SELECTED EXCERPTS ON CHINESE SPACE AND COUNTERSPACE ACTIVITIES FROM:

ANNUAL REPORT ON THE MILITARY POWER OF THE PEOPLE'S REPUBLIC OF CHINA

ANNUAL REPORT ON THE MILITARY POWER OF THE PEOPLE'S REPUBLIC OF CHINA—2000

2. Space Development

China has the capability to launch military photoreconnaissance satellites; however, the technology employed is outdated by Western standards. Beijing does not possess a real-time photoreconnaissance capability, but eventually may deploy advanced imagery reconnaissance and earth resource systems with military applications. The China-Brazil Earth Resources Satellite (CBERS) was launched in October 1999 and the experience gleaned from operating this satellite will support Beijing's efforts to develop improved military reconnaissance satellites. CBERS also will provide some militarily useful data. China also may attempt to deploy a near-real-time electro-optical imaging satellite within the next decade, as well as a high-resolution film-based photoreconnaissance satellite. In the interim, Beijing can be expected to exploit commercial SPOT and LANDSAT imagery. Use of other commercial higher resolution satellite imagery also can be anticipated, as it becomes available.

China already has launched three low-orbit meteorological satellites and a geosynchronous weather satellite. Although Beijing has received some degree of foreign technological assistance in the areas of reconnaissance, surveillance and targeting capabilities, many of its system development efforts appear to have a substantial indigenous component. In the future, however, Beijing could be expected to acquire and incorporate greater amounts of foreign technology and hardware to expedite program development.

China is interested in 400-500 kilogram (kg) satellites and plans an oceanographic research satellite Haiyang 1 (Ocean-1) in this class that is scheduled for launch in 2001. Other missions for satellites of this class that Beijing eventually may field include earth observation, communications, and navigation. China also is developing minisatellites (weighing less than 100 kgs) for missions, which include remote sensing and networks of electro-optical and radar satellites. A joint venture between China's Tsinghua University and Great Britain's University of Surrey is building the "Tsinghua" system, a constellation of 7 minisatellites with 50-meter (m) resolution remote sensing payloads. The first satellite is scheduled for launch in 2000. Later satellites in the series probably will have improved resolution. In addition, Beijing participates in the Asia-Pacific Small Multi-Mission Satellite Project as part of the Asia-Pacific Multilateral Cooperation in

Space Technology and Applications Program, which reportedly includes Iran, Pakistan, Thailand, Mongolia, South Korea, and Bangladesh.

Although China is improving its overall space launch program, there is no evidence that it currently is developing the capability to conduct "launch-on-demand space launch operations," i.e., the capability to use satellites and space launch vehicles in storage to launch within 24 hours of a decision to do so.

Exploitation of space--to include manned space operations--remains a high priority. Although nearly all major aspects of China's manned space program began within the last five years or so, Beijing is still aiming for a possible first manned launch by 2001. While one of the strongest motivations for this program appears to be political prestige, China's manned space efforts could contribute to improved military space systems in the 2010-2020 time frame. In addition to scientific and technical experiments, Chinese astronauts, for instance, could investigate the utility of manned reconnaissance from space.

China is said to be acquiring a variety of foreign technologies, which could be used to develop an anti-satellite (ASAT) capability. Beijing already may have acquired technical assistance which could be applied to the development of laser radars used to track and image satellites and may be seeking an advanced radar system with the capability to track satellites in low earth orbit. It also may be developing jammers, which could be used against Global Positioning System (GPS) receivers. In addition, China already may possess the capability to damage, under specific conditions, optical sensors on satellites that are very vulnerable to damage by lasers. Beijing also may have acquired high-energy laser equipment and technical assistance, which probably could be used in the development of ground-based ASAT weapons. Given China's current level of interest in laser technology, Beijing probably could develop a weapon that could destroy satellites in the future. Although specific Chinese programs for laser ASAT have not been identified, press articles indicate an interest in developing this capability and Beijing may be working on appropriate technologies.

China has extensive space-related cooperation programs with many countries. Although most of these projects are described as scientific or civilian in nature, militarily significant technology transfer nonetheless likely occurs in many of them.

