

**People's Liberation Army Leverage of Foreign  
Technology To Achieve Advanced Military Capabilities**

**Testimony of Richard D. Fisher, Jr.  
Vice President, International Assessment and Strategy Center  
Before the U.S.-China Economic and Security Review Commission  
March 16, 2006**

Mr. Chairman, and distinguished Members of this Commission, I would like to thank you for the opportunity to offer testimony on the degree to which access to foreign weapons, plus military and dual use technologies have enabled China's People's Liberation Army (PLA) to transform its capabilities in some cases, and in others, to revive their domestic military technical sectors. Over the past 15 years the PLA's ability to purchase, co-produce and absorb foreign weapons and foreign military technology has had played a decisive role in achieving the capabilities it now demonstrates, and will demonstrate in the near future.

I think it is fair to say that very few people indeed, and no neighboring states, expected China's military build up to proceed with the rapidity and sophistication it now clearly manifests. A new challenge has emerged that directly affects the security interests of China's neighbors and the world. Japan and India will be deeply concerned. So too should be Russia, though Russia is a main source of Chinese military technology. All of the states of Southeast Asia will be worried, one way or another, by China's unanticipated capabilities. Certainly Washington should take all of this very seriously.

Thanks in part to foreign assistance, direct or indirect, by 2010 China will have a military formidable enough to cause real trouble for its neighbors in the region and for the United States, should it attempt, as an ally or friend, to help them. For this reason successive U.S. Administrations have sought to stem the traffic in weapons and related technologies to China. It is essential that Washington continue its dialogue of concern with China's main suppliers: Russia, Ukraine, Europe, and Israel. It is also vital that the United States continue to deny militarily useful technologies to China for as long as it refuses to curb its nuclear and missile proliferation and to renounce the use of force in the region..

I would also like to acknowledge the support given me by this Commission to pursue research concerning this topic. In early 2004 I produced an extensive review of foreign military systems and technologies acquired by the PLA and assessed their impact on then developing PLA capabilities.<sup>1</sup> My testimony today builds on this report but also benefits from subsequent interviews at arms shows in China, Russia, Pakistan, Abu Dhabi and India, as well as a review of numerous open sources. Because it is confined to open sources, this approach has weaknesses. It is not possible to obtain precise PLA documentation of their broad or specific military intentions and the range of individuals and companies that sell technology to the PLA are often evasive. The PLA is an institution that abhors transparency and its many clients reflect that preference.

It must also be noted that weapon and technology acquisitions alone do not convey the full story of the PLA's transformation over the last decade, from a still largely defensive force, just beginning to use modern weapon systems, to a more confident force today that has experienced fundamental doctrinal, personnel, logistic and training reforms, plus numerous upgrades and reforms within its research and development and production sectors. Starting with the large "Peace Mission 2005" combined-arms exercises in August 2005, Russia is starting to transfer "software" in addition to hardware, and this trend is likely to grow. China does not wish to be dependent on foreign weapons, and the true test of this period of transition in which it must turn to foreign sources, is the degree to which it can succeed in absorbing foreign technology to enable the production of equal or better next-generation weapon systems.

### **Massive Weapons Purchases Shifting To Components, Technology**

For 1999 to 2004 the Stockholm International Peace Research Institute (SIPRI) ranked China as the world's largest weapons importer.<sup>2</sup> SIPRI notes that for the five year period 2000 to 2004 that China imported over \$11.6 billion in weapons.<sup>3</sup> However, it is not possible to offer precise figures owing to lack of complete information. For example, a Russian source notes that from 1995 through 2005 that China purchased \$15 billion in weapons from Russia alone. Over the last several years this rate has been sustained at about \$2 billion a year, though one source notes that 2004 Russian military exports to China rose to \$2.84 Billion.<sup>4</sup> Less is known about the continuing military sales to China from Ukraine, Europe, or the previous sales from Israel (which promised to halt such sales in 2004 but has now reportedly resumed them). The following chart illustrates SIPRI's estimates of Chinese weapons purchases.

**China as the recipient of major conventional weapons**

<b>Rank 2000-2004</b>	<b>Rank 1999-2003</b>	<b>Recipient</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2000-2004</b>
<b>1</b>	<b>1</b>	<b>China</b>	<b>1797*</b>	<b>3018</b>	<b>2586</b>	<b>2038</b>	<b>2238</b>	<b>11677</b>

\* Numbers in millions of dollars

Source: Stockholm International Peace Research Institute

What is known is that rising PLA budgets are able to sustain a growing amount of foreign military purchases if it desires. China's 2006 official military budget of about \$35 billion, announced on March 4, was said to amount to a 14.7 percent rise over the 2005 official budget,<sup>5</sup> but is also a 40 percent increase over the official 2004 budget. Few believe that China's official budget is close to the reality of China's military spending, which the Pentagon has stated could be up to three times the official figure.<sup>6</sup> By this estimate China's real 2006 budget could be up to \$105 billion. To be sure, China protests that alarm over such spending is unjust given the fact, however valid, that much of the increases are devoted to rising personnel costs. But it also cannot be denied that rising PLA budgets will mean increased funds for foreign as well as domestic weapon purchases. Some sources indicate that capital costs are in any case not included in the military budget.

In terms of outright foreign purchases, 2004 to 2006 have seen a shift from emphasis on aerospace to naval weaponry. During these years imports will be dominated by deliveries of 8 KILO 636M conventional submarines and two Project 956EM Sovremenniy class cruisers. For the next several years there could be a shift back to aerospace, as Russia delivers 32 Ilyushin Il-76 heavy transports and 6 Il-78M tanker aircraft, and there may be looming purchases of Russian Sukhoi Su-33 and Su-33UB carrier-based combat aircraft. Wild cards would include the potential sale of Russian Tupolev bombers and strategic aircraft, like the Tu-22M3 Backfire and the Tu-95 strategic bomber or the Tu-142 long-range maritime patrol bomber.

One trend that became more discernable during the 10<sup>th</sup> 2001 to 2005 Five Year Plan was the PLA's desire to shift from outright system purchases to the acquisition of components and technologies. Russian technology has enabled China to build new types of electro-optical and radar satellites, while the Chinese Shenzhou space capsule is essentially a highly modified Russian Soyuz capsule. While the PLA has continued to purchase Russian Sovremenniy missile cruisers, it also imported weapons and electronic components from Russia and Ukraine to enable its construction of three new classes of air defense destroyers. China apparently has chosen to purchase Russian components and technology to help develop its Type 093 nuclear attack submarine (SSN) and its Type 094 nuclear powered ballistic missile submarine (SSBN) over buying used ones from Russia. The Chengdu Aircraft Company's J-10 has been made possible not only by U.S. and Israeli technology, but also by Russian engines. Shenyang Aircraft Company is trying to turn its J-11, now based on Su-27SK kits made in Russia, into a fighter with enough Chinese content to pass as a Chinese export product. Denied the Israeli-Russian A-50/Phalcon AWACS by Washington in 2000, China has somehow succeeded in producing three such AWACS that may have the same performance characteristics as the Israeli Phalcon radar. The Ukraine's Antonov bureau is ready to meet emerging PLA demands to develop an indigenous large transport aircraft. The PLA also has used Russian missile components to produce its PL-12 "AMRAAM" air-to-air missile and to make one or possibly more modern medium-range surface-to-air missiles.

