] torpedoes), and two six-barrelled RBU-1000 anti-submarine rocket launchers/mortars

						(integrated with the SU-630/Purga-956 fire control system) with a total of 120 RGB-10 rockets carried by each Sovremenny-class destroyer. In reality, they are specialist surface warfare ships designed for distant anti-ship and shore-bombardment missions[482], complementing the ASW-capable destroyers of the Udaloy class (Project 1155). The two vessels delivered to the Chinese Navy were originally built for the account of the Soviet/Russian Navy (they had been laid down in 1989 and in 1990 respectively, and both of them had been launched in 1996), but after USSR's breakup the order was cancelled (due to budget constraints) before the construction of the ships was completed, and the hulls remained unfinished. As a matter of fact, the building of the former Soviet/Russian destroyer *Vazhny*/*Yekaterinburg*[483] had been completed to 65%-70%, and only to 30%-35% for the destroyer *Vdumchivy*/*Alexander Nevsky*. China entered into negotiations with the Russian government and, finally, in 1996 managed to acquire the two destroyers paying 667-885 million dollars.
Anti-submarine warfare (ASW) helicopter	Ka-27PL/Ka-28, and Ka-27PS (NATO reporting names: "Helix-A", and "Helix-D")	Kamov Design Bureau JSC; Kumertau Aviation Production Enterprise JSC	1998	1999–2000	8	The Ka-27PL/Ka-28 ASW helicopter is designed to search for, detect, track, and engage surfaced and submerged submarines sailing at speeds of up to 40.5 knots, submerged at a maximum depth of 500 m. The helicopters are organic to the Sovremenny-class, Type 052C (Luyang-II class), and Type 052B (Luyang-I class) destroyers or the Type 054A (Jiangkai-II class) frigates of the PLAN. For its anti-submarine missions the Ka-27PL/Ka-28 is equipped with a VGS-3 Ros'-V ("Lamb Tail") dipping sonar and sonobuoys. The helicopters ordered by the PLA Navy included 3 of the Ka-27PS ("Helix-D") version, which is specifically configured and adapted to undertake search and rescue (SAR) missions. The Ka-27PS is the SAR version of the Ka-27PL/Ka-28 ASW helicopter, featuring a more efficient fuel system, life-rafts, radio direction finder and medical equipment, as well as an emergency beacon receiver. The radar of the Ka-27PS is interfaced with specialized equipment to detect surface targets fitted with radar transponders. According to the manufacturer, speedboat-type targets are detected at a range of up to 25 km, and radar transponders at a range of up to 100 km. The helicopter carries a salvage jib/electric hoist with a lifting capacity of 300 kg. In addition, up to 4,830 litres of internal fuel, along with 3,000 kg of

						cargo under external pylons can be transferred by the Ka-27PS. The Ka- 27PS is outfitted with auxiliary lighting equipment, while ditching is facilitated by inflatable ballonets. The Ka-27PL/Ka-28 and Ka-27PS helicopters are powered by two TV3-117VMAR turboshaft engines, each rated at 2,200 shp. The first 3 units were delivered to the PLAN in 1999, and the delivery of the remaining 5 units followed in 2000.
Naval surface-to-air missile system	9K37M1-2 Shtil-1 (U.S. DoD/NATO reporting names: "SA-N-12 Grizzly")	JSC Altair Naval Radio Electronics Scientific Research Institute; "Almaz-Antey" Concern of Air Defence (PVO) JSC	2001/2002	2003–2004	4	For installation on Chinese 052B-type (Luyang I-class) destroyers. More specifically, the missile system was installed on the *Guangzhou* (No. 168) and *Wuhan* (No. 169). The 9K37M1-2 Shtil-1 (naval version of the land-based 9K37M1-2 Buk-M1-2 SAM system) surface-to-air, vertically-launched missile system is armed with 9M317E/ME[484] missiles. The 9M317E missile uses a 9E420 digital semi-active radar homing seeker (the ARGS Slanets mono-pulse active radar homing seeker has also been offered by *Agat* for integration on the missile). The Mach 3 semi-active, radar-homing missile's maximum engagement range is quoted to be 45 km against aircraft, and up to 15 km against anti-ship cruise missiles. It is capable of engaging targets at altitudes of 30-25,000 m, and can sustain 23 g manoeuvres. The system's ability to cope with tactical ballistic missile threats may be limited by the performance of the existing shipboard illuminating radar systems. China has purchased approximately 150-264 9M317E missiles.
Destroyer	Improved Sovremenny-class destroyer	Severnoye Design Bureau JSC;	December 2001/January	2005–2006	2	The Improved Sovremenny (Project 956EM) destroyers are modernized variants of the older Project 956E destroyers. The 956EM fighting ships feature an enhanced air-defense protection:

[484] As of 2009, the PRC is not known to have acquired any 9M317ME missiles. However, it is worth noting that the 9M317ME missile is designed to be fired from a cylindrical container/launcher mounted in a cell within the Shtil-1 VLS. This arrangement provides a much higher rate of fire than the original trainable launcher and magazine system used in Shtil and Shtil-1. The latter can fire a missile every 6 seconds, but the 9M317ME-based system being offered for Sovremenny-class destroyers can fire rounds at 1-2 second intervals. A dual-mode solid-propellant rocket motor based on a more energetic charge than that used in the 9M38 missile provides the 9M317ME missile with a maximum speed of Mach 4.5 (1,550 m/s), a significant increase over the Mach 3.0 (1,230 m/s) of the older 9M38 missile. Guidance remains a combination of inertial and semi-active radar (SAR) homing. If the missile is being fired against long-range targets, it can receive mid-course updates while flying under inertial control. Launch weight of the 9M317ME is 581 kg. It is armed with a 62 kg warhead initiated by a dual-mode (active or semi-active) radar proximity fuse, or a contact fuse.

	s (Project	Severnaya	2002			i) a 9K37 Shtil-1 system armed with forty-eight 9M38/M1 or, the more advanced, 9M317E[485]

[485] The 9M317E (SA-N-12 "Grizzly") surface-to-air missile was developed as a unified weapon for both land and naval use. It can engage tactical ballistic missiles, aircraft (manoeuvring at up to 12 g), cruise missiles, attack helicopters hovering at low altitudes, UAVs, and anti-ship missiles in a heavy ECM environment. The 9M317E missile, when compared to the Buk-M1's 9M38/M1 missile, features an extended engagement envelope of up to 45 km in range and up to 25 km in altitude. The 9M38/M1 and 9M317E missiles are direct equivalents in basic design to the U.S. Raytheon RIM-66 Standard family of naval missiles. Range performance of the Russian missiles is similar to the RIM-66B, and lesser than the RIM-66C, although this may in part reflect control laws employed. The 9M317E (SA-N-12 "Grizzly") missile employs a very different, higher span and shorter chord configuration, cruciform wing design compared to the earlier 9M38 missile. In 2001, China ordered 150-264 9M317E surface-to-air missiles, which were delivered to the PLA Navy in 2004-2005. Vassily Ektov, "9M317 Missile: The Ultimate Performer", *Military Parade*, Issue 34, July-August 1999, http://milparade.udm.ru/34/045.htm . Carlo Kopp, "NIIP 9K37/9K37M1/9K317 Buk M1/M2: Self Propelled Air Defence System / SA-11/17 Gadfly/Grizzly", *Air Power Australia*, July 2009, http://www.ausairpower.net/APA-9K37-Buk.html . Stockholm International Peace Research Institute (SIPRI) Arms Transfers Database, http://armstrade.sipri.org/armstrade/page/trade_register.php . Derek J. Mitchell, "China and Russia", in C. Fred Bergsten, Bates Gill, Nicholas R. Lardy, and Derek J. Mitchell, eds., *The China Balance Sheet in 2007 and Beyond*, Peterson Institute for International Economics and the Center for Strategic and International Studies (CSIS), May 2007, p. 148, http://csis.org/files/media/csis/pubs/090212_07china_russia.pdf .

[486] The 9M311-1/M missile, which is also used by the land-based 2K22M1/2S6M1 Tunguska-M1 SAM system, has two stages: i) a booster stage (with four folding fins) with a low-smoke motor, designed to avoid problems with optical/infrared tracking of targets and laser range-finding, which boosts the missile to a velocity of 900 m/s; and, ii) a terminal kill stage (with four fixed fins and four control surfaces), which is un-powered and relies on kinetic energy imparted by the booster stage, intended to minimize the dead weight and drag of the terminal stage. The missile's launch weight is 42 kg and the warhead weighs approximately 9 kg. Average missile speed is cited at 600 m/s (~Mach 2), and the weapon has a cited capability to engage targets manoeuvring at 5-7 g. Early variants of the missile use a laser proximity fuse with a blast fragmentation warhead, while later variants use a radio proximity fuse in order to improve effect against cruise missiles and precision guided munitions. The fuse is triggered approximately 5 metres from the target. An impact fuse is also provided, with the proximity fuse disabled, for shots against surface targets. The missile employs command link guidance, with an automatic Command to Line Of Sight (CLOS) control loop for the terminal phase to impact. The engagement radar component of the 1RL144M "Hot Shot" system is claimed to operate in the millimetric band, using jam resistant mono-pulse angle tracking; a 1A29M optical sight is bore-sighted with the radar; and, a 1RL138 IFF system is also part of the weapon system. The PLA Navy ordered 225 9M311-1/M missiles in 2002 with deliveries completed in 2005-2006. Carlo Kopp, "Russian/PLA Point Defence Weapons", *Air Power Australia*, May 2008, http://www.ausairpower.net/APA-Rus-PLA-PD-SAM.html#Grison . Carlo Kopp, "KBP 2K22/2K22M/M1 Tunguska SA-19 Grison / 96K6 Pantsir S1 / SA-22 SPAAGM", *Air Power Australia*, July 2009, http://www.ausairpower.net/APA-96K6-Pantsir-2K22-Tunguska.html . Stockholm International Peace Research Institute (SIPRI) Arms Transfers Database, http://armstrade.sipri.org/armstrade/page/trade_register.php .

[487] According to most available sources, the development of the 3M-80MBE anti-ship missile was, at least partially, funded by China, and its maximum range is 220-240 km. This claim about the missile's maximum range is corroborated by Moskit's manufacturer, the State Machine-Building Design Bureau "Raduga". In fact, according to Raduga, the missile's range on a low-altitude flight profile is up to 140 km, and up to 240 km when following a composite (10-12,000 m) flight profile. Richard D. Fisher, Jr., *China's Military Modernization: Building for Regional and Global Reach*, Praeger Security International, Westport, CT-London, September 2008, pp. 152, 153. Alexandr Nemets, "China Rapidly Modernizes for War with U.S.", *Newsmax*, August 10, 2004, http://archive.newsmax.com/archives/articles/2004/8/9/172001.shtml . "Moskit MBE Missile System", *Tactical Missiles Corporation JSC website*, http://eng.ktrv.ru/production_eng/323/507/541/ . Carlo Kopp, "Soviet/Russian Cruise Missiles", *Air Power Australia*, August 2009, http://www.ausairpower.net/APA-Rus-Cruise-Missiles.html .

