Chinese Military Power 2009	Chinese Military Power 2010
Military Strategy and Doctrine ***Space Warfare.*** PLA strategists see space as central to enabling modern informatized warfare; indeed, a 2003 analytic article in the PLA's leading journal was entitled "Control of Space is Decisive in Modern High-Tech Informatized Warfare." That said, China does not appear to have a dedicated space campaign; rather, space operations form an integral component of all campaigns. The PLA's military theoretical journal *China Military Science* argues that "it is in space that information age warfare will come into its more intensive points." Specifically, space-based Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) is important to enable and coordinate joint operations and win modern wars. Accordingly, the PLA is acquiring technologies to improve China's space-based C4ISR. A PLA analysis of U.S. and Coalition military operations reinforced the importance of operations in space to enable informatized warfare, claiming that "space is the commanding point for the information battlefield. Battlefield monitor and control, information communications, navigation and position, and precision guidance all rely on satellites and other sensors." Concurrently, China is developing the ability to attack an adversary's space assets. PLA writings emphasize the necessity of "destroying, damaging, and interfering with the enemy's reconnaissance/observation and communications satellites," suggesting that such systems, as well as navigation and early warning satellites, could be among initial targets of attack to "blind and deafen the enemy." The same PLA analysis of U.S. and Coalition military operations also states that "destroying or capturing satellites and other sensors … will deprive the opponents of initiatives on the battlefield and [make it difficult] for them to	**Military Strategy and Doctrine** ***Space Warfare.*** PLA strategists see space as central to enabling modern informatized warfare, but PLA doctrine does not appear to contemplate space operations as an operational "campaign" on its own; rather, space operations form an integral component of all campaigns. The PLA's military theoretical journal *China Military Science* argues that "it is in space that information age warfare will come into its more intensive points." Specifically, space-based communications, intelligence, and navigational systems are important to enable and coordinate joint operations and win modern wars. Accordingly, the PLA is acquiring technologies to improve China's space capabilities. A PLA analysis of U.S. and Coalition military operations reinforced the importance of operations in space to enable informatized warfare, claiming that "space is the commanding point for the information battlefield. Battlefield monitor and control, information communications, navigation and position, and precision guidance all rely on satellites and other sensors." Concurrently, China is developing the ability to attack an adversary's space assets, accelerating the militarization of space. PLA writings emphasize the necessity of "destroying, damaging, and interfering with the enemy's reconnaissance ... and communications satellites," suggesting that such systems, as well as navigation and early warning satellites, could be among initial targets of attack to "blind and deafen the enemy." The same PLA analysis of U.S. and Coalition military operations also states that "destroying or capturing satellites and other sensors … will deprive the opponents of initiatives on the battlefield and [make it difficult] for them to bring their precision guided weapons into full play."

bring their precision guided weapons into full play." PRC military writings also discuss the importance of space warfare for its supposed psychological impact on the will of the adversary to fight. In a PLA National Defense University book, *Joint Space War Campaigns* (2005), author Colonel Yuan Zelu writes: *"[The] goal of a space shock and awe strike is [to] deter the enemy, not to provoke the enemy into combat. For this reason, the objectives selected for strike must be few and precise … [for example], on important information sources, command and control centers, communications hubs, and other objectives. This will shake the structure of the opponent's operational system of organization and will create huge psychological impact on the opponent's policymakers."* The January 2007 test of a direct ascent anti-satellite (ASAT) weapon demonstrates that the PLA's interest in counterspace systems is more than theoretical. In addition to the "kinetic kill" capability demonstrated by the ASAT test, the PLA is developing the ability to jam, blind, or otherwise disable satellites and their terrestrial support infrastructure.	
Strategic Capabilities ***Space and Counterspace.*** China's space activities and capabilities, including ASAT programs, have significant implications for anti-access/area-denial in Taiwan Strait contingencies and beyond. Many of China's space programs, including the manned program and the planned space station, are run by the PLA. China views the development of space and counterspace capabilities as bolstering national prestige and, like nuclear weapons, demonstrating the attributes of a great power. ***Reconnaissance***: China is deploying advanced imagery, reconnaissance, and Earth resource systems with military applications. Examples include the Yaogan-1, -2, -3, -4, and -5, the Haiyang-1B, the CBERS-2 and -2B satellites,	**Strategic Capabilities** ***Space and Counterspace.*** China's space activities and capabilities, including ASAT programs, have significant implications for anti-access/area-denial in Taiwan Strait contingencies and beyond. Many of China's non-military space programs, including the manned program and the planned space station, are run by the PLA. ***Reconnaissance:*** China is deploying imagery, reconnaissance, and Earth resource systems with military utility. Examples include the Yaogan-1, -2, -3, -4, -5, and -6, the Haiyang-1B, the CBERS-2B satellite, and the Huanjing disaster/environmental monitoring satellite constellation. China is planning eight satellites in the Huanjing program that are capable of