There remains a critical question over whether such reliance on foreign weapons, technology and design assistance reflects continued weakness or inability by the PLA to make modern weapons systems or to produce innovative military technologies that could potentially rival that of the United States? There are likely many in the PLA who share this concern, but it is also clear that many PLA leaders are for now willing make practical compromises concerning foreign reliance in order to achieve substantial near-term capability growth. It is also clear that China's interaction with the breadth of the Russian military-industrial complex, plus its interactions with European and U.S. companies, mainly in regards to dual use technologies, has significantly accelerated its military technical learning curve. China has just started producing, or is about to start making advance active phased array radar for AWACS, ships and fighters, new modern turbofan engines, stealth technologies, and maneuverable and terminally-guided warheads for ballistic missiles; all of which will contribute to new and far more capable weapons systems. Very soon China will begin marketing its new, inexpensive and capable

weaponry that will rival the performance of Western systems enough to cause real concerns, especially when sold to “rogues” like Iran or rising rogues like Venezuela. In the next decade there likely will be many “shocks” as the PLA proves it has mastered the necessary foundations to produce “innovative” weapons.

<b>Foreign Content of Future PLA Weapons</b>		
<b>Weapon System</b>	<b>Foreign Content</b>	<b>Domestic Content</b>
<b>Microsat-based ASAT, Communication, Recon Sat</b>	British micro and nano-satellite technology	PRC design and solid fueled mobile launch system
<b>EO and Radar Satellite</b>	Russian EO and antenna	PRC satellite bus
<b>New large transport aircraft</b>	Antonov An-70 design and substantial consulting assistance	PRC made components, possible PRC made engines
<b>Y-9/Y-8 transport, AWACS, command/ELINT aircraft</b>	Design consulting from Antonov bureau, foreign composite tech	Shaanxi Y-8 transport aircraft production and design
<b>Chengdu J-10 Multi-Role Fighter</b>	Russian engine; possible Russian radar; Israeli airframe and control system assistance	PRC designed airframe; possible PRC Radar and defensive systems; PRC weapons
<b>Shenyang J-11B Multi-Role Fighter</b>	Russian airframe, some avionics and electronic systems	PRC multi-mode radar; PRC weapons, PRC WS-10A engine
<b>PL-12 Active Air-to-Air Missile</b>	Russian radar and data link	PRC motor; airframe
<b>HQ-9/FT-2000 Surface-to-Air Missile</b>	Russian guidance systems; possible US seeker technology; possible Israeli design assistance	PRC motor; airframe
<b>Aircraft Carrier</b>	Russian Varyag, Russian design consulting, possible Russian Su-33 combat aircraft	Chinese modifications of Varyag and then Chinese construction of future carriers
<b>Luyang I and Luzhou class destroyers</b>	Russian Shtil or RIF-M SAM; guidance and search radar; Ukrainian gas turbine engine	PRC hull; anti-ship missile; CIWS; defensive systems
<b>Luyang II destroyer</b>	Ukrainian design assistance for APAR; Russian assistance for VL SAM; Russian helicopter	PRC hull and stealth technology; CIWS; defensive systems
<b>SONG-A SSK</b>	German engine; possible Russian weapons and design assistance; possible Israeli design assistance	PRC hull; defensive systems
<b>Type 093 SSN and Type 094 SSBN</b>	Russian design assistance; possible 4 <sup>th</sup> generation nuke sub tech, possible Russian weapons	PRC hull; nuclear reactor; defensive systems
<b>EC-175 6-ton Medium Transport/Attack Helicopter</b>	Eurocopter design assistance; possible French engine	PRC full co-production
<b>Type-99 Main Battle Tank</b>	Russian influenced hull and 125mm main gun; Russian gun-launched guided missile; British or German influenced engine	PRC designed composite armor; tank design and integration; PRC laser countermeasures system
<b>PLZ05 Self Propelled Arty</b>	Russian MSTA-1S9 technology	PRC-made hull, 155mm gun

### “Informationalization”

Perhaps the most profound transformation to take place in the PLA has been the wide and deep application of information technology to enable the development of joint doctrine and tactics, to increase the ability to PLA to surveil and target its enemies, and to give its weapon systems more combat power. The PLA has given this broad doctrinal aspiration the term “informationalization.” To be sure the PLA has been able to pursue this aspiration largely as China has developed a modern information sector, to include building a substantial national fiber-optic network and a world-class computer and electronics sector during the 1990s. This process has been assisted by a very broad commercial interaction with companies in the United States, Japan and Europe, and can be tracked with the rise of Chinese electronics powerhouses like Huawei. But the PLA has also closely followed the U.S. military experience as the world leader in developing military information innovations.

In addition, the PLA has also sought specific foreign information technologies to enhance its combat power. It has obtained Russian electro-optical and radar satellite technology, and French communication satellite technology. Russian and Ukrainian naval radar technology dominates new PLA warships. Russians have accused the Chinese of stealing their application of modern computer processing to old meter-wave radar to produce better counter-stealth radar.<sup>7</sup> China is also producing its own passive radar, patterned after the innovative Ukrainian Kolchuga radar.

### **Enabling New Power Projection Capabilities**

A relatively new trend in China’s pursuit of foreign weapons and military technologies has been a clear shift in emphasis to systems designed for longer range, or power-projection missions. These systems may not facilitate the global reach long enjoyed by the American military, but for scenarios within the greater Asian periphery, China is gaining the platforms it needs should it then also seek to assert regional or even extra-regional dominance. Many of these systems would have application to Japan or Taiwan contingencies, but their appearance will also limit the ability of U.S. forces to deter Chinese military adventures without substantial cost.