According to press reporting, Moscow and Beijing currently have 11 joint space projects underway. These include cooperative manned space activities. The Chinese also have shown strong interest in Western--Canadian and German--radar satellite capabilities, to include a possible purchase of synthetic aperture radar (SAR) satellite systems. China recently signed a contract to launch an Italian-built communications satellite with 28 ku-band transponders in 2001; two earlier contracts appear to involve research into "observation and data detection satellites" that will be built jointly by both countries.

China’s Xian Satellite Control Site and the French national space agency announced a program of cooperation for satellite command and control in February 1999. A December 1998 press report stated that China has signed intergovernmental agreements and

memoranda on aerospace cooperation with the United States, Canada, Germany, Italy, France, Britain, Russia, Pakistan, India, and Brazil. In addition, Beijing has promoted technical and economic cooperation and exchanges of different types, including jointly developing satellites, with corporations, enterprises, and research institutes in more than 70 countries and areas.

Since 1998, China and the United States have signed three intergovernmental agreements on launching services. Several US satellite-manufacturing companies have signed agreements on commercial satellite launching services, involving a total of some 30 satellites. The satellite "Sinosat"--jointly developed by China, France, and Germany--was launched successfully in 1999. Moreover, in the form of a joint venture, China and Germany have made improvements to the Dongfanghong 3 communications satellite and have worked on a new generation of similar satellites.

According to December 1998 South Korean press reports, South Korea and China are expected to share data and information collected by their respective remote sensing satellites. November 1998 Chinese media reported a jointly funded contract with Holland for a cooperative project to develop and use a new satellite to monitor desertification and crop yields in China. Chinese scientists likewise have been reported studying minisatellite technologies in Great Britain. Chinese and British entities apparently have established a joint venture to build and launch China's first privately built satellite.

China’s aerospace industry also is seeking to integrate GPS and Russian Global Navigation Satellite System (GLONASS) guidance technology into fighters and helicopters. The China Aerospace Corporation displayed a GPS receiver at an exhibition in Beijing in September 1996 and provided brochures advertising both a 12-channel GPS receiver and a 12-channel GPS/GLONASS receiver. One brochure showed a space launch vehicle, suggesting GPS use in missile applications. Information obtained at a more recent air show indicates that all of China's new fighters will incorporate GPS navigation systems. China's military-backed industries also have entered into joint ventures with foreign firms to produce GPS receivers, which may find their way to military weapons. To complement GPS/GLONASS navigation aids, China has been attempting to acquire commercial satellite imagery from various foreign countries. This widely available satellite imagery could be used in conjunction with GPS/GLONASS to develop digital terrain maps for targeting, missile guidance, and planning.

H. Counterspace Development

Publicly, China opposes the militarization of space, and seeks to prevent or slow the development of anti-satellite (ASAT) systems and space-based missile defenses. Privately, however, China's leaders probably view ASATs – and offensive counterspace systems, in general – as well as space-based missile defenses as inevitabilities. In addition to passive counterspace measures – such as denial and deception – China is said to be acquiring a variety of foreign technologies, which could be used to develop an active ASAT capability.

China probably has a thorough knowledge of U.S. and foreign space operations, based, in part, on access to open-source information on U.S. space systems and space operations. Beijing already may have acquired technical assistance that could be applied to the development of laser radars used to track and image satellites and may be seeking an advanced radar system with the capability to track satellites in low earth orbit. It also may be developing jammers that could be used against Global Positioning System (GPS) receivers. In addition, China already may possess the capability to damage, under specific conditions, optical sensors on satellites that are very vulnerable to damage by lasers. Beijing also may have acquired high-energy laser equipment and technical assistance, which probably could be used in the development of ground-based ASAT weapons. Given China's current level of interest in laser technology, Beijing probably could develop a weapon that could destroy satellites in the future. Although specific Chinese programs for laser ASAT have not been identified, press articles indicate an interest in developing this capability and Beijing may be working on appropriate technologies. For example, a Hong Kong newspaper article in January 2001 reported that China had developed and tested an ASAT system described as a "parasitic microsatellite." This claim is being evaluated. Nonetheless, a number of countries, including China, are developing and proliferating microsatellite (10- to 100-kg mass) and nanosatellite (1- to 10-kg mass) technologies.

