

**CHAPTER 3**  
**CHINA'S MILITARY POWER AND ITS EFFECTS**  
**ON AMERICAN INTERESTS AND**  
**REGIONAL SECURITY**

**SECTION 1: CHINA'S MILITARY MODERNIZATION**

The Commission shall investigate and report on “REGIONAL ECONOMIC AND SECURITY IMPACTS—The triangular economic and security relationship among the United States, [Taiwan], and the People’s Republic of China (including the military modernization and force deployments of the People’s Republic of China aimed at [Taiwan]), the national budget of the People’s Republic of China, and the fiscal strength of the People’s Republic of China in relation to internal instability in the People’s Republic of China and the likelihood of the externalization of problems arising from such internal instability.”

**Key Findings**

- China continues its extensive military modernization program. For the tenth year in a row, China’s new annual military budget will reflect double-digit growth over the previous year’s. According to Chinese government figures, the 2006 budget will increase 14.7 percent from the previous year to approximately \$35 billion. The Department of Defense believes China’s actual defense expenditures could be two to three times higher at \$70—\$105 billion.
- In the near term, among China’s principal military modernization aims are to deter Taiwan from moving toward independence; to defeat and occupy Taiwan if it declares independence and to accomplish this before U.S. or other military assistance can arrive; and to deny U.S. forces the ability to intercede effectively in such a conflict and prevent China from prevailing.
- Despite calls for increased transparency, Beijing continues to shroud much of its military structure, activities, and intentions in secrecy, leading to increased chances for misunderstanding and potential conflict.
- China has recognized the profound effectiveness and strategic importance of force multipliers such as advanced command, control, communications, computer, intelligence, surveillance, and reconnaissance (C4ISR) capabilities employed by U.S. forces, and it is exerting great efforts to enhance its C4ISR abilities and integrate them in its military procedures. Once the People’s Libera-

tion Army (PLA) achieves these objectives, it will be a much more effective and formidable fighting force.

- China's military intentions beyond Taiwan remain unclear. The PLA understands itself to be in an extended military competition with the United States.
- The PLA's doctrine recognizes that to succeed against a sophisticated potential adversary such as the United States, it must among other things be able to disrupt the adversary's C4ISR advantages through such means as attacking its computer and communications systems. Accordingly, the PLA is establishing information warfare units and capacities, and developing anti-satellite capabilities.
- China is pursuing measures to try to control the seas in the Western Pacific and developing space warfare weapons that would impede U.S. command and control.

### Overview

In its February 2006 Quadrennial Defense Review Report (QDR), the U.S. Department of Defense warned of China's military potential. Specifically it noted that "Of the major and emerging powers, 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."<sup>1</sup> The QDR also stressed that the pace of China's military modernization effort puts regional strategic balances at risk.<sup>2</sup> Currently, China's military, the People's Liberation Army (PLA)<sup>3</sup>, is undergoing a long-term, comprehensive modernization aimed at fighting conflicts of high intensity and limited duration near its borders.<sup>4</sup> This accelerating military modernization and buildup hold serious implications for the East Asian region, the United States, and, depending on China's long term global strategic aspirations, the world.

Currently, Beijing focuses on bolstering military capabilities to address Taiwan Strait scenarios.<sup>5</sup> 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.

During 2006, cross-Strait tensions appear to have receded to a degree, and Chinese leaders have been less strident in their comments to and about Taiwan. Nonetheless, the United States accepts the reality of China's threat to use military force to prevent Taiwan from claiming or declaring independence from China. This would include military action to deter, deny, or delay outside assistance, including U.S. assistance, to Taiwan.<sup>6</sup> China's growing military capability may embolden Beijing to adopt a more aggressive approach toward Taiwan or parties to other disputes, particularly if there is

reason to believe the United States or others would be unlikely, unprepared, or unwilling to intervene.

China's military threat against Taiwan also presents 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."<sup>7</sup> Taiwan's successful conversion from authoritarian rule to a democracy makes it symbolically important to many Americans, and increases the likelihood that the United States would commit its forces to assist in defending Taiwan in a conflict with China. For these reasons, and because any cross-Strait conflict likely would result in massive humanitarian, economic, and political consequences throughout Asia and even in other portions of the world, it is very important to dissuade both Beijing and Taipei from taking steps that could endanger the status quo and lead to the outbreak of war. Toward this end, the United States seeks to maintain a credible deterrence to China's use of force against Taiwan, and, at the same time, encourages Taiwan to avoid rhetoric and actions that would inflame China while simultaneously "correct[ing] imbalances in the areas of air and missile defense, and anti-submarine warfare." Toward this end, the United States has offered to sell such defensive military systems to Taiwan.<sup>8</sup>

It is in U.S. interests to possess and deploy sufficient military capability (1) to persuade China that the United States can and will inflict severe injury on Chinese forces and objectives if it intervenes in a China-Taiwan conflict on behalf of Taiwan, and (2) to prevail rapidly and with low costs in battle damage and casualties should it intervene in such a conflict. It also is in U.S. interests to help Taiwan ensure its military is sufficiently robust to prevent China from landing a knock-out blow before American military forces can arrive and engage in a defensive effort.

Although there is no evidence China has near-term aspirations to acquire the military ability to project power around the globe in a way that would effectively compete with the United States, it is apparent that China is working to increase its military's reach in the Asia-Pacific region and beyond. This involves not only acquisition of new naval and air force weapons systems and capabilities, but also greater integration of forces in the PLA to improve its coordination and extend its reach beyond green-water territories.<sup>9</sup> This is not surprising given China's growing international commercial and diplomatic involvement. According to retired Admiral Eric McVadon, "an emerging China wants to build a military appropriate to the country that it is becoming."<sup>10</sup>

Increasingly, Chinese forces operate beyond China's immediate coast and borders.<sup>11</sup> Essentially, China is "at the very beginning stages of power projection capability."<sup>12</sup> Evidence suggests that Beijing's continued military development will allow it to extend power beyond the Taiwan Strait,<sup>13</sup> and that this is a Chinese strategic objective. With China's growing economic reliance on international trade, and the country's increasing dependence on im-

ported petroleum, it undoubtedly will increase its efforts to protect its sea lines of communication (SLOCs).<sup>14</sup> Cortez Cooper, Director of East Asian Studies at Hicks and Associates, Inc., stated in his testimony before the Commission, “By roughly 2020, Beijing hopes to be able to focus on the greater periphery, particularly the Strait of Malacca, the Indian Ocean, and the Persian Gulf. This obviously would require development of a blue water fleet and a strategic bomber force . . . to conduct operations out to that distance.”<sup>15</sup> China also could take advantage of a more advanced military to threaten use of force, or actually use force, to facilitate desirable resolutions of disputes over natural resources and territorial claims such as those with Japan.<sup>16</sup>

In response to China’s military modernization program, the United States has realized the necessity of developing a strategy to “encourage China to make the right strategic choices for its people while we hedge against other possibilities.”<sup>17</sup> As Peter Rodman, Assistant Secretary of Defense for International Security Affairs, explained in his March 2006 testimony, hedging implies taking a realistic approach toward China’s military ambitions, cooperating with allies in the Asian region to form a balance of power, and ensuring that our own military remains prepared for contingencies involving China.<sup>18</sup> Moreover, hedging encompasses the “measures we can take to reorient our global posture for the opportunities and the challenges of the 21st century.”<sup>19</sup>

James Thomas, Deputy Assistant Secretary of Defense for Resources and Plans, underscored the fact that hedging is a prudent, historical methodology for addressing the changing military capabilities of other countries, especially when their intentions are not always clear.

### **China’s Military Opacity**

Beijing’s military opacity contributes to the fear that China is becoming a growing threat in the Western Pacific, and possibly beyond. It also raises the chances for misunderstanding and military miscalculation.<sup>20</sup> According to the U.S. Department of Defense, “[t]he outside world has little knowledge of Chinese motivations and decision-making or of key capabilities supporting PLA modernization.”<sup>21</sup> China’s opacity has led and will continue to lead others to consider possible scenarios for conflict and to “hedge” accordingly.<sup>22</sup>

A central contributor to the opacity is China’s active policy of deception and misinformation.<sup>23</sup> Dr. Jacqueline Newmyer, Senior Analyst with the Long-Term Strategy Project at Harvard University, defines this policy as corresponding to the traditional Chinese notion of military power, *shi*, that uses intelligence to surprise enemies with drastic policy changes or unexpected attacks.<sup>24</sup> To employ this traditional stratagem, China must place a high priority on spying to increase its intelligence advantage and also prevent others from collecting information about China; it accomplishes this through “concealment and deception.”<sup>25</sup>

In his testimony to the Commission, Assistant Secretary Rodman noted that “We are caught by surprise by the appearance of new systems that suddenly appear fully developed.”<sup>26</sup> China’s active deception is compounded by its unwillingness to divulge information

or engage the U.S. military. For example, China's exclusion of the United States from certain security exercises, such as those in 2005 with Russian forces, indicates that China is unwilling to reveal meaningful information and intentionally obstructs U.S. efforts to achieve military transparency.

As one means of achieving greater Chinese military transparency, some defense analysts advocate increasing military-to-military contacts with China that will advance the exchange of information and allow opportunities to collect data.<sup>27</sup> Such contacts have been limited since the 2001 Chinese downing of a U.S. Navy EP-3 surveillance plane on Hainan Island.<sup>28</sup> Secretary of Defense Donald Rumsfeld's October 2005 trip to China produced an agreement to expand senior-level visits by defense officials.<sup>29</sup>

In May 2006, Admiral William J. Fallon, the commander of U.S. Pacific forces, visited Chinese military installations.<sup>30</sup> In June, Assistant Secretary Rodman traveled to China to discuss increasing military contacts.<sup>31</sup> Later that month a Chinese delegation accepted an invitation to observe a U.S. military exercise known as "Valiant Shield"<sup>32</sup> and the command ship of the U.S. Navy's Seventh Fleet, the *U.S.S. Blue Ridge*, visited Shanghai.<sup>33</sup> Most recently, General Guo Boxiong, Vice Chairman of the Central Military Commission and China's highest ranking general, visited the United States in July for a week-long tour, including visits to the National Defense University and the Navy's Third Fleet in San Diego.<sup>34</sup> These may be positive steps, but the Commission remains concerned that, because of the lack of reciprocity in access, they may disproportionately benefit the PLA. Military-to-military contacts with China should be calculated so that they do not increase the PLA's knowledge of U.S. military capabilities. Some charge that in the past China's military has not provided the same level of access that it has received from the U.S. military.<sup>35</sup> However, U.S. armed forces personnel were granted observer status for one day in the final phase of China's 2005 Northern Sword military exercise in Inner Mongolia—an exercise that involved roughly 16,000 PLA personnel.<sup>36</sup>

To reduce the number of surprises the United States encounters with respect to new or enhanced Chinese military capabilities and activities, it will be necessary for the U.S. intelligence community to increase its focus on China's military; its objectives, doctrine, and strategy; and its modernization efforts, and dedicate increased personnel and other collection and analysis resources to this purpose. If the focus and resource allocation are not commensurate with the assessment of the threat China potentially poses as stated in the Defense Department's QDR, the United States should expect repeated—and unpleasant—surprises from China, some of which may pose significant threats to U.S. interests.