	956EM)	Shipyard				(SA-N-12 "Grizzly") missiles; along with ii) sixty-four 9M311-1 (SA-N-11 "Grison") missiles in two 3M87 Kashtan/Kortik (NATO designation: "CADS-N-1", standing for *Close Air Defense System-Naval-1*) close-in, point-defense weapon systems. On the Project 956EM destroyers the four AK-630M CIWS (that were installed on the earlier Project 956E destroyers) have been replaced by two CADS-N-1 Kashtan short-range air defense gun/missile systems. Each Kashtan system comprises: i) one 3R86E1 command and control module, which serves to detect and classify aerial and surface targets, perform IFF interrogation, track and distribute the threat data and designate the targets to the combat modules; and, ii) two (in larger vessels this number could be up to six) 3R87E combat modules. The combat module comprises a combined gun and missile mount, a radar and optical control system with a range of 4.4 nm, a computing system, and a power supply system. The combined gun/missile mount consists of two 30 mm six-barrelled (AO-18K) water-cooled, gas-operated GSh-6-30K automatic guns (with a muzzle velocity of 960 m/s, using the 2A42 cartridge), and four ready-to-launch 9M311-1[486] (SA-N-11 "Grison") two-stage solid-propellant surface-to-air missiles featuring a fragmentation rod warhead with a proximity fuse. Each Kashtan combat module includes a reloading system, storing 32 SAMs in container-launchers in the ship's under-deck spaces. Moreover, reinforced surface-to-surface missile armament with the 3M-80MBE missile (SS-N-22 "Sunburn") with a range of 200-240 km[487] is provided to the Project 956EM destroyers. On the Improved Sovremenny-class destroyers the after 130 mm gun turret was removed; for that reason, the Project 956EM destroyers carry only 1,000 rounds of 130 mm ammunition. The two Improved Sovremenny (Project 956EM) destroyers delivered to China bear the names *Taizhou* (No. 138) and *Ningbo* (No. 139). There have been several unconfirmed reports claiming that the construction of the two ships ordered by the PLA Navy in 2002 is likely to have been based on semi-finished hulls (with pennant numbers 880 and 881) of the late Soviet era (1990-1991). Assigned to the East China Fleet (Zhoushan Naval Base), which is responsible for operations in the Taiwan Strait, the type 956E/M destroyers could play an important supporting role

						in any contingency over the island. The range, speed, and flight profile of the 3M-80MBE missiles would not only pose a direct threat to Taiwanese surface combatants, but also serve to hold U.S. aircraft carrier battle/strike groups at bay. The Sovremennys, in short, are eminently suited for a strategy of deterrence and, failing that, sea denial. The total cost of the contract, including the vessels armament (the PLA Navy acquired 35 3M-80MBE missiles), amounted to 1.4 billion dollars with an option providing for the order of another two destroyers, which was never exercised by the PLA Navy.
Diesel-Electric submarines modernization programme	Kilo-class submarines (Project 877EKM)	Zvezdochka [Zvyozdochka] State Machine – Building Enterprise	2002	N/A	2+2	Repair and modernization (to meet the requirements of the so-called "*08773 standard*") of the two 877EKM-type submarines (handed over to the PLA Navy in 1994-1995), including the integration of the supersonic long-range 3M-54E Klub-S (SS-N-27B "Sizzler") anti-ship missile, as well as the subsonic, wave-skimming, long-range 3M-54E1 Klub-S (SS-N-27 "Sizzler") anti-ship missile. In the context of this retrofit programme, a new automated combat information management system and a small-size inertial navigation system have been installed on the Chinese submarines. It might have also been carried out the integration of the 3M-14E Klub-S dedicated land-attack missile (fitted with a 450 kg warhead, and a maximum range of 250-300 km). The programme could eventually expand to include the first two 636-type submarines, which were delivered to the PLA Navy in 1997-1998.[488]

[488] Apart from a reference made by K. Makienko in an article appeared in the *Moscow Defense Brief* (Issue 2 -2-, 2004) and a mention made by the same author in a paper published by the French "*Foundation for Strategic Research*", it proved out to be impossible to find any other credible evidence positively confirming that this retrofit/modernization programme has taken place. However, interestingly enough, the *Military Balance 2009* edition of the British IISS seems to verify, although indirectly and implicitly, K. Makienko. The *Military Balance 2009* maintains that all 12 PLAN Kilo-class submarines can fire the SS-N-27 Klub family of anti-ship missiles. That means that the four Project 877EKM and Project 636 submarines of the Chinese Navy must have been modernized in order to be able to fire anti-ship missiles from their torpedo tubes. In any case, and despite the information quoted by the *Military Balance*, it remains dubious whether this modernization programme was indeed carried out successfully. On the contrary, it is widely known that four Kilo-class submarines of the Indian Navy are currently undergoing an extensive overhaul programme, carried out by the Zvezdochka shipyard, in order to be able to fully exploit the Klub-S family of missiles and remain in active service with the Indian Navy for the coming 10-15 years. Konstantin Makienko, "The Russian-Chinese Arms Trade: An Attempt at Qualitative Analysis", *Moscow Defense Brief*, No. 2 (2), 2004, p. 18, http://mdb.cast.ru/mdb/2-2004/at/rcat/ . Isabelle Facon and Konstantin Makienko, *La coopération militaro-technique entre la Russie et la Chine: bilan et perspectives*, Fondation pour la Recherche Stratégique, Paris, July 2006, p. 91, http://www.frstrategie.org/barreFRS/publications/rd/RD_20060701.pdf . James Hackett (ed.), *The Military Balance 2009*, The International Institute for Strategic Studies, Routledge, London, January 2009, p. 384.

Naval surface-to-air missile system	S-300FM/Rif-M (U.S. DoD/NATO reporting names: "SA-N-20A Gargoyle")	JSC Altair Naval Radio Electronics Scientific Research Institute	April 2002	2006–2007	2	Integration of the SAM system on two 7,000-ton 051C-type (Luzhou-class) air-defense missile destroyers. The two vessels in question were the *Shenyang* (No. 115) and the *Shijiazhuang* (No. 116). The S-300FM/Rif-M surface-to-air missile system is making use of the 48N6K (3M41M) missile, which features a maximum range of 120 km and can engage targets at altitudes ranging from 10 to 25,000 metres. Within its phased array antenna working sector, the fire control radar system can track up to 6 targets and guide up to 12 missiles onto them simultaneously. 48N6 vertically-launched missiles are tilted towards the target in the beginning of their trajectory according to a programme fed at their launch sequence. Russian sources claim that the S-300FM/Rif-M naval SAM systems employed on China's Type 051C destroyers are not capable of successfully carrying out complex anti-ballistic missile operations. In order to do so, they would require both software and hardware (integration of the 48N6-2, 9M96E, or 9M96E1 missiles) upgrades.[489] Each S-300FM/Rif-M missile system consists of six large-size revolver vertical launching systems (VLS), each housing eight ready-to-launch missiles. In the Luzhou-class destroyers two revolver VLS are installed underneath the bow deck behind the main gun, and four inside the aft deckhouse on the stern ahead of the helicopter flight deck, carrying a total of 48 48N6 missiles. As reported by *SIPRI*, the PLA Navy has purchased approximately 150 48N6 missiles. The cost for carrying out this armament programme reached the amount of 200 million dollars.
Diesel-Electric submarine	Improved Kilo-class submarines (Project 636M)	Central Design Bureau for Marine Engineering "Rubin" JSC; Admiralty	May 2002	2004–2007	8	The Project 636EM submarine is a follow-on development of the Project 877EKM and Project 636 submarines. In comparison to the earlier versions of the Kilo-class submarines, the Project 636EM is fitted with enhanced-power and quitter diesel generators; underwater full speed increased to 19 knots; extended snorkeling range (at 7 knots) to 7,500 nm; noise level reduced by introducing equipment with better shock-absorbing qualities. The submarine's combat information system is capable of providing

"Russia to equip four Indian subs with new cruise missiles", *RIA Novosti*, September 16, 2009, http://en.rian.ru/mlitary_news/20090916/156148137.html .

[489] Richard Fisher, Jr., "PLA Navy Carrier Update and Euro-Naval Notes", *International Assessment and Strategy Center*, November 7, 2006, http://www.strategycenter.net/research/pubID.126/pub_detail.asp .

[490] The 3M-54E1 anti-ship cruise missile employs an airframe derived from that of the S-10/RK-55 Granat (SS-N-21 "Sampson"), and is intended to fit in a standard 533-mm torpedo tube. After launch, the 3M-54E and 3M-54E1 follow similar trajectories: after the missile has climbed to 150 m, the solid-propellant booster is jettisoned, the under-fuselage air intake is extended, and the air-breathing subsonic turbojet sustainer is started; at the same time, the wings and tail control surfaces are deployed, and the weapon descends to its cruising altitude of 10-15 m above sea level, flying at a speed of Mach 0.6-0.8. However, we should keep in mind that, unlike the 3M-54E, the 3M-54E1 is a two-stage (not a three-stage) subsonic missile with a rocket booster and an air-breathing sustainer, and it doesn't carry a supersonic rocket-powered payload (as it is the case with its supersonic sibling, the 3M-54E). Both missiles are powered by the same 400/500-kgf-thrust TRDD-50 (Izdeliye 37) turbojet cruise engine. The 3M-54E1 missile is fitted with an ARGS-54E active radar homing seeker (with a cited range of 60-65 km), GPS/GLONASS satellite and inertial guidance. The ARGS-54E radar seeker (which provides guidance during the missile's terminal attack phase) employs a gimballed slotted planar array antenna, which is steered +/- 45 degrees in azimuth and +10 to -20 degrees in elevation. The missile is reportedly making use of the RVE-B radar altimeter, which operates at altitudes between 1 m and 5,000 m. The 3M-54E1 missile is considered roughly equivalent to Raytheon's UGM-109B Tomahawk and the cancelled (it was never deployed by the USN) AGM-109L MRASM Tomahawk in performance and appearance. Carlo Kopp, "Sunburns, Yakhonts, Clubs and the Region", *Air Power Australia*, September 2000, http://www.ausairpower.net/Analysis-Regional-ASCM.html . Carlo Kopp, "Soviet/Russian Cruise Missiles", *Air Power Australia*, August 2009, http://www.ausairpower.net/APA-Rus-Cruise-Missiles.html . Defense Threat Information Group, *The Klub Missile Family*, DTIG website, May 2005, pp. 3-5, http://www.dtig.org/docs/Klub-Family.pdf .

[491] The 3M-54E anti-ship missile consists of a rocket booster, a subsonic cruise low-flying air-breathing sustainer stage, and a low-flying supersonic rocket-powered terminal stage. The 3M-54E combines the subsonic cruise airframe of the 3M-54E1/3M-14E missile, with a Mach 2.9 rocket-propelled guided payload. For that reason, the supersonic 3M-54E missile is both heavier (2,300 kg as opposed to 1,770-1,780 kg) and longer (8.22 m as opposed to 6.20 m) than the 3M-54E1 and 3M-14E subsonic cruise missiles. However, the 3M-54E is fitted with a smaller warhead (200 kg) in comparison to its subsonic analogues (400 kg for both the 3M-54E1 and 3M-14E). Once the missile is out of the water (at an altitude of up to 150 m), the solid-propellant booster is jettisoned, the under-fuselage air intake is extended, and the air-breathing subsonic turbojet sustainer/engine is started. At the same time, the wings and tail control surfaces are deployed, and the weapon descends to its cruising altitude of 10-15 m above sea level, approaching therefore its target from under the radar horizon at a speed of Mach 0.8. At a distance of up to 30-40 km from the target, the missile climbs to higher altitude and activates its ARGS-54E active homing radar seeker. The ARGS-54E seeker provides terminal guidance during the missile's attack, and, as such, it detects targets, selects a specific target to attack within a group, determines the target's azimuth, elevation, range and closing speed relative to the missile, and generates steering cues for the weapon's guidance system. Once the target is locked on, at a distance of approximately 20 km from the target, the missile discards its cruise airframe, fires its rocket motor, and accelerates to a supersonic speed of Mach 2.9 following a sea-skimming flight profile at 5-6 meters above sea surface. Both the 3M-54E and 3M-54E1 missiles are relatively small weapons, which are difficult to detect on radar, especially should even basic radar signature reduction techniques (e.g. the use of a band-pass radome and minimal absorbent coatings) be applied to them. The 3M-54E does not have a direct equivalent in the Western/NATO inventory. Defense Threat Information Group, *The Klub Missile Family*, DTIG website, May 2005, pp. 3-5, http://www.dtig.org/docs/Klub-Family.pdf . Carlo Kopp, "Soviet/Russian Cruise Missiles", *Air Power Australia*, August 2009, http://www.ausairpower.net/APA-Rus-Cruise-Missiles.html . "ARGS-54E (China), Airborne fire-control radars", *Jane's Radar And Electronic Warfare Systems*, March 28, 2009, http://www.janes.com/articles/Janes-Radar-and-Electronic-Warfare-Systems/ARGS-54E-China.html . "Novator Missile variants offer subsonic and supersonic attack, anti-ship and ASW", *Jane's Missiles and Rockets*, August 1, 1999, http://www.janes.com/articles/Janes-Missiles-And-Rockets-99/NOVATOR-MISSILE-VARIANTS-OFFER-SUBSONIC-AND-SUPERSONIC-ATTACK.html .