**Aircraft Carriers** The year 2005 marked a turning point in China’s willingness to continue to deny or obfuscate its ambitions to build aircraft carriers.<sup>8</sup> Last May it moved the old Russian uncompleted aircraft carrier hulk the Varyag, that it purchased and moved to Dalian harbor in 2002, from dockside into a drydock. It then emerged in early August painted in PLA Navy grey, and the most recent Internet-source photos show that the carrier deck is receiving new multiple coatings.<sup>9</sup> China’s ruse was that the Varyag would be turned into a casino and Chinese officials have repeatedly denied they were developing carriers. But on March 10, Hong Kong’s *Wen Wei Po* quoted General Wang Zhiyuan, a Deputy Director of the Science and Technology Committee of the General Armaments Department, that in “three to five years,” “The Chinese army will conduct research and build an aircraft carrier and develop our own aircraft carrier fleet.” He went on to add that the escort and support ships for this carrier group are either being built or have already been built.<sup>10</sup> These would likely include the new Luyang 1, Luyang 2 and

Luzhou class air defense destroyers launched from 2003 to 2005, new Type 093 nuclear powered attack submarines, and new Fuchi class underway replenishment ships.

If General Wang is to be believed, then the carrier Varyag, now undergoing what appears to be substantial refurbishment, will be used for some kind of military mission.<sup>11</sup> These could include the refinement of China's anti-aircraft carrier doctrine and tactics, training and development of a new carrier air wing, and future aerial and amphibious support combat missions. In August 2005 Russian sources interviewed at the Moscow Airshow offered confirmation of China's carrier plans in that two Russian companies offered that China was interested in two types of future carrier combat aircraft, the Sukhoi Su-33 and the Chengdu J-10 modified with a new Russian engine thrust vector to enable slower carrier landing speeds.<sup>12</sup> The Russians also used the Moscow Airshow to market the twin-seat Su-33UB, but modified with thrust vector engines. It is quite likely that all three will be upgraded with new more powerful Russian Al-31 engines, have new active-phased array radar, and carry a range of active guided and helmet display sighted air-to-air missiles and precision ground attack missiles. As such both could offer some performance parameters that equal or even exceed that of the U.S. Boeing F/A-18E/F, the main U.S. carrier combat aircraft.<sup>13</sup> Internet sources also indicate that China is developing a carrier-sized AWACS aircraft that could also be developed into anti-submarine and cargo support variants.<sup>14</sup> While the U.S. Navy benefits from its over 70 years of constant practice and employment of effective carrier aviation, it is nonetheless a major shock that China's carrier fleet could commence with combat capabilities that could neutralize those of the U.S. Navy in some scenarios.

**Bombers** A second, though at this point potential foreign assisted power projection ambition, would be new manned strategic bombers. While these were denied to China during the 1990s, since 2004 Russia has been marketing its Tupolev stable of bombers to the PLA, to include the supersonic Tu-22M3 Backfire, the very long-range Tu-95 Bear and the Tu-142 anti-submarine/maritime patrol bombers. They appeared in model form at the 2004 Airshow China, and then the Tu-22M3 and the Tu-95 were high-profile participants in the August 2005 "Peace Mission 2005" China-Russia combined arms exercise. In August 2005 Asian sources also noted that Russia and China were conducting negotiations regarding sale of these bombers,<sup>15</sup> but this has not been confirmed by subsequent reporting. The PLA would likely be interested in updating its Xian H-6, a copy of the 1950s vintage Tu-16, which has been forced back into production to carry new land-attack cruise missiles (LACMs). With the Tu-22M3 the PLA could launch supersonic attacks against Okinawa or against U.S. Navy formations operating in that area. And with aerial tanker support or refueling stop in Burma or Gwadar, Pakistan, the PLA Tu-142s could support PLA Navy operations along the length of the oil shipping routes from the Persian Gulf.

**Large Transport Aircraft** A third major PLA investment in power projection to involve critical foreign inputs is that of large transport aviation. A week after Premier Wen Jiabao's March 5 report on government work to the Chinese National People's Congress, it became clear that he listed the development of "jumbo aircraft" as one of 16 new programs for the 11<sup>th</sup> Five Year Plan from 2006 to 2010.<sup>16</sup> An official from the AVIC-1

aviation consortium clarified that “jumbo aircraft” refers to a planned “150-seat” airliner and a 100-ton capacity cargo transport.<sup>17</sup> According to Ukrainian sources, the Antonov bureau has proposed a radical development of its An-70 transport that would replace its current contra-rotating propfan engines with four turbofan engines, lengthen the fuselage and increase cargo capacity to between 50 and 60 tons.<sup>18</sup> This would approach the 70-ton capacity of the Boeing C-17 and exceed the 50-ton capability of the Ilyushin Il-76MD. It appears the new An-70 variant may be able to carry four of the ZLC-2000 airborne tank revealed in 2005 by the PLA. In September 2005 the PLA agreed to purchase about 32 Il-76MD transports, which can only carry three ZLC-2000s, in addition to about 20 acquired during the 1990s. Antonov has also helped China’s Shaanxi Aircraft Company to produce a much improved version of the Y-8 called the Y-9, which can carry 20 tons of cargo. In addition, China has held discussions with Antonov regarding the possible co-production of the 150-ton capacity An-124 Ruslan,<sup>19</sup> which exceeds the 120-ton capacity of the U.S. C-5 transport.

The declared ambition to develop a 150-seat airliner not only signals China’s determination to challenge Boeing and Airbus, it also means that the PLA will receive several military derivatives. China’s previous failed attempts to copy the Boeing B707 during the 1970s, co-produce the McDonnell Douglas DC-9 during the 1980s and 90s, and then start a similar sized airliner with European firms during the 1990s, should not lead to conclusions that China will fail again. Unlike the previous periods, today China has a developed market of airline infrastructure and about 600 Boeing and Airbus airliners, and growing demand that can be used to subsidize domestic airline production. Chinese aircraft companies have also been co-producing components for successive Boeing and Airbus airliners, and by 2008 Airbus hopes to assemble its first A320, building to a rate of four a month,<sup>20</sup> which is in the same class of airliner China now intends to build. On top of this, China apparently will meet its 2009 in service goal for its ARJ-21 90-seat regional airliner, a program which involves numerous U.S. and European firms.<sup>21</sup> It is reasonable to assume that China will apply the knowledge and technology gained from this broad experience to the new 150-seat airliner project. This aircraft will then grow in size, making it a logical candidate for future PLA aerial tanker, AWACS, electronic intelligence and maritime patrol variants. When it was developing its Y-10 copy of the B707 during the 1970s, Chinese designers went as far as to produce a wind-tunnel model of a Y-10 in AWACS configuration.