### **China's Defense Expenditures**

China's very substantial and rapidly growing investment in enhanced military capacity casts a shadow on its self-described "peaceful rise." From 1994 to 2004 China's publicly acknowledged defense budget grew at an average annual rate of 15.8 percent. This March, Beijing announced that its 2006 defense budget is expected to rise 14.7 percent from the previous year—from 244 billion

renminbi in 2005 to 280 billion renminbi (\$35 billion).<sup>37</sup> However, China's budget does not include items commonly accounted for in military budgets, including procurements of weapons abroad; research and development expenditures; funding of paramilitary groups such as the People's Armed Police; and government subsidies to the defense industry.<sup>38</sup> Taking into account these missing figures and other transparency problems, the Department of Defense believes China's total military budget may be two to three times higher than the announced amount—in the range of \$70—\$105 billion.

China's military budgetary picture is ultimately "clouded by a multitude of funding sources, subsidies, and cutouts at all levels of government and in multiple ministries. Real spending on the military, therefore, is so disaggregated that even the Chinese leadership may not know the actual top line."<sup>40</sup> But the salient fact is that it is growing substantially on a sustained basis. And it appears that one key reason is to enable the Chinese military to obtain national objectives that run counter to U.S. interests.

According to a Defense Department specialist on China, the Administration has discussed military accounting and budgeting transparency with China, most notably when Assistant Secretary Rodman traveled to Beijing in June 2006 for the Defense Consultative Talks. The United States encourages China to adopt international standards for reporting military budgets and expenditures to facilitate the accuracy of estimates about China's progress and the nature, extent, and purposes of its military modernization.

### **Domestic Defense Industrial Capacities**

China works to modernize its military and reduce reliance on imported military equipment and technologies.<sup>41</sup> This effort is advancing in some ways while still facing serious limitations in others.

For decades, the productivity, efficiency, and innovation of China's state-owned defense industries lagged well behind Western defense industries. Although "sweeping conclusions about the backwardness of the [Chinese] defense-industrial complex are no longer accurate" because of reforms initiated in the 1990's, comparably sweeping "claims about systemic reform are equally unwarranted."<sup>42</sup>

Beijing introduced "commercialization" principles to some defense industries, hoping to improve their capacities<sup>43</sup> and make them more responsive to the PLA's modernization needs and improve efficiency.<sup>44</sup> Layoffs and consolidations constitute part of the means for reaching these goals. As China's defense budget continues to grow, so do the resources and sales generated by these companies, allowing them to improve equipment and attract increasingly qualified employees.<sup>45</sup>

According to Dr. Roger Cliff, Senior Analyst at the RAND Corporation, "China's defense industries are advancing increasingly rapidly, and striving to close the technological gap with the United States."<sup>46</sup> Research and development (R&D) capabilities also benefit from the heightened military spending.

Additionally, China's emerging private sector, with growing access to Western equipment, technology, and know-how, supports

the country's defense modernization efforts. According to Dr. Adam Segal of the Council on Foreign Relations, "Chinese policy makers are working to ensure that the civilian economy makes a more direct contribution to defense modernization . . . dismantling many of the barriers between civilian and defense R&D . . ."47 China is particularly interested in acquiring Western civilian goods and technologies that have military applications.

But China's defense industrial base still has serious problems and faces the challenge of implementing reforms. In addition, reforms have not greatly increased competition within the defense sector, further hindering innovation and accountability. As a result, China's military modernization efforts are complicated and slowed, and the financial resources China is investing cannot be spent with optimum efficiency.

### **Airpower and Air Defense**

The PLA Air Force, with more than 700 combat aircraft based within striking distance of Taiwan,<sup>49</sup> has been described as "a defensive force with offensive aspirations."<sup>50</sup> Beijing wants a force capable of muscling opponents further away from its shore and the vicinity of Taiwan in the event of a conflict.<sup>51</sup>

Newer, fourth-generation aircraft—with capabilities equivalent to current U.S. or European aircraft—constitute an increasing portion of China's air force.<sup>52</sup> Its military aviation industry, drawing heavily on foreign technologies, has "made more progress in improving quality and technological sophistication of aircraft in recent years than in the previous decades . . . a noteworthy rate of improvement."<sup>53</sup> Reportedly, China's Shenyang Aircraft Industry Company and the Chengdu Aircraft Industry Company are developing advanced fourth generation fighters, including a new twin-engine fighter with stealth technology known as the J-12 expected to have many of the capabilities of the fifth-generation F/A-22.<sup>54</sup> These planes could be flying for the PLA Air Force by 2015.<sup>55</sup>

China continues to turn to Moscow for tactical, maritime, and multi-role aircraft and other aviation-related technology.<sup>56</sup> For example, Russia continues to supply China with fourth generation Su-30MK2 and Su-30MKK aircraft,<sup>57</sup> and provides to the PLA Navy advanced multi-role helicopters.<sup>58</sup> Beijing may also be interested in the Russian-made Tu-22M-3/ BACKFIRE bomber which could improve China's sea-denial and -control ability and allow it to target U.S. facilities on Guam, based on its reported combat radius.<sup>59</sup>

Mr. Cooper explained to the Commission that China is acquiring or developing aerial refueling capabilities, airborne targeting capabilities, and over-the-horizon radars.<sup>60</sup> It also has advanced, Russian-made SA-10 and SA-20 surface-to-air missiles on its side of the Taiwan Strait and is expected to field the Russian S-300PMU2 surface-to-air system this year.<sup>61</sup> The S-300PMU2 has an extended range allowing China to engage targets over Taiwan.<sup>62</sup> Despite these improvements and acquisitions, Cooper maintained that the PLA Air Force will not be able to project power beyond Chinese territory and the near periphery,<sup>63</sup> especially without the development of a strategic bomber force.

The Chinese have fielded unmanned aerial vehicles and the PLA operates them at the company and squad levels<sup>64</sup> to provide “additional options for long-range reconnaissance and strike [capabilities].”<sup>65</sup> China’s special operations forces also employ unmanned aerial vehicles, or drones<sup>66</sup> and the PLA reportedly has a unit that monitors U.S. drones operating in Afghanistan<sup>67</sup> while simultaneously developing its own Predator 1-sized drones.<sup>68</sup>

These developments in China’s air power will make it more difficult and costly for the United States to prevail over China if it intervenes in the event of a conflict between China and Taiwan, but there appear to be few other notable implications for the United States.

### **Ground Forces**

The PLA has been downsizing its traditional ground forces while improving technology and equipment to enhance the level of unit efficiency and capability. China’s ground forces number approximately 1,600,000—about 200,000 less than a year earlier and a significant decrease from 2.2 million soldiers ten years ago<sup>69</sup>—but still more than 70 percent of China’s total military personnel. These ground forces consist primarily of 18 group armies, each with an approximate troop complement of 30,000 to 65,000.<sup>70</sup>

A major focus of PLA modernization is the replacement or improvement of old equipment, including improvements to the Type 59/69 tanks that comprise much of the PLA’s tank force. China’s Type 63 amphibious light tank has been replaced with the Type 63A that has “a significant increase in its amphibious capabilities and firepower.”<sup>71</sup> The Type 63A has an improved turret holding a 105mm rifled tank gun, similar to those on PLA main battle tanks, which if stabilized results in a “fire on the move” capability and an increase in first-round hit probability.<sup>72</sup> Overall, these light tank enhancements improve the PLA’s amphibious resources that are a key factor in scenarios involving conflict with Taiwan.

PLA artillery equipment includes approximately 14,000 towed artillery pieces, 1,200 self-propelled artillery units, and more than 2,400 multiple rocket launchers.<sup>73</sup> Beijing’s 2005 International Aviation Expo unveiled the latest PLZ05 155mm self-propelled howitzer, bearing resemblance to the Russian MSTA-S 2S19 152mm model and allegedly supporting a fully automatic loading system greatly improving efficiency and reliability.<sup>74</sup>

*The Military Balance 2006* reports that the PLA has only 421 helicopters, a relatively small number given the size of its operational forces.<sup>75</sup> But China’s helicopter production capabilities continue to improve.<sup>76</sup> Reports indicate that the Changhe Aircraft Industries Group and the China Helicopter Research and Development Institute are developing a third generation, dual seat attack helicopter referred to as the WZ-10.<sup>77</sup> Changhe is reportedly producing another helicopter, the WZ-11, capable of carrying anti-tank missiles and rocket pods.<sup>78</sup>

Exemplifying the Chinese military’s focus on the Taiwan Strait, the army recently increased by 25,000 (or seven percent) to 400,000 the number of troops in the three military regions opposite Taiwan—Jinan, Nanjing and Guangzhou.<sup>79</sup> The PLA’s main training objectives appear related to amphibious operations such as the Au-

gust 2005 Peace Mission joint exercise with Russia. The amphibious component of this three-day exercise involved landing operations by 1,000 troops of the combined PLA ground, helicopter, marine, airborne, and special forces all exercising together (supported by naval and air forces), albeit in small units for short periods of time in limited areas.<sup>80</sup> Based on Chinese media accounts, in 2005 elements of two armored and eight infantry divisions (including both active and reserve units) and three infantry brigades participated in various levels<sup>81</sup> of amphibious training in the Nanjing, Guangzhou, and Jinan military regions.<sup>82</sup>

All these modernization steps are supportive of the PLA's overall strategy of fighting "local wars under the conditions of informationalization" by creating a more mobile, highly-trained, and responsive force. Central to this strategy, ground forces focus on training for electronic and information warfare and long-range precision strikes through joint forces cooperation.<sup>83</sup>

### Naval Forces

It appears that China's short-term objectives for naval modernization correlate to China's goal of acquiring the ability to frustrate potential adversaries such as the U.S. Navy and deny the ability of its adversaries to operate in areas vital to China's interests such as the Taiwan Strait. Currently, China is hindered in achieving this goal by the lack of a strong, reliable fleet. The PLA Navy includes fewer than twenty ships possessing limited anti-air warfare defense systems and believed "capable of operating in an early 21st-century naval environment."<sup>84</sup>

China's maritime strategy relies on submarines to patrol the coastal waters, blockade the Taiwan Strait, and deter foreign navies from operating in the region in the event of a conflict.<sup>85</sup> Consequently, China continues to expand and improve a submarine fleet that is considered the PLA Navy's most "potent strength." China should have approximately 30 modern submarines in operation by 2007.<sup>86</sup> Specifically, China serially produces the *Song*-class diesel submarine and according to the Department of Defense has completed or nearly completed developing newer nuclear attack and ballistic missile submarines.<sup>87</sup> For example, the *Shang*-class (Type 093) nuclear attack submarine is now entering operation.<sup>88</sup> China is also procuring a second delivery of more modern Russian *Kilo*-class submarines.<sup>89</sup> (With the deployment of the newer submarines, China's *Ming*- and *Romeo*-class submarines likely will be decommissioned.<sup>90</sup>)

China has placed a priority on modernizing its destroyer and frigate fleets and the PLA Navy's surface fleet is steadily improving, both qualitatively and quantitatively.<sup>91</sup> China received its first *Sovremenny II*-class destroyer from Russia, with a second expected by the end of the year.<sup>92</sup> Mr. Cooper predicts that by 2007 China should have more than 15 modern frigates equipped with upgraded air defense systems.<sup>93</sup> By 2008 the PLA Navy should be able to extend short-term sea-denial operations roughly 400 nautical miles from its shoreline.<sup>94</sup> The PLA Navy may be able to conduct these operations for several straight weeks by the end of the decade.<sup>95</sup>

Looking toward the future, China may seek to extend its naval capacities to its "greater periphery" that encompasses portions of

the Indian Ocean, the Persian Gulf, and the Strait of Malacca.<sup>96</sup> Should China wish to extend its naval reach westward to protect its energy-related interests in the Middle East or Africa, it would require a reliable blue-water fleet, possibly including aircraft carriers and a long-range bomber force.<sup>97</sup> Mr. Cooper estimates that by 2020 China could have a fleet in place to accomplish this objective.<sup>98</sup>