[492] The 3M-14E land-attack missile has been designed to destroy stationary ground-based targets, such as administrative and economic centres, weapon and petrochemical storage areas, command posts, seaports, and airports. The missile is almost identical in appearance to the 3M-54E1 anti-ship missile, and consists of a rocket booster stage and a subsonic low-flying air-breathing sustainer stage. The onboard control system includes a barometric altimeter used to maintain altitude in terrain-following mode (making the weapon

		Shipyards; Krasnoye Sormovo Shipyard; JSC Production Association Northern Machine – Building Enterprise "Sevmash"				simultaneous fire control data on two targets. All boats delivered to the PLAN are fitted with: i) the 3M-54E1[490] Klub-S (SS-N-27 "Sizzler") subsonic, long-range (300 km) anti-ship missile armed with a 400 kg warhead; and, ii) the 3M-54E[491] Klub-S (SS-N-27B "Sizzler") supersonic (during the terminal stage of the flight), long-range (220 km) anti-ship missile carrying a 200 kg warhead. Possibly the 3M-14E[492] Klub-S (SS-N-30B) land-attack variant (fitted with a 450 kg warhead, and displaying a maximum range of 250-300 km) has been included to the submarines' armament. As of 2009, the PLA Navy is not known to have taken delivery of the supersonic 91RE1 anti-submarine ballistic missile (carrying an acoustic homing APR-3ME lightweight torpedo, which is released to a pre-set location at a distance of up to 50 km from the launch platform, and descends to the sea using a parachute to reduce velocity and prevent breakup on splash down, upon which the torpedo engages the target submarine). It is worth mentioning that missiles of the Klub-S family are launched from the submarine's 533 mm torpedo tubes. Both 3M-54E and 3M-54E1 use a common inertial navigation system (INS) with active radar guidance, and both fly a low-altitude sea-skimming mission profile. The PLA Navy has

stealthier than designs which rely solely on radar altimeters, because the 3M-14E is capable of following a low-flight altitude profile of 20 m above sea and 50-150 m over land), and a receiver for the GPS/GLONASS satellite navigation systems. The missile is thus able to take threat avoidance manoeuvres (using the GPS/GLONASS satellite navigation system for in-flight/mid-course correction) en route to the target, which can be located at ranges of between 250 km and 300 km. At the terminal stage of the flight, the guidance is carried out by a Scene Matching Area Correlation package, which guides the missile to a set of coordinates within a pre-programmed image surrounding the target, and an ARGS-14E active radar homing head, which pre-supposes the user has detailed three-dimensional imagery-derived digital data on the target. The ARGS-14E seeker is designed for attacks on land targets with sufficient radar contrast. It has a cited range of 20 km, and employs a gimballed slotted planar array antenna, which is steered +/- 45 degrees in azimuth and +10 to -20 degrees in elevation. The 3M-14E missile can be launched from a depth of 30-40 m below sea surface, and most closely resembles Raytheon's UGM-109C Tomahawk in size, weight and general concept. In the 1980s, the U.S. Department of Defense had attributed the designation "SS-NX-30" to the 3M-14E Kalibr land-attack cruise missile. Nevertheless, nowadays the "SS-NX-30" designation is exclusively used for the 3M30 Bulava intercontinental ballistic missile (the submarine-launched version of the land-based Topol-M, SS-27 "Sickle B", ICBM). Andreas Parsch and Aleksey V. Martynov, "Designations of Soviet and Russian Military Aircraft and Missiles", *Designation-Systems.Net*, 2005-2008, http://www.designation-systems.net/non-us/soviet.html#_Listings_SSN . Richard Fisher, Jr., "China's New Strategic Cruise Missiles: From the Land, Sea and Air", *International Assessment and Strategy Center*, June 3, 2005, http://www.strategycenter.net/research/pubID.71/pub_detail.asp . Carlo Kopp, "Soviet/Russian Cruise Missiles", *Air Power Australia*, August 2009, http://www.ausairpower.net/APA-Rus-Cruise-Missiles.html . Defense Threat Information Group, *The Klub Missile Family*, DTIG website, May 2005, pp. 9-11, http://www.dtig.org/docs/Klub-Family.pdf . Roy Braybrook, Eric H. Biass, "Tactical Missiles for the Next War", *Armada International*, Issue 3/2008, June/July 2008, pp. 71, 72, http://www.armada.ch/pdf/2008/3_2008/05_Tactical_Missiles.pdf .

						taken delivery of at least 150 missiles of the Klub-S family. Out of the eight Project 636EM submarines ordered by the PLA Navy, five were built at Admiralty Shipyards, two at the Sevmash Shipyards, and one at Krasnoye Sormovo Shipyard. Contract worth 1.6-2 billion dollars, including the purchase of 150 3M-54E/E1 anti-ship missiles.
Two-seat multi-role maritime strike aircraft (with enhanced anti-shipping attack capabilities)	Su-30MK2 (NATO reporting name: "Flanker-G")	Sukhoi Design Bureau JSC; Komsomolsk-on-Amur Aircraft Production Association (KnAAPO)	January 2003	2004	24	The Su-30MK2 ("Flanker-G") multi-role fighter-bomber aircraft is designed to gain air superiority and destroy surface (ground and sea) targets with high precision munitions. Compared to the MKK version in service with the PLAAF, the Su-30MK2 features an improved precision-attack capability (with an expanded air-to-surface weapons suite), and an entirely new C4ISTAR (Command, Control, Communications, Computers, Intelligence, Surveillance, Target Acquisition, and Reconnaissance) role not previously hinted at. The aircraft's phased-array N001VEP[493] radar is specifically modified to support a range of guided weapons, including the Kh-31A/MA/R[494] and Kh-31P[495] anti-radiation,

[493] The NIIP N001VEP is a reflective space feed passive phased array antenna. It is lighter than the legacy N001/VE design, yet offers roughly comparable beam steering agility with modern AESA radars, but with lower cost and transmit power ratings. The relationship between the N001VE and the N001VEP radars is like that between the APG-63 on the F-15C and the APG-70 on the F-15E. Carlo Kopp, "Flanker Radars in Beyond Visual Range Air Combat: Tikhomirov NIIP N001/N001VE/N001VEP", *Air Power Australia*, April 3, 2008, http://www.ausairpower.net/APA-Flanker-Radars.html .

[494] The Kh-31A/MA missile (dubbed the "Mini-Moskit", because of its close resemblance and common design origin with the 3M-80E Moskit surface-to-surface missile) is designed to engage surface ships in all weather conditions. The missile is fitted with an RGS-31/ARGS-31E active radar homing seeker, an A-069A radar altimeter (operating at altitudes between 100 m and 6 km), a 94 kg HE shaped-charge warhead, and a combined propulsion unit comprising a solid-propellant booster and a ramjet sustainer operating on kerosene. The missile operates jointly with the sighting and navigation system and the fire control system as part of the carrier aircraft onboard equipment. The Kh-31A/MA can be used in two modes: i) the joint mode, when the homing head locks on a target for its automatic tracking, with the missile suspended from the carrier aircraft; and, ii) the autonomous mode, when the homing head locks on a target for its automatic tracking during missile flight (after launch) at a range of 7 to 20 km from the target. The missile's maximum range varies between 25 km (for missile/patrol boat-type targets) and 50 km (for destroyer-type targets). A Su-30MKK/MK2 fighter can carry up to six Kh-31A/MA/P missiles (carried on AKU-58 launchers) on wing stations 3, 4, 11, 12, and inlet stations 9 and 10. Yuri Babushkin (ed.), *Russia's Arms: 2001-2002*, Military Parade, Moscow, 2001, pp. 424-425. Carlo Kopp, "Soviet/Russian Tactical Air to Surface Missiles", *Air Power Australia*, August 2009, http://www.ausairpower.net/APA-Rus-ASM.html . Carlo Kopp, "Regional Precision Guided Munitions Survey", *Defence Today*, January/February 2006, p. 66, http://www.ausairpower.net/DT-Missiles-01-06.pdf .

[495] Between the years 2002 and 2007 China took delivery of up to 300 missiles of the Kh-31A/MA/R series, and assembled locally (under licence) another 270 missiles of the Kh-31P family (built by "Hongdu Aviation Industry Corporation", under the designation YingJi-91). The Kh-31P anti-radiation missile (fitted with an L-111E passive anti-radiation seeker) was developed in the 1980s specifically to target the U.S. Navy's AN/SPY-1 "Aegis" radar, and the U.S. Army's AN/MPQ-53/-65 phased-array radar used by the Patriot SAM system. At least the first batch of 200 Kh-31P missiles were outfitted with Russian-made anti-

radiation seekers (reported to be designated L-111E), optimised against radars likely to be encountered as part of any Chinese air campaign against Taiwan. The most modern Chinese-made version of the YJ-91 missile combines an Israeli technology anti-radiation seeker and guidance package, with the motor of the Russian Kh-31P ramjet-powered missile. Given Washington's veto on Israel's intention to upgrade PLA's Harpy anti-radar UAVs in 2004-2005 and press for a halt to Israeli sales of high-technology weapons to the three service branches of the PLA, the YJ-91 missile could in essence constitute a "supersonic Harpy", able to threaten AWACS and Aegis combat system-equipped guided missile cruisers/frigates. "Tactical Missiles Corporation Missile Exportation Since 1992", *Moscow Defense Brief*, No. 4, 2008, http://mdb.cast.ru/mdb/4-2008/item7/article2/ . "China may be producing Kh-31P ARM, air-to-surface", *Jane's Missiles and Rockets*, July 11, 2005, http://www.janes.com/articles/Janes-Missiles-And-Rockets-2005/China-may-be-producing-Kh-31P-ARM.html . Richard Fisher, Jr., "Chengdu J-10 Fighters for Iran", *International Assessment and Strategy Center*, October 28, 2007, http://www.strategycenter.net/research/pubID.171/pub_detail.asp . Richard Fisher, Jr., "Chinese Dimensions of the 2005 Moscow Aerospace Show", *International Assessment and Strategy Center*, September 12, 2005, http://www.strategycenter.net/research/pubID.78/pub_detail.asp .

[496] The Kh-59MK/MK2 subsonic missile is designed to engage and destroy ground and sea-surface targets detected by the operator, with the coordinates preset before the launch of the missile (via the Su-30MKK/MK2's radar, operating in surface mapping mode). The Kh-59MK is a significant departure from the baseline Kh-59M/E design, because it incorporates a radar seeker (which is activated 15-25 km before impact), satellite guidance (GPS/GLONASS) and inertial navigation capability, and a Lyulka-Saturn 36MT two-shaft turbofan engine, which generates 450 kgf (i.e. 4.4 kN) of thrust. This allows the Kh-59MK to function in the anti-ship role at extended ranges of up to 285 km (against large ships), or 145 km (against smaller vessels, such as patrol boats). As a consequence, it becomes clear that the development of the Kh-59MK/MK2 missile took the tactical Kh-59M/E weapon (with a maximum range of 115 km) and transformed it almost into the strategic realm, in terms of reach and capability. However, it is to be noted that the radar-guided Kh-59MK missile is effective mainly against high-contrast sea-borne targets with radar cross-sections greater than 300 m^2. The missile's longer ranges are achieved by fitting additional fuel tanks in the rear fuselage, in place of the boost motor carried by the TV-guided Kh-59M variant. The PLAN is reported to have ordered an optimised anti-ship variant equipped with an ARGS-59E active radar seeker and an A-079E radar altimeter, designated Kh-59MK2, for the Su-30MK2 aircraft fleet. Su-30MK2 fighter-bombers can carry two rounds of the Kh-59MK/MK2 missile on wing stations 3 and 4 (using AKU-58 launchers), with the APK-9E/ME data link pod carried on the left -no. 9- inlet pylon. The PLAAF took delivery of 150 examples of the Kh-59MK missile in 2004-2006, and subsequently the PLANAF received in 2008-2009, possibly, 20 rounds of the Kh-59MK2 missile. In addition, the Su-30MK2 can be armed with the Kh-29T/L air-to-surface missile. "Kh-59M/ME Ovod-M (AS-18 'Kazoo') and Kh-59MK (Russian Federation), Air-to-surface missiles-Stand-off and cruise", *Jane's Air-Launched Weapons*, August 7, 2009, http://www.janes.com/articles/Janes-Air-Launched-Weapons/Kh-59M-ME-Ovod-M-AS-18-Kazoo-and-Kh-59MK-Russian-Federation.html . Carlo Kopp, "Anti Shipping Missile Survey", *Defence Today*, January/February 2008, p. 36, http://www.ausairpower.net/DT-Regional-ASCM-1207.pdf . "Russia to re-engine AS-18 Kazoo cruise missile", *Flight International*, April 30, 2002, http://www.flightglobal.com/articles/2002/04/30/146926/russia-to-re-engine-as-18-kazoo-cruise-missile.html . "Raduga set for Kh-59MK firing trials", *Flight International*, Vol. 162, No. 4850, September 24-30, 2002, p. 19, http://www.flightglobal.com/articles/2002/09/24/155279/raduga-set-for-kh-59mk-firing-trials.html . Stockholm International Peace Research Institute (SIPRI) Arms Transfers Database, http://armstrade.sipri.org/armstrade/page/trade_register.php . Yuri Babushkin (ed.), *Russia's Arms: 2001-2002*, Military Parade, Moscow, 2001, p. 428.

[497] The Su-30MK2 is also capable of carrying the RVV-AE/R-77 (AA-12 "Adder") MRAAM. There are no reports as yet of the Kh-35E (AS-20 "Kayak") subsonic, active radar homing anti-ship missile being offered for export to the PRC. Carlo Kopp, "Sunburns, Yakhonts, Clubs and the Region", *Air Power Australia*, September 2000, http://www.ausairpower.net/Analysis-Regional-ASCM.html .

[498] Some bibliographical sources have erroneously noted that Su-30MK2's ordnance is mounted on 10 hardpoints. "Su-30MK2: Double-seat fighter", *KNAAPO JSC website*, http://www.knaapo.ru/eng/products/military/Su30MK2.wbp .