J. "New Concept" Weapon Systems

China is pursuing research and development programs to introduce so-called "new concept" weapon systems into the PLA inventory. Key weapon systems in this category include laser and radio frequency weapons.

Laser Weapons

China is pursuing a robust research and development program for laser weapons. The Chinese have openly stated that their scientists have "laid a firm technical foundation" in laser technology and are capable of developing laser weapons. China reportedly is focusing its laser weapon development on anti-personnel, counter-precision guided munitions air defense, and ASAT roles.

China's research into laser weapon technologies already has resulted in the development

and fielding of several systems. In 1995, China North Industries Corporation (NORINCO), a military trading company, introduced the ZM-87 laser weapon at defense exhibitions in Manila and Abu Dhabi. Since that time, Chinese writings indicate a continuing effort to develop additional laser systems. A second system was unveiled at the 50th Anniversary Military parade in 1999, when the Chinese displayed a probable laser-based ATGM countermeasure on its Type 90-II tanks. Additional Chinese ground combat systems include laser pointers, laser range finders, and laser target designators. These devices are routinely marketed at defense exhibitions. In the future, China can be expected to continue to develop and field military weapon and non-weapon laser systems. Using a combination of indigenous capabilities and foreign assistance, China could emerge as a leading producer and exporter of military lasers by 2020.

Radiofrequency Weapons
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Finally, China may consider RF weapons with an ASAT capability. An ASAT mission is undoubtedly one of the most stressing RF weapon applications. For a ground-based system beaming RF energy into space, HPM sources operating at very high power levels as well as large transmitting antennas having high gain would be required. For an RF weapon delivered via a direct-ascent missile or deployed as an orbital system, there are severe constraints on system size and mass and the question of competitiveness with other ASAT systems that also must approach the target. Even if the Chinese commit resources to a major ASAT RF development program, they likely will be unable to deploy such a weapon for at least fifteen years.

Counterspace Developments

China is expected to continue to enhance its satellite tracking and identification network. Beijing's only current means of destroying or disabling a satellite, however, would be to launch a ballistic missile or space launch vehicle armed with a nuclear weapon. Such weapons, however, risk collateral damage to "friendly" space systems. According to press accounts, China can use probable low-energy lasers to "blind" the sensors on low-Earth-orbiting satellites, although whether this claim extends to actual facilities is unclear.

A Hong Kong newspaper article in January 2001 reported that China had developed and ground-tested and would soon begin space-testing an antisatellite (ASAT) system described as a "parasitic microsatellite." This claim is being evaluated. Nonetheless, a number of countries, including China, are developing and proliferating microsatellite (10- to 100-kilogram mass) and nanosatellite (1- to 10-kilogram mass) technologies. Moreover, China clearly is working on, and plans to field, ASATs. Additional press reports and activities at several laser institutes suggest Beijing most likely will continue to pursue development of ground-based laser ASAT weapons and radars. China's current level of interest in laser technology suggests that it is reasonable to assume Beijing eventually could develop a weapon to destroy satellites.

Space and Counterspace

Beijing has focused on building the infrastructure to develop advanced space-based C4ISR and targeting capabilities. Building a modern ISR architecture is likely one of the primary drivers behind Beijing's space endeavors and a critical component of its overall C4ISR modernization efforts. Beijing's ongoing space-based programs with potential military applications include:

• China launched its first manned spacecraft into Earth orbit on October 15, 2003. Chinese press reports indicate that it will send up a two-person crew on a five-day mission in September 2005.

• China has two remote-sensing satellite programs known as Ziyuan-1 (ZY-1), also known as the China-Brazil Earth Resources Satellite, and ZY-2. China launched the ZY-1B in October 2003. A third ZY-2 satellite was launched in October 2004. ZY-2 payloads probably are digital imagery reconnaissance satellites and have worldwide coverage. Beijing also tested new film-based imagery satellites and small digital imagery satellites in 2003 and 2004.