and the Huanjing disaster/environmental monitoring satellite constellation. China is planning eight satellites in the Huanjing program that are capable of visible, infrared, multi-spectral, and synthetic aperture radar imaging. In the next decade, as Beijing fields a more robust constellation of reconnaissance satellites, it probably will employ commercial satellite imagery to supplement existing coverage. ***Navigation and Timing***: China is pursuing multiple possibilities for satellite navigation independence. Currently, the PRC uses the U.S. global positioning system (GPS), Russia's GLONASS, and its own BeiDou-1 (regional) systems for navigation. The BeiDou-1 system consists of three satellites and serves both civil and military purposes. The Beidou-1 system will be replaced by a BeiDou-2 system (expected to be operational in 2011) that will become a regional complement to the worldwide BeiDou-2/Compass system expected to be operational in 2015-2020. ***Manned Space and Lunar Programs***: China successfully performed its first space walk in September 2008 from the Shenzhou-VII, which was preceded by the October 2007 launch of its first lunar orbiter, the Chang'e-1. China's goals are to have a manned space station and to conduct an unmanned lunar landing and return mission by 2020. The manned space program probably benefits PLA weapons development programs. Rocket and control system capabilities required for the Shenzhou-VII mission may have applications for ballistic missile development. During its mission, the Shenzhou-VII deployed the Banxing-1 (BX-1), a small imaging satellite, which successfully positioned itself into an orbit around the orbital module. The stated purpose of this technology is to monitor instrumentation in space and detect malfunctions. Further applications could support counterspace activities. ***Communications***: China uses commercial, consortium, and civil communications	visible, infrared, multi-spectral, and synthetic aperture radar imaging. In the next decade, even as Beijing fields a larger and more capable array of reconnaissance satellites, it probably will continue to employ commercial satellite imagery to supplement its coverage. China currently accesses high-resolution, electrooptical and synthetic aperture radar commercial imagery from all of the major providers including Spot Image (Europe), Infoterra (Europe), MDA (Canada), Antrix (India), GeoEye (United States), and Digital Globe (United States). ***Manned Space:*** China's most recent manned mission, Shenzhou-7, launched on September 25, 2008, and successfully conducted China's first spacewalk. China will continue its manned space program, including both manned and unmanned docking, with the final goal of a permanently manned space station by 2020. ***Navigation and Timing:*** China is pursuing several avenues to reduce its dependence on any single foreign-owned satellite navigation system. Currently, the PRC uses the U.S. global positioning system (GPS), Russia's GLONASS, and its own BeiDou-1 system for navigation. The BeiDou-1 consists of three satellites and serves both civil and military purposes, but its orbital configuration covers only the East Asian region. The BeiDou-1 system will be replaced by a more capable, but still regionally constrained, BeiDou-2 system that is expected to become operational in 2011. The initial BeiDou-2 constellation will become part of a more advanced BeiDou-2/Compass system with global coverage, expected in the 2015-2020 timeframe. ***Communications:*** China uses communications satellites for both regional and international telecommunications in support of civil and military users, including satellite television, internet, and telephony. China also maintains a single data-relay satellite launched in mid-2008, the TianLian-1. Along with regional development of related technologies, China has recently entered the world market by exporting