[499] Su-30MKK/MK2 fighter-bombers have the potential to contest airspace up to 900 km or further from their runways, and launch limited strikes out to around a 1,850 km radius. Even without a proper aerial

refuelling capability (the refuelling system installed on PLAAF/PLANAF's H-6U/DU tankers is not compatible with the refuelling probes of the Su-30MKK/MK2 fighters), the PLAAF has the option of "buddy" refuelling Su-30MKK/MK2 aircraft (at the expense of half of the Su-30 force committed to tanking sorties), using the Sakhalin UPAZ-1A pod (with a fuel transfer rate of up to 3,900 lb/minute). While such a strike refuelling technique is not viable for sustained high intensity operations, it is feasible for raids against very high value assets (such as airfields, petrochemical/gas plants, shipping, aircraft carriers, etc), the destruction of which could be highly politically embarrassing to the victim. Carlo Kopp, "Sukhoi Flankers: The Shifting Balance of Regional Air Power", *Air Power Australia*, January 2007, http://www.ausairpower.net/APA-Flanker.html .

[500] During naval strike missions, the Su-30MKK/MK2 fighter-bombers could be assisted and accompanied by JH-7A "Flounder" fighter-bombers (armed with four YJ-81, or YJ-82K anti-ship missiles), and H-6D/M medium-range strategic bombers (which have a combat radius of 2,400-3,300 km, and are outfitted with YJ-61, or YJ-63/KD-63 air-launched cruise missiles, with a cited range of approximately 180 km). JH-7A fighter-bombers are assigned to PLANAF's 5th (in the Jinan Military Region) and 9th (on Hainan, in the Guangzhou Military Region) Air Divisions, as well as to PLAAF's 28th Air Division (83rd Fighter Regiment, stationed in the Nanjing Military Region). A PLANAF JH-7A regiment typically consists of 18-20 aircraft. The principal PLAAF units operating H-6A/E/H bombers are the 8th (144th Bomber Regiment), 10th (28th Bomber Regiment), and 36th (107th/108th Bomber Regiments) Air Divisions. In addition, PLANAF's 1st (1st Bomber Regiment) and 2nd (4th Bomber Regiment) Air Divisions fly the more advanced H-6D/M variants. "JianHong-7 Fighter-Bomber", *Sino Defence*, http://www.sinodefence.com/airforce/groundattack/jh7.asp . "H-6 Inventory", *Sino Defence*, http://www.sinodefence.com/airforce/groundattack/h6-inventory.asp . Andrei Chang, "Combat missions of PLAAF's five key fighter-bomber regiments", *Kanwa Asian Defence*, Issue 47, September 2008, August 15, 2008, http://www.kanwa.com/ . Carlo Kopp, "XAC (Xian) H-6 Badger", *Air Power Australia*, July 2007, http://www.ausairpower.net/APA-Badger.html .

[501] Every time the PLAAF and the PLANAF confront (in line with the usual scenario of major, large-scale PLA combined arms/tri-service military exercises) adversaries equipped with Western aircraft and large surface units, they adopt and employ, to a large extent, the Soviet Air Force doctrine and tactics. In effect, the PLANAF's doctrine is formulated on the basis of the Soviet/Russian teachings aiming at sinking or inflicting serious damage and putting out of action enemy key surface vessels. Therefore, based on the Soviet experience, the combat formation of Chinese fighter bombers attacking a sea target consists of a basic group, and a supporting group. The basic group consists of one or more air strike groups, and a reconnaissance-strike or reconnaissance group. An air strike group is designed to destroy or suppress surface (and also air) targets by using missiles, bombs, torpedoes, or mines. The supporting group may include a vectoring and target designation group, a radio-electronic suppression group, an air defense suppression group, a demonstration group, and a final reconnaissance group. Thus, an air operation against an aircraft carrier battle group may consist of one or more striking groups, an anti-fighter interceptor group, a group for target designation and illumination, a radio-electronic combat group, a group for destroying enemy air defense assets, a final reconnaissance group, and, if necessary, an in-flight refueling group, a demonstration group, and a reserve group.

PLANAF ASM-carrying bombers strike targets at sea either independently or in cooperation with other naval combat arms. An independent strike operation carried out only by naval bombers is usually organized against relatively weakly defended targets, such as medium-sized convoys or smaller groups of surface combatants. On the contrary, a strike against a target like a U.S. Navy aircraft carrier battle group is normally carried out as part of a larger effort involving multipurpose (conventional and nuclear powered) submarines and, often, SSM-armed surface ships (notably, large destroyers and frigates), as well as UAVs (e.g. the Israeli-made Harpy UAV), as anti-radiation drones that would crash into the radars of the air-defense destroyers, and fighter bombers. On some rare occasions, naval attack fighter bombers may be ordered to strike an aircraft carrier battle group independently of other forces –a very difficult and challenging task, however, because of the very strong and deeply layered air defenses typically surrounding a carrier.

The principal methods of combat employment of Chinese naval bombers against sea targets are simultaneous, and successive strikes. Simultaneous strikes are used against targets that must be destroyed as quickly as possible, or against those that are strongly defended. This method enables several targets to be attacked at once, offers good possibilities for overcoming enemy air defenses, and does not require the

aircraft to spend much time in enemy airspace or over enemy territory. However, to be successful the strikes require excellent organization, coordinated actions, and large forces, and the targets must be well reconnoitered beforehand. Successive strikes may be conducted against one or several targets. Such strikes are intended to methodically increase the pressure on the target. The groups of aircraft (usually 6-12 aircraft per group) are employed continuously, one following another at established time intervals. The interval between strikes must be too short to allow the enemy to recover between them. In practice, this interval is reportedly 15-60 minutes. Strikes in succession are organized against targets that require considerable time to destroy. In that context, a typical attack by a Chinese naval aircraft includes 5 phases: i) closing in; ii) maneuver to bring the aircraft to the point of entrance to the attack; iii) entrance to the attack; iv) combat course; v) withdrawal and departure from the target area.

In striking enemy amphibious landing forces, Chinese naval attack aircraft fly at low altitude and maximum speed to avoid enemy air defenses, maintaining total radio silence. The most important targets are hit by high-precision weapons, such as stand-off air-to-ground missiles and guided bombs, while other targets are hit with free-fall bombs. Milan Vego, *Soviet Naval Tactics*, United States Naval Institute, Annapolis, MD, 1992, pp. 209, 211, 212, 217. Carlo Kopp, "Sukhoi Flankers: The Shifting Balance of Regional Air Power", *Air Power Australia*, January 2007, http://www.ausairpower.net/APA-Flanker.html .

[502] USAF fighter operations are generally considered more efficient when the aircraft are taking off from airports located within a distance of no more than 500 nm from the battle area. Therefore, during the Operation Desert Strom, allied fighters had to cover a distance of approximately 556 nm before reaching their targets over Iraqi territory; while, during the Operation Allied Force, NATO aircraft had to cover a distance of approximately 366 nm before reaching Belgrade. John Stillion, Scott Perdue, *Air Combat Past, Present and Future*, RAND Corporation, Project Air Force, Santa Monica, CA, August 2008, p. 14.

[503] According to the *Office of Naval Intelligence*, in 2007 the PLANAF had 7 air divisions, which were organized into air regiments and regiment-grade field stations; battalion-grade flight and maintenance groups; and, company-grade flight and maintenance squadrons. PLANAF also had several independent regiments, such as its shipborne helicopter regiments (mainly composed of Ka-28 and Z-9C helicopters). PLANAF's air divisions and regiments were assigned to 25 air bases located throughout the three PLAN's fleets. *North Sea Fleet*: Anyang, Changzhi, Dalian, Jiaoxian, Jinxi, Jiyuan, Laishan, Laiyang, Liangxiang, Qingdao, Shanhaiguan, and Xingtai. *East Sea Fleet*: Daishan, Danyang, Ningbo, Luqiao, Shanghai, and Shitangqiao. *South Sea Fleet*: Foluo, Guiping, Haikou, Jialaishi, Lingling, Lingshui, and Sanya. Office of Naval Intelligence, *China's Navy 2007*, Washington, D.C., 2007, p. 47, http://www.fas.org/irp/agency/oni/chinanavy2007.pdf .

[504] To accommodate the newly arrived Su-30MK2 fighters, new underground aircraft shelters (which are often tunnelled into hillsides) were built at the Feidong Air Base, along with 24 hardened hangars. Since the Feidong Air Base (located in central-eastern China) is reckoned among PLAAF's "super-hardened" fighter bases, its infrastructure includes an auxiliary take-off alert runway (the runways are usually placed behind a hill or mountain, relative to the threat axis) directly connected to the underground aircraft shelters entrance, allowing the fighters to roll out of the tunnel, line up, open the throttles, and take off quickly. Fighters taking off from Feidong Air Base can be used to intercept American and Japanese naval forces moving south to support Taiwan, if a conflict breaks out. Aircraft from the Feidong Air Base could also provide air support (along with aircraft originating from PLAAF's 3rd and 29th Air Divisions) for PLA's landing forces attacking Taipei, in the northern part of Taiwan (the north of Taiwan will constitute the prime target in possible landing operations of the PLA). On the contrary, in time of war, Su-30MKKs dispatched from PLAAF's 18th Air Division would probably be used to attack targets in the southern part of Taiwan. Parenthetically, it is worth noting that Feidong Air Base is not included in the *Office of Naval Intelligence* list, which we have quoted in the previous footnote. Indeed, the Feidong Air Base is not reckoned among PLANAF's order of battle. This happens because the Feidong Air Base is officially considered a PLAAF, and not PLANAF, air base. Andrei Chang, "PLA Navy Expanding East Sea Fleet Bases", *UPI Asia*, July 15, 2008, http://www.upiasia.com/Security/2008/07/15/pla_navy_expanding_east_sea_fleet_bases/1275/ . Andrei Chang, "Combat missions of PLAAF's five key fighter-bomber regiments", *Kanwa Asian Defence*, Issue 47, September 2008, August 15, 2008, http://www.kanwa.com/ . Carlo Kopp, "People's Liberation Army Air Force and Naval Air Arm Air Base Infrastructure", *Air Power Australia*, January 30, 2007, www.ausairpower.net/APA-PLA-AFBs.html .

						air-to-surface missiles (AS-17 "Krypton"; they can be used in a maritime environment), and the Kh-59MK/MK2[496] (AS-18 "Kazoo") active radar-guided, long-range (285 km) anti-ship missiles. The Su-30MK2 is also capable of carrying the KAB-500/1500L laser-guided bombs, the KAB-500/1500Kr and KAB-1500TK (with a man-in-the-loop data link) electro-optical TV-guided bombs. Specially tailored to meet the requirements of the PLA Navy-Air Force (PLANAF), the Su-30MK2 features enhanced anti-ship strike capability. For a typical anti-ship mission the aircraft carries 4 Kh-31A/MA/R anti-ship missiles, and 4 R-73E SRAAMs for self-defence.[497] The Su-30MK2 combat load is carried on 12[498] external hardpoints. The Su-30MK2 fighter is fitted with a UOMZ Sapsan-E forward-looking infrared/electro-optic targeting and laser designation system. The Su-30MK2 is also capable of carrying the Kupol M400 reconnaissance suite, a large airborne pod system housing sensors including: i) a sideways-looking airborne radar (SLAR); ii) a high and low altitude TV/infrared payload; or, iii) a long-range oblique photography (LOROP) camera. The optical sensors are said to have a range of over 70 km, while the SLAR is claimed to have a maximum range of 100 km. The M400 reconnaissance suite allows a single Su-30MK2 to control up to 10 other fighters, thus giving PLANAF's units an organic, but limited, AWACS function to complement other PLAAF Intelligence, Surveillance and Reconnaissance (ISR) systems. Su-30MK2's cockpit is equipped with 4 (2 in the front seat + 2 in the rear seat) 158x211 mm MFI-10-5 LCD multi-function displays. The Su-30MK2 is powered by two AL-31F turbofan engines, each rated at 122.58 kN (12,500 kgf, 27,557 lbf) with afterburning. The maximum takeoff weight of the aircraft has been increased to 38,000 kg. One of the main implications for the regional East Asian security system posed by China's Su-30MKK/MK2 fleet is that U.S. Navy's role as a viable tool for coercive diplomacy has already started diminishing. More specifically, U.S. Navy aircraft carrier battle/strike groups have likely lost much of their ability to intimidate China by "gunboat diplomacy", since PLAAF and PLANAF can credibly threaten an aircraft carrier battle/strike group with a mixed package of Su-27SK/UBKs and J-11s (with radii

						essentially greater than those of the F/A-18E/F Super Hornet, and F-35C Lightning II carrier-based fighter jets[499]) on a Combat Air Patrol/COMAO protection role, and Su-30MKK/MK2s[500] on a naval strike role (launching attacks upon enemy ships, even in waters to the east of Taiwan, without requiring in-flight aerial refuelling).[501] Besides, it is worth keeping in mind that the PLA has 27 bases within 500 nm of Taiwan Strait, while the USAF has only one (Kadena Air Base in Okinawa Prefecture, home to the USAF's 18th Wing).[502] The first batch of 12 examples was delivered to the PLA Navy-Air Force in February/March 2004, followed by the second batch of 12 examples in August 2004. The first (and only till nowadays) PLA Navy-Air Force unit[503] to receive Su-30MK2 aircraft was 4th Air Division's 10th Fighter Regiment, based at Feidong Air Base, in the east of the city of Hefei, Anhui Province (in the Nanjing Military Region).[504] The cost paid by the Chinese government for the implementation of this armament programme amounted to 1-1.2 billion dollars.
Anti-submarine warfare (ASW) helicopter	Ka-27PL/Ka-28 (NATO reporting name: "Helix-A")	Kamov Design Bureau JSC; Kumertau Aviation Production Enterprise JSC	2009[505]	2010–2011	9	The helicopters are almost identical to those 8 ordered by the PRC in 1998. They are fitted with the Osminog-E combat direction/command and control system, and the Izumrud sonobuoy signal receiving and processing system (with slight, minor adjustments and upgrades in comparison to the original 1998 systems). It has been reported that, upon arrival to China, the Ka-28 helicopters will be assigned to the 4th PLANAF Independent Aviation Regiment.