One of the presumed requirements of a blue-water fleet is one or more operational aircraft carriers. China appears interested in developing one indigenously.<sup>99</sup> It also recently repainted its Soviet-era *Kuznetsov*-class carrier with PLA Navy markings and refurbished its electrical systems and the flight deck.<sup>100</sup> Whether or not this will become China's first operational carrier remains to be seen; in any event, PLA Navy technicians use the ship to study carrier construction and design.<sup>101</sup>

### Missiles

China continues to make significant strides in modernizing and enlarging its missile forces. Currently, there are at least ten types of ballistic missile systems that are either operational or under development.<sup>102</sup> China's longer-range missiles can target locations beyond the Pacific region; the CSS-4 can target portions of the continental United States.<sup>103</sup> In addition, Beijing continues to improve its older intercontinental ballistic missiles (ICBMs) and seeks to field increasingly mobile, accurate, and survivable, and therefore more credible, ICBMs.<sup>104</sup> Some of these include significant, newer systems that will become operational within the next four years, such as the DF-31 and DF-31A ICBMs as well as the sea-launched JL-2<sup>105</sup> carried aboard the *Jin*-class (Type 094) submarine.<sup>106</sup> According to Assistant Secretary Rodman, China's newer "longer-range [missile] systems will reach many areas of the world . . . including virtually the entire continental United States."<sup>107</sup> Due for deployment in 2007, the DF-31A will be the first Chinese ICBM capable of hitting Washington, DC.<sup>108</sup>

China has an increasingly accurate and lethal short-range ballistic missile force arrayed against Taiwan that could complicate U.S. military planning and operations in the area.<sup>109</sup> Nearly 800 Chinese short-range ballistic missiles are stationed near Taiwan and during the past several years the number of these missiles has increased by about 100 missiles a year.<sup>110</sup> The newer generation missiles have greater range and accuracy.<sup>111</sup>

China is also making strides in the cruise missile sector. It is developing first and second generation conventionally armed land-attack cruise missiles, which eventually could be armed with nuclear payloads.<sup>112</sup> The PLA Navy and its Naval Air Force have obtained or are in the process of obtaining roughly a dozen types of anti-ship cruise missiles, including the Russian SS-N-22/SUNBURN and SS-N-27B/SIZZLER.<sup>113</sup> According to the Department of Defense, China's "pace of indigenous [anti-ship cruise missile] research, development, and production—and of foreign procurement—has accelerated over the past decade."<sup>114</sup> China's new *Shang*-class (Type 093) nuclear attack submarine reportedly will carry both anti-ship and land-attack cruise missiles.<sup>115</sup>

Just as China is working to improve its missiles, China is making significant investments in its space program. In October 2005, China conducted its second manned space mission, and plans to launch another manned mission in 2007 and a lunar robot probe by 2010.<sup>116</sup>

China's military space doctrine is opaque, but some experts believe that among the goals for the PLA's space program is obtaining space-related information dominance and the ability to disable its opponents' space assets in order to disrupt their space-based information and navigation systems in the event of conflict.<sup>117</sup> Regarding the first of these two objectives, China is working to develop advanced space-based imagery and reconnaissance systems to aid its military.<sup>118</sup> These capabilities will serve, as they do for the United States, as force multipliers and will make China's armed forces more competitive and lethal. With regard to the second space objective, there is evidence suggesting that China "is developing the capacity to deny ... [the use of space] to others ... [and has] at least one ground-based laser anti-satellite research and development program underway." In September 2006, U.S. officials confirmed that China, in fact, has test fired such lasers at U.S. satellites.<sup>120</sup> According to the Department of Defense, "Acquiring more sophisticated space systems will allow China to expand the reach of its anti-access forces and could serve as a key enabler for regional power projection."<sup>121</sup>

### **Information and Cyber-Warfare**

China is actively improving its non-traditional military capabilities. Chinese military strategists write openly about exploiting the vulnerabilities created by the U.S. military's reliance on advanced technologies and an extensive C4ISR infrastructure it uses to conduct operations.<sup>122</sup> China's approach to exploiting the technological vulnerabilities of adversaries extends beyond destroying or crippling military targets. Chinese military writings refer to attacking key civilian targets such as financial systems.<sup>123</sup>

The Commission believes Chinese intelligence services are capable of doctoring computer systems. It has seen clear examples of computer network penetrations coming from China, some of which were publicized in the "Titan Rain" exposé that received substantial press coverage. In August and September 2006, attacks on computer systems of the Department of Commerce's Bureau of Industry and Security forced the Bureau to replace hundreds of computers and lock down Internet access for one month.<sup>124</sup>

The PLA, leveraging private sector expertise, steadily increases its focus on cyber-warfare capabilities and is making serious strides in this field.<sup>125</sup> According to the Department of Defense, the PLA's cyber-warfare strategy has evolved from defending its own computer networks to attacking the networks of its adversaries and limiting their ability to obtain and process information,<sup>126</sup> and PLA information warfare units are developing viruses to harm the computer systems of its enemies.<sup>127</sup> Such attacks would be intended to disable defense systems that facilitate command and control and intelligence communication and the delivery of precision weapons,<sup>128</sup> primary instruments for the conduct of modern U.S. warfare.

China also works to improve its own C4ISR capabilities. For example, the PLA reportedly has mobile command and control centers where commanders interact with frontline units through digital wireless and satellite communications and gather additional real-time battlefield information.<sup>129</sup>

### **Intelligence**

China is hungry to acquire, adapt, and capitalize on the value of capabilities and technologies available elsewhere. Whether in the military or the commercial realm, China is willing to acquire and exploit the knowledge developed by others; it will do this legally if possible, and otherwise illegally by espionage. In this way it saves tremendous sums it otherwise would have to invest in research and development; arguably more importantly, it shrinks the amount of time necessary to transform an idea into reality.

In this effort, China has established an impressively large human intelligence apparatus that extends far beyond traditional military and national intelligence operations. For example, "... there are between 2,000 and 3,000 Chinese front companies operating in the United States to gather secret or proprietary information ..."<sup>130</sup> China also often requests or requires its citizens who are studying or working in places where they have access to cutting-edge research activities or to technology development and application to obtain whatever information about those activities they can obtain and provide the information to the Chinese government. This poses a very significant challenge for U.S. counterintelligence efforts. The number of Chinese exchange students and "specialty workers" entering the United States each year complicates the ability of U.S. immigration officials to track these students and workers.<sup>131</sup> The *Christian Science Monitor* reports that China's espionage often depends upon "relative amateurs: Chinese students and visiting scientists, plus people of Chinese heritage living in the U.S." to gather small amounts of military and economic data.<sup>132</sup>

Recently, several indictments of Chinese citizens for espionage have spotlighted China's spying activities in the United States. In October 2005 in California, for example, the Federal Bureau of Investigation (FBI) arrested a Chinese man (a naturalized U.S. citizen) who is an engineer for a U.S. defense firm and his wife and later arrested his brother, sister-in-law, and nephew. The FBI charged them with illegally obtaining and providing to China sensitive information related to submarine propulsion systems.<sup>133</sup>

China also cultivates relationships with U.S. officials in policy-making positions, illustrated by the charges filed against former Defense Intelligence Agency official Ronald Montaperto. Montaperto admitted he passed classified information to Chinese intelligence officials over a 22-year career in government, and he pled guilty to illegally retaining classified documents.<sup>134</sup>

## SECTION 2: THE EFFECT OF U.S. AND MULTILATERAL EXPORT CONTROLS ON CHINA'S MILITARY MODERNIZATION

The Commission shall investigate and report on “ECONOMIC TRANSFERS—The qualitative and quantitative nature of the transfer of United States production activities to the People’s Republic of China, including the relocation of high technology, manufacturing, and research and development facilities, the impact of such transfers on United States national security, the adequacy of United States export control laws, and the effect of such transfers on United States economic security and employment.”

### Key Findings

- China makes a concerted effort to modernize its military by obtaining military-related systems and technologies from other countries, particularly Russia. China uses legal and illegal means, including espionage, to obtain such technologies from the United States.
- There is only one full-time U.S. export control officer stationed in China to verify that licensed U.S. dual-use items are used in the location and for the purpose for which they are licensed. There also is only one full-time U.S. export control officer stationed in Hong Kong to verify that dual-use items licensed for use there remain in Hong Kong and are used as intended rather than being diverted, possibly to China. As a result, it is impossible to adequately oversee compliance with U.S. export licensing requirements by licensees in China or Hong Kong. This makes it easier for militarily-sensitive U.S. materials and technology to be misused or diverted without detection and without penalty to the licensees and thereby undermines the credibility of the export control process.
- China, in violation of a U.S.-China agreement, often fails to schedule timely end-use inspection visits of dual-use items licensed for export to China. This frustrates U.S. oversight of compliance with U.S. export licensing requirements by licensees in China, and makes it easier for militarily-sensitive U.S. materials and technology to be misused or diverted without detection and without penalty to the licensees and thereby undermines the credibility of the export control process.
- Export controls are likely to be substantially effective only if they are multilateral, if there are no notable sources of the controlled goods and technologies who choose to disregard the controls, and if all source nations administer and enforce the restrictions effectively. While unilateral controls may delay acquisition of controlled goods and technologies by targeted nations, those delays are unlikely to be significant if a targeted nation is intent on acquisition and if other nations possess and are willing to make available the goods and technologies.

- The memberships of most of the existing multilateral export control regimes have not agreed that China should be a target of their efforts and so do not seek to impede Chinese acquisition of the items and technologies of which they try to facilitate and coordinate control by their member nations. Not surprisingly, therefore, these regimes and their controls play no role in preventing China from acquiring items and technologies the United States believes are militarily-critical. This highlights the fact that effectively controlling the acquisition of items and technologies by a particular nation requires multilateral agreement both that possession of the items and technologies should be controlled and that the nation in question should be a target of the controls.

### **Concerns and Opportunities**

To bolster its armed forces and their capabilities, China makes concerted efforts to obtain foreign military and military-related goods and technologies and tries to acquire these through legal and illegal means,<sup>135</sup> including espionage. According to former Under Secretary of Commerce for Industry and Security David McCormick, “China has a clear strategy to strengthen its military capabilities by acquiring advanced dual-use technologies [those having legitimate civilian and military uses] and incorporating them into defense systems.”<sup>136</sup> Desired U.S. technologies include those capable of improving China’s command and control, communications, computer, intelligence, surveillance, and reconnaissance (C4ISR) systems, radar systems, and maritime programs.<sup>137</sup> Over the past year the United States has convicted and sentenced a number of individuals for illegally exporting critical technology to China. For example, in May 2006 four naturalized U.S. citizens originally from China were sentenced in federal court for illegally exporting to Chinese state-sponsored research institutes items that are export controlled because of their military criticality, including items used in radars, smart weapons, and electronic warfare.<sup>138</sup>

It is in the national interest of the United States that China’s military forces not be able to employ our unique, militarily-critical capabilities. Of comparable concern is the possibility that China or Chinese organizations, were they to acquire such technologies and goods, may sell or transfer them to countries of concern or to terrorists. According to a report issued by the Department of Commerce’s Inspector General, “China’s export control system has been criticized in the past by many western nations for its insufficiency in controlling the exports of sensitive technologies and weapons to nations of global and regional security concern.”<sup>139</sup>

The reason for some of China’s failures to control such exports is that its export control system is not well developed and fails to meet international standards, and it simply lacks the ability to effectively mandate and enforce controls. But in other cases it is apparent that China’s leadership for various reasons has not desired to control the export or re-export of some items and technologies the United States believes to be militarily-critical and therefore wants to keep out of the hands of rogue nations, potential adversaries, and terrorists. Even the most effective national export con-

trol system will be effective in controlling only the export of items and technologies the nation's government *intends* to control to end-users that government does not want to receive the items and technologies. Given that China appears not to subscribe to U.S. concerns about the availability of a number of particular items and technologies the United States believes are militarily-critical, nor to some U.S. conclusions about undesirable end-users and end-uses of those items or technologies outside China, it should not be surprising that China has made no visible effort to restrain exports or re-exports of those items and technologies to those end-users and end-uses.