• China is interested in electronic intelligence (ELINT) or signals intelligence (SIGINT) reconnaissance satellites. Although these digital data systems probably will be able to transmit directly to ground sites, China may be developing a system of data relay satellites to support global coverage. Furthermore, Beijing has acquired mobile data reception equipment that could support more rapid data transmission to deployed military forces and units.

• China is studying and seeking foreign assistance on small satellites. It has launched a number of them, including an oceanographic research satellite, Haiyang (HY)-1, in 2002 with at least two more satellites in this series, HY-2 and -3, expected. Beijing launched four small satellites during 2004; two of these probably have imagery missions and the other two possibly are conducting space environmental research. Other missions for satellites of this class include Earth observation, communications, and navigation.

• China is developing microsatellites – weighing less than 100 kilograms – for remote sensing and networks of electro-optical and radar satellites. In April 2004 Beijing launched a microsatellite with a probable imagery mission.

• A joint venture between China's Tsinghua University and the UK's University of Surrey is building a constellation of seven minisatellites – a class of satellites weighing between 101 and 500 kilograms – with 50-meter-resolution remote-sensing payloads. Later satellites in the series probably will have improved resolution.

In 2004, China placed 10 satellites into orbit, the most of any year, and has a similar schedule through 2006. It hopes to have more than 100 satellites in orbit by 2010, and

launch an additional 100 satellites by 2020. In the next decade, Beijing most likely will field radar, ocean surveillance, and improved film-based photo-reconnaissance satellites. China will eventually deploy advanced imagery, reconnaissance, and Earth resource systems with military applications. In the interim, China probably will supplement existing coverage with commercial SPOT, LANDSAT, RADARSAT, Ikonos, and Russian satellite imagery systems.

Anti-Satellite Weapons (ASATs). China is working on, and plans to field, ASAT systems. Beijing has and will continue to enhance its satellite tracking and identification network – the first step in establishing a credible ASAT capability. China can currently destroy or disable satellites only by launching a ballistic missile or space-launch vehicle armed with a nuclear weapon. However, there are many risks associated with this method, and consequences from use of nuclear weapons. China is also conducting research to develop ground-based laser ASAT weapons. Based on the level of Chinese interest in this field, the Defense Intelligence Agency believes Beijing eventually could develop a laser weapon capable of damaging or destroying satellites. At lower power thresholds, Chinese researchers may believe that low-energy lasers can "blind" sensors on low-Earth-orbiting satellites; whether Beijing has tested such a capability is unclear.

Trends in Space Modernization

China seeks to become a world leader in space development and maintain a leading role in space launch activity. Beijing's goal is to place a satellite into orbit "within hours upon request." The Long March series of rockets can support that requirement as long as adequate satellites remain in reserve. With ever-bettersatellites, China is becoming a peer in quality to the world's leading producers. In manned space, after the two-person mission scheduled for this fall, China hopes to conduct space walks and docking missions with a space lab by 2010, followed by a full space station by 2020.

Anti-Satellite (ASAT) Weapons.
Beijing continues to pursue an offensive anti-satellite system. China can currently destroy or disable satellites only by launching a ballistic missile or space-launch vehicle armed with a nuclear weapon. However, there are many risks associated with this method, and potentially adverse consequences from the use of nuclear weapons. Evidence exists that China is improving its situational awareness in space, which will give it the ability to track and identify most satellites. Such capability will allow for the deconfliction of Chinese satellites, and would also be required for offensive actions. At least one of the satellite attack systems appears to be a ground-based laser designed to damage or blind imaging satellites.

Radio Frequency and Laser Weapon Development
Chinese technicians are working to develop several types of "new concept" weapon systems, two of which are radio frequency and laser-based systems. Long-range beam weapons would use narrow radio frequency (RF) beams to engage targets such as aircraft or precision guided munitions (PGMs). Short-range systems would be packaged into missiles or artillery shells and launched into the vicinity of targets such as radars or command posts before releasing an RF pulse. In recent years, the application of RF weapons has expanded to include deployment on small vehicles or in suitcases for targeting critical military or civilian infrastructures where close access is possible.