[505] *SIPRI*'s assumption that this contract was signed in 2005 (and not in 2008-2009) seems improbable. A timetable of 5-6 years, as it is suggested by *SIPRI*, for the delivery of 9 Ka-28 helicopters to the PLAN is, beyond doubt, not realistic. There is no reliable evidence suggesting that the contract was concluded in 2005. Stockholm International Peace Research Institute (SIPRI) Arms Transfers Database, http://armstrade.sipri.org/armstrade/page/trade_register.php .

8.4. Weapon systems and military materiel/equipment/hardware for the Chinese air defense forces (PLA[506] and PLA Air Force[507] units)

Weapon description	Weapon designation	Manufacturer	Year of order	Year(s) of deliveries	Number of units	Comments. Additional information
Long-range surface-to-air missile system	S-300PMU (U.S. DoD/NATO reporting names: "SA-10B Grumble")	NPO Almaz n/a A.A. Raspletin	1991	1993	8 batteries	The S-300PMU long-range, multi-channel, mobile air defense missile system is designed to counter raids of aircraft, UAVs, strategic cruise missiles, tactical and theatre ballistic missiles[508] (with re-entry speeds of up to 1.2 km/s) under ECM conditions. With battalions as the basic fighting units, the Chinese surface-to-air missile (SAM) force is usually organized into divisions, regiments and battalions, or into brigades/regiments and battalions. On the other hand, the Chinese anti-aircraft artillery (AAA) force, with batteries[509] as the basic fighting units,

[506] The principal combat units of the PLA are its i) infantry; ii) tank; iii) artillery; and, iv) anti-aircraft artillery (AAA) divisions. A few PLA anti-aircraft artillery (AAA) units have received short-range, mobile surface-to-air missile (SAM) systems to become mixed/combined (SAM/AAA) air defense units. As a matter of fact, it is the PLAAF that operates the majority of SAM units found in the Chinese inventory, as well as large numbers of larger calibre anti-aircraft artillery guns. Dennis J. Blasko, "PLA Ground Forces: Moving toward a smaller, more rapidly deployable, modern combined arms force", in James C. Mulvenon, Richard H. Yang, eds., *The People's Liberation Army in the Information Age*, RAND Corporation, Project Air Force, Santa Monica, CA, July 1999, pp. 316, 317.

[507] The PLAAF makes a clear distinction in its writings between: i) aviation (i.e. aircraft); and, ii) air defense, which includes anti-aircraft artillery (AAA), surface-to-air missile (SAM) systems, and radar troops. The PLAAF consists of five branches/service arms: i) aviation; ii) AAA; iii) SAM; iv) radar; and, v) airborne troops. The backbone of PLAAF's SAM branch is composed of HQ-2B, HQ-7/A, HQ-9, HQ-64, Tor-M1, S-300PMU, S-300PMU-1, and S-300PMU-2 missile systems. Ken Allen, "PLA Air Force Organization", in James C. Mulvenon, Richard H. Yang, eds., *The People's Liberation Army in the Information Age*, RAND Corporation, Project Air Force, Santa Monica, CA, July 1999, p. 373.

[508] The legacy S-300PMU missile system has a limited ability to effectively intercept tactical ballistic missiles at various ranges, depending on the missile system employed and the speed of the incoming target. However, in order to enhance the system's anti-ballistic effectiveness, for the S-300PMU-1/2 was developed a warhead designed to cause the inbound ballistic missile's warhead to detonate in-flight. The new warhead was a directional warhead, roughly analogous to a shaped charge warhead, insofar as it is able to direct/concentrate the bulk of the explosive force of the warhead towards the target, rather than being omni-directionally dissipated as in conventional warheads. This technology provides the maximum destructive effect upon detonation to the designated target, and allows for a smaller warhead to destroy the incoming ballistic missile. Sean O'Connor, "The S-300P: A Detailed Analysis", *IMINT & Analysis*, July 8, 2008, http://geimint.blogspot.com/2008/07/s-300p-detailed-analysis.html .

[509] An artillery battery is equivalent to an infantry company.

[510] In 1985, the PLAAF began restructuring some of its AAA and SAM regiments into Combined (SAM/AAA) Brigades, with the goal of eventually combining as many SAM and AAA units as possible. The process involved turning over most of the AAA to the PLA, and combining the majority of the remaining AAA regiments with SAM regiments into Combined (SAM/AAA) Brigades (even though some individual SAM and AAA brigades and regiments were not absorbed into the new organizational scheme). Therefore, beginning in 1985, AAA troops were operationally organized either as part of a Combined (SAM/AAA) Brigade or into regiments, battalions, companies, squads, and platoons. The Combined Brigades eliminated the regiment-level, but kept the rest of the SAM and AAA organization in tact, so that the chain of command went directly from the brigade to the battalion. Therefore, nowadays each Combined (SAM/AAA) Brigade has 5-6 battalions, including 2-3 AAA and 2-3 SAM battalions. AAA regiments, which are not part of a Combined (SAM/AAA) Brigade, have the status of an independent regiment, and are therefore equal to a division. Each AAA regiment has 2-3 battalions; each battalion has 3-5 companies/batteries; each company has 3 AAA squads plus support (vehicle, maintenance, logistics, etc) squads; each squad has 3-6 platoons; and each platoon has 1 AAA piece. Each SAM regiment has 1-3 battalions, and each battalion has 6 launchers plus various support companies (i.e. command and control, logistics, maintenance, radar, etc). By the end of the 1990s, the PLAAF started re-instituting the division level for SAM systems, and apparently raised at least some of the Combined (SAM/AAA) Brigades to a Combined (SAM/AAA) Division level. It was estimated that in early 2000s the PLAAF had 16 active air defense (AAA/SAM) Divisions. According to Western analysts, this change may reflect the PLAAF's acquisition of the S-300PMU-1/2 SAM systems from Russia, and an increased number of SAMs overall, as well as the view that the Combined Brigades may not be the best solution to accomplishing the air defense mission. Information Office of the State Council of the People's Republic of China, *China's National Defense in 2008*, Beijing, January 2009, p. 27, http://www.fas.org/programs/ssp/nukes/2008DefenseWhitePaper_Jan2009.pdf . Ken Allen, "PLA Air Force Organization", in James C. Mulvenon, Richard H. Yang, eds., *The People's Liberation Army in the Information Age*, RAND Corporation, Project Air Force, Santa Monica, CA, July 1999, pp. 375, 390, 435, 436.

[511] The 5N63S radar maximum detection range is 200 km, and is capable of allowing intercepts of targets flying at speeds of up to 1.2 km/s. The 5N63S was influenced by Raytheon's MPQ-53 engagement radar, developed for the MIM-104 Patriot SAM system.

[512] The Ukrainian-made 36D6/ST-68U early-warning target acquisition radar has a maximum detection range of 150-165 km, an altitude threshold of 20 km, and is sometimes deployed on a 40V6M mast, towed by a KrAZ-260/MAZ-7910 semi-trailer truck. By collocating 36D6 radar assets with S-300PMU series batteries, the PLAAF maximizes the situational awareness of the deployed SAM batteries. China has purchased a total of 12 36D6 radars, with orders placed in 1993, 1996, and 2004. In 2007/2008 China reportedly signed a contract with Ukraine's Iskra Bureau providing for the upgrade of the 36D6 radars, possibly, to the 36D6-M standard. The 36D6-M radar is advertised as having a range of up to 360 km. Y. Sidov, "China to upgrade Ukraine-made radar", *Kanwa Asian Defence*, Issue 45, July 2008, June 17, 2008, http://www.kanwa.com/ . "36D6-M Mobile 3-D Air Surveillance Radar", *State Enterprise Scientific and Production Complex Iskra*, http://www.iskra.zp.ua/ver2_angl/Radar/36-D6/index.htm .

[513] The 5N66M maximum detection range is 120 km. The radar is frequently mounted atop a 23.8 meter 40V6M mast assembly (towed by a MAZ-537, 65-ton payload tractor, truck), and can track 120 targets. 40V6M's cited deployment time is approximately 1 hour. Given the fact that the minimum altitude figure for a long-range SAM system is dependent upon the height of the emitter in conjunction with the radar horizon, elevating the radar antenna by using a mast, directly increases the radar's useful range against low-altitude targets. It also aids in detection of high flying targets at much longer ranges, by reducing the necessary depression angle of the antenna bore-sight required to see such targets. Sean O'Connor, "Range vs. Radar Horizon", *IMINT & Analysis*, August 23, 2008, http://geimint.blogspot.com/2008/08/range-vs-radar-horizon.html . Carlo Kopp, "NKMZ 40V6M/40V6MD Universal Mobile Mast", *Air Power Australia*, May 2009, http://www.ausairpower.net/APA-40V6M-Mast-System.html .

[514] In some cases, the number of the TELs may rise up to a maximum of 8 vehicles. We should underline the fact that the composition of the Russian and Chinese S-300PMU batteries differs to a non-negligible extent. The S-300PMU batteries in service with the Russian Armed Forces usually comprise 8 TEL vehicles, while the PLAAF's batteries usually incorporate 4 TELs. Therefore, as it has been correctly observed, "the number of TELs present varies from user to user, location to location, and variant to

						is usually organized into brigades/regiments, battalions, and batteries/companies.[510] A typical PLAAF S-300PMU battery includes: i) one 5N63S/30N6E[511] ("Flap Lid B/C") phased-array illumination and guidance (i.e. fire control/target engagement) radar, mounted on a MAZ-543M all-terrain chassis; ii) a 36D6/ST-68U[512] ("Tin Shield") all-altitude, and a 5N66M[513] ("Clam Shell") low-altitude early-warning detection/target acquisition radars; and iii) usually four[514] 5P85SU/DU transporter erector launcher (TEL) vehicles (on a MAZ-543M chassis), each armed with four 5V55R/K[515] rounds (i.e. a total of 16 ready-to-launch missiles per battery). PLAAF's standard deployment strategy, as far as the S-300PMU batteries are concerned, is as follows: 4 TELs are positioned on 4 separate launch pads, deployed around the 5N63S/30N6E target engagement radar, which is positioned on a raised berm. 5N66M or 76N6 tower-mounted

variant". Sean O'Connor, "The S-300P SAM System: A Site Analysis", *IMINT & Analysis*, August 1, 2007, http://geimint.blogspot.com/2007/08/s-300p-sam-system-site-analysis.html . "Advanced air defence radar deployed at the Taiwan Strait", *Kanwa Asian Defence*, Issue 51, January 2009, December 17, 2008, http://www.kanwa.com/ .

[515] The 5V55 missile series is available in 4 different variants: i) the 5V55K, a radio command-guided missile (i.e. a missile relying on targeting data from the engagement radar complexes), with a maximum range of 47 km; ii) the 5V55KD, a radio command-guided missile, featuring a maximum range of 75 km; iii) the 5V55R, a semi-active seeker-aided ground-guided missile (similar to the Track-Via-Missile guidance mode employed by the U.S. Patriot SAM system), with a maximum range of 75 km; iv) the 5V55RD, a semi-active seeker-aided ground-guided missile, with a maximum range of 90 km against aircraft, and 30 km against ballistic missiles. Sean O'Connor, "The S-300P: A Detailed Analysis", *IMINT & Analysis*, July 8, 2008, http://geimint.blogspot.com/2008/07/s-300p-detailed-analysis.html .