The challenge constantly facing the U.S. government with respect to its own export control system is to effectively prevent China and other nations of concern from acquiring militarily-critical technologies and goods with military applications while not unnecessarily interfering with or impeding U.S. businesses from engaging in profitable trade of goods and technologies determined not to pose significant security risks to the United States. For example, according to former Under Secretary McCormick, "U.S. policy should facilitate sales of American-made semiconductors to companies in China for use in stereos or a child's Game Boy [video game], but not for advanced missile systems or submarines."<sup>140</sup>

China presents enormous export opportunities for U.S. companies. Taking maximum advantage of such opportunities is in the interests of individual companies and their owners and workers; it also is in the national interest as we confront the historically large trade deficit with China that shows no sign of leveling off. China is the fastest growing major export market for U.S. companies<sup>141</sup> and U.S.-China trade reached \$285 billion during 2005.<sup>142</sup> As a result of China's increasing market potential for U.S. exports coupled with its rapid military modernization, the Department of Commerce is reexamining its China-related export control policy. The Department currently advocates increased trade in goods and technologies with civilian end uses while at the same time further restricting trade of goods and technologies with military applications.

The Chinese government complains that current U.S. export controls are too restrictive and add to the growing trade imbalance. "We hope that the U.S. can take concrete measures to relax or lift its restrictions on high-tech exports to China, to better address the imbalances of China-U.S. trade," explained a spokeswoman for China's Foreign Ministry.<sup>143</sup> But Administration officials dismiss Beijing's claims that relaxed controls would significantly reduce the \$201 billion U.S. trade deficit with China.<sup>144</sup> This argument is supported by the fact that the total value of U.S. exports to China in federal fiscal year 2005 was roughly \$40 billion and the total value of denied exports—\$12.5 million—was only slightly more than three-hundredths of one percent of that total value.<sup>145</sup>

### **U.S. Export Controls**

Currently, the U.S. export control system involves numerous federal agencies in devising, supporting, and enforcing a complex set of regulations that covers both military goods and technologies and dual-use items.<sup>146</sup> During the final decade of the Cold War, the Ex-

port Administration Act of 1979 provided the legislative authority to control and license the export of dual-use items. But the Cold War ended—and with it, the U.S. security focus on the nations of the former Soviet Union and its allies. The Export Administration Act (that controlled the export of dual-use goods and technologies as differentiated from the arms or defense services—technically referred to as “munitions list” items—of which export is controlled under the Arms Export Control Act) expired in 2001, and Congressional efforts to update and reauthorize the Export Administration Act have been unsuccessful.<sup>147</sup> In the absence of the Export Administration Act, the executive branch maintains export controls on dual-use goods and technologies based on authority in the International Emergency Economic Powers Act, but that Act’s authorities are limited, and needed modifications to the U.S. dual-use export control system cannot be made until the Export Administration Act is reauthorized.

The United States maintains an embargo on the export to China of military-use goods and technologies and it also controls the export of dual-use items to China.<sup>148</sup> According to the President of the Coalition For Employment Through Exports, Edmund Rice, “the U.S. [munitions list] embargo is doubtless contributing to the U.S. goal of denying Chinese access to the most advanced U.S. military technologies.<sup>149</sup> But China can and does obtain weapons and technology from other nations such as Russia. Of additional concern, sometimes countries to which U.S. firms are permitted to sell export-controlled, dual-use goods and technologies permit such goods or technologies to be transferred to China.<sup>150</sup> Mr. Rice explained to the Commission that “only Japan has any significant dual-use restrictions for China, which means China has virtually unrestricted access to U.S. dual-use technologies through procurement in third countries.<sup>151</sup>

Having concluded that the current U.S. dual-use export control system allows export to China of certain U.S. goods and technologies that potentially can enhance China’s conventional military capabilities,<sup>152</sup> the Department of Commerce has worked with the Departments of Defense and State and other federal agencies to devise a new policy on dual-use export controls to China with the objective of easing certain export restrictions while increasing scrutiny of key technology exports to China that later could threaten U.S. security.<sup>153</sup> The current draft of this new policy requires U.S. exporters to secure a license to export some previously-uncontrolled items to China, including certain computers and electronics, whenever the exporters know or “have reason to know” the items may have a military end-use.

### **Improving End-Use/End-User Verification**

The effectiveness of U.S. export controls depends to a large extent on the ability of the United States to verify the legitimate use of controlled technologies that were approved for export. To enhance the ability of the United States to verify the end-use and end-user of approved exports to China, the two nations signed an End Use Visit Understanding in April 2004. Despite this agreement and continued consultation over end-use visits, Beijing peri-

odically frustrates U.S. efforts to conduct end-use verification visits.<sup>154</sup> Pursuant to the End Use Visit Understanding, China's Ministry of Commerce schedules end-use visits requested by the U.S. export control officer stationed in Beijing. But in violation of that agreement, a majority of the visits are not scheduled for more than 60 days after the export control officer submits a visit request,<sup>155</sup> and any significant delay in conducting such visits affords time for misuse of a licensed item or technology in ways that could inflict damage on U.S. interests, and for concealing evidence of such misuse. Further, the Chinese Ministry of Commerce usually provides short notice to the export control officer that an end-use visit has been scheduled,<sup>156</sup> again increasing the difficulty of accomplishing these important visits.

In addition to these verification problems caused by the Chinese government, the frequency and number of end-use visits pertaining to approved dual-use exports to China are constrained by the fact there is only one American export control officer stationed in China. During fiscal year 2005, the Beijing-based control officer conducted 33 end-use checks.<sup>157</sup> But during that same period the Department of Commerce approved 1,058 applications for export to China of dual-use goods and technologies.<sup>158</sup> In a related matter, the Commerce Department's Inspector General's review concluded that the Department's end-use verification program in Hong Kong—that also depends on one export control officer stationed there—does not adequately monitor the potential diversions of export-controlled items to illegitimate end-uses or end-users, including end-uses and end-users in China.<sup>159</sup> A larger pool of export control officers from which these officials could be selected and placed more rapidly when vacancies occur in either China and Hong Kong could help reduce some of the backlog created by the Chinese.

### **Multilateral Export Controls**

Unfortunately, U.S. export controls are not achieving their objectives as they apply to China; a major reason is that, for the most part, U.S. controls are unilateral. Of the world's leading industrial and technological nations, the only other nation that has any significant China-related dual-use export controls is Japan.<sup>160</sup>

There are several multilateral export control regimes. But these regimes are voluntary, and many of their member nations do not apply to exactly the same set of importing nations the export restrictions on which the members agree. Further, some regime member nations operate more effective enforcement mechanisms than do others.<sup>161</sup>

One multilateral regime, the Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-use Goods and Technologies, aims to increase regional and global stability by encouraging member states to increase transparency surrounding their sales of arms and dual-use goods and technologies.<sup>162</sup> By sharing such information regarding their arms transfers, members hope to prevent the accumulation of weapons that could increase tensions or instability.<sup>163</sup> However, "[t]he decision to transfer or deny a transfer of any item is the sole responsibility of each Participating [member] State."<sup>164</sup> Therefore, discrepancies can and do emerge be-

tween the national export control policies of the member states. For example, Wassenaar members have not agreed that China should be a target of its controls, and therefore the regime does not suggest that its members should restrict exports to China of semiconductor manufacturing equipment that can be used to improve weapons systems<sup>165</sup>—restrictions that the United States imposes unilaterally.

After China's 1989 Tiananmen Square crackdown, the European Council, meeting in Madrid, agreed to impose an embargo on arms exports by European Union (EU) nations to China. By imposing this embargo, the Council sought to express its disapproval of China's crackdown.<sup>166</sup> The EU's arms embargo prohibits export to China of lethal equipment and systems. It is binding on all EU member nations, but its precise scope and coverage is vague and interpretations of its restrictions vary. As a result, some EU member nations have exported significant "nonlethal" military items and technologies to China during the embargo, including 1) military helicopters; 2) fire control radars; 3) aircraft engines; 4) submarine technology; and 5) airborne early warning systems.<sup>167</sup> During 2004, EU governments approved the sale of over \$400 million in defense exports to China.<sup>168</sup>

Despite loopholes through which EU nations have exported certain technologies to China, the EU embargo coincides with and makes a substantial contribution to U.S. security interests because it complements U.S. export controls and other restrictions directed at China. Over the past few years, there have been calls by some European countries to lift the embargo, and China vigorously lobbies Brussels to repeal it. This would be a very damaging action. According to the Pentagon, lifting the embargo could 'remove implicit limits on Chinese military interaction with European militaries, giving China's armed forces broad access to critical military 'software' such as management practices, operational doctrine and training, and logistics expertise.'<sup>169</sup> In addition, repealing it would send the wrong message to Beijing about its human rights record and increase military-related exports to China, which could alter the cross-Taiwan Strait military balance.<sup>170</sup>

To date, the EU has retained the embargo—partly as a result of its displeasure with China's passage in March 2005 of the Anti-Secession Law authorizing use of force to prevent Taiwan from declaring independence, partly as a result of energetic diplomatic efforts by the Administration, and partly as a result of Congressional threats to enact legislation prohibiting European firms from participating in weapons systems projects with the United States or from being given access to U.S. leading-edge military technology.

The bottom line with respect to export controls is that while unilateral controls may delay acquisition of controlled goods and technologies by targeted nations, those delays are unlikely to be significant if a targeted nation is intent on acquisition and if other nations possess and are willing to provide the goods and technologies. As a corollary, export controls are likely to be substantially effective only if they are multilateral, if there are no notable sources of the controlled goods and technologies who choose to disregard the control, and if all possible source nations administer and enforce the restrictions with uniform effectiveness. While there are other

reasons a nation such as the United States may choose to impose unilateral export controls or embargos on a nation such as China, which may include a determination that such restrictions are morally necessary, no nation should do so in the belief that unilateral restrictions will significantly impede the targeted nation; that is very unlikely to be true unless the nation imposing controls is the sole source of the restricted goods and technologies.

### **SECTION 3: THE MILITARY BALANCE ACROSS THE TAIWAN STRAIT**

The Commission shall investigate and report on “REGIONAL ECONOMIC AND SECURITY IMPACTS—The triangular economic and security relationship among the United States, [Taiwan], and the People’s Republic of China (including the military modernization and force deployments of the People’s Republic of China aimed at [Taiwan]), the national budget of the People’s Republic of China, and the fiscal strength of the People’s Republic of China in relation to internal instability in the People’s Republic of China and the likelihood of the externalization of problems arising from such internal instability.”

#### **Key Findings**

- The cross-Strait military balance of power currently substantially favors the mainland. China possesses advanced aircraft, submarines, surface vessels, and ballistic missiles, in greater quantities and, in many cases, equal or greater sophistication than Taiwan’s. In an all-out conflict between the two, Taiwan, if relying only on its own capabilities, would be unable to prevent China from ultimately realizing its objectives.
- 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 People’s Liberation Army (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. However, the lack of an integrated command, control, computer, intelligence, surveillance, and reconnaissance (C4ISR) architecture currently precludes the PLA from effective joint targeting of a carrier battle group.<sup>171</sup>
- There is substantial agreement among experts that a “window of vulnerability” will exist between 2008 and 2015 for U.S. forces that likely would be involved if the United States made a decision to intervene militarily in a pre-conflict China-Taiwan crisis or in a China-Taiwan conflict. Many of the Chinese modernization programs focused on Taiwan, including weapons systems such as submarines, destroyers, cruise missiles, and maneuverable ballistic missiles, and advances in C4ISR and targeting, will be deployed around or soon after 2008, while some U.S. capabilities to defeat these advances, such as ballistic missile defenses,

littoral strike assets, and an integrated anti-submarine warfare network, probably will not become operational until approximately 2015. This will decrease the deterrent effect of the possibility of U.S. intervention in a China-Taiwan conflict, and will increase the cost to the United States of intervening.