PRC officials have publicly indicated their intent to acquire RF weapons as a means of defeating technologically advanced military forces. Chinese writings have suggested that RF weapons could be used against C4ISR, guided missiles, computer networks, electronically-fused mines, aircraft carrier battle groups, and satellites in orbit.

Analysis of Chinese technical literature indicates a major effort is underway to develop the technologies required for RF weapons, including high-power radiofrequency sources, prime-power generators, and antennas to radiate RF pulses. Chinese scientists are also investigating the effects of RF pulses on electronics and the propagation of these pulses through building walls and through the atmosphere. Furthermore, China appears to be assessing its own vulnerability to RF weapons and exploring ways to "harden" electronics.

China is also involved in advanced, state-of-the-art research and development in laser technologies, including both low- and high-energy lasers. While much of China's efforts are commercial in nature, the PLA and the government directly support some of this research, suggesting that discoveries or findings could be used to develop future laser weapons. Moreover, China has fielded in its own forces and marketed for sale abroad low energy laser weapons. Non-weapon military lasers are already widespread in the PLA.

Space and Counterspace.
China's space activities and capabilities, including anti-satellite programs, have significant implications for anti-access/area denial in Taiwan Strait contingencies and beyond.

China further views the development of space and counter-space capabilities as bolstering national prestige and, like nuclear weapons, demonstrating the attributes of a world power.

China has accorded space a high priority for investment. Premier Wen Jiabao, marking the 50th anniversary of China's aerospace industry in October 2006, stated that "China's aerospace industry is standing at a new starting point and facing a new situation and tasks." It is now necessary, he said, "to implement the principle of independent innovations, leaps in key areas. …carry out major state science and technology special projects in manned space flights and a lunar probe, and achieve new breakthroughs in research and development [of] aerospace equipment and . . . space technology."

Reconnaissance. China is deploying advanced imagery, reconnaissance, and Earth resource systems with military applications. Examples include the CBERS-1 and -2 satellites and the Huanjing disaster/environmental monitoring satellite constellation. China is planning eleven satellites in the Huanjing program capable of visible, infrared, multi-spectral, and synthetic aperture radar imaging.

In the next decade, Beijing most likely will field radar, ocean surveillance, and high-resolution photoreconnaissance satellites. In the interim, China probably will rely on commercial satellite imagery (e.g., SPOT, LANDSAT, RADARSAT, and Ikonos) to supplement existing coverage.

Navigation and Timing. China has launched four BeiDou satellites with an accuracy of 20 meters over China and surrounding areas. China also uses GPS and GLONASS navigation satellite systems, and has invested in the EU's Galileo navigation system.
Manned Program. In October 2005, China completed its second manned space mission and Chinese astronauts conducted their first experiments in space. Press reports indicate China will perform its first space walk in 2007-2008, and rendezvous and docking in 2009-2012. China's goal is to have a manned space station by 2020.
Communications. China uses foreign providers, like INTELSAT and INMARSAT, for communications, but is expanding indigenous capabilities in this area. China may be developing a system of data relay satellites to support global coverage, and has reportedly acquired mobile data reception equipment that could support more rapid data transmission to deployed military forces and units.

Small Satellites. Since 2000, China has launched a number of small satellites, including

an oceanographic research, imagery, and environmental research satellites. China has also established dedicated small satellite design and production facilities. China 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.

Anti-Satellite (ASAT) Weapons. In January 2007, China successfully tested a direct-ascent ASAT missile against a Chinese weather satellite, demonstrating its ability to attack satellites operating in low-Earth orbit. The direct ascent ASAT system is one component of a multi-dimensional program to generate the capability to deny others access to outer space.

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.

China's nuclear arsenal has long provided Beijing with an inherent ASAT capability. However, in recent years Beijing has pursued a robust, multidimensional counterspace program. UHF-band satellite communications jammers acquired from Ukraine in the late 1990s and probable indigenous systems give China today the capacity to jam common satellite communications bands and GPS receivers. In addition to the direct ascent ASAT program demonstrated in January 2007, China is also developing other technologies and concepts for kinetic (hit-to-kill) weapons and directed-energy (e.g., lasers and radio frequency) 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 physical attacks.