[516] In mobility terms, the 5N66M or 76N6 radars mounted atop a 40V6M mast cannot compete with the S-300PMU's 5 minute shoot-and-scoot configurations, but this must be weighed against the increased coverage the mast system provides. Besides, according to some sources, the ability to relocate a mast-equipped radar in 1-2 hours provides sufficient mobility to defeat the targeting cycle of most cruise missiles. Carlo Kopp, "NKMZ 40V6M/40V6MD Universal Mobile Mast", *Air Power Australia*, May 2009, http://www.ausairpower.net/APA-40V6M-Mast-System.html .

[517] The S-300PMU is also compatible with the older 73N6 Baikal-1ME, and 34L6 Senezh-M1E command and control systems.

[518] In most of cases, a PLAAF SAM battalion consists of 4 batteries. From a technical point of view, in all versions of the S-300PMU SAM system, the battle management complex (consisting of the 5N83S, 83M6E/2, or the older 73N6 Baikal-1ME, or 34L6 Senezh-M1E systems) can control up to 6 separate batteries, placed at distances of up to 100 km from the battle management complex.

[519] The 5N83S and 83M6E/2 battle management complexes represent the central command post for each S-300PMU-1/2 battalion, controlling the primary acquisition radar and assigning target tracks to individual batteries, a process which can be accomplished automatically. All of the associated engagement radars possess the ability to acquire targets in their assigned sectors independently, but the primary source of target track data remain the associated battle management complexes. Sean O'Connor, "The S-300P: A Detailed Analysis", *IMINT & Analysis*, July 8, 2008, http://geimint.blogspot.com/2008/07/s-300p-detailed-analysis.html .

[520] The 5N64S radar maximum detection range is 300 km.

						engagement radars are not always employed, allowing the core system components to be rapidly repositioned (with a set-up and tear-down time of 5 minutes).[516] A 36D6 or 64N6 early-warning target acquisition radar is collocated with each SAM battery, with at least one 64N6 being present in each deployment area, either in a collocated or nearby position, in a command role, providing long-range target detection data to multiple batteries (forming a battalion). The S-300PMU SAM system is capable of operating both autonomously, with an attached target acquisition radar, or as part of an air defense grouping/battalion, when controlled by the 5N83S or 83M6E/2 command and control systems.[517] That means that the employment of the 36D6 (or 64N6) target acquisition radar allows individual batteries to operate without support from a battle management complex. In addition, the 36D6 radar system, in conjunction with a 5N66M low-altitude radar, can be used to refine target track data and pass this information along to the engagement radar. A typical air defense battalion in service with the Chinese Armed Forces combines three-five[518] batteries, making use of the 5N83S[519] battle management complex, comprising the 5K56 mobile command post (mounted on a MAZ-543M chassis) and the 5N64S[520] ("Big Bird B") dual-sided phased-array surveillance/target acquisition radar (in an anti-ballistic missile or anti-cruise missile role). As a consequence, one S-300PMU PLAAF air defense battalion is armed with a total of 48-80 ready-to-launch missiles. In principle, S-300PMU series SAM systems are employed in defense of key industrial and military areas, as well as large population centers. In that context, China has chosen to employ the S-300PMU-1/2 systems to defend key population centers, relying on HQ-2B SAM systems to defend smaller population centers and military facilities. The S-300PMU systems ordered in 1991 were initially placed on combat duty around Beijing; several years later some S-300PMU batteries were redeployed around Nanchang, in south-eastern China. The implementation of this contract placed a burden of nearly 220 million dollars (65% of the contract's price was paid in barter goods) on China's defense budget.
Long-range surface-to-air missile	S-300PMU-1 (U.S.	NPO Almaz n/a A.A.	1994	1997–1999	8 batteries	The S-300PMU-1 long-range, multi-channel, mobile air defense missile system is designed to engage combat aircraft, UAVs, strategic cruise

system	DoD/NATO reporting names: "SA-20A Gargoyle")	Raspletin				missiles, tactical and theatre ballistic missiles (with re-entry speeds of up to 2.8 km/s) under ECM conditions, making it an equivalent to Raytheon's U.S.-made MIM-104 PAC-1 and PAC-2 Patriot variants. The main upgrades incorporated in the S-300PMU-1 SAM system (when compared to the previous S-300PMU variant) can be summarized in the following points: i) the introduction of the more capable 48N6E missile; ii) the introduction of digital (not only physical cable connections, as it was the case with the S-300PMU system) data-links for connecting the TELs, radars, and command and control post, in an effort to reduce the system's set-up time to 5 minutes; and iii) the 64N6E target acquisition, and the 30N6E1 target engagement radars. A typical PLAAF S-300PMU-1 battery includes: i) one 30N6E1[521] ("Tomb Stone") phased-array illumination and guidance (i.e. fire control/target engagement) radar (capable of providing automatic data exchange with the 83M6E/2, 5N83S, Baikal-1E, or Senezh-M1E command and control systems), mounted on a MAZ-543M/MAZ-7910 all-terrain chassis; ii) a 36D6/ST-68U[522] ("Tin Shield") all-altitude, and a 76N6E[523] ("Clam Shell") low-altitude early-warning detection/target acquisition radars (towed by a KrAZ-260 truck); and iii) usually four[524] 5P85SE/TE TEL vehicles (on a MAZ-7910

[521] With regard to the 30N6E1 radar, the manufacturer claims an ability to engage targets at a range of up to 200-300 km, and an autonomous search capability. The radar can, optionally, be deployed on a 40V6M semi-mobile mast, so as to achieve better antenna elevation above terrain. Moreover, the 30N6E1 radar is equipped with a redesigned radar array and displays improved performance over the earlier 5N63 series, being capable of detecting targets flying at speeds of up to 2.8 km/s. It is also capable of simultaneously engaging up to 6 targets, and guiding up to 2 missiles per target. The radar can reject moving clutter from rain, chaff, and birds using unambiguous Doppler filtering, as do the continuous wave radars in U.S. SAM systems, such as the MIM-23 Hawk. Carlo Kopp, "Search and Acquisition Radars (S-band, X-band)", *Air Power Australia*, January 2009, http://www.ausairpower.net/APA-Acquisition-GCI.html . David K. Barton, "Design of the S-300P and S-300V Surface-to-Air Missile Systems", *Air Power Australia*, March 2009, http://www.ausairpower.net/APA-Russian-SAM-Radars-DKB.html .

[522] The 36D6 target acquisition radar has a maximum detection range of 150-165 km. Alternatively, the S-300PMU-1 batteries may use the 96L6E radar, introduced for the first time with the S-300PMU-2 system.

[523] The 76N6E maximum detection range is 120 km, and is specifically designed to acquire and track low-flying cruise missiles, and terrain-following aircraft. The radar is usually mounted atop a 23.8 meter 40V6MD mast assembly, which is towed by a MAZ-537 truck, with the 15 meter extension used by the 40V6MD being mounted on a 5T58 missile transporter semi-trailer, towed by a KrAZ-260/MAZ-7910 semi-trailer truck. When assembled (the cited deployment time is approximately 2 hours), 40V6MD's height is 38.8 m. Sean O'Connor, "The S-300P: A Detailed Analysis", *IMINT & Analysis*, July 8, 2008, http://geimint.blogspot.com/2008/07/s-300p-detailed-analysis.html . Carlo Kopp, "NKMZ 40V6M/40V6MD Universal Mobile Mast", *Air Power Australia*, May 2009, http://www.ausairpower.net/APA-40V6M-Mast-System.html .

						chassis in the SE version, or towed by a KrAZ-260B truck in the TE version), each armed with four 48N6E[525] rounds (i.e. a total of 16 ready-to-launch missiles per battery). The S-300PMU-1 system is capable of operating both autonomously, with an attached target acquisition radar, or as part of an air defense grouping/battalion, when controlled by the

[524] In some cases, the number of the TELs may rise up to a maximum of 8 vehicles.

[525] The 48N6E missile (with a 143 kg HE fragmentation warhead) features double the engagement range (i.e. 150 km against aircraft-type targets, and 40 km against ballistic missile-type targets, with a minimum engagement range of 5 km, and an engagement altitude of 10 m-27 km) of the older 5V55R, thanks to a more efficient rocket motor, without changing the dimensions of the missile to a degree significant enough to necessitate the use of new launch canisters and, possibly, new launch vehicles. Russian sources claim a single shot kill probability of 80% to 93% for aerial targets, 40% to 85% for cruise missiles, and 50% to 77% for tactical ballistic missiles. A further improved variant, the 48N6E2, was developed for the S-300PMU-2 Favorit SAM system. The ability of the S-300PMU-1/2 variants to employ various types of missiles is an important attribute of the system. The plethora of available weapons allows the SAM complex to select the most appropriate weapon for the designated target. For instance, in a jamming-free environment, a 5V55K missile may be selected, reserving the 5V55R and 48N6E/2 weapons for more difficult targets. In 2001 China ordered 150 48N6E missiles, delivered in 2002. Sean O'Connor, "The S-300P: A Detailed Analysis", *IMINT & Analysis*, July 8, 2008, http://geimint.blogspot.com/2008/07/s-300p-detailed-analysis.html . Carlo Kopp, "Search and Acquisition Radars (S-band, X-band)", *Air Power Australia*, January 2009, http://www.ausairpower.net/APA-Acquisition-GCI.html . Stockholm International Peace Research Institute (SIPRI) Arms Transfers Database, http://armstrade.sipri.org/armstrade/page/trade_register.php .

[526] The 83M6E battle management complex can control both S-300PMU and S-300PMU-1 batteries.

[527] The 64N6E ("Big Bird D") radar is a modification of the earlier 5N64 series radar systems. It can detect ballistic missile-type targets (with an RCS of 0.4 m^2) at a range of up to 127 km, and aircraft-type targets at a range of up to 300 km. The system operates in the 2 GHz (S/E) band and is a phased array with a 30% larger aperture than the U.S. Navy AN/SPY-1 Aegis radar. Carlo Kopp, "Search and Acquisition Radars (S-band, X-band)", *Air Power Australia*, January 2009, http://www.ausairpower.net/APA-Acquisition-GCI.html .

[528] The 64N6E radar can assign up to 36 targets to 6 batteries (i.e. 6 targets per battery). While the S-300PMU-1/2 does feature multiple-target engagement capability, most users of this SAM system overlap coverage areas in order to reduce the effect of saturation by actual or false targets, and increase the network's defensive effectiveness.

[529] Jiangxi would be the most import region for China's strategic air defense in the event of a confrontation with Taiwan. Given the fact that Jiangxi is one of the main strategic corridors for attacking the Chinese mainland, developing a second-line air defense network to counter attacks from Taiwanese aircraft is a priority for PLAAF's General Staff/HqAF. Although an air defense shield, comprising at least 4-5 S-300PMU series batteries, has been established in Fujian Province, the PLAAF is still worried that ROCAF's F-16s may be able to launch attacks upon inland Chinese targets, benefiting from their advanced anti-electronic jamming capabilities and LANTIRN pods. Therefore, the deployment of S-300PMU SAM systems in Nanchang is intended to put in place an air defense shield for the key metropolitan areas of central China (e.g. the city of Wuhan, in Hubei Province), or important defense industrial sites (e.g. the cities of Xi'an and Baoji, in Shaanxi Province, where it is based CASIC's "4th Academy" -China Academy of Rocket Motor Technology- that produces critical components for the DF-15 SRBM). Moreover, this deployment intends to protect critical Second Artillery Corps units (e.g. No. 807, 811, 815, and 821 Brigades stationed in Anhui and Jiangxi Provinces), armed with DF-21 and DF-15 medium and short-range ballistic missiles. Last but not least, the Nanchang-based S-300PMU batteries help to protect the vital for China's economy "Three Gorges Dam". Andrei Chang, "China deploys S-300 SAMs in the South", *UPI Asia*, May 16, 2008, http://www.upiasia.com/Security/2008/05/16/china_deploys_s300_sams_in_the_south/4893/ .