**Software and Expanded Reach** With this effort, it is possible that by 2015, China will be building its second aircraft carrier, perhaps based on the Varyag design but larger, and building its own C-17 class large transports, and new airliner-based refueling tankers and electronic warfare aircraft. Before that year, China may also have embarked on building a second or even a third Airborne Army, to complement the current single 15<sup>th</sup> Airborne Army. But before this period it can be expected that the PLA will have absorbed many lessons regarding the employment of its larger naval and airborne forces. Russia’s eagerness to participate in the August 2005 “Peace Mission 2005” combined-arms exercises with China under the rubric of the Shanghai Cooperation Organization (SCO), points to a heady future in China joins Russia in future larger and more sophisticated exercises. This exercise marks the beginning of Russian transfers of “software” or

doctrine and tactics, to compliment its “hardware” transfers. Indian source indicate that Russia, China and India will join in “counter-terror” exercises perhaps in the Summer of 2006. The 2005 admission of Pakistan and Iran as SCO “observers” points to the possibility of China helping to lead combined arms exercises in South West Asia, to include Iranian and Pakistani forces.

### **Assisting Strategic Military Space Capabilities**

Foreign technology has been essential to the realization of China’s unmanned and manned military space ambitions. China’s unmanned and manned space programs are controlled by the General Armaments Department under the PLA Central Military Commission. While Chinese diplomats regularly inveigh against American moves to militarize outer space, it is clear that China is developing systems to exploit space for terrestrial military activities, and is preparing for offensive and defensive outer space combat, to possibly include manned military missions. According to Chinese sources there has been some debate about whether to form a new separate military-space service under the CMC.<sup>22</sup> While some have said that the PLA Air Force and Second Artillery missile force were vying for control of this mission set, other information suggests the GAD may succeed in gaining the lead of a future “Space Force.”<sup>23</sup>

While China has invested heavily in the development of a range of space launch vehicles, many of which are based on liquid and solid fuel strategic missiles, and has also invested heavily in its domestic satellite program, it has also sought Russian and European technologies to support its satellite and manned space programs. Both Russian and Chinese officials confirm that a soon-to-be-launched series of new Chinese electro-optical (EO) and radar surveillance satellites will be based on the Kernet series developed by Russia’s NPO Machinostroyeniya.<sup>24</sup> France’s Alcatel contributed technology to China’s latest DFH-4 communications satellite, and its DFH-3 predecessor, which reportedly forms the basis for the PLA’s Xhongzhing-22 communications satellite, two of which were launched in 2000 and then in 2003. According to a British report China was invited to become an investing partner in the European Galileo navigation satellite network because its espionage success against this project made it futile to keep China out.<sup>25</sup> Despite its partnership with Galileo, and its access to U.S. GPS and Russian GLONASS navsat signals, China still intends to launch its own navigation satellite network. In addition, China has plans for data-relay satellites that will allow its manned space program to be less dependent on ground and ship-based relay stations, and to better conduct distant military operations.

**Manned Mil-Space** Perhaps more ominous has been China’s willingness to use all of the unmanned test missions and the two manned missions to date, of its Shenzhou space capsule, to support military missions.<sup>26</sup> The Shenzhou is a larger and highly modified version of the Russian Soyuz capsule, based on data and technology sold to China during the mid-1990s. China and Russia apparently plan future larger though undisclosed space cooperation projects.<sup>27</sup> The main difference is that the orbital module has been modified to perform continuing missions after the crew capsule has returned to Earth. Shenzhou 1 to 3 likely carried electronic intelligence or signals monitoring payloads, while



Shenzhou 4 through 6 all carried electro-optical cameras; Shenzhou 5 carried at least two cameras while the October 2005 Shenzhou 6 mission very likely carried one.<sup>28</sup> In 2010 China intends to launch a small “space laboratory,” in preparation for a “space station” in 2011 to 2012.<sup>29</sup> Have the Shenzhou missions set a precedent that China will also use its space stations for military purposes, even arm them, as did the former Soviet Union with at least three of its Salyut/Almaz space stations? Should future military competition also be a concern regarding China’s ambition to put men on the Moon, perhaps in 15 years?<sup>30</sup>

**Microsatellites** While Chinese assert they have been researching microsatellites for over 30 years, it is also the case that their micro and nanosatellite competencies were advanced by their 1998 cooperation agreement with Britain’s Surrey Space Systems, perhaps the world’s leading micro and nanosat developer. This agreement helped contribute to China’s ability to launch their first 50kg microsatellite in 2000 and its first 20kg nanosat in 2004. China is also developing its MS-1, a 70kg communication satellite with one transponder.<sup>31</sup> In the event Chinese communication satellites are attacked it could launch a large number of MS-1 comsats that would be much more difficult to detect. The KS series of mobile solid fueled space launch vehicles, based on MRBMs and ICBMs, has been developed just to launch new micro and nanosats. In addition, these micro and nanosatellites could be adopted as direct ascent anti-satellite (ASAT) weapons for launch on the same KS series launchers.

### **Precision Strike and Air Force Modernization**

Foreign technology is also contributing to just emerging PLA capabilities in the areas of precision strike and air combat modernization. Taiwanese civilian and military officials contend that in 2005 the PLA has started deployment of its long-awaited new land attack cruise missiles (LACMs).<sup>32</sup> Asian sources contend that two Chinese companies are making LACMs; one for the Second Artillery missile forces, and one for PLA Navy and PLA Airforce platforms, most likely based on the new 300+ km range YJ-62 anti-ship missile.<sup>33</sup> It has been well reported that China has sought to develop modern LACMs since the 1970s and has sought technology from Russia, Israel, and has obtained at least six Russian Novator Kh-55 LACMs via the Ukraine, and has obtained parts of U.S. RGM/UGM-109 Tomahawk LACMs via Iraq, Afghanistan and very likely, Pakistan. When these LACMs are married to new Russian-assisted EO and Radar satellites, French assisted communication satellite, access to U.S., Russian and European navigation satellites signals, and then carried by Russian assisted nuclear submarines or future Russian-made bombers, then the PLA will have its first limited non-nuclear global strike capability.<sup>34</sup> Such a synergy could emerge by 2010 or shortly thereafter. This might not equal the U.S. all-weather intimate moving-target hitting capability, but China may be able to use LACMs for political-military influence much as the U.S. does today.

Foreign technology is also helping with emerging capabilities of the PLA Air Force. According to recent Russian statements China has acquired over 300 of the Sukhoi Su-27SK/UBK/Su-30MKK/MKK2/J-11 family of fighters and fighter-bombers. The Su-30s and potentially some Su-27s and J-11 are able to employ new Russian R-77

self-guided anti-air missiles, at least 300 of which have been delivered to China.<sup>35</sup> China has also taken delivery of thousands of precision guided missiles and bombs for its Su-30s. China has multiple aircraft laser/electro-optical targeting pod programs, and at least one appears to have benefited from Russian technology.