- 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.
- Despite disagreement within the Legislative Yuan, the Taiwan government is committed to its own defense and is taking measures to improve its deterrent posture. It has begun development of an indigenous surface-to-surface missile and is seeking to purchase greater numbers of F-16 fighter aircraft from the United States.

China repeatedly has made it clear that the matter of Taiwan is an extremely high priority. It considers Taiwan to be “an inalienable part of China,” and steadfastly seeks to isolate Taiwan from the international community using political and economic means. The Chinese leadership also frequently reiterates its willingness to use military force against Taiwan if it perceives Taiwan to have moved too far toward independence. In March 2005, to the displeasure of much of the international community, the National People’s Congress enacted the Anti-Secession Law that codified the authority China claims to use force to counter any move by Taiwan toward separation or independence. China demonstrates its seriousness on this topic by maintaining and constantly improving and expanding its military capability to threaten Taiwan with blockade, strike, or invasion in order to deter or coerce Taiwan from seeking *de jure* independence, which continues to be one of China’s top strategic priorities. In its 2004 National Defense White Paper, the Chinese government asserts that “the separatist activities of the “Taiwan independence” forces have increasingly become the biggest immediate threat to China’s sovereignty and territorial integrity as well as peace and stability in ... the Asia-Pacific region as a whole.”<sup>172</sup>

### **The PLA Strategy**

In seeking to prevent Taiwan from moving toward or achieving independence, the PLA has developed a number of strategies and associated capabilities that will allow it to escalate the threat or actual degree of conflict as it sees fit. In addition to the physical threat created by this buildup, a component of the strategy is to influence Taiwan’s domestic politics. The first of these strategies is deterrence achieved by the threat of imposing unacceptable costs upon Taiwan. As early as the Taiwan Strait Crisis of 1995–1996,<sup>173</sup> the PLA’s strategic missile force, the Second Artillery, has deployed steadily increasing numbers of short- and medium-range ballistic missiles in the regions opposite Taiwan primarily as a means of intimidating Taiwan’s populace of 23 million. Independent consultant Mark Stokes explained in his March 2006 testimony to the Commission that “the most significant aspect of the missiles is political,

psychological, and strategic in nature ... [Their] primary purpose is to intimidate Taiwan's population, to prevent them from taking actions deemed to be inimical to Beijing's interests."<sup>174</sup> However, Mr. Stokes also notes that this build up has been going on for some time and should no longer be surprising.

The acquisition and development of advanced conventional and nuclear-powered attack submarines and advanced surface vessels constitutes a second component in this deterrence strategy. The PLA Navy currently operates more than two dozen advanced submarines of indigenous and Russian origin as well as dozens of older submarines that are easier to detect by sonar, but still very capable.<sup>175</sup> The PLA Navy also has been modernizing its fleet of surface combatants, and introduced destroyers and frigates in five different classes during the 2005-to-2006 period.<sup>176</sup> The threat these pose to Taiwan's navy and to regional commercial shipping—upon which Taiwan's economy depends—is very significant.

China's increasingly capable force of maritime and air force strike aircraft is a third and final component to this deterrence strategy. Within the PLA Air Force and Navy, the ratio of newer, advanced aircraft to older, 1950s-era models is steadily increasing. Newer systems are equipped with the sensors and targeting packages capable of launching cruise missiles and precision-guided bombs against land and sea-based targets.<sup>177</sup>

If the threat of force fails to deter Taiwan, the PLA is prepared to escalate tensions through the employment of a blockade or "sea-denial" strategy.<sup>178</sup> This could range in severity from a demonstration similar to that of the 1995–1996 Strait Crisis where missiles were fired into sea areas adjacent to Taiwanese ports, to the actual sinking of commercial vessels. The objective would be to reduce or even cut entirely commercial shipping to and from Taiwan in order to sever its economic lifeline. Such action would be "very, very detrimental to Taiwan's economy ..."<sup>179</sup>

Attack and invasion of Taiwan is the last and most severe strategic option for China. This scenario would most likely employ the full range of Chinese armed forces, with strikes by conventionally armed short- and medium-range ballistic missiles and by PLA Air Force and Navy aircraft, and with raids by special operations troops to "soften up" Taiwan for a full-scale amphibious and airborne assault.<sup>180</sup> PLA doctrine for such an operation stresses quick, decisive strikes on command and control nodes and other key facilities that would paralyze Taiwan's defenses and enable the insertion of a PLA force sufficiently large and capable to end the conflict on Beijing's terms before aid could arrive.<sup>181</sup>

In both the blockade and invasion scenarios, Chinese strategists believe that they will likely have to contend with U.S. intervention and perhaps that of the United States' treaty ally Japan in addition to Taiwan's own armed forces.<sup>182</sup> Thus the direction of much of China's military modernization has been driven by a strategy of "sea denial" to block or impede access to the immediate area surrounding Taiwan until Beijing's aims have been achieved. In his testimony to the Commission, Mr. Cortez Cooper of Hicks and Associates Inc. explains, "Beijing is focused on fielding modern destroyers, submarines, cruise missiles, and maritime strike aircraft to deter or prevent an adversary for a given period of time in or

above a critical sea lane or maritime zone of maneuver.”<sup>183</sup> According to Mr. Cooper, China’s current capabilities “could be quite effective in slowing U.S. response to a short, limited objective fight on China’s periphery.”<sup>184</sup> By 2008, China will have the capability to conduct credible short-term sea denial operations out to roughly 400 nautical miles. By 2010, it is projected it will be able to sustain such operations for a few weeks.<sup>185</sup>

### **PLA Force Modernization and Capabilities**

The direction of PLA modernization has, in large measure, been driven by planning for effecting a blockade of Taiwan and an anti-access campaign. In order to counter Taiwan’s armed forces, the PLA has developed a number of capabilities. The first of these is the growing short- and medium-range ballistic missile force. In his testimony before the Commission, Mr. Stokes stated, “the PRC’s growing arsenal of increasingly accurate and lethal conventional ballistic and land attack cruise missiles is a central aspect of Beijing’s strategy against Taiwan . . .”<sup>186</sup>

Since the Taiwan Strait Crisis in 1995–96, the Second Artillery has deployed a growing number of ballistic missiles across the Strait from Taiwan. Currently, the Second Artillery deploys 800 ballistic missiles opposite Taiwan in seven brigades, and is adding to this number at a rate of 100 per year.<sup>187</sup> However, the number of missile transporter-erector-launchers is actually a better threat indicator, as it provides “a more accurate reading of operational effectiveness in terms of raid size”—or the ability to overwhelm Taiwan’s missile defense architecture.<sup>188</sup> The seven missile artillery brigades opposite Taiwan (out of a PLA total estimated between 16 and 19)<sup>189</sup> currently possess 168 to 336 reusable launchers<sup>190</sup> capable of reloading every 45 minutes.<sup>191</sup>

It is reported that the PLA may be deploying surface-to-surface land attack cruise missiles to supplement the existing ballistic missile force. China may add as many as 200 DH-10<sup>192</sup> land attack cruise missiles to the areas opposite Taiwan by the end of 2006.<sup>193</sup>

Chinese missiles also are increasingly sophisticated, accurate, and capable. There are indications that a variety of warhead options may now be available, including runway-cratering submunitions, penetration warheads for hardened targets, and fuel air explosives.<sup>194</sup> There are also indications that China is researching electromagnetic pulse and radio-frequency warheads.<sup>195</sup> The former, if detonated at the proper altitude, could knock out much or all electricity and unprotected electronic systems on the island.<sup>196</sup>

China is expanding its airborne heavy-lift capabilities, and is showing increased interest in existing Russian aircraft. In September 2005, China agreed to purchase 32 Ilyushin IL-76 transports to supplement its existing inventory of 20. Each of these transports can carry three of China’s new airborne tanks.<sup>197</sup>

China is indigenously developing increasingly capable multi-role, ground attack and air superiority aircraft and is acquiring others from Russia. The J-10,<sup>198</sup> a multi-role indigenous aircraft in development for more than 15 years, is finally being produced in sizeable numbers.<sup>199</sup> It is widely speculated that the design of this air-

craft benefited from the cancelled Israeli *Lavi* program—which in turn was based, in large measure, on the U.S. F-16 design. Similarly, after even longer developmental delays, the JH-7A<sup>200</sup> ground attack aircraft now is being fielded to air units. Russian multi-role fighters, such as the Su-27SK/UBK, Su-30MKK, and Su-30MK2<sup>201</sup> equipped with anti-ship missiles and land attack cruise missiles, constitute a growing threat to Taiwan's defenses. Regarding air defense, the PLA Air Force now can threaten aircraft over Taiwan's airspace. The S-300PMU, an anti-aircraft surface-to-air missile acquired from Russia and deployed opposite Taiwan, can hold all aircraft in this region at risk, "denying the Taiwan Strait as an air defense buffer zone . . ." <sup>202</sup>

In addition to building a force designed to neutralize Taiwan's defenses, another key driver of PLA modernization is a desire to develop capabilities to support an anti-access strategy. China's planning assumption is that U.S. forces—possibly supplemented by the Japanese—will attempt to influence the outcome of a Taiwan conflict. The need to delay such a force and deny it access to the sea and air spaces adjacent to Taiwan until Beijing's strategic or military objectives have been achieved, is a high priority in the minds of Chinese strategists.

In his testimony before the Commission in March 2006, Mr. Cooper outlined two pillars of China's anti-access strategy. The first is its submarine force. While the PLA Navy currently operates more than two dozen older, conventional submarines, such as the *Ming* and *Romeo* classes, it also possesses a matching number of more modern, quiet boats.<sup>203</sup> The dozen *Kilo*-class conventional attack submarines purchased from Russia (11 of which have been delivered<sup>204</sup>) constitute the backbone of this force.<sup>205</sup> The newer version is capable of firing advanced land attack and anti-ship cruise missiles, and anti-submarine warfare rockets, in addition to its normal complement of torpedoes.<sup>206</sup> China's indigenous construction program is building four classes of submarines—ranking it first in the world in terms of the number of different types of boats in production simultaneously.<sup>207</sup> In the event of conflict, locating 80 to 90 percent of only half this fleet so it can be neutralized could take weeks, leaving it able to prey on naval forces allied with Taiwan and significantly slowing the arrival their aid.<sup>208</sup>

The second pillar is the surface force of destroyers and frigates. Chief among these is the *Sovremenny*-class destroyer with its supersonic anti-ship cruise missiles designed to defeat the U.S. Aegis defense system. Also in the PLA Navy's inventory are domestically-produced 052 destroyers equipped with an Aegis-like radar system and capable of providing air defense for a small squadron of ships. Looking toward the future, the PLA Navy is building eight new classes of indigenous destroyers and frigates,<sup>209</sup> among which is a destroyer to be equipped with a naval version of the very capable long-range S-300 air defense system.<sup>210</sup>