						83M6E command and control post. The employment of the 36D6 radar allows individual batteries to operate without support from a battle management complex. In addition, the 36D6 radar system, in conjunction with a 76N6E low-altitude radar, can be used to refine target track data and pass this information along to the engagement radar. A typical air defense battalion in service with the Chinese Armed Forces combines three-five batteries, making use of the 83M6E[526] battle management complex, comprising the 54K6E mobile command post (mounted on a MAZ-543M/MAZ-7910 truck chassis) and the 64N6E[527] ("Big Bird D") S/E-band three-dimensional phased-array surveillance/target acquisition radar (mainly in an anti-ballistic missile or anti-cruise missile role, mounted on a MZKT-79104/9988 semi-trailer). One S-300PMU-1 battery (when controlled by the 83M6E command and control system, making use of the 64N6E target acquisition radar) is capable of simultaneously detecting up to 300 targets, tracking up to 100 targets, and engaging up to 6 targets.[528] It can simultaneously guide up to 12 missiles (with a maximum of 2 missiles guided per target) at a maximum altitude of 27 km (with a maximum target speed of 2.8 km/s). The S-300PMU-1 SAM systems ordered in 1994 were initially positioned to defend Beijing and Shanghai, with further deployments along the Taiwan Strait (e.g. in Fujian province). The addition of S-300PMU-1 systems around Beijing allowed for some S-300PMU batteries to be redeployed around second line cities, such as the city of Nanchang (in Jiangxi province[529]) where 2 S-300PMU batteries have been deployed. Contract worth 400-600 million dollars (possibly, 50% of the contract's value was settled through barter agreements).
Short-range surface-to-air missile system	Tor-M1 (U.S. DoD/NATO reporting names:	Antey Concern; Izhevsk Electromechanical Plant	1996	1997	14 firing systems	The 9K331 Tor-M1 short-range SAM system is designed to protect ground troops and installations from attacks carried out not only from low-flying airplanes, helicopters and UAVs, but also cruise and stand-off missiles, and precision-guided munitions[530] during their terminal flight phase.

[530] By mentioning tactical "precision-guided weapons/munitions", Russian technical literature refers to: i) Anti-radar missiles, with a range of 15-70 km (and, in some cases, up to 150 km, or even more), flight speeds of 200-700 m/s, flying altitude of 60 m-12/16 km, and an effective RCS of 0.1 m^2; ii) Airborne-guided missiles fitted with infrared, laser, or TV-homing heads, with a range of 6-10 km, flight speeds of 200-600 m/s, and an effective RCS of 0.06-0.5 m^2; iii) Gliding and -controlled guided aerial bombs and clusters, with a release (drop) range of 8-10 km, flight speeds of 250-400 m/s, and an effective RCS of no

	"SA-15 Gauntlet")	(IEMZ) "Kupol"				Tor-M1's 9A331-1 transporter-launcher and radar (TLAR) vehicle (mounted on a GM-5955 series tracked chassis) is designed to be a completely autonomous air defense system with two Pulse-Doppler target acquisition, and target engagement/missile tracking radars, and a magazine of 8 Automatic Command to Line-of-Sight (ACLOS) guided missiles. Tor-M1's three-dimensional target acquisition radar (carrying the NATO reporting name "Scrum Half") making use of its Moving Target Indication system (so as to discriminate a target against clutter) can detect targets displaying an effective RCS equal to 0.1 m^2 (with a detection probability of p=0.5), high-speed and low-speed targets (with a minimum speed of 10 m/s). The accuracy of target designation is claimed to be 100 m in range, 20 arcmin in azimuth, and 2 degrees in elevation. The electronically beam-steered Pulse-Doppler target acquisition radar has an average power output of 1.5 kW and a maximum detection range of 22-25 km, which is sufficient to engage targets at ranges up to 12 km, within virtually all elevations (i.e. up to 64 degrees). The elevation zone of the target acquisition radar covers 32 degrees, but in order to augment the radar's potential the antenna system can be revolved mechanically through 32 degrees with a detection zone of 32-64 degrees. This means that two TLAR vehicles can cover a detection zone of 0-64 degrees, and allow target engagement within 0-80 degrees in elevation. The target acquisition radar allows discrimination

more than 0.5 m^2; iv) Missiles fitted with inertial guidance and terrain avoidance features, capable of flying at 60 m above earth's surface and lower altitudes. Russian analysts note that precision-guided weapons can serve in a preventive or a pre-emptive disarming first-strike operation, aiming at disabling air defenses, and destroying vital military infrastructure, including pinpoint and small-size targets. According to Iosif Drize, chief designer of the Tor-M1 SAM system, "*[Tor-M1 has been] the world's first short-range air defense system specifically tailored for highly effective use against precision-guided munitions*". Carlo Kopp, "Kupol 9K330/9K331/9K332 Tor-M/M1/M2 Self-Propelled Air Defence System: SA-15 Gauntlet", *Air Power Australia*, July 2009, http://www.ausairpower.net/APA-9K331-Tor.html . Iosif Drize, Alexandr Luzan, "Tor-M1 SAM system: Protecting ground installations against high-precision weapons", Military Parade, Publishing House Passport International, 1996, http://www.aviation.ru/PVO/Tor-M1/ .

[531] Carlo Kopp, "Kupol 9K330/9K331/9K332 Tor-M/M1/M2 Self-Propelled Air Defence System: SA-15 Gauntlet", *Air Power Australia*, July 2009, http://www.ausairpower.net/APA-9K331-Tor.html .

[532] Yuri Babushkin (ed.), *Russia's Arms: 2001-2002*, Military Parade, Moscow, 2001, p. 576.

[533] A Tor-M1 battery is the smallest tactical subunit capable of executing combat missions independently.

[534] A PLA Group Army is a corps-sized combined arms unit, commanded by a Major General. Gross manpower totals for a Group Army range from about 45,000 to 60,000 personnel. Dennis J. Blasko, "PLA Ground Forces: Moving toward a smaller, more rapidly deployable, modern combined arms force", in James C. Mulvenon, Richard H. Yang, eds., *The People's Liberation Army in the Information Age*, RAND Corporation, Project Air Force, Santa Monica, CA, July 1999, pp. 316, 317.

						between 4 types of targets: i) precision-guided munitions; ii) airplanes; iii) helicopters; iv) unidentified targets. It can operate in an active jamming environment, when the entire transmitted power of the radar is accumulated in one critical portion, instead of being distributed among three portions. The phased-array target engagement/missile tracking radar used by the Tor-M1 carries the NATO reporting name "Scrum Half" (i.e. Tor-M1's target acquisition, and target engagement/missile tracking radars bear identical NATO designations). It is a Pulse-Doppler electronically steered radar with an average power output of 0.6 kW, providing a maximum tracking range of 20 km. The target engagement radar, located at the front of the TLAR's turret, is capable of determining 4 coordinates of the selected target. The Tor-M1 SAM system is also equipped with a TV optical tracker (with a range of 20 km) that auto-tracks target angular coordinates, as a backup tracking system in a heavy ECM environment. To track its missiles the target engagement/missile tracking radar uses two channels: i) a channel to lock on to and track the missile by using beacon signals at the starting leg of the flight; ii) a channel that uses the missile responder signals, received via the phased antenna array, to track the missile during the latter stages of its flight. The Tor-M1 TLAR vehicle detects and selects air targets on the move and fires missiles at them from short halts. The system's total reaction time varies between 3.4 and 10.6 seconds. Eight vertically launched 9M331 SAM rounds are carried in sealed magazines (9Ya281 transport-launch canisters) in each Tor-M1 short-range SAM system. The 9M331 radio command-guided missile (with radar-controlled proximity fuses) weighs 165 kg (14.5 kg is the warhead's mass), and has a maximum range of 12 km against aircraft, and approximately 5 km against cruise missiles; with a single shot kill probability against aircraft-type targets of 45-80%[531], or, according to other sources, 60-95%[532], and 60-90% against cruise missiles and precision-guided munitions. Nose-mounted thrust vectoring jets are used to pivot the missile to the desired azimuth and pitch angle after its vertical launch. PLA Tor-M1 battalion composition appears to match the Russian concept of having 3-5 batteries per battalion. Each battery[533] consists of four 9A331-1 TLAR vehicles, and one 9S737M Ranzhir battery

						command post (BCP). Using the coded communications and navigation, survey control and orientation equipment of the TLAR vehicles, the 9S737M BCP controls the combat actions and fire of the TLARs, producing target distribution and precluding accidental concentration of fire of several TLARs on one target. The BCP also integrates the SAM battery into the general structures of the air defense systems of a large unit (e.g. a brigade). One Tor-M1 system is capable of simultaneously detecting and identifying up to 48 targets, tracking up to 10 targets, and engaging up to 2 targets. It can simultaneously guide up to 4 missiles at a maximum altitude of 6 km (with a maximum target speed of 700 m/s, and g-loads up to 10 g). The PLA Tor-M1 SAM systems were initially deployed with the air defense brigade (52966 Unit) of the 38th Group Army[534] in the Beijing Military Region, and with the air defense brigade (32525 Unit) of the 31st Group Army in the Nanjing Military Region. Russian thinking is that S-300PMU/S-400 battery elements (such as radars and command posts) are to be covered by Tor-M1 point-defense systems, intended to engage and destroy guided munitions targeting the S-300PMU/S-400 battery elements. The amount of money spent by the Chinese government for the acquisition of 14 Tor-M1 TLAR vehicles ranged between 300 and 378 million dollars. The PLA was the first export client for this short-range SAM system.
Short-range surface-to-air missile system	Tor-M1 (U.S. DoD/NATO reporting names: "SA-15 Gauntlet")	Antey Concern; Izhevsk Electromechanical Plant (IEMZ) "Kupol"	1999	1999–2000	13 firing systems	This arms deal was paid for mostly by writing off Russian debt amounting to 300-350 million dollars (programme for arms-for-debt sales).[535]
Long-range surface-to-air missile system	S-300PMU-1 (U.S. DoD/NATO reporting	"Almaz-Antey" Concern of Air Defence (PVO)	December 2001	2003–2004	4 batteries	Two S-300 SAM sites are currently found under construction in the north-eastern Shandong Province: i) close to the city of Qingdao (to protect the Headquarters of the North Sea Fleet, and the facilities of the 1st Nuclear Submarine Flotilla in Shazikou Nuclear Submarine Base -the

[535] According to *SIPRI*, the contract was signed in 1998 and it provided for the purchase of possibly 20 Tor-M1 firing systems. Deliveries were completed in 2000. Stockholm International Peace Research Institute (SIPRI) Arms Transfers Database, http://armstrade.sipri.org/armstrade/page/trade_register.php .

	names: "SA-20A Gargoyle")	JSC				first SSBN base to be constructed in China-); ii) near the city of Penglai (to provide coverage -in conjunction with 2 currently unoccupied S-300PMU series sites located in Liaoning Province- for the bulk of the Bohai Gulf, including PLAN's SSBN facility at Xiaopingdao, and the naval construction yards of Dalian). Reinforcing Shandong's air defenses is also expected to enhance Beijing's air defense posture. The probable face value of all four batteries was 462 million dollars. The sale was partially carried out under the provisions of the programme for arms-for-debt sales (arms exports in exchange for the PRC writing off Russian debts).
Long-range surface-to-air missile system	S-300PMU-2 Favorit (U.S. DoD/NATO reporting names: "SA-20B Gargoyle")	"Almaz-Antey" Concern of Air Defence (PVO) JSC	2004	2006–2008	8 batteries	The S-300PMU-2 Favorit, unveiled for the first time in 1997 and released for the international market in 2001, is an upgrade to the S-300PMU-1 SAM system, and shares many common technical features with the S-400 *Triumf* SAM system. The introduction of the 48N6E2 missile (with a 180 kg HE directional warhead, and a seeker aided ground guidance -SAGG- mode) resulted in the extension of the maximum range to 195 km for aircraft-type targets (as opposed to 150 km in the S-300PMU-1 SAM system), and 40-45 km for ballistic missile-type targets (as opposed to 40 km in the previous S-300PMU-1 variant).[536] Therefore, the upgraded missile system (with the 30N6E2, 64N6E2, and 96L6E radars) is capable against not just short-range ballistic missiles, but also medium-range tactical ballistic missiles, making it roughly an equivalent to Raytheon's MIM-104 PAC-3 Patriot variant, as far as the anti-aircraft capabilities are concerned, and with better ABMD capabilities than those featured by the PAC-2 standard (even though its anti-ballistic performance is undoubtedly inferior to that of the

[536] Other innovations used in the 48N6E2 missile include: the use of fundamentally new guidance algorithms; more advantageous flight trajectories; and new military loads. Indeed, the warhead's design was optimized to cope with ballistic missile-type targets (without impairing lethality against aircraft), by changing the mass of the warhead fragments and their initial velocity. 48N6E2's single shot kill ratio, as advertised by the manufacturer, is as following: 80-93% against aircraft; 80-98% against Tomahawk-series cruise missiles. The S-300PMU-2 system retains compatibility with the 48N6E, and the 5V55 series missiles. Carlo Kopp, "Almaz-Antey S-300PMU2 Favorit Self Propelled Air Defence System: SA-20 Gargoyle", *Air Power Australia*, May 2009, http://www.ausairpower.net/APA-S-300PMU2-Favorit.html . Vovick Karnozov, "The Favorite Defence Systems", *AeroWorldNet*, November 10, 1997, http://www.aeroworld.net/1ra11107.htm . "S-300P (SA-10 Grumble)", *Missile Threat*, http://www.missilethreat.com/missiledefensesystems/id.50/system_detail.asp . "S-300PMU-2, SA-20B, Gargoyle B Surface-to-Air Missile", *Army Recognition*, http://www.armyrecognition.com/s-300_variants_sol_air_missile_system_russia_uk/s-300pmu2_s-300_pmu2_sa-20b_gargoyle_b_surface_to_air_defense_missile_system_technical_data_sheet_uk.html .