The Xian JH-7A twin-engine strike fighter entered production in 2004 following the completion of a technology transfer from Britain's Rolls Royce to enable China to co-produce an improved version of its Spey 202 turbofan, called the "Qinling." It is now entering PLA Airforce and Naval Air Force regiments and is capable of delivering new supersonic anti-ship missiles and precision-guided bombs. Recent reports indicate that the PLA wishes to double current "Qinling" production, which could enable an increase in JH-7A production to over 25 a year.<sup>36</sup>

**Fighters** After a production hiatus in which it appeared that Sukhoi/Russia and Shenyang/China were at loggerheads over China's desire to increase the Chinese content of its J-11/Su-27 co-produced fighters, it appears that delays in China's WS-10A turbofan engine program have prompted China to resume J-11 co-production from Russian parts, perhaps as many as 17 a year.<sup>37</sup> However, Chinese sources report that the WS-10A has met with some level of success, perhaps even reach low-level production over the last year. Thus, to Sukhoi's detriment, Shenyang may soon begin to produce a J-11 with a Chinese engine, radar and equipped largely with Chinese weapons. The PLA, however, does remain dependent on Russia for follow on engine orders and for maintenance of purchased fighters.

After many years of development, with substantial Israeli and Russian assistance, Chengdu's J-10 has entered production and may now equip a small number of PLAAF regiments. In late 2003 a twin-seat trainer version flew and this could be developed into a dedicated attack version. Then in early 2005 Chinese sources indicated that an "advanced" version of the J-10 was in development and that a version with a Chinese engine would fly "soon."<sup>38</sup> The advanced version will likely incorporate a more powerful version of the AI-31FN engine specifically designed for the J-10, with a thrust vectored nozzle.<sup>39</sup> But until the WS-10A reaches sufficient production, the J-10 will rely on Russian engines; 100 more were ordered in 2005, with indications 150 more will follow.

Shenyang and Chengdu are also developing "5<sup>th</sup> generation" fighters. Shenyang's appears to be most developed, a seeming F-15 size twin-engine fighter that employs stealth shaping, internal weapon carriage, and very likely, an active phased array radar. It is likely that Sukhoi has attempted to interest Shenyang in co-development but it is not clear that Shenyang is interested. Chengdu may have two 5<sup>th</sup> generation designs. One is a canard delta design that apparently benefits from Russian design assistance; early versions bore a healthy resemblance to the unused Mikoyan MiG 1.44 design. Chinese sources also indicate that Chengdu is considering a smaller F-35 class 5<sup>th</sup> generation design, which if it emerges, may be much less expensive than the Lockheed-Martin fighter.<sup>40</sup>

**Force Multipliers** Foreign technology is also helping the PLA to produce aerial force multipliers. Even though Israel apparently halted its transfer of Phalcon airborne active phased array radar technology in 2000, the PLA has built three AWACS aircraft that look nearly the same as the A-50/Phalcon. Asian sources suggest that the radar signals from this aircraft approximate those from a Phalcon-like radar.<sup>41</sup> In addition, the Antonov bureau has helped the Shaanxi Aircraft Co. to produce new modifications of the Y-8/An-12 airframe to support AWACS, command/control, and perhaps a radar ground-mapping mission. And on March 13, the Hongdu L-15 twin-engine advanced trainer made its first “official” flight. Powered by two Ukrainian Motor Sich AI-222 engines, and benefiting from substantial design assistance from Russia’s Yakovlev bureau, the L-15 will likely become the PLA’s next advanced trainer, and form the basis for new carrier trainers and possibly future ground-attack aircraft. Ukrainian sources confirm reports earlier this year that Hongdu has ordered 200 AI-222 engines to support future L-15 production.<sup>42</sup>

**Deadly SAMs** One area where Russian technology in particular is producing a new and dangerous PLA capability is that of modern air defenses. The PLA Air Force is on its way to purchasing up to 14 to 20 Battalions of Russian S-300/PMU-1/PMU-2 surface-to-air missiles (SAMs), which could mean the purchase of 700 to 1,000 of these deadly missiles.<sup>43</sup> The S-300 family is very difficult to jam and can only be evaded with some assurance by stealthy F-22A or B-2 aircraft. The range of the S-300PMU-2 allows it to target aircraft that operate over Taiwan, thus denying the Taiwan Strait as an air defense buffer zone for the Taiwan Air Force. Jane’s reports that China may be funding the development of the even longer-range S-400 missile, while Asian sources report that China may be co-producing the deadly short range TOR-M1,<sup>44</sup> which can shoot down precision-guided cruise missiles and bombs.

### **Accelerating China’s Naval Buildup**

The last decade has seen the PLA Navy (PLAN) accelerate its modernization via access to foreign weapons and technology. Submarines, surface combatants, and as noted previously, carrier aviation, have benefited variously from Russian, Ukrainian and European naval technology.

**Submarines** It appears that Russian technology has played a major role in the PLA’s completion of its new 2<sup>nd</sup> generation Type 094 JIN nuclear ballistic missile (SSBN) and Type 093 SHANG nuclear attack (SSN) submarines. Much reporting during the mid 1990s noted that Russia’s Rubin bureau was assisting new PLAN nuclear submarine development. Rubin’s main current nuclear program, however, is the Project 995 Borei 4<sup>th</sup> generation SSBN. In 2004 the U.S. Office of Naval Intelligence produced an artists projection of the Type 094 that showed a sub-launched nuclear missile (SLBM) “farm” of similar configuration seen on Russian projections for the Borei,<sup>45</sup> raising at least the possibility that Russian 4<sup>th</sup> generation nuclear submarine technologies have been sold to China. While it would seem strange that Russia would sell such sensitive technology to China, unfortunately, the trend has been for Russia to increasingly sell its most modern kit, in order to fund next-generation weapons development. If this suspicion proves true

then the Type 093 and Type 094 could offer a remarkable improvement in capability over first generation PLAN nuclear submarines.<sup>46</sup>

In 2006 the PLAN should complete its acquisition of 8 Russian KILO 636M conventional submarines ordered in 2002. These will differ from the four KILOs purchased during the 1990s in they will carry the deadly Novator CLUB group of anti-ship, anti-submarine and land-attack cruise missiles. The Novator 3M54E anti-ship missile has a supersonic terminal second stage that likely cannot be defeated by early U.S. Phalanx close in weapon ship defense systems (CIWS). The PLAN is now producing its Type 039 SONG in Wuhan and Shanghai shipyards, building about 14 so far. The Type 039 looks similar to the French Agosta class submarine and uses German designed diesel engines. And in 2004 the Wuhan yard produced the first of a new class of conventional sub dubbed the YUAN class by the U.S. Navy. The YUAN bears a strong resemblance to Rubin's new AMUR/LADA class modern conventional submarine. Rubin officials recently refused to discuss this resemblance but did note the AMUR exhibits far better acoustic performance and greater automation than the KILO.<sup>47</sup>