A third component of China's anti-access strategy, and one that remains more in the future, is China's C4ISR architecture. The ability to coordinate space, air, land, and sea-based assets in order to locate, track, and target the enemy is an essential component of modern warfare, the importance of which Chinese strategists understand. While China is making significant progress on develop-

ment of some individual systems, such as more advanced electro-optical and synthetic aperture radar satellites; Aegis-like air defense systems; shipborne helicopters with data links; unmanned aerial reconnaissance vehicles; over-the-horizon radars; and airborne early warning aircraft and fighters with limited airborne warning and control capability, the PLA's ability to integrate these systems remains limited and is unlikely to be achieved prior to 2012.<sup>211</sup> However, once this is achieved, these integrated systems will pose "a viable threat" to U.S. and Japanese command and control nodes, logistics assets, and forward deployed forces.<sup>212</sup>

It appears that China has not yet completed development of a ballistic missiles force capable of targeting ships at sea. However, development efforts are being pursued vigorously.<sup>213</sup> One of China's newest missiles under development, the DF-21C, may include a terminal guidance system, enabling it to defeat terminal missile defenses.<sup>214</sup> The successful deployment of this missile, and short range ballistic missiles with maneuvering re-entry vehicles, would constitute a fourth means of denying access to sea and air space surrounding Taiwan.<sup>215</sup>

Finally, the PLA is investing in deep-water anti-submarine warfare. This is a relatively inexpensive deterrent and provides a useful role for the older *Romeo* and *Ming*-class submarines.<sup>216</sup> The PLA is researching "a wide variety of applications via varied delivery and activation mechanisms," such as acoustically-activated and remote control technology.<sup>217</sup>

### **Taiwan's Armed Forces**

Taiwan continues to improve its own defenses in an effort to deter possible hostile action by China and to increase its ability to resist such action. It purchases most of its weapons systems and associated military equipment from the United States. During the past five years, highly publicized squabbling between the two principal political coalitions in Taiwan has resulted in a stalemate with respect to procurement of the items in a package of defensive major weapons systems or modernization projects for current systems that the United States first proposed Taiwan purchase in 2001. Mr. Stokes told the Commission that "the most significant implication is a perception in the United States that Taiwan is not investing sufficient resources in [its] defense. This is a misperception. Taiwan's actual defense spending is \$12 billion a year, not \$8 billion, [or] about 3.6 percent of GDP ...<sup>218</sup> [T]he fact is that Taiwan is committed to its defense."<sup>219</sup>

Over the last four years, Taiwan has spent \$1 billion on early warning and other defensive systems in order to minimize damage from a ballistic missile attack. It has invested in large UHF radar, tactical communications hardening to preserve command and control capabilities, and rapid runway repair to prevent the grounding of its air force.<sup>220</sup> In August 2006, it accepted delivery of its second pair of U.S.-built, *Kidd*-class destroyers. The backbone of Taiwan's ballistic missile defense is the batteries of Patriot Advanced Capability-2 missile interceptors. Taiwan's media indicate that Taiwan's military has invested in the development of its own indigenous active terminal missile defense interceptor, possibly as an alternative

to purchase of the U.S.-upgraded Patriot Advanced Capability-3 missile.<sup>221</sup>

Overall, it is undeniable that Taiwan possesses a numerically inferior mix of modern and obsolete weapons systems to counter Chinese forces. Taiwan's surface vessels include *Kidd*-class destroyers, *Perry*, *Knox*, and *Lafayette*-class frigates and a host of mine-sweeping and patrol craft. Its submarine fleet is very small and consists of only two, modern *Zwaardvis*-class, and two obsolete *Guppy*-class conventional boats, useful only for training.

To defend its airspace, Taiwan's frontline fighter aircraft include fourth-generation F-16s and Mirage 2000-5s, and the Ching-kuo Indigenous Defense Fighter. These are supplemented by older, less-capable F-5s.

In addition to its ground-based UHF early warning radar, Taiwan's air force also operates a handful of E-2 Hawkeye airborne early warning aircraft purchased from the United States, which constitute the airborne component of Taiwan's C4ISR architecture tasked to locate Chinese targets and vector Taiwan's fighters to them. The U.S. has also established operational links with Taiwan to provide early warning of Chinese ballistic missile launches.<sup>222</sup>

In order to deter China by holding targets on the mainland at risk, Taiwan is developing its own conventional missile force, including both land attack cruise missiles and a new generation of short-range ballistic missiles.<sup>223</sup>

As referenced above, political infighting in Taiwan has been the principal obstacle preventing the government from taking action on the components of the package of weapons systems and system modernizations approved for purchase by the Bush Administration in April 2001. These systems include P-3C Orion anti-submarine aircraft, conventional submarines, and Patriot Advanced Capability-3 anti-ballistic missile systems.<sup>224</sup> Each of these systems is designed to negate existing strengths in the PLA arsenal including submarines, surface vessels, and China's conventional ballistic missile force, respectively. Taiwan officials in both party coalitions told Commissioners visiting Taipei this summer that they intend to make progress on approving some features of this package before the end of the year, but as this report is being written in October, that does not appear probable. The failure of the Legislative Yuan to take action on the April 2001 package complicates the issue of U.S. arms sales to Taiwan. This was evidenced most recently by the Bush Administration's decision in October 2006 to reject Taiwan's request for additional F-16 fighter aircraft.<sup>225</sup>

### **Could Taiwan be Overrun?**

There is no consensus of expert observers on how rapidly and at what cost the PLA would be able to overcome Taiwan's defenses if China decided to launch an all-out assault. However, there certainly is a consensus that the military balance between the two tilts substantially toward the mainland.<sup>226</sup> Most experts also agree that while an assault would likely prove very costly for the mainland, China probably could achieve the strategic objective of political capitulation by Taiwan if the conflict were limited to the forces of China and Taiwan. This makes the question of whether the

United States, and possibly Japan, might intervene in a China-Taiwan conflict—and how, how vigorously, and how rapidly they would engage—of paramount importance in trying to predict the outcome.

### **Comparison of Chinese and U.S. Armed Forces**

Chinese strategists believe that the United States is likely to respond militarily on Taiwan's side in a China-Taiwan conflict. They believe that in such a case, one or more U.S. carrier battle groups might try to shield Taiwan from the Chinese attack and deprive the Chinese forces of the ability to achieve their objectives. Chinese strategists also understand that China does not possess the resources to compete with the United States in a force-on-force arms race.<sup>227</sup> Hence, in the short-term, they are focused primarily on one strategy—sea-denial—and developing capabilities that support this strategy. Ballistic missiles with terminal guidance, surface vessels with supersonic anti-ship cruise missiles, and attack submarines capable of launching cruise missiles while submerged constitute several layers of counter-carrier capability and would significantly affect the speed with which the United States could respond in a crisis.<sup>228</sup> Regarding the PLA Navy's submarine force, Mr. Cooper told the Commission, "In a protracted head-to-head fight [with the U.S. Navy], the PLA would lose these submarines; but they could be quite effective in slowing U.S. response to a short, limited objective fight on China's periphery."

However, the PLA is still bound by significant limitations, principally in the areas of anti-submarine warfare<sup>229</sup> and C4ISR integration. The PLA is attempting to remedy its C4ISR shortfall by developing indigenous and procuring foreign systems, but it currently lacks the architecture and systems integration required for precision strikes necessary to attack and sink an aircraft carrier.<sup>230</sup>

If the PLA can sustain its pace of modernization, in the next decade it is likely to introduce greater numbers of quieter, more lethal nuclear submarines, and conventional submarines equipped with air-independent propulsion allowing for longer submergence; more advanced fighter, ground-attack, airborne early warning, air-to-air refueling, and heavy lift aircraft; ballistic missiles with terminal guidance; and perhaps one or two aircraft carriers<sup>231</sup> or air capable ships.<sup>232</sup> The PLA also is likely to improve its deep-water anti-submarine mining capabilities and perhaps acquire strategic bombers from Russia.<sup>233</sup> Significantly, the PLA also is likely to develop and operationalize an integrated C4ISR architecture capable of joint targeting.

U.S. armed forces arguably are the best equipped in the world by most measures. The Aegis radar air defense system on U.S. surface vessels, *Seawolf*- and *Virginia*-class nuclear submarines, space-based assets, and airborne early warning aircraft, among other systems, continue to be "the gold standard" in their respective categories. U.S. joint targeting and precision-strike capabilities are unmatched, made possible by an integrated C4ISR architecture connecting aircraft, ships, satellites, and ground forces through a variety of data links.

U.S. armed forces are seeking to develop and implement enhanced littoral operations, effective theater ballistic missile defense capability, an integrated anti-submarine network, and cutting edge air superiority and ground attack aircraft. For example, the introduction of the littoral combat ship and the *Zumwalt*-class DDG1000 will provide the U.S. Navy with a stealthy force capable of sophisticated anti-submarine warfare and fire-support operations. Fielding the F/A-22 air superiority fighter and the F-35 Joint Strike Fighter, with their stealth, range, and maneuverability, will substantially increase the lethality of air and ground attack operations.

The trends in both Chinese and U.S. armed forces weapons and ancillary systems development and the projected deployment dates for these systems reveal a window of vulnerability<sup>234</sup> for the United States between 2008 and 2015. Many Chinese modernization programs focused on Taiwan, such as submarines, destroyers, and cruise and maneuverable ballistic missiles, will be deployed around 2008, while some U.S. capabilities to defeat a Chinese anti-access strategy, such as ballistic missile defenses, littoral strike assets, and an integrated anti-submarine warfare network, may not be ready for deployment until 2015.<sup>235</sup>

## RECOMMENDATIONS

### *China's Military Modernization*

- The Commission recommends that Congress direct the Administration to engage in a strategic dialogue with China on the importance of space surveillance, the military use of space, and space weapons. Such a dialogue should include strategic warning and verification measures.
- The Commission recommends that Congress instruct the Director of National Intelligence, working with the Department of Defense, to formulate and establish a more effective program for assessing the nature, extent, and strategic and tactical implications of China's military modernization and development.
- The Commission recommends that Congress require the Department of Defense to include in its annual report to Congress on China's military power an assessment of U.S. weapons systems, force structure, basing, doctrine, and tactics in order to maintain a favorable balance of military power in the region and to ensure U.S. forces will prevail as rapidly and effectively as possible in the event of a conflict with the Chinese military over Taiwan or other interests in the Asia-Pacific region.

### *U.S. Export Controls*

- The Commission recommends that Congress enact a new Export Administration Act to clarify U.S. export control policy and the U.S. approach to multilateral export control regimes. The new legislation should take into account new and emerging national security threats, unique U.S. technological advances, and global trade developments since the expired Export Administration Act was enacted in 1979. It also should establish strengthened penalties against violators.

- The Commission further recommends that Congress encourage the Administration, as it reviews U.S. export controls aimed at China, to engage in substantive discussions with U.S. companies and business groups with the objective of avoiding the imposition of unnecessary export burdens that do not appreciably enhance U.S. security interests.
- The Commission recommends that Congress urge the Administration to engage in more vigorous diplomatic activity at high levels in order to obtain multilateral cooperation necessary for effective global export controls.
- The Commission recommends that Congress provide adequate funding to support an increase in the number of initial and periodic follow-up end-use/end-user verification visits for exports licensed to China and Hong Kong. This should include increasing the number of qualified, Mandarin-speaking export control officers stationed in China and Hong Kong.
- The Commission recommends that Congress encourage the Administration to discuss with key allies the establishment of a multilateral arrangement to ensure post-shipment verification of the status of certain sensitive technologies exported to China.

*Military Balance Across the Taiwan Strait*

- The Commission recommends that Congress urge the Administration to encourage Taiwan's Legislative Yuan to approve the purchase of the remaining components of the arms package offered by the United States in April 2001, or alternative systems that will enhance Taiwan's defense capability, and that additional arms requests from Taiwan be considered by the U.S. government on their merits.