[537] The 30N6E2 target engagement radar has a detection range of up to 300 km, and is capable of simultaneously engaging up to 6 targets (flying at speeds of up to 2.8 km/s), and guiding up to 2 missiles per target. It can control up to 12 5P85SE2/TE2 TELs, and retains compatibility with the 40V6M/D mast system. The 30N6E2 radar shares the same basic characteristics as the 30N6E1, differing primarily in the engagement range offered by the 48N6E2 missile. However, several other upgrades were also incorporated in the 30N6E2: a) Revised missile guidance control law algorithms to improve endgame accuracy, especially when engaging ballistic targets, or aircraft at extreme range; b) An interface terminal adaptor for track data feed from the 96L6E target acquisition radar; c) Revised PESA scan patterns in sector search modes, intended to improve acquisition of high velocity ballistic targets; d) Independent main-lobe steering for the auxiliary PESA canceller antenna arrays, in order to permit jammer nulling capability, and expand the engagement envelope in a countermeasures environment; e) Replacement of the digital beam steering controller with a new design to permit auxiliary PESA canceller antenna array control. Sean O'Connor, "The S-300P: A Detailed Analysis", *IMINT & Analysis*, July 8, 2008, http://geimint.blogspot.com/2008/07/s-300p-detailed-analysis.html . Carlo Kopp, "Almaz-Antey S-300PMU2 Favorit Self Propelled Air Defence System: SA-20 Gargoyle", *Air Power Australia*, May 2009, http://www.ausairpower.net/APA-S-300PMU2-Favorit.html .

[538] The 96L6E maximum detection range is 300 km (with a target speed of 30-2,800 m/s), and can track up to 100 targets. The radar is sometimes deployed on a 40V6M/D mast. Mast mounting facilitates the use of 3 elevation beams, and mechanical rotation in azimuth. The 96L6E radar can operate with all S-300PMU variants, and is usually mounted on a MZKT-7930 vehicle, based on the MAZ-543M chassis. "96L6E 3-D surveillance radar (Russian Federation): Land-based air defence radars", *Jane's Radar and Electronic Warfare Systems*, May 26, 2009, http://www.janes.com/articles/Janes-Radar-and-Electronic-Warfare-Systems/96L6E-3-D-surveillance-radar-Russian-Federation.html .

[539] The 76N6E maximum detection range is 120 km, and is specifically designed to acquire and track low-flying cruise missiles, and terrain-following aircraft.

[540] The 83M6E2 command and control system is able to manage simultaneously up to 12 TELs, with any mix of 5P85SE2/TE2 self-propelled and semi-trailer TELs. The 83M6E2 has the capability to control S-300PMU/1/2 batteries, as well as S-200VE (SA-5 "Gammon") batteries. Carlo Kopp, "Almaz-Antey S-300PMU2 Favorit Self Propelled Air Defence System: SA-20 Gargoyle", *Air Power Australia*, May 2009, http://www.ausairpower.net/APA-S-300PMU2-Favorit.html .

[541] The 54K6E2 mobile command post fits into one half the volume and mass of the 54K6E command post (used by the S-300PMU-1 system), with 3 to 4 times lower power consumption. Carlo Kopp, "Almaz-Antey S-300PMU2 Favorit Self Propelled Air Defence System: SA-20 Gargoyle", *Air Power Australia*, May 2009, http://www.ausairpower.net/APA-S-300PMU2-Favorit.html .

[542] The 64N6E2 target acquisition radar differs in performance with the earlier 64N6E radar only in the area of the ballistic target detection sector. In the 64N6E2 radar the elevation value is from 0 to 75 degrees, as opposed to 0-55 or 20-75 degrees in the 64N6E radar. Sean O'Connor, "The S-300P: A Detailed Analysis", *IMINT & Analysis*, July 8, 2008, http://geimint.blogspot.com/2008/07/s-300p-detailed-analysis.html . Yuri Babushkin (ed.), *Russia's Arms: 2001-2002*, Military Parade, Moscow, 2001, p. 569.

[543] The 64N6E2 radar can assign up to 36 targets to 6 batteries (i.e. 6 targets per battery).

[544] The 64N6E2 radar can simultaneously guide up to 72 missiles, when controlling 6 batteries (i.e. 12 missiles per battery).

[545] Available Imagery Intelligence (IMINT) sources reveal that, as of 2009, S-300PMU-2 batteries have been deployed on the outskirts of Shanghai. Andrei Chang, "Shanghai further reinforces air defence", *Kanwa Asian Defence*, Issue 64, February 2010, January 18, 2010, http://www.kanwa.com [*N.B. The reference to A. Chang's article was added in January 2010, after the original draft of the present study was completed*]. Sean O'Connor, "Image of the Week: Chinese S-300PMU-2", *IMINT & Analysis*, September 14, 2009, http://geimint.blogspot.com/2009/09/image-of-week-chinese-s-300pmu-2.html .

[546] By employing a number of S-300PMU-2 batteries positioned to provide overlapping areas of coverage, the PLAAF can create what amounts to an area of denied airspace.

[547] The Chinese S-300PMU-2 SAM systems can cover air routes used by international airliners landing on Taiwan, thus forcing air traffic into Taiwanese airfields via eastern approaches at low altitude, to avoid entering the envelope of the Chinese S-300PMU systems. They can also be used by the PLA in a different role; that is, denying the Taiwan Strait as an air defense buffer zone for the ROCAF, and extending a protective umbrella across the Taiwan Strait for the PLAN and the PLAAF, allowing Chinese forces to

						PAC-3 standard). A typical PLAAF S-300PMU-2 battery includes: i) one 30N6E2[537] ("Tomb Stone") phased-array illumination and guidance (i.e. fire control/target engagement) radar, mounted on a MAZ-7910/MZKT-7930 all-terrain chassis; ii) a 96L6E[538] ("Cheese Board") all-altitude, and a 76N6E[539] ("Clam Shell") low-altitude early-warning detection/target acquisition radars (on a MZKT-7930 chassis); and iii) usually four 5P85SE2/TE2 TEL vehicles (on a MAZ-7910 chassis in the SE2 version, or towed by a BAZ-64022 truck in the TE2 version), each armed with four 48N6E2 rounds (i.e. a total of 16 ready-to-launch missiles per battery). The S-300PMU-2 system is capable of operating both autonomously, with an attached target acquisition radar, or as part of an air defense grouping/battalion, when controlled by the 83M6E2 command and control post. The employment of the 96L6E radar (with enhanced performance over the previous 36D6) allows individual batteries to operate autonomously, without support from a battle management complex. In addition, the 96L6E radar system, in conjunction with a 76N6E low-altitude radar, can be used to refine target track data and pass this information along to the engagement radar. A typical air defense battalion in service with the Chinese Armed Forces combines three-five batteries, making use of the 83M6E2[540] battle

perform a combined amphibious and airborne assault against fortified Taiwanese positions in the eastern part of the island. Furthermore, the S-300PMU-2 anti-aircraft missile systems could threaten the survivability of U.S. Navy early warning aircraft, degrading the U.S. theatre commander's ability to coordinate the operations of forward-deployed forces or the U.S. ability to collect and transmit early warning information, thus increasing the vulnerability of forward-deployed forces to air and missile attacks. Nevertheless, we should bear in mind that, given the limited number of S-300PMU-2 SAM systems currently in service with the PLA and the Suppression of Enemy Air Defenses (SEAD) and Electronic Warfare (EW) missions that will be executed by the ROCAF (or the USAF/USN) in case a conflict with the mainland erupts over the Taiwan Strait, actual coverage by the S-300 missile systems will be non-contiguous and dependent upon precise deployment sites and the effectiveness/success rate of the ROCAF's SEAD and EW operations. Office of the Secretary of Defense, *Military Power of the People's Republic of China 2009*: *Annual Report to Congress*, Washington, D.C., 2009, p. 42, http://www.defenselink.mil/pubs/pdfs/China_Military_Power_Report_2009.pdf . Roger Cliff, Mark Burles, Michael S. Chase, Derek Eaton, Kevin L. Pollpeter, *Entering the Dragon's Lair: Chinese Antiaccess Strategies and Their Implications for the United States*, RAND Corporation, Project Air Force, Santa Monica, CA, 2007, p. 85. Carlo Kopp, "Almaz S-300 – China's 'Offensive' Air Defense", *International Assessment and Strategy Center*, February 25, 2006, http://www.strategycenter.net/research/pubID.93/pub_detail.asp .

Parenthetically, it is worth remarking that most of Taiwan's international and domestic air traffic travels along its western coast, which, in case of a conflict, will be covered by the Chinese S-300PMU-2 missile systems. Such a missile blockade also affects the rest of Asia, insofar as major air transport corridors critical to commerce between Northeast and Southeast Asia transit the Taiwan Strait.

						management complex, consisting of the 54K6E2[541] mobile command and control post vehicle (mounted on a MAZ-543M/MAZ-7910 truck chassis) and the 64N6E2[542] ("Big Bird D") three-dimensional phased-array surveillance/target acquisition radar (mainly in an anti-ballistic missile or anti-cruise missile role, mounted on a MZKT-7930 truck chassis). One S-300PMU-2 battery (when controlled by the 83M6E2 command and control system, making use of the 64N6E2 target acquisition radar) is capable of simultaneously detecting up to 300 targets, tracking up to 100 targets, and engaging up to 6 targets.[543] It can simultaneously guide up to 12 missiles[544] at a maximum altitude of 27 km (with a maximum target speed of 2.8 km/s). The S-300PMU-2 SAM systems ordered in 2004 were delivered to locations already operating S-300PMU-1 batteries (e.g. in Shanghai[545], Beijing, and across the Taiwan Strait, i.e. in Fujian province), likely for reasons of crew training (due to the familiarity between the two systems), with the probable end result being the redeployment of the older S-300PMU/1 batteries to new locations. As well as serving defensive roles (i.e. denying Chinese airspace to enemy air forces[546]), the S-300PMU-2 missile system could also be used in a more "offensive" manner by deploying the missiles close to the border to force enemy aircraft (following a medium or high altitude flight profile) avoid entering the S-300PMU-2 flight envelope, thus implementing a partial airspace blockade over enemy territory.[547] The Chinese order, including the acquisition of 300 48N6E2 rounds, was worth 980 million dollars. It is to be noted that China was the first export customer for this long-range SAM system.
Long-range surface-to-air missile system	S-300PMU-2 Favorit (U.S. DoD/NATO reporting names: "SA-20B Gargoyle")	"Almaz-Antey" Concern of Air Defence (PVO) JSC	October 2006	2008–2010	8 batteries	Contract worth 1 billion dollars. The S-300PMU-2 SAM system is armed with the 48N6E2 missile. The contract included the order of 300 48N6E2 missiles.

Nikolaos Diakidis, *An Assessment of China's Defense Strategy in the post-Cold War Era. What Role for Bilateral Defense Cooperation with Russia?*, Piraeus, December 2009

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- Air Power Australia ("*Australia's independent defence think tank*"): http://www.ausairpower.net/
- Center for Strategic and International Studies: www.csis.org
- China Defense: http://www.china-defense.com/ ; http://www.china-defense.com/smf/
- Defense Industry Daily: http://www.defenseindustrydaily.com/
- Fondation pour la Recherche Stratégique: http://www.frstrategie.org/
- Institut de Stratégie Comparée: http://www.stratisc.org/
- International Assessment and Strategy Center: http://www.strategycenter.net/
- Jamestown Foundation: www.jamestown.org ; http://www.jamestown.org/programs/chinabrief/ ; http://www.jamestown.org/programs/edm/
- Johnson's Russia List (Center for Defense Information): http://www.cdi.org/russia/johnson/default.cfm
- Ministry of National Defense of the People's Republic of China: http://eng.mod.gov.cn/index.htm
- Moscow Defense Brief: http://mdb.cast.ru/
- Sino Defence: http://www.sinodefence.com/
- Space War: http://www.spacewar.com/
- Stockholm International Peace Research Institute (SIPRI) Arms Transfers Database: http://www.sipri.org/databases/armstransfers ; http://armstrade.sipri.org/armstrade/page/trade_register.php
- Stratfor: http://www.stratfor.com/
- U.S. Congressional Research Service (CRS) Reports and Issue Briefs: http://www.fpc.state.gov/c18185.htm
- U.S. Department of Defense publications: http://www.defenselink.mil/pubs/
- U.S. Naval War College "China Maritime Studies Institute" publications: http://www.nwc.navy.mil/Research---Gaming/China-Maritime-Studies-Institute/Publications.aspx
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