**Surface warships** In 2006 the PLAN should take delivery of its second Project 596EM Sovremenniy class missile destroyer, which differs from the first two delivered in 1999 and 2001 in that they have more capable 200km range versions of the supersonic Moskit anti-ship missile and more capable Kashtan combined missile/gun ship defense systems. Russia and the Ukraine have also provided weapons and technologies for the PLAN to produce three new classes of destroyers, six in total launched between 2003 and 2006. These 10 new destroyers can provide up to 480 capable SAMs, which for the first time, allows to PLAN to provide air cover for more distant operations. The Luyang 1 and the Sovremenniy use the medium range Shtil SA-N-12, while the Luzhou uses the 120-150km range RIF-M, based on the S-300. The RIF-M has been modified to carry newer active-guided 9M96E, and its maker Altair would neither confirm nor deny this modified version has been sold to the PLAN.<sup>48</sup> The Luyang 1 and Luzhou destroyers use Russian Fregat search radar, while all ten new destroyers use the Russian Mineral-ME active-passive weapon targeting radar, which also incorporates a data link. The Luyang II uses a new Aegis-like active phased array radar that is very likely based on technology developed by the Ukrainian Kvant Co.<sup>49</sup> All six Chinese-made destroyers use the Type 730 radar/optical guided 30mm gattling gun apparently derived from the French SEAMOS CIWS.

In 2003 and 2004 the PLAN launched two new stealthy Type 054 Jiankai frigates, which may benefit from French stealth design technology associated with the La Fayette frigates sold to Taiwan. Included in revelations from La Fayette purchase corruption and murder scandals in Taiwan was information that France gave China La Fayette technology to quiet its protests. Series production of the Type 054 is expected to resume when Russia's Altair can deliver a newer and faster vertical-launched version of its medium range Shtil SAM. The PLAN is also expected to produce up to 30 of a new stealthy missile-armed fast attack craft (FAC). This FAC is derived from fast ferry technology developed by the Australian AMD design firm.

## **Aiding PLA Ground Forces Modernization**

The PLA Army is somewhat less dependent on foreign technology to pursue its modernization, but some specific systems and technologies have made a difference. With Russian assistance the Army has developed a series of new main battle tanks. The heavy Type-99 and more medium weight Type-96 use a 125mm main gun that is at least influenced by Russian and Ukrainian technology. The Type-99 uses the Russian Reflex gun-launched anti-tank missile (ATGM). The new Type-63A amphibious tank that is equipping PLA Marine and Army Amphibious tank units, and the new Assaulter wheeled light tank, use a copy of the 105mm Russian Bastion ATGM. These missiles have a range of 5km, which in many cases out-ranges the regular 105mm gun rounds used by Taiwan's tanks. The PLA is now producing a new infantry fighting vehicle (IFV) armed with the 30mm and 100mm gun combination used by the Russian BMP-3 IFV, which also uses an ATGM.

The Army has also relied heavily on foreign technology to build up its Army Aviation forces. The Army has purchased over 200 of the Russian Mi-17 helicopter, from both the Kazan and Ulan Ude factories. China's domestic produced helicopters are heavily dependent on European designs and engine technology. The Z-8, Z-9, and Z-11 are all based on designs now owned by Eurocopter. In 2004 it emerged that Eurocopter was co-developing a 6-ton transport helicopter with China, which is now known as the EC-175; by 2011 it will have production lines in China and France. The Z-9, based on the AS-365 Dauphin, and the Z-11, based on the AS-350, are now being produced in attack-helicopter variants. And at least two prototypes of the heavy Z-10 attack helicopter are in testing. There have been reports of Z-10 related consulting by Eurocopter and Italy's Agusta aerospace company. Internet source pictures show it has unique design features like V-shape fuselage to better deflect blasts, but also show the dominant influence of the Italian Agusta A-129 on the Z-10 design.

## **Impact on the Region**

These developments, now no longer prospects but realities, are already having a strong impact on the Asian region. The case of India is the clearest. That country has now undertaken a major program of force development and modernization that, as the very highest Indian officials have confirmed, is fundamentally a response to China. Evidence suggests that at least some in Russia are increasingly concerned by China's range of strengths in its weakly-held Far East and Central Asian regions. Why exactly Moscow continues to sell to China is a difficult question to answer, but money alone most likely does not suffice. Certainly the entire Russian Pacific coast, including Vladivostok, are placed at every increasing risk by these new Chinese capabilities.

Southeast Asian states are also concerned, though none, except Singapore, is responding with a really major attempt to strengthen its military—and Singapore, of course, will deny that China has anything to do with it. Of particular concern to this region will be China's apparent intention to base some of its future SSBN and SSN fleet on Hainan Island, which is closer to deep water patrolling areas. This deployment will

also cause China to move more naval and air forces to that island, perhaps even aircraft carriers in the future. This may then lead to more aggressive Chinese behavior to enforce its territorial claims, and more incidents similar to the April 2001 EP-3 incident could occur should the U.S. Navy seek to monitor or contain China's vital strategic submarines.<sup>50</sup>

Perhaps the best way to sum up the situation is with the current cliché: “The US wants a unipolar world and a multipolar Asia, China wants a unipolar Asia and a multipolar world, while India wants a multipolar Asia and a multipolar world.” One can quibble with this, but the bit about a “unipolar Asia” seems accurate, true to Chinese traditions, and confirmed by current activities.

Political scientists believing in “realist” theory of international relations argue that a major challenge to the military balance, such as China is currently mounting, will lead to one of two possible reactions. States may bend to the new power and accommodate themselves. Or they may seek to form balancing coalitions and seek allies. Unfortunately the theory does not tell us how to know which of these two quite different reactions will be followed in a given case.

The evidence suggests that China is expecting the first reaction: accommodation and acquiescence. Beijing wants paramount influence, it would appear, and expects to achieve it by over awing its neighbors with military might—but with luck not actually using it. This is very much the approach Sun Zi endorses. It makes sense to think this is Beijing's hope, because if this method works, it will be possible to attain hegemony without conflict or even endangering economic links around the world.

What about the other states, however? Here the evidence suggests unwillingness to bend and accommodate, and instead balancing and a seeking for allies. India is a good example. But so too is Japan, which already possesses a strong military, though without force projection capabilities or weapons of mass destruction. Should Japan feel the need, it could rapidly and self-sufficiently create military forces far stronger and more sophisticated than China's. For the moment Japan is committed to alliance with the U.S. The steps Tokyo and Washington are now taking to coordinate military capabilities are very important. As long as Washington does its part, the U.S.-Japanese alliance will be secure, and it is the real foundation of security and stability in Asia. But if the United States should wobble or be seen as unreliable, then Japan would most likely decide the time had come to take over its own defense. China fears Japan more than it does any other power. Yet by arming itself with such vigor, China is, paradoxically enough, pushing once pacifist Japan into doing the same.