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. China further views the development of space and counter-space capabilities as bolstering national prestige and, like nuclear weapons, demonstrating the attributes of a world power.

Reconnaissance. China is deploying advanced imagery, reconnaissance, and Earth resource systems with military applications. Examples include the Ziyuan-2 series, the Yaogan-1 and -2, the Haiyang-1B, the CBERS-1 and -2 satellites, and the Huanjing disaster/environmental monitoring satellite constellation. China is planning eleven satellites in the Huanjing program capable of visible, infrared, multi-spectral, and synthetic aperture radar imaging. In the next decade, Beijing most likely will field radar, ocean surveillance, and high-resolution photoreconnaissance satellites. In the interim, China probably will rely on commercial satellite imagery to supplement existing coverage.

Navigation and Timing. China has launched five BeiDou satellites with an accuracy of 20 meters over China and surrounding areas. China also uses GPS and GLONASS navigation satellite systems, and has invested in the EU's Galileo navigation system. However, the role of non-European countries in Galileo currently is unsettled, as the Europeans are focusing on internal funding issues.

Manned Space and Lunar Programs. In October 2005, China completed its second manned space mission and Chinese astronauts conducted their first experiments in space. In October 2007, China launched its first lunar orbiter, the Chang'e 1. Press reports indicate China will perform its first space walk in 2008, and rendezvous and docking in 2009-2012. China's goal is to have a manned space station and conduct a lunar landing, both by 2020.

Communications. China increasingly uses satellites, including some obtained from foreign providers, like INTELSAT and INMARSAT, for communications, may be developing a system of data relay satellites to support global coverage, and has reportedly acquired mobile data reception equipment that could support rapid data transmission to deployed military forces.

Small Satellites. Since 2000, China has launched a number of small satellites, including oceanographic research, imagery, and environmental research satellites. China has also established dedicated 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 efforts to develop small, rapid reaction space launch vehicles currently appears to be stalled.

Anti-Satellite (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 its potential adversaries during times of crisis or conflict.

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.

China's nuclear arsenal has long provided Beijing with an inherent ASAT capability; the extent to which China's leaders have thought through the consequences of nuclear use in outer space or of nuclear EMP to degrade terrestrial communications equipment is unclear. UHF-band satellite communications jammers acquired from Ukraine in the late 1990s and probable indigenous systems give China today the capacity to jam common satellite communications bands and GPS receivers. In addition to the direct-ascent ASAT program demonstrated in January 2007, China is developing other technologies and concepts for kinetic and directed-energy (e.g., lasers and radio frequency) 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.

Information Warfare. There has been much writing on information warfare among China's military thinkers, who indicate a strong conceptual understanding of its methods and uses. For example, a November 2006 Liberation Army Daily commentator argued:

[The] mechanism to get the upper hand of the enemy in a war under conditions of informatization finds prominent expression in whether or not we are capable of using various means to obtain information and of ensuring the effective circulation of information; whether or not we are capable of making full use of the permeability, sharable property, and connection of information to realize the organic merging of materials, energy, and information to form a combined fighting strength; [and,] whether or not we are capable of applying effective means to weaken the enemy side's information superiority and lower the operational efficiency of enemy information equipment.

The PLA is investing in electronic countermeasures, defenses against electronic attack (e.g., electronic and infrared decoys, angle reflectors, and false target generators), and CNO. China's CNO concepts include CNA, computer network exploitation (CNE), and computer network defense (CND). The PLA sees CNO as critical to achieving "electromagnetic dominance" early in a conflict. Although there is no evidence of a formal PLA CNO doctrine, PLA theorists have coined the term "Integrated Network Electronic Warfare" (wangdian yitizhan - 网电一体 战) to prescribe the use of electronic warfare, CNO, and kinetic strikes to disrupt battlefield network information systems that support an adversary's warfighting and power projection capabilities.

The PLA has established information warfare units to develop viruses to attack enemy computer systems and networks, and tactics and measures to protect friendly computer systems and networks. In 2005, the PLA began to incorporate offensive CNO into its exercises, primarily in first strikes against enemy networks.