*Protection of Government Computers from Espionage*

- The Commission recommends that Congress examine the federal procurement process to ensure that all agencies consider security measures when purchasing computers.

**ENDNOTES**

1. U.S. Department of Defense, *Quadrennial Defense Review Report*, (Washington, DC: February 6, 2006), p. 29.

2. U.S. Department of Defense, *Quadrennial Defense Review Report*, (Washington, DC: February 6, 2006), p. 29. Assistant Secretary of Defense Peter Rodman explained to the Commission that China's modernization effort "has implications not only for the military balance in the Taiwan Strait, but for the balance in the Asia-Pacific region as well." U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Peter Rodman, March 16, 2006,.

3. China uses the term "People's Liberation Army" to refer to its combined Army, Navy, Air Force and Strategic Rocket Forces. For the purposes of this section, the terms "ground forces or Army," "Navy," "Air Force," or "Second Artillery", respectively, will be used to distinguish single service branches from the entire armed forces.

4. House Armed Services Committee, *Hearing on the Military Power of the People's Republic of China*, testimony of Peter Rodman, June 22, 2006.

5. U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. 1.

6. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Peter Rodman, March 16, 2006.

7. Taiwan Relations Act, Public Law 98-6, 96th Congress, (April 10, 1979), Sec. 2 (5) (6).
8. U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. 37.
9. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006.
10. Eric McVadon, "China's Maturing Navy," *Naval War College Review*, vol. 59, no. 2 (Spring 2006).
11. U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. 11.
12. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Peter Rodman, March 16, 2006.
13. U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. 7.
14. "Increased dependence on overseas resources will bring Beijing to require a greater effort by Chinese naval forces to protect the trade flows and show the flag in ports of countries that are considered important trading partners." Giuseppe Anzera. "The Modernization of the Chinese Navy," *Power and Interest News Report*, September 12, 2005. See also U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. 15.
15. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006.
16. "In the near term, Beijing's efforts to build a navy able to satisfy... maritime security concerns focus on Taiwan; in the mid-term, they include the disputes with Japan over natural gas deposits in the East China Seabed and with the claimants to South China Sea territories." National Defense University, *Conference on China's Global Activism: Implications for U.S. Security Interests*, remarks of Bernard Cole, June 20, 2006, p. 3.
17. Quote from Quadrennial Defense Review cited in U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Peter Rodman, March 16, 2006.
18. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Peter Rodman, March 16, 2006.
19. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Peter Rodman, March 16, 2006.
20. High level U.S. Government officials continually have urged Beijing to be more transparent in its military activities. For example, when meeting with senior Asia-Pacific defense officials earlier this year in Singapore, Secretary of Defense Donald Rumsfeld noted that "there are aspects of China's actions that can complicate their relationships with other nations. The lack of transparency with respect to their military investments understandably causes concerns for some of its neighbors." Ralph Cossa, "A Subtler China Policy?," *The International Herald Tribune*, June 9, 2006, p. 7. In March 2006, Secretary of State Condoleezza Rice expressed concern over China's military modernization and said, "We've told the Chinese that they need to be transparent about what their military buildup means." David Gollust, "Rice Urges Chinese Transparency on Defense Plans," *The Voice of America News*, March 16, 2006.
21. U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. I.
22. U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. I.
23. U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. 14.
24. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Jacqueline Newmyer, March 16, 2006.
25. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Jacqueline Newmyer, March 16, 2006.
26. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Peter Rodman, March 16, 2006.

27. For more on military-to-military contacts, see Shirley A. Kan, *U.S.-China Military Contacts: Issues for Congress*, (Congressional Research Service, Washington, DC: June 30, 2006).

28. Edward Cody, "U.S. Aims to Improve Military Ties With China," *The Washington Post*, May 16, 2006, p. A-14.

29. House Armed Services Committee, *Hearing on The Military Power of the People's Republic of China*, testimony of Peter Rodman, June 22, 2006.

30. Edward Cody, "U.S. Aims to Improve Military Ties With China," *The Washington Post*, May 16, 2006, p. A-14.

31. "China, U.S. Hold Military Talks Following Heated Exchanges," *Agence France-Presse*, June 9, 2006.

32. Rear Admiral Zhang Leiyou led the Chinese delegation and said "The visit helped China obtain a better understanding of U.S. weapons, training, skills and exercise arrangements." Christopher Bodeen, "Chinese Officers Claim Appreciation of U.S. Weapons and Tactics From Wargames Observation," *Associated Press*, June 22, 2006.

33. Shirley A. Kan, *U.S.-China Military Contacts: Issues for Congress*, (Congressional Research Service, Washington, DC: June 30, 2006), p. 61.

34. "China, US agree to further military coop," *China Daily*, July 19, 2006. [www.chinadaily.com.cn/china/2006-07/19/content\\_644838.htm](http://www.chinadaily.com.cn/china/2006-07/19/content_644838.htm).

35. Shirley A. Kan, *U.S.-China Military Contacts: Issues for Congress*, (Congressional Research Service, Washington, DC: June 30, 2006), pp. 17-18.

36. "China Launches North Sword 2005 War Exercises," *Renmin Ribao (People's Daily)*, September 28, 2005.

37. International Institute for Strategic Studies, *The Military Balance, 2005-2006*, (Routledge, London: 2006), p. 249. See also "China's Defense Budget to Increase 14.7% in 2006," *Xinhua*, March 5, 2006. [english.people.com.cn/200603/05/eng20060305\\_247883.html](http://english.people.com.cn/200603/05/eng20060305_247883.html). See also U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Peter Rodman, March 16, 2006. U.S. dollar amount based upon an exchange rate of 8 RMB = \$1.

38. International Institute for Strategic Studies, *The Military Balance, 2005-2006*, (Routledge, London: 2006), p. 252.

39. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Peter Rodman, March 16, 2006.

40. U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. 20. The Report also notes that "[w]hile the United States has long urged China to increase transparency in reporting military budgets and expenditures, to date Beijing has only provided a highly aggregated breakout of maintenance and operations, personnel, and equipment roughly defined as equal shares in its Defense White Papers."

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44. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Richard Bitzinger, March 16, 2006.

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47. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Adam Segal, March 16, 2006.

48. Cheung Tai Ming, "Chinese Defense Industrial Reform and the Navy," *The Jamestown Foundation China Brief*, February 25, 2005. See also U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Roger Cliff, March 16, 2006.

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50. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006.
51. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006. See also U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. 30—"The PLA has shifted from point defense of key military, industrial, and political targets to a new Joint Anti-Air Raid Campaign doctrine based on a modern, integrated air defense system capable of effective offensive counter-air (OCA) and defensive counter-air (DCA). Under this doctrine, the PLA will use aircraft, surface-to-air missiles, long-range artillery, special operations forces, naval forces, and guerrilla units to destroy and enemy's ability to conduct offensive air operations and provide defense of PRC airspace."
52. U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. 4.
53. Keith Crane, et al., *Modernizing China's Military — Opportunities and Constraints*, (RAND Corporation, Santa Monica, CA: 2005), p. 176.
54. "J-XX 4th Generation Fighter Aircraft," *Chinese Defence Today*, updated June 2, 2006. [www.sinodefence.com/airforce/fighter/jxx.asp](http://www.sinodefence.com/airforce/fighter/jxx.asp). See also U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Richard Fisher, March 16, 2006.
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56. U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. 4.
57. U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. 4. In October 2006, Russian sources confirmed negotiations over China's purchase of Su-33 aircraft. This aircraft is similar to the Su-27 but configured for carrier operations. See "China to Buy Su-33 Fighter from Russia," *Chinese Defence Today*, updated October 24, 2005. [www.sinodefence.com/news/2006/news06-10-24.asp](http://www.sinodefence.com/news/2006/news06-10-24.asp).
58. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Bernard Cole, March 16, 2006.
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61. U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006).
62. U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006).
63. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006.
64. "Jane's World Armies: China," *Jane's Online*, updated June 14, 2006. [www.janes.com.arugula.cc.columbia.edu](http://www.janes.com.arugula.cc.columbia.edu).
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73. International Institute for Strategic Studies, *The Military Balance, 2005–2006*, (Routledge, London: 2006), p. 265
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93. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006.
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95. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006.

96. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006.

97. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006.

98. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006.

99. House Armed Services Committee, *Hearing on The Military Power of the People's Republic of China*, testimony of Peter Rodman, June 22, 2006.

100. U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. 32.

101. U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. 32.

102. House Armed Services Committee, *Hearing on The Military Power of the People's Republic of China*, testimony of Peter Rodman, June 22, 2006.

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104. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Peter Rodman, March 16, 2006. See also U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. 26.

105. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Peter Rodman, March 16, 2006. According to the Pentagon, these three missiles all will have initial operating capacity (IOC) within the next four years: DF-31 (IOC in 2006), DF-31A (IOC in 2007) and the JL-2. (IOC in 2007–2010). U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. 27.

106. U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. 27.

107. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Peter Rodman, March 16, 2006.

108. Wendell Minnick, "China Speeds ICBM Plans, To Debut Missiles With Longer Reach in 2007," *DefenseNews*, July 10, 2006, p. 1. See also U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. 27.

109. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Mark Stokes, March 16, 2006. See also Keith Crane, et al., *Modernizing China's Military — Opportunities and Constraints*, (RAND Corporation, Santa Monica, CA: 2005), p. 185— "China's solid-fuel conventional ballistic missiles are increasingly reliable and accurate and have become a central element of some of the PLA's options in a Taiwan scenario."

110. House Armed Services Committee, *Hearing on The Military Power of the People's Republic of China*, testimony of Peter Rodman, June 22, 2006.

111. U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. 29.

112. U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. 29.

113. U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. 29.

114. U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. 29.

115. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006.

116. Joe McDonald, "China Shows Off Secretive Space Program," *The Associated Press*, July 4, 2006.
117. *China's Space Program — Civilian, Commercial, & Military Aspects*, (CNA Conference Report, Alexandria, VA: May 2006), pp. 11–12.
118. U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. 33.
119. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Peter Rodman, March 16, 2006.
120. Vago Muradian, "China Tried To Blind U.S. Sats with Laser," *DefenseNews*, September 25, 2006, p. 1.
121. U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. 32.
122. "The Chinese believe that creating local and momentary momentum (especially air and information superiority) in a regional clash will allow them to defeat a more advanced adversary's plan and bring conflict to a close under Beijing's terms ... The Chinese seek to deprive an adversary of the ability to use operational and technical superiority to control strategic outcomes." U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006.
123. Dawn S. Onley and Patience Wait, "Red Storm Rising," *Government Computer News*, August 21, 2006.
124. Gregg Keizer, "Chinese Hackers Hit Commerce Department," *Information Week*, October 6, 2006. [www.informationweek.com/management/showArticle.jhtml?articleID=193105227&subSection=Global](http://www.informationweek.com/management/showArticle.jhtml?articleID=193105227&subSection=Global).
125. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Peter Rodman, March 16, 2006. See also U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Adam Segal, March 16, 2006.—"Chinese policy makers are working to ensure that the civilian economy makes a more direct contribution to defense modernization."
126. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Peter Rodman, March 16, 2006. See also U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), pp. 35–36.
127. U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. 36.
128. Dawn S. Onley and Patience Wait, "Red Storm Rising," *Government Computer News*, August 21, 2006.
129. "Mobile Command Post," *Chinese Defence Today*, updated May 10, 2006. [www.sinodefence.com/c4i/c4isr/mobilecommand.asp](http://www.sinodefence.com/c4i/c4isr/mobilecommand.asp).
130. Subcommittee on Immigration, Border Security and Claims, House of Representatives, *Continuation of Unclassified Portion of Oversight Hearing on: "Sources and Methods of Foreign Nationals Engaged in Economic and Military Espionage,"* testimony of Larry M. Wortzel, September 15, 2005.
131. Subcommittee on Immigration, Border Security and Claims, House of Representatives, *Continuation of Unclassified Portion of Oversight Hearing on: "Sources and Methods of Foreign Nationals Engaged in Economic and Military Espionage,"* testimony of Larry M. Wortzel, September 15, 2005. "In 2003, for example, the State Department granted about 27,000 visas to Chinese 'specialty workers,' the H1-B visa ... In 2003, there were about 55,000 student visas granted to Chinese students."
132. Peter Grier, "Spy case patterns the Chinese style of espionage," *The Christian Science Monitor*, November 30, 2005.
133. H.G. Reza, "Pair Are Indicted in Chinese Spy Case," *Los Angeles Times*, June 8, 2006. See also Peter Grier, "Spy case patterns the Chinese style of espionage," *The Christian Science Monitor*, November 30, 2005.
134. Bill Gertz, "Ex-DIA analyst admits passing secrets to China," *The Washington Times*, June 23, 2006. See also Bill Gertz, "Friends rallying to defend DIA spy," *The Washington Times*, July 5, 2006.
135. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Beth McCormick, March 17, 2006.
136. Center for Strategic and International Studies, *Discussion on Win-Win High Technology Trade With China*, remarks of Under Secretary of Commerce David McCormick, June 9, 2006, p. 4. [www.bis.doc.gov/News/2006/McCormick06-9-06.htm](http://www.bis.doc.gov/News/2006/McCormick06-9-06.htm).

137. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Darryl Jackson, March 17, 2006.

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141. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Darryl Jackson, March 17, 2006.

142. Center for Strategic and International Studies, *Discussion on Win-Win High Technology Trade With China*, remarks of Under Secretary of Commerce David McCormick, June 9, 2006, p. 1. [www.bis.doc.gov/News/2006/McCormick06-9-06.htm](http://www.bis.doc.gov/News/2006/McCormick06-9-06.htm).

143. “China Seeks Reduced U.S. Export Controls,” *The Associated Press*, June 27, 2006.

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145. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Francis Record, March 17, 2006. See also U.S. Department of Commerce, Office of Inspector General, *U.S. Dual-Use Export Controls for China Need to Be Strengthened*, (Washington, DC: March 2006), p. 3.

146. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Senator Michael Enzi, March 17, 2006.

147. For more on the Export Administration Act, see Ian Ferguson, et al., *Export Administration Act of 1979 Reauthorization*, (Congressional Research Service, Washington, DC: January 2, 2003).

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149. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Edmund Rice, March 17, 2006.

150. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Edmund Rice, March 17, 2006.

151. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Edmund Rice, March 17, 2006.

152. Center for Strategic and International Studies, *Discussion on Win-Win High Technology Trade With China*, remarks of Under Secretary of Commerce David McCormick, June 9, 2006, p. 4. [www.bis.doc.gov/News/2006/McCormick06-9-06.htm](http://www.bis.doc.gov/News/2006/McCormick06-9-06.htm). See also U.S. Department of Commerce, Office of Inspector General, *U.S. Dual-Use Export Controls for China Need to Be Strengthened*, (Washington, DC: March 2006), p. 17.

153. Center for Strategic and International Studies, *Discussion on Win-Win High Technology Trade With China*, remarks of Under Secretary of Commerce David McCormick, June 9, 2006, p. 4. [www.bis.doc.gov/News/2006/McCormick06-9-06.htm](http://www.bis.doc.gov/News/2006/McCormick06-9-06.htm).

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156. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Darryl Jackson, March 17, 2006.

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160. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Edmund Rice, March 17, 2006.

161. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Christopher Hankin, March 17, 2006.

162. "Introduction," *The Wassenaar Arrangement*. [www.wassenaar.org/introduction/print\\_intro.html](http://www.wassenaar.org/introduction/print_intro.html).

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166. "The European Arms Embargo On China," *The Stockholm International Peace Research Institute*, March 2004. [www.sipri.org/contents/expcon/euchiemb.html](http://www.sipri.org/contents/expcon/euchiemb.html).

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168. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Francis Record, March 17, 2006.

169. U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. 23.

170. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Francis Record, March 17, 2006.

171. For more information on Chinese use of network-centric warfare to attack carrier battle groups, see Zhang Kaide and Zhao Shubin, "shimin Daji Zhihui Kongzhi Jishu Chutan" ("The Command and Control Technology of Time Critical Strikes"), *Zhihui Kongzhi yu Fangzhen (Command and Control Simulation)* 28, No. 2 (April 2006), pp. 1–5. See also Nie Yubao, "Daji Haishang Di Da Jian Jianting Biandui de Dianzi Zhan Zhanfa" ("Current Methods for Electronic Warfare Attacks on Heavily Fortified Naval Formations"), *Wo Jun Xinxu Zhan Wenti Yanjiu (Research on Questions about Information Warfare)*, (National Defense University Press, Beijing: 1999).

172. State Council Information Office, *China's National Defense in 2004*, (People's Republic of China: 2004), p. 3.

173. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Mark Stokes, March 16, 2006.

174. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Mark Stokes, March 16, 2006.

175. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006.

176. The types of surface combatants introduced during this period include 956EM *Sovremenny*-, Type 052B *Luyang I*, and Type 052C *Luyang II*-class destroyers, and the Type 054 *Jiangkai*-, Type 053H3 *Jiangwei II*-class frigates. A fourth

class of destroyer, the Type 051C *Luzhou*, has been launched and is expected to enter service by the end of 2006. See Ronald O'Rourke, *China Naval Modernization: Implications for U.S. Naval Capabilities—Background and Issues for Congress*, (Congressional Research Service, Washington DC: November 18, 2005). See also "Naval Ships," *Chinese Defence Today*, October 26, 2006. [www.sinodefence.com/navy/default.asp](http://www.sinodefence.com/navy/default.asp).

177. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Richard Fisher, March 16, 2006.

178. U.S. Navy RADM Michael McDevitt (ret), defines "sea denial" as the capability to temporarily deny a maritime area to an enemy, "with the recognition that control will be contested, and that neither side has complete freedom to use the sea as it wishes." In contrast, "sea control" describes a state in which one side has the means to deny an area to its enemy for as long as it wishes and can use the area "at [its] pleasure while an opponent cannot." McDevitt also notes that dominance of the airspace above the water in question is a key component of sea control.

179. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006.

180. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Mark Stokes, March 16, 2006.

181. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006.

182. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006.

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185. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006.

186. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Mark Stokes, March 16, 2006.

187. House Armed Services Committee, *Hearing on The Military Power of the People's Republic of China*, testimony of Peter Rodman, June 22, 2006.

188. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Mark Stokes, March 16, 2006.

189. Kenneth Allen and Maryanne Kivlehan-Wise, "Implementing PLA Second Artillery Doctrine Reforms," *China's Revolution in Doctrinal Affairs: Emerging Trends in the Operational Art of the Chinese People's Liberation Army*, (Center for Naval Analyses, Alexandria, VA: November 2005), p. 175.

190. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Mark Stokes, March 16, 2006.

191. Kenneth Allen and Maryanne Kivlehan-Wise, "Implementing PLA Second Artillery Doctrine Reforms," *China's Revolution in Doctrinal Affairs: Emerging Trends in the Operational Art of the Chinese People's Liberation Army*, (Center for Naval Analyses, Alexandria, VA: November 2005), p. 159.

192. The Donghai-10 (DH-10) is a ground-launched, second generation land attack cruise missile with a range of more than 1,500 km. Its guidance system permits a circular error probable of 10 meters. See Wendell Minnick, "China Tests New Land-Attack Cruise Missile," *Jane's Missiles and Rockets*, September 21, 2004.

193. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Mark Stokes, March 16, 2006.

194. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Mark Stokes, March 16, 2006.

195. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Mark Stokes, March 16, 2006.

196. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Mark Stokes, March 16, 2006.

197. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Richard Fisher, March 16, 2006.

198. The Jian-10 (J-10) is an advanced, multi-role fighter aircraft reported to be similar in weight and performance to the Eurofighter Typhoon or Dassault Rafale. See U.S. Department of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, (Washington, DC: May 2006), p. 4.

199. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Richard Fisher, March 16, 2006.

200. The JianHong-7A (JH-7A) is a ground-attack aircraft similar to the Vietnam-era MiG-21 Fishbed in terms of performance, but with upgraded avionics and weapons systems. See Ronald O'Rourke, *China Naval Modernization: Implications for U.S. Naval Capabilities—Background and Issues for Congress*, (Congressional Research Service, Washington DC: November 18, 2005), p. 66.

201. The roughly 400 Sukhoi aircraft purchased from Russia constitute the most lethal component of China's air force. The Su-27SK/UBK (also known as the "Jian-11" [J-11] for those versions built under license by China) has performance capabilities thought to equal or surpass those of the F-15C. See *Chinese Defence Today*, October 19, 2006. [www.sinodefence.com/airforce/fighter/su27.asp](http://www.sinodefence.com/airforce/fighter/su27.asp). The Su-30 is an improved, multi-role version of the Su-27 and is considered roughly comparable to the US Air Force F-15E Strike Eagle in terms of performance and capability. The "MKK" designation denotes this model as modified for export to China. The maritime version of this aircraft, the Su-30MK2, is equipped to carry the Kh-31A supersonic anti-ship missile and is capable of tasking and controlling up to 10 other aircraft through a common communications net. See *Chinese Defence Today*, October 19, 2006. [www.sinodefence.com/airforce/fighter/su30.asp](http://www.sinodefence.com/airforce/fighter/su30.asp).

202. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Richard Fisher, March 16, 2006.

203. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006.

204. "Project 877EKM/636 Kilo Class Diesel-Electric Submarine," *Chinese Defence Today*, updated December 25, 2005. [www.sinodefence.com/navy/sub/kilo.asp](http://www.sinodefence.com/navy/sub/kilo.asp).

205. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006.

206. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006.

207. The Heritage Foundation, *A New Look at China's Military*, (Washington, DC: June 7, 2006).

208. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Bernard Cole, March 16, 2006.

209. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006.

210. "Type 051C (Luzhou Class) Guided Missile Destroyer," *Chinese Defence Today*, updated June 18, 2006. [www.sinodefence.com/navy/surface/type051cluzhou.asp](http://www.sinodefence.com/navy/surface/type051cluzhou.asp).

211. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006.

212. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006.

213. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006. See also, Ted Parsons, "China Develops Anti-ship Missile," *Jane's Defence Weekly*, January 18, 2006.

214. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Mark Stokes, March 16, 2006.
215. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Mark Stokes, March 16, 2006.
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217. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006.
218. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Mark Stokes, March 16, 2006.
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220. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Mark Stokes, March 16, 2006.
221. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Mark Stokes, March 16, 2006.
222. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Mark Stokes, March 16, 2006.
223. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Mark Stokes, March 16, 2006.
224. "Taiwan Takes Delivery of Last Two of Four Destroyers," *Deutsche Presse-Agentur*, August 25, 2006.
225. Richard Dobson, "U.S. Suspends F-16 Sale to Taiwan over Budget Delay," *Reuters*, October 3, 2006.
226. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Richard Fisher, March 16, 2006.
227. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006.
228. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Bernard Cole, March 16, 2006.
229. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006.
230. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Cortez Cooper, March 16, 2006.
231. U.S.-China Economic and Security Review Commission, *Hearing on China's Military Modernization and U.S. Export Controls*, testimony of Bernard Cole, March 16, 2006.
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