Other states in the region are also looking toward greater military self sufficiency. An arms race has begun, thanks to Beijing, and it has been intensified by the qualitative leaps that foreign technology has permitted. Now we must brace ourselves for the reaction to China's initiative, for as Clausewitz stresses, in international security no less than in physics, actions elicit reactions. The problem is that in international relations one cannot predict the reactions as one can in physics.

## **Impact on the Taiwan Strait**

While a seemingly risky policy, the cumulative weight of PLA foreign weapons purchases over the last decade has made a substantial contribution to the ongoing shift in the balance of military power on the Taiwan Strait. New Russian satellites and future European navigation satellites will enable better targeting for the PLA's 784 SRBMs and new LACMs. Russian Su-30s and British engine powered JH-7As will deliver new Russian precision missiles to further devastate Taiwan naval and air defense units, and Russian S-300 SAMs will confront any Taiwan fighters that survive to fly. Russian KILo submarines, plus Russian assisted Type 093 SSNs, and the ten new Russian build or Russian assisted destroyers will ease the PLAN's attempt to impose a naval embargo on Taiwan, or to confront American naval forces that may seek to aid Taiwan. Foreign technology will be instrumental in the PLA's ability to target and attack U.S. carrier battle groups.

But perhaps just as important is the role this buildup is playing in demoralizing the Taiwan population, and even demoralizing Taiwan's supporters in the United States, creating a sense that accommodation with Beijing may be preferable to resistance. This is in line with the first response outlined above and is one of Beijing's most important goals. China would rather force a slow surrender, promoted by intense political warfare that manipulates political factions in Taiwan, rather than fight and risk international opprobrium.

## **Impact on the United States**

For Washington the PLA's foreign fueled buildup only adds further challenges to an already stressed U.S. military, as it is eroding support for the U.S.-led alliance and military cooperation network in Asia. To be sure, Japan's reaction has been quite the opposite and it wants to increase security cooperation with Washington. But should the PLA conquer Taiwan and hold Tokyo's maritime arteries hostage with superior naval forces, there could also be accommodation at the expense of the American relationship. But South Korea, the Philippines, Australia, even Vietnam show signs of wanting to accommodate Beijing, be it regarding Taiwan or conflicting maritime resource claims, or even security relations with the United States. In addition, the PLA's near-term potential to be better able to project power into Central Asia will strengthen Beijing's leadership within the Shanghai Cooperation Organization, help this organization evolve into a more active military bloc, and potentially give India reason to moderate its more recent strategic tilt toward Washington.

A less observed danger to U.S. security will come from China's soon to be realized ability to sell very capable and relatively inexpensive weapons. China has not been a major arms seller in recent decades but this may change soon. It will be able to sell modern air defense networks from microsatellites to fighters, AWACS and SAMs. Its non-nuclear submarines will be almost as capable as Russian and European models, but more affordable. And should they prove robust, its new light armor may become

very popular within the developing world markets. A rising rogue like Venezuela may have the option to forgo U.S. made weapons for Chinese systems almost as good.

### **Whither Beijing's Suppliers?**

Of course, Beijing's suppliers do not escape with their interest unthreatened as well. Russia is creating a vigorous competitor that could pose a real threat to its own underfunded and increasingly less competitive arms sector. A more militarily powerful China will also seek to displace Russian leadership within the Shanghai Cooperation Organization. After a painful process, the Bush Administration finally thought it had convinced Israel to halt its military technical cooperation with China, though recently a resumption of such sales has been reported. In the past some Israeli officials have argued that military sales to China may help convince it not to sell weapons to Israel's enemies. Yet this has not stopped China from selling weapons to Iran, even helping with cruise missile technology that could be developed into longer-range systems that may eventually be used to target Israel. In addition, Chinese help with North Korea's No Dong has migrated to Iran to assist its Shahib-3 missile, and Chinese nuclear bomb designs given to Pakistan have apparently migrated to Iran via the A.Q. Khan network.

After much work, by mid-2005 the Bush Administration also managed to convince most members of the European Union not to lift their 1989 arms embargo on China. While this might eventually happen in the next few years, the EU has apparently agreed to work with Washington to establish new, hopefully binding rules to restrict the export of dangerous military technologies to China. But this process is not yet complete, and recent European moves to set up Airbus construction lines and increase helicopter co-development and co-production, are not encouraging signs from a U.S. perspective.<sup>51</sup> It behooves Washington to continue to engage all of China's current and past military technology suppliers and encourage broader instance that China not threaten its democratic neighbors, or persist in its proliferation behavior, as a minimum price for normal military relations.

---

<sup>1</sup> Richard D. Fisher, Jr. "The Impact of Foreign Weapons And Technology On The People's Liberation Army, A Report for the U.S.-China Economic and Security Review Commission," January 2004, [http://www.uscc.gov/researchpapers/2004/04fisher\\_report/04\\_01\\_01fisherreport.htm](http://www.uscc.gov/researchpapers/2004/04fisher_report/04_01_01fisherreport.htm)

<sup>2</sup> Stockholm International Peace Research Institute, "The SIPRI arms transfers database 1999-2004," <http://first.sipri.org/index.php?page=step2>

<sup>3</sup> Ibid.

<sup>4</sup> Ekaterina Grigorieva and Dmitri Litovkin, "China will be offered some new Russian weapons," *Izvestia*, September 9, 2005, p. 3.

<sup>5</sup> "China's Military Spending Is 'Low,' General Says," *Bloomberg*, March 7, 2006, <http://www.bloomberg.com/apps/news?pid=100...id=asajL1r3Gf2UH>

<sup>6</sup> Office of the Secretary of Defense, *Annual Report To Congress, The Military Power of the People's Republic of China, 2005*, p. 22, hereafter called, "DoD PLA Report 2005."

<sup>7</sup> Interview, Moscow Airshow, August 2001.