satellites (COMSATs) for both regional and international telecommunications, to include satellite television, internet, and telephony. Along with regional development of related technologies, China has recently entered the world market by exporting COMSATs and infrastructure to Venezuela and Nigeria. In April 2008, China launched its first data-relay satellite, the TianLian-1. ***Small Satellites****:* Since 2000, China has launched a number of small satellites, including oceanographic research, imagery, and environmental research satellites. China has also established small satellite design and production facilities and is developing microsatellites – weighing less than 100 kilograms – for remote sensing, and networks of imagery and radar satellites. These developments could allow for a rapid reconstitution or expansion of China's satellite force in the event of any disruption in coverage, given an adequate supply of boosters. Beijing's effort to develop small, rapid-reaction space launch vehicles currently appears to be stalled. ***ASAT Weapons***: In January 2007, China successfully tested a direct-ascent ASAT missile against a PRC weather satellite, demonstrating its ability to attack satellites in low-Earth orbit. The direct-ascent ASAT system is one component of a multi-dimensional program to limit or prevent the use of space-based assets by potential adversaries during times of crisis or conflict. China's nuclear arsenal has long provided Beijing with an inherent ASAT capability. Ultra High Frequency (UHF)-band satellite communications jammers acquired from Ukraine in the late 1990s along with probable indigenous systems give China the capacity to jam common satellite communications bands and GPS receivers. In addition to the direct-ascent ASAT program (see above), China is developing other technologies and concepts for kinetic and directed-energy (e.g., lasers, high-powered microwave, and particle beam)	satellites and infrastructure to Venezuela and Nigeria. Although the satellite built and launched for Nigeria failed, China continues to market its services worldwide, to customers such as Pakistan, Bolivia, Laos, and Vietnam. ***ASAT Weapons:*** In January 2007, China successfully tested a direct-ascent ASAT weapon against a PRC weather satellite, demonstrating its ability to attack satellites in low-Earth orbit. China continues to develop and refine this system, which is one component of a multi-dimensional program to limit or prevent the use of space-based assets by potential adversaries during times of crisis or conflict. China's nuclear arsenal has long provided Beijing with an inherent ASAT capability, although a nuclear explosion in space would also damage China's rapidly multiplying space assets, along with those of whomever it was trying to target. Foreign and indigenous systems give China the capability to jam common satellite communications bands and GPS receivers. In addition to the direct-ascent ASAT program, China is developing other technologies and concepts for kinetic and directed-energy (e.g., lasers, high-powered microwave, and particle beam) weapons for ASAT missions. Citing the requirements of its manned and lunar space programs, China is improving its ability to track and identify satellites—a prerequisite for effective, precise counterspace operations.

weapons for ASAT missions. Citing the requirements of its manned and lunar space programs, China is improving its ability to track and identify satellites – a prerequisite for effective, precise counterspace operations.	
Development of China's Asymmetric Capabilities ***Space and Counterspace Capabilities.*** China is rapidly improving its space-based intelligence, surveillance, reconnaissance, navigation, and communications capabilities, allowing for greater military support from space. In parallel, China is developing a multi-dimensional program to improve its capabilities to limit or prevent the use of space-based assets by potential adversaries during times of crisis or conflict. Although China's commercial space program has utility for non-military research, it demonstrates space launch and control capabilities that have direct military application. • China conducted 11 space launches in 2008, putting 15 satellites in orbit. Included in this number are four new remote sensing satellites: Yaogan-4, Yaogan-5, Huanjing-1A, and Huanjing-1B; the Shenzhou-VII manned spacecraft along with its accompanying small satellite, Banxing-1; three communications satellites; and, two meteorological satellites. • In April 2008, China successfully launched its first data relay satellite, TianLian-1. According to PRC news broadcasts, TianLian-1 was initially tasked to support the launch of Shenzhou-VII manned space mission, increasing surveillance and control coverage of the manned spacecraft's path from 12 percent to roughly 60 percent. • China began development and testing of the Long March V rocket, the world's largest. Intended to lift heavy payloads into space, it will more than	**Development of China's Asymmetric Capabilities** ***Space and Counterspace Capabilities.*** China is expanding its space-based intelligence, surveillance, reconnaissance, navigation, and communications satellite constellations. In parallel, China is developing a multidimensional program to improve its capabilities to limit or prevent the use of space-based assets by potential adversaries during times of crisis or conflict. China's commercial space program has utility for non-military research, but it also demonstrates space launch and control capabilities that have direct military application. • Beijing launched a navigation satellite on April 15, 2009, and plans to have a full network to provide global positioning for military and civilian users by 2015-2020. • China launched Yaogan-6 on February 22, 2009, the 6th in a series of new reconnaissance satellites orbited since 2006. • Russia launched a commercial communications satellite (COMSAT), Asiasat-5, for China on September 11, 2009. Beijing launched a commercial COMSAT, Palapa-D, for Indonesia on August 31, 2009. • China continues development and testing of the Long March V rocket. Intended to lift heavy payloads into space, it will more than double the size of the Low Earth Orbit and Geosynchronous Orbit payloads that China can currently place into orbit. To support these new rockets, China began construction of a launch facility near Wenchang on Hainan Island in 2008.

double the sizes of Low Earth Orbit (LEO) and Geosynchronous Orbit (GEO) payloads that China can place into orbit. To support these new rockets, a launch facility near Wenchang on Hainan Island began construction in 2008. • The Chang'e-1 lunar probe, launched in late 2007, continued to operate successfully with a controlled orbit. Chang'e-2 will launch in 2009 to conduct a lunar surface survey. China plans to land a lunar rover on the moon in 2012. • China's leaders remain silent about the military applications of China's space programs and counterspace activities.	