- 
- <sup>8</sup> Richard D. Fisher, Jr., "2005: A Turning Point For China's Aircraft Carrier Ambitions," *International Assessment and Strategy Center web page*, January 8, 2006, [http://www.strategycenter.net/research/pubID.87/pub\\_detail.asp](http://www.strategycenter.net/research/pubID.87/pub_detail.asp)
- <sup>9</sup> Photos of Varyag aircraft carrier being refurbished in Dalian harbor viewed on [Hwww.China.military.com](http://www.China.military.com) on March 13, 2006.
- <sup>10</sup> "Report: China plans to build carrier," *Associated Press*, March 10, 2006.
- <sup>11</sup> Some reports raise questions about whether this ship's steam turbine engines are in working order, which may only be answered after further revelations.
- <sup>12</sup> Interviews, Moscow Airshow, August 2005; for additional reporting on Chengdu's plans to upgrade the J-10 with thrust vectored engines, see, Henry Ivanov, "China working on 'Super-10' advanced fighter," *Jane's Defence Weekly*, January 11, 2006.
- <sup>13</sup> At medium fuel states the Su-33 will be more maneuverable than the F/A-18E, and with thrust vectoring, both will be much more maneuverable and better able to evade even new highly maneuverable air-to-air missiles. While the F/A-18E may have some margin of superiority in anti-air missiles and active phased array radar, in relatively short order this margin could be reduced to an unacceptable level.
- <sup>14</sup> The picture has been reproduced in "2005: A Turning Point...", op-cit. It appears to illustrate a model concept for a carrier AWACS roughly the size of the former Grumman E-1 Tracer.
- <sup>15</sup> Interview, August 2005.
- <sup>16</sup> "China to resume jumbo aircraft production," *People's Daily*, March 11, 2006, [http://english.people.com.cn/200603/11/eng20060311\\_249701.html](http://english.people.com.cn/200603/11/eng20060311_249701.html)
- <sup>17</sup> "China's Large Aircraft Dream To Come True by 2015: NPC Deputy," *Xinhua*, March 10, 2006.
- <sup>18</sup> Interview, Defexpo, New Delhi, January 2006.
- <sup>19</sup> Robert Sae-liu, "China approaches Ukraine for heavy lift aircraft," *Jane's Defence Weekly*, September 29, 2004.
- <sup>20</sup> Viki Kwong and Kyunghye Park, "Airbus will build first A320 in China by 2008," *Bloomberg*, February 22, 2006, [Hhttp://www.bloomberg.com/apps/news?pid=10000100&sid=allcyQk7hndo&refer=germanyH](http://www.bloomberg.com/apps/news?pid=10000100&sid=allcyQk7hndo&refer=germanyH); in addition, by the second half of 2006 Airbus and China hope to settle China's workshare for both design and production of the A350, which is intended to compete with the new Boeing B787.
- <sup>21</sup> The ARJ-21 uses General Electric engines, Collins avionics, Honeywell primary flight controls, Sagem flightdeck controls, and Fisher Advanced Composite Components for its interior, in addition to many other foreign contractor systems, see, Leithen Francis, "Chinese Turn," *Flight International*, February 14-20, 2006, pp. 64-66.
- <sup>22</sup> Interview, Shenzhen China, November 2004.
- <sup>23</sup> Chin Chien-li, "PRC is preparing to form a space force," *Chien Shao*, July 1, 2005, No 173, pp. 52-55.
- <sup>24</sup> Interviews, Moscow Airshow, August 1997 and Airshow China, November 2002.
- <sup>25</sup> Damien McElroy, "China aims spy network at trade secrets in Europe," *Telegraph*, July 3, 2005.
- <sup>26</sup> Richard D. Fisher, Jr., "China's Manned Military Space Ambitions," *International Assessment and Strategy Center web page*, October 10, 2005, [http://www.strategycenter.net/research/pubID.80/pub\\_detail.asp](http://www.strategycenter.net/research/pubID.80/pub_detail.asp)
- <sup>27</sup> "China's Ambassador to Russia on Space Cooperation with Russia," March 10, 2006, [www.china.military.com](http://www.china.military.com)
- <sup>28</sup> Speculation that Shenzhou 6 carried a high resolution camera inside its orbital module is supported by illustrations in the December 2005 issue of *Binqi Zhishi*.
- <sup>29</sup> Chen Lan, "China reveals manned programme revisions," *Flight International*, February 14-20, 2006, p. 42.
- <sup>30</sup> "China faces realities of manned spaceflight," *Reuters*, March 8, 2006.
- <sup>31</sup> Yu Dengyun, China Academy of Space Technology, "The Development State and Prospect for Micro and Small Satellites in China," July 2005.
- <sup>32</sup> Rich Chang, "China to deploy cruise missiles: NSB," *Taipei Times*, April 24, 2005, p. 1.
- <sup>33</sup> China began marketing the YJ-62 (C-602) at a British arms show in September 2005, see Douglas Barrie and Robert Wall, "Chinese Cruise Missile Portfolio Expands," *Aviation Week & Space Technology*, September 19, 2005, p. 43.

- 
- <sup>34</sup> Richard D. Fisher, Jr. "China's New Strategic Land Attack Cruise Missiles: From the Land, Sea and Air," *International Assessment and Strategy Center web page*, June 3, 2005, [http://www.strategycenter.net/research/pubID.71/pub\\_detail.asp](http://www.strategycenter.net/research/pubID.71/pub_detail.asp)
- <sup>35</sup> R-77 numbers from SIPRI, op-cit.
- <sup>36</sup> Yihong Chang, "China deploys upgraded JH-7 fighter," *Jane's Defence Weekly*, August 3, 2005.
- <sup>37</sup> Yihong Chang, "China orders Russian equipment for J-11, but continues to develop local content," *Jane's Defence Weekly*, March 22, 2006.
- <sup>38</sup> Interview, London, May 2005.
- <sup>39</sup> Interviews, Moscow Airshow, August 2005, and Ivanov, op-cit.
- <sup>40</sup> Interview, London, May 2005.
- <sup>41</sup> Interview, November 2005.
- <sup>42</sup> Interview, Defexpo, New Delhi, January 2006.
- <sup>43</sup> Dr. Carlo Kopp, "S-300: China's "Offensive" Air Defense," *International Assessment and Strategy Center web page*, February 25, 2006, [http://www.strategycenter.net/research/pubID.93/pub\\_detail.asp](http://www.strategycenter.net/research/pubID.93/pub_detail.asp)
- <sup>44</sup> Interview, November 2005.
- <sup>45</sup> Office of Naval Intelligence, *Worldwide Maritime Challenges*, 2004.
- <sup>46</sup> For further details on China's submarine buildup see, Richard D. Fisher, Jr., "Trouble Below," *Armed Forces Journal*, March 2006, H[http://www.armedforcesjournal.com/story.php?F=1518994\\_0306H](http://www.armedforcesjournal.com/story.php?F=1518994_0306H)
- <sup>47</sup> Interview, Defexpo, New Delhi, January 2006.
- <sup>48</sup> Interview, Defexpo, New Delhi, January 2006.
- <sup>49</sup> Interview, IDEX, Abu Dhabi, February 2005.
- <sup>50</sup> Also explored in Fisher, "Trouble Below," op-cit.
- <sup>51</sup> For a more detailed analysis of what European countries have sold the PLA in recent years see Richard D. Fisher, Jr., "How May Europe Strengthen China's Military," *International Assessment and Strategy Center web page*, January 16, 2005, [http://www.strategycenter.net/research/pubID.61/pub\\_detail.asp](http://www.strategycenter.net/research/pubID.61/pub_detail